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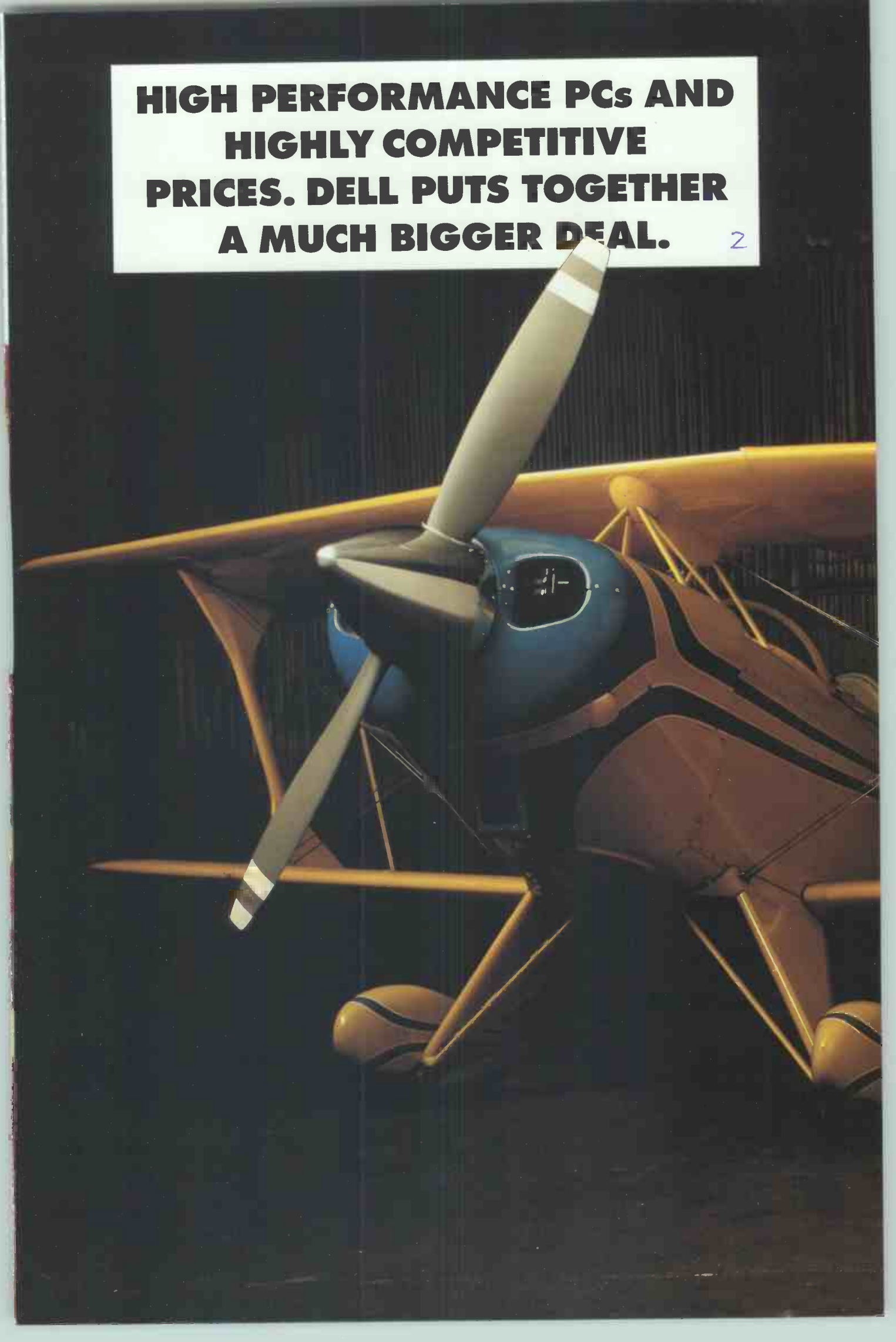
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Contents

PC Awards 1995

The best PCs, PC software and peripherals voted for by you, the readers

422

PCW Cover Photography by David *Whyte*
PCW Computer Graphics by Magic Lantern Group

Disk with every issue

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PCW Interactive CD-ROM 14
Hundreds of megabytes of hot stuff, including Peter Gabriel's Xplora, PaintShop Pro 3.0, full-screen demo of Hell, plus 30 royalty-free photos

CUTTING EDGE

571 Introduction

PCW Online
572 Net.answers
574 Net.surf
578 Net.news
582 Comms
588 Net.newbies

PCW Futures
591 Innovations
593 Horizons
597 Bluesky
601 Retro Computing

PCW Media
602 Books (with the *PCW* Bookshelf Selection, p605)
610 CD-ROMs

PCW Fun
614 Kids' Stuff
619 Competition: Win a multimedia kit, two sound sample CD-ROMs or a Microsoft Natural Keyboard
621 Screenplay
624 Leisure Lines

● *Playing to the gallery: Great Artists on CD-ROM*

Features

Performa Macs 402
by CHRIS CAIN
Apple's bid for a slice of the home market is based on three new Performa Macs, one of which bears an uncanny resemblance to Compaq's Presario.

Five go mad with £1,500 408
by THE *PCW* TEAM
Our annual look at how to buy a complete PC system — PC, printer and software — armed with a pen, a phone and a wad.

Reader Survey 420
Win a Western Systems Pentium 60 and help us make *PCW* even better into the bargain.

PCW Awards 422
by THE *PCW* TEAM
The best PC products of the last year, including, for the first time, the *PCW* Reader Awards.

Uninstall utilities 502
by PAUL BEGG
A close look at seven utilities for clearing out the detritus left by unruly Windows apps.

Programming in Access 2.0 518
by IAIN SUMMERS & ANGUS MacKELLAIG
The first of a three-part series on how to get the most out of Microsoft's popular Windows database.

Create a poster 550
by CHRIS JONES
If you think producing slick, professional-looking A1 posters costs an arm and a leg, think again.

Tutorial: Procomm Plus for Windows, part 2 554
by STEPHEN RODDA
Writing Procomm scripts to access CIX can automate the process and offer you superfast file transfer speeds.

Personal Computer World

First Impressions

366 **Compaq DeskPro 575 Model 420 4/4**
With outstanding network management and top-of-the-range components, this looks set to make a real impact.

368 **3D Interior Designer**
Redesign your entire home from the comfort of your PC.

369 **Quicken 4.0 for Windows**
The best program for balancing your personal accounts gets better.

370 **Word Pro**
With a new name, Lotus's word processor is back to challenge Microsoft Word.

372 **Micropolis AV Gold Series Capricorn 3243AV**
The ideal hard disk for jitter-free multimedia performance.

374 **Visual FoxPro 3.0**
New, easy-to-use version of FoxPro with 32-bit goodness.

376 **Psion Series 3a 2Mb**
Psion's latest organiser puts more RAM in your pocket.

376 **FreeStyle for Macintosh**
At last, a sequencer that thinks like a musician.

378 **Acorn RISC PC 486**
Windows on the Archimedes is no longer a RISCy business.

383 **Paint Shop Pro 3.0**
It's only a shareware paint package but it feels like Photoshop.

383 **VVL PC Card Camera**
A nice idea for niche applications.

386 **Circle Elements**
Simple sound-sample fun.

387 **CD-Speed**
Soup up your CD-ROMs.

394 **Setup Advisor**
Help for those who don't know their DMAs from their IRQs.

Long Term Tests

398 HP ScanJet IIc
399 PC Tools for Windows 2.0

Regulars

325 **Newsprint**
The **Infobahn** is set to become a reality; the PC world prepares for the **21st century**; **Adobe** and **NetScape** indulge in Acrobatics; **Delrina** homes in on memory lane; the **French** have their PCs, the **Brits** have more fun; Amstrad airs "**Text Radio**"; Gates on **Win95**.

346 **News Analysis**
Tim Bajarin on the industry vs. Microsoft; Jack Schofield on the future of Unix; Barry Fox on video data storage.

351 **Sounding Off** by Michael Hewitt

353 **Homefront** by Tim Nott

355 **Straight Talking** by Barry Fox

357 **Business Matters** by Nick Beard

361 **Letters**

696 **Buyer's Charter**

703 **ChipChat**

Hands On

627 **Introduction**
628 **Windows**
632 **DOS**
634 **32-Bit**
638 **Word Processing**
642 **Spreadsheets**
646 **Databases**
650 **Graphics & DTP**
656 **Multimedia**
660 **Sound**
662 **Visual Programming**
666 **Low Level**
674 **Numbers Count**
676 **Networks**
680 **Macintosh**
684 **Computer Answers**
686 **Beginners**

Group Tests

DX2-66MHz 486s 454
DX2-66 is fast becoming the entry level for multimedia PCs, with prices starting to dip below the £1,000 mark. Eleanor Turton-Hill put 22 of the machines through the VNU Eurolabs mill.

Maths software 530
Eric Adler set tests for seven leading mathematics packages, totted up the marks and awarded the Editor's Choice prize.

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Editorial

One day in early April the final Windows 95 beta arrived in the *PCW* office. It was enough to tempt a few people, including me, into installing it on their main office machines on the *PCW* network. Very quickly we ran into problems: problems with video drivers, problems with a complex MIDI setup, problems with a network card, with plug and play, with TCP/IP support...

Troubleshooting Windows 95 problems is not easy. I spent a frustrating hour talking to Windows 95 technical support, endlessly waiting for Win95 to reboot while the support guy experimented with different settings. At the end of an hour my system still refused to recognise the editorial network and would only boot into safe mode — safe but useless — where a bare minimum of drivers are installed. I spent three tortuous hours re-installing Windows 3.1, before writing, "from the state of the final beta, I seriously doubt that Microsoft will be able to deliver the flawless, plug and play operating system it has promised. I expect it to be plagued by the kind of niggling incompatibilities that have dogged OS/2 Warp, particularly for people attempting to install it over Windows 3.x".

Just hours later came the news that Bill Gates himself has now cast doubts over whether Windows 95 will hit its late August ship date. "August is likely, but it's not guaranteed and it's not the highest priority," he said. Gates added that Windows 95 still has a "substantial" bug list.

It's hard to know how to react to the latest Windows 95 setback. I figure it can't be deliberate, but delaying it again will do Microsoft very little harm as vendors will just carry on pre-installing DOS and Windows until it does. But the widely publicised August ship date can't have helped IBM's OS/2 sales. Lots of people must have deferred switching to OS/2 because Win95 was coming.

Ben Tisdall
Editor

Next Month

Colour scanners

Gordon Laing checks out 18 flatbed colour scanners, from as little as **£299**

Stats software round-up

Cutting Edge Special... Web Browsers - which one is right for you?

NEW!

Hands On Windows 95

Tim Nott tries out the final beta

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— On Sale Thursday 1st June
- colour printers
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August issue
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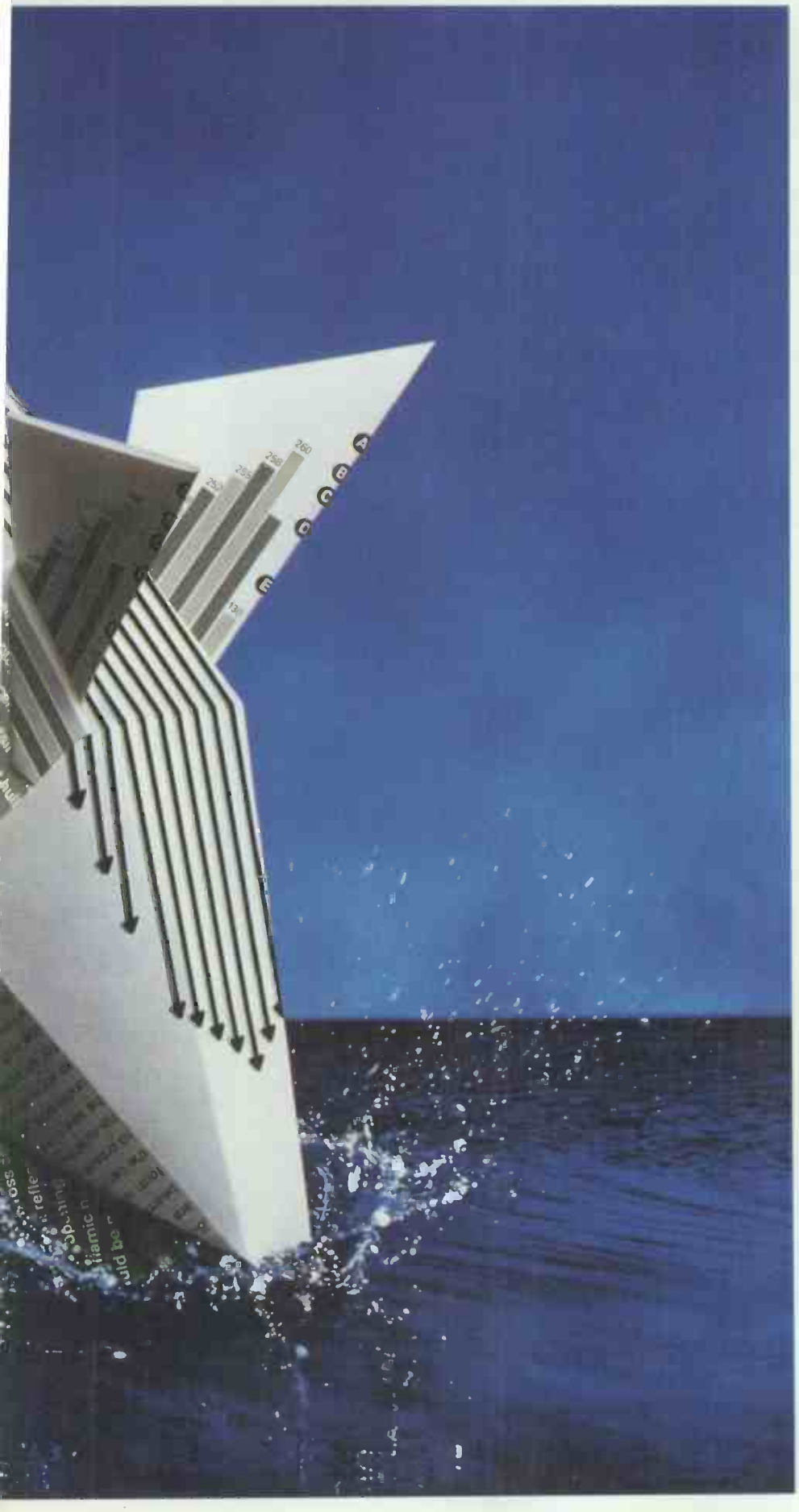

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PCW Cover Disk

Chris Nixon introduces this month's cover disk which exclusively brings you a superb, complete and fully working image editing program, Flamingo Lite. The program has many features you normally only find in expensive brand name products and yet is free, without any requirement to register — although a special offer upgrade to Flamingo Plus is available to *PCW* readers.

● *Giving the Tower of Babel a facelift with Flamingo Lite*

Installing and running the PCW Cover Disk

To install the programs, insert the disk in drive A: (or B: — whichever you normally use for installing software) and, from either DOS or Windows run the file FLAMINGO.EXE in the root directory of the floppy disk. Please note that this is a Windows installer which will set the program up on your hard disk and create the Program Manager icons needed to access it.

• Flamingo Lite

[Minimum requirements: Windows 3.1, 4Mb RAM]

Flamingo is one of the most powerful painting and photo-retouching packages we have recently seen, and yet it's extremely easy to use. The large 256-colour icons on every toolbar put most other Windows applications firmly in the shade in the presentation stakes.

Just some of the effects you can create in Flamingo Lite

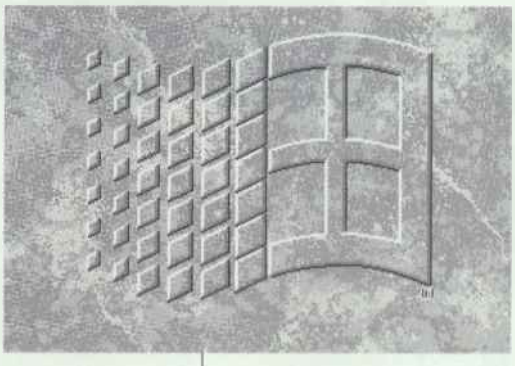
Flamingo is surprisingly fast for such a fully-featured system, yet it doesn't need much to run on. A 4Mb PC is quite sufficient to exploit its full potential, although one or two advanced features do require a little more RAM.

The Flamingo Title Bar shows the name of the program and the image's name and colour mode (such as Greyscale, Indexed and RGB) in fully-expanded presentation windows. For new images you haven't yet saved, the Title Bar shows the word "Untitled 1", "Untitled 2" and so on. If the window isn't full-sized you can move it by dragging the Title bar.

The Title bar contains one or more buttons for you to control the window.

The Menu bar contains the command menus. To activate a command click on the menu and drag to highlight your chosen command, then release the mouse button. Commands with three dots next to them open up a dialogue

box in which you can specify further details on how the command will operate. While the commands with an arrow to the right of the command name contain submenus. Some commands allow you to take a short cut by using Control and a letter to perform an operation.



A now-rather-familiar image, post manipulation using Flamingo Lite

The Tool bar allows quick activation of a number of commands using uttons. These are New, Open, Save, Print, Cut, Copy, and Paste. It also includes a zoom and progress indicator.

Here is a breakdown of the more basic commands in Flamingo Lite's:

NEW — Opens the New Image dialogue box, which allows you to create a new image in Flamingo. If you already have a open image NEW creates a new image with the same format (size and colour mode).

OPEN — Opens the Open dialogue box, which allows you to open an existing image.

SAVE — Saves changes, and updates the image. If the image has not previously been saved the Save As dialogue box will appear.

PRINT — Prints an image, with various options available. You can add information to the printed page such as image name an printing date, or print the image as a process colour separation and adjust screening, and so on. Flamingo even remembers and displays the four most recently opened image files, allowing you to access recently-used files quickly.

CUT — Removes a selection from the image and places a copy of it on the Clipboard, ready for you to paste back into Flamingo or many other programs.

COPY — Makes a copy of a selection and places it on the Clipboard. Unlike Cut, using Copy will leave the original selection in the image your are working on.

PASTE — Inserts a selection from the Clipboard. You may paste an object many time over if you wish as pasting doesn't remove the object from the Clipboard.

ZOOM — Informs you of the current zoom factor. When clicked, Zoom displays a list of predefined zoom factors to choose from, including a Fit command which will fit the image in a window.

HELP — Jumps directly to the Help contents page. The help supplied with Flamingo is comprehensive, clearly laid out and highly recommended reading.

PROGRESS — Displays the progress of time-consuming operations such as applying filters or loading and saving files.

In fact, Flamingo has so many features there isn't room to tell you everything it can do, so here's a brief summary of some of its most interesting functions:

COLOUR FILL (Effects menu) Fills a selection with a colour or a pattern.

BLUR (Blur submenu) — Blurs an image or a selection by reducing the contrast between the individual neighbouring pixels.

EMBOSS (Other submenu) — Creates an effect that makes an image or a selection look as if it were moulded in a solid material.

SHARPEN (Sharpen submenu) Brings an image or selection into focus. The filter sharpens a certain value in the image or selection by increasing the contrast between the individual pixels.

DIFFUSE (Stylize submenu) — Creates an effect in an image or a selection that makes it look less focused. The filter mixes the pixels.

TILES (Stylize submenu) — Parts the image into rectangles and offsets them.

MOSAIC (Stylize submenu) — Groups pixels together in square blocks, all pixels in a block receiving the same colour. This filter gives the impression that the image or selection has another (lower) resolution.

• Flamingo Plus

If you like Flamingo (and we're sure you will), you'll be interested to learn that Flamingo Plus is now available, incorporating the following features:

EFFECTS — Motion Blur, Gaussian Blur, 3D Distort, 3D Flipping, Perturbing, Shear, Add Noise, Remove Noise, Median, Custom Kernel, Min/Max, Sharpen Edges, Unsharp Mask, Shake, Rt Screens, Trace Contour, Find Edges, Lighting, Diffuse, Emboss, Tile

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OTHER FEATURES — TWAIN Scanner Support, Custom Colour Palette support, Advanced masking/selection functions including: Grow, Similar, Modify Border, Modify Edge, Pattern Fill.

You can order your copy of Flamingo Plus for £49.95 (plus VAT and P&P) from Springsoft, Springfield House, Llanfynydd, Wrexham, Clwyd, LL11 5HW. Tel 01352 770 049 Fax: 01352 770 816.

Important details

If you have problems with the Cover Disk such as receiving a "Cannot read from drive A:" error, send the disk with a stamped addressed envelope to TIB PLC (*PCW*), TIB House, 11 Edward Street, Bradford, BD4 7BH.

However, You should note that if a phone number is shown for the publisher of any cover disk program then it will probably be quicker for you to call them first as they will be able to provide direct assistance on their own programs more quickly than might otherwise be possible. Alternatively you can ring our hot-line on weekdays between 10.30 and 12.30 on 01274 736 990.

The *PCW* cover disk is virus checked at every stage of production, However, neither VNU nor *PCW* can be deemed liable for any problems arising from the use of the disk. Installing or running any of the programs on the disk indicates your agreement to this condition.

You are advised not to install any software on a networked PC before checking the disk. While *PCW* maintains a high standard of quality control, disks may be damaged in transportation. Check the disk shutter before putting disks in the drive.

If you have received the cover disk but would prefer the CD-ROM, please write to our subs department at: *PCW* Subs, VNU House, 32-34 Broadwick Street, London, W1A 2HG, enclosing a cheque or postal order for 75p to cover post and packing. Please allow up 14 days for the receipt of your CD-ROM.

PCW Interactive CD-ROM

Robin Nixon introduces this month's packed CD-ROM, which includes the best demos, animations, videos, music, and much more.

Installing and running PCW Interactive

[Minimum requirements: 4Mb free RAM (swapfile acceptable), 386SX/33 processor, Windows 3.1. (Users with less than this should at least be able to run the DOS programs on the CD-ROM using the batch file DOSMENU.BAT). Recommended for best performance: 8Mb installed RAM, 486DX/50 processor, Windows 3.11.]

To run PCW Interactive you no longer need to install any part of it to your PC other than Video for Windows (if you wish to view the movies). All you need to do is select your CD-ROM drive and run the file PCWI.EXE in the root directory for PCWI to run.

• Using the CD-ROM from DOS

If you don't have Windows, or experience any problems running some of the DOS software from Windows, you can run the batch file \DOSMENU.BAT from DOS, but don't try running it from a Windows DOS prompt. It will then display a menu from which you can select any of the DOS programs and run them, using either the cursor keys and Return, or a mouse.

• Using PCW Interactive

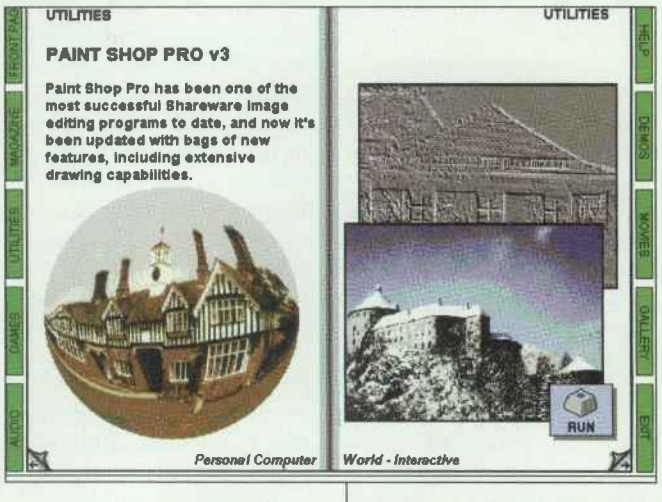
The magazine has been designed to look and feel like you're reading a printed publication. For example, at the bottom left and right of each page you'll find a Page Turn icon for turning backwards or forwards a page. In addition there is a set of 10 tabs which appear down the left- and righthand side of each page. Clicking on any of these will take you directly to the page in the magazine where the indicated magazine section begins.

• Video for Windows

(STOP PRESS: This disc includes the very latest version of Video for Windows (1.1e) which you should install in place of any previous version you may use.)

On page 1 you'll have the opportunity to install the latest version of Video for Windows, so that you can view the digital movies on the CD. If you haven't installed Video for Windows from a PCW Interactive CD before, then you *must* install this new version, as it contains the latest drivers which deliver higher quality, a larger size and a faster playback rate. If you don't install the new version, some videos will display the message "Cannot display this video", or similar.

We strongly recommend you install this every time you use a new issue of PCW Interactive as we always try to ensure the very latest programs and drivers are on the CD-ROM.



Just some of the exciting programs on this month's PCW CD-ROM

Throughout PCW Interactive you'll have the opportunity to run or install programs, get further details on a particular program, try out demonstrations of programs, play videos, listen to audio files and much more. When any of these options is available an icon will be displayed indicating the fact. All you need to do is click once on it to activate the choice.

• MSCDEX

Microsoft's CD-ROM extensions (called MSCDEX.EXE) provide the interface between your PC and your CD-ROM drive. There are two versions in common use, 2.22 and 2.23. If you are using 2.22 you'll find that data is pulled off your CD-ROMs much more slowly than with version 2.23. Also, slightly faulty discs

can be read using version 2.23, which 2.22 (with less sophisticated error correction) usually can't read.

To enable you to upgrade to the latest version, from the MSCDEX directory of the CD-ROM, run the file CDUPDATE.EXE. This will automatically install the new program on your hard disk in the directory MSXDEX2.23. Your AUTOEXEC.BAT file will also be modified. However, the old MSCDEX driver will remain on your hard disk should you wish to return to it, while a backup copy of your AUTOEXEC.BAT file will be saved as AUTOEXEC.SAV.

We strongly recommend you upgrade to the new driver as it will enable you to run most CD-ROM programs you may have had trouble with and you'll find that if digital videos play jerkily, they should become much smoother, while loading data and running programs will be much quicker.

• Testing your CD-ROM

If you suspect your CD-ROM may actually be faulty (ie, damaged) you can run the file CDTEST.EXE in the root directory of the CD-ROM. The program will then examine every byte of data on the disc to see if it can be correctly read. The process lasts up to 35 minutes and generates a verification code if the disc passes the test. If the CD-ROM fails this test please contact the support hotline as you may need to send for a replacement.

• Getting help

Detailed help on most of the programs is available when you run them. For further details on using the magazine itself click on the Help side tab at the top right of any page.

• Troubleshooting

• The videos are jerky

If you have a single-speed CD-ROM drive consider upgrading to a double-speed or faster drive. You could also try selecting Control Panel | Drivers | Video for Windows. Then uncheck the "Skip frames if behind" entry. We would also suggest that seeing as the very latest version of Video for Windows is on this month's disc (version 1.1d, released less than 10 days before the CD-ROM was pressed), you should install it over your old copy in order to gain higher quality playback with less jerkiness.

• DOS programs will not run

You must have at least 575kb free RAM in a Windows DOS box in order to run all the software on this CD. If you have less, much will work but some won't, so you may prefer to quit from Windows and (if you have DOS 6.0), use MEMMAKER.EXE to increase the free base RAM. If you don't have DOS 6.0, try removing all TSRs and unused drivers from your AUTOEXEC.BAT and CONFIG.SYS files by placing a REM command in front of them. Alternatively, you could boot up from a backup of your DOS System disk, which will give you just about the maximum amount of free base RAM possible without using a memory manager. Note that there is now a DOS menu to access DOS programs on each CD-ROM. It's called DOSMENU.BAT and you'll find it in the root directory.

• The computer crashes or hangs

• Sound effects and music stop playing

Neither of these should happen. However, with the huge amount of software supplied on this CD and the inherent instability of Windows, after using several of the programs in a single session, any unexpected problems can generally be corrected by simply exiting from and restarting Windows.

• PCW Interactive runs slowly

We are now using Macromedia Director as the multimedia engine for PCWI as it offers a speed increase of several hundred percent over the previous system. However, to achieve this speed it requires 4Mb free RAM. So, if you have 4Mb or less RAM you may experience delays when turning pages as up to half of this RAM may already be in use by Windows and DOS. The solution is to add additional RAM to your PC (which will also make all your other CD-ROMs run much faster), or at least, to ensure you have a permanent swapfile of an additional 4Mb RAM. Also, make sure you read the section about MSCDEX in this article.

CD-ROM advice & contacts

The PCW CD-ROM is virus checked at every stage of production. However, neither VNU nor *PCW* can be deemed liable for any problems arising from its use. You are advised not to install software on a networked PC before checking the disc.

For technical support on the CD and the programs on it call Advice by Telephone on 01708 641 454, or email them at PCWCE@MFL.ORG.

To give feedback on the CD-ROMs or cover disks you can email the PCWI team at either: rnixon@cix.compulink.co.uk or CompuServe: 70007,5547 (Please note that these are not the correct email addresses for technical support or subscription enquiries.)

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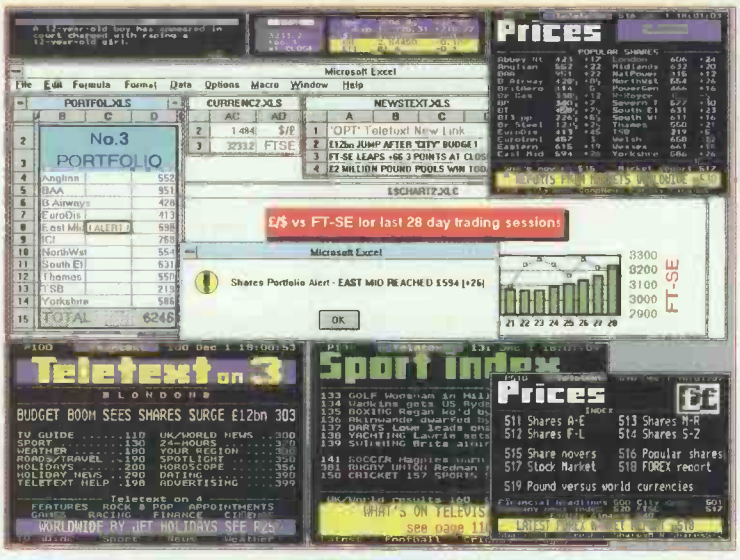

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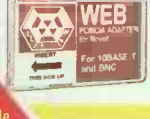

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NETLAND (UK) LTD. Unit 5F Lynx Business Pk. Newmarket. Cambs. CB8 7NY

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Mitac 486 DXII/66 Price Breaker

£749

This new PC from Mitac offers the very latest features at a price our competitors charge for entry level machines. Whatever your PC requirements, the Mitac offers more than enough power, thanks to its 486 DXII CPU running at a blinding 66MHz. Its built in co-processor makes light of any maths work and an internal 8K cache gives fast data handling within the CPU.

Because the fastest chip is only as good as it's surrounding hardware we've not only included an additional external static RAM cache of 256K, (one of the fastest memorys available today), but also a 32 bit VESA local bus display card with 1MB of dedicated video memory. Add to this an MPRII low radiation 14" digital colour monitor with on screen display and a maximum resolution of 1024 x 768 in non-interlaced mode and you've probably never seen Windows as fast or as clear as this before.

PC PLUS RECOMMENDED

PC MAGAZINE UK EDITORS' CHOICE

- 486 DXII/66 MHz processor
- 256K External cache
- 4MB RAM expandable to 64MB
- 540 MB HDD
- 3.5" 1.44MB floppy disk drive
- 32 Bit VESA Local Bus card, 1MB RAM expandable to 2MB
- 14" SVGA Colour monitor with digital on screen adjustment, 28 dot pitch, MPRII low radiation
- Expandable desk top case with 4 drive bays and extra 16 bit expansion slot
- MS DOS® 6.22, MS Windows™ 3.11 & PFS Window Works
- 12 months Return To Base Warranty
- 4MB RAM upgrade £120
- Mini Tower version +£49

MULTI MEDIA KIT

• Twin Speed CD Rom Drive • Sound Fx™ Card Sound blaster compatible 16 bit • Audio Software • Speakers • 5 CD ROM Titles

The New Grolier Multimedia Encyclopedia – 33,000 articles, 3,000 photos and illustrations, 100's of detailed maps, sound tracks and animations.

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- PFS Windows Works
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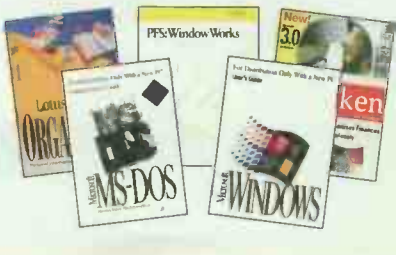

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1995 is the year of the Internet and dan technology is ready to help you jump in as easily and painlessly as possible.

Dan can help you keep your cool on the Internet.

All of **dan's** award winning systems can be easily upgraded to work perfectly on the Internet. All you need is the simple addition of a **dan** internal modem which can be fitted to any **dan system**. We will pre-configure the modem to work with your computer. All you have to do is dial the communications company of your choice, pay your subscription, and you'll be ready to dive into the Internet!

If you want to get into the Internet without going in over your head, the obvious choice is **dan**.

Add £99

14.4BPs FAX-Modem for the

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This is your gateway to the outside world. You can now send and receive faxes from your PC as well as talk to millions of other computer users through services like CIX, Compuserve, City Scape, Demon etc (available on subscription). You can 'surf' the INTERNET, find out information on almost any subject and even do some of your shopping.

dan Ultimate PC

The **dan Ultimate PC** is the system you've been waiting for. It includes everything you ever dreamed of - nothing has been omitted. This computer has the fastest possible CPU, a giant hard drive, large monitor and high performance sound card. In addition, you get a quad-speed CD ROM, **dan** fax/modem and even a super powerful DAT tape streamer. If you're looking for the best, this one is unbeatable.

Intel 486 PROCESSOR

dan 95 PCi/S

Special Offer 486 Power System

- 486 DX2-DX4 Intel Processor
- 16MB RAM - 525MB HDD
- 2MB VRAM Stealth 64 Video Card
- 15" FST - Low Radiation N/I Monitor

- 256KB Cache Memory
- Free Slots: 1 PCi, 1 PCi or ISA & 3 ISA
- Fast PCi EIDE Hard Disk Controller
- 1.44MB Floppy disk Drive
- Desktop or Mini Tower Case w/200W PSU
- 1 Parallel & 2 Fast Serial Ports
- 102 Key UK Keyboard
- New Microsoft Mouse
- Windows for Workgroups 3.11
- MS DOS 6.22
- Lotus Organizer for Windows

486DX2-66	£1348
486DX4-100	£1426

1GB EIDE HDD Upgrade Add £115

pentium PROCESSOR

dantium 95 PCi/S

Special Offer Pentium® Processor System

- 75-100MHz Pentium® Processor
- 16MB RAM - 525MB HDD
- 2MB VRAM Stealth 64 Video Card
- 15" FST - Low Radiation N/I Monitor

- 256KB Cache Memory
- Free Slots: 1 PCi, 1 PCi or ISA & 3 ISA
- Fast PCi EIDE Hard Disk Controller
- 1.44MB Floppy disk Drive
- Desktop Case w/200W PSU
- 1 Parallel & 2 Fast Serial Ports
- 102 Key UK Keyboard
- New Microsoft Mouse
- Windows for Workgroups 3.11
- MS DOS 6.22
- Lotus Organizer for Windows

75MHz	£1551
90MHz	£1632
100MHz	£1714

1GB EIDE HDD Upgrade Add £115

Other Configurations

Based on the above specification with 14" Monitor and your choice of hard disk & CPU.

14"	Intel486 Processor DX2/50	DX2/66	DX4/100
525MB	£1299	£1321	£1402
850MB	£1340	£1362	£1443
1GB	£1418	£1440	£1521
SCSI 1.04GB	£1724	£1746	£1827
SCSI 2.10GB	£2037	£2059	£2140

(SCSI systems have one PCi slot less)

Other Configurations

Based on the above specification with 14" Monitor and your choice of hard disk & CPU.

14"	PENTIUM® Processor 75MHz	90MHz	100MHz
525MB	£1532	£1618	£1703
850MB	£1573	£1659	£1744
1GB	£1651	£1737	£1822
SCSI 1.04GB	£1957	£2043	£2128
SCSI 2.10GB	£2270	£2356	£2441

(SCSI systems have one PCi slot less)

Delivery cost to most of UK for one system is £15. E.&O.E.
All prices exclude VAT @ 17.5%.

BEST TEST windows

"Dan's PCs have regularly come out ahead of the competition in *Windows Users* hardware reviews for the simple reason that they are excellently designed and specified. The PC supplied for this review was no exception. The layout is excellent, cables are neatly clipped away out of sight and it's relatively easy to get at the RAM slots for upgrading memory. There's lots of expansion potential too. Dan's disk performance under Windows is spectacular - the dan's disk performance outstripped that of all others in this review." ***Windows User*, BEST on TEST** *(dan 95), April '95*

What makes dan Systems

All dan systems have DOS & Windows installed *"Ready to Run"* and include:

15"Non-Interlaced Low Radiation Monitor with Microprocessor

New Microsoft Ergonomic Mouse

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Special Configurations at Special Offer Prices

The configurations of dan /s systems are not variable.

pentium PROCESSOR

dan PCi Ultimate PC

The PC you always dreamed of

100MHz Pentium Processor
16MB RAM - 1GB EIDE HDD
2MB VRAM Stealth 64 Video Card
2GB DAT Tape Streamer
17" Monitor Trinitron LR N/I Monitor
4x CD-ROM
SoundBlaster AWE 32 Value 512K
FAX/Modem - Network Card

- 256KB Cache Memory
- Free Slots: 2 PCi
- Fast PCi EIDE Hard Disk Controller
- Hi-Fi Power dan Speakers (80W PMPO)
- dan Internal 14.4BPS Fax/Modem
- 1.44MB Floppy disk Drive
- Full Size Tower Case w/250W PSU
- 1 Parallel & 2 Fast Serial Ports
- 102 Key UK Keyboard
- New Microsoft Mouse
- Windows for Workgroups 3.11
- MS DOS 6.22
- Software titles:
  MS Encarta '95 Encyclopedia,
  MS Works,
  MS Money,
  Lotus Organizer for Windows,
  MS Scenes

pentium PROCESSOR

100MHz £3238

As above without the DAT Streamer

100MHz £2523

from £1299

Dan's commitment to continuous improvement and customer satisfaction has already resulted in numerous awards and accolades, both from customers and industry experts. Dan received over forty awards in 1993 and 1994, including PC Magazine's Overall Satisfaction with Service and Reliability Award for two years running. New awards are still coming in 1995. You know you can rely on dan.

dan Mini Tower Case Option

better than others

Large Fast IDE Hard Disk Drives (420MB with Premium)

Fast 64-bit Graphic Processor Windows Accelerators from DIAMOND (except Premium)

The unparalleled dan Service & Support that has won dan technology more awards than any other computer company in UK.

PC MAGAZINE "A well-specified system, the dan dantium90-PRO includes everything needed to handle multimedia, backing this up with good quality components throughout. The screen, in particular, is superb - due mainly to the TRINITRON tube - and together with the Diamond Stealth 64 graphics card lifts the dantium above the ordinary." *PC Magazine, (dantium 90MM), January '95*

COMPUTER SHOPPER LABS "Dan's machines are presented in a consistent and professional manner. The 15" digital monitor gives a clear, bright image and handles resolution changes extremely well. The excellent set of performance results ensures top place among the DX4 PCs. This machine might look expensive for a DX4/100, but then it does have an excellent multimedia configuration and good quality presentation." ***Computer Shopper,** (dan 95MM), April '95*

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dan technology plc

“dan does it better”

Computer Buyer, February '95

Three classic ranges of PCs for Windows available from dan.

All combine high performance, superb reliability and quality, together with excellent value for money. All **dan** systems, irrespective of price, are built with the highest quality components and are fully upgradable.

The **dan Premium** is an entry level Windows system for the value conscious Windows user. The Local Bus Video and Hard Disk Controller give excellent perfomance in programs that are graphics oriented, including entry level CAD, Windows and desktop publishing, e.g. MS Publisher.

The **dan for Windows** delivers advanced technology and high perfomance to create the perfectly optimised Windows solution. This system is for the power user who is running graphics intensive programs and the most demanding Windows applications such as Pagemaker, Corel Draw and AutoCad, which make the most advantage of caching controllers and powerful video accelerators.

The **dantium** personal computer is a high power system. It uses PCi Local Bus, the latest in computer architecture together with the incredible processing power of the Pentium® Processor. **Dan** has obviously come up with yet another star performer!

Intel 486 PROCESSOR

dan Premium/s

Special Offer 486 Windows System

- 486 DX2-DX4 Intel Processor
- 8MB RAM - 420MB HDD
- 1MB S3 TRIO 32 DRAM Video Card
- 15" FST - Low Radiation N/I Monitor

- Fast EIDE PCi Hard Disk Controller
- 256KB Cache Memory
- Pentium® Overdrive® Processor Upgradable
- Free Slots: 1 PCi, 1 PCi or ISA & 3 ISA
- 1.44MB Floppy disk Drive
- Desktop Case w/200W PSU
- 1 Parallel & 2 Fast Serial Ports
- 102 Key UK Keyboard
- New Microsoft Mouse
- Windows for Workgroups 3.11
- MS DOS 6.22
- Lotus Organizer for Windows

486DX2-66	£ 991
486DX4-100	£ 1069

Intel 486 PROCESSOR

dan for Windows/s

Special Offer 486 Power System

- 486 DX2-DX4 Intel Processor
- 8MB RAM - 525MB HDD
- 1MB DRAM Stealth 64 Video Card
- 15" FST - Low Radiation N/I Monitor
- 2MB VL IDE Cache Controller

- 256KB Cache Memory
- Pentium® Overdrive® Processor Upgradable
- Free Slots: 3 ISA
- 1.44MB Floppy disk Drive
- Desktop Case w/200W PSU
- 1 Parallel & 2 Fast Serial Ports
- 102 Key UK Keyboard
- New Microsoft Mouse
- Windows for Workgroups 3.11
- MS DOS 6.22
- Lotus Organizer for Windows

486DX2-66	£ 1140
486DX4-100	£ 1218

1GB EIDE HDD Upgrade Add £115

pentium PROCESSOR

dantium/s

Special Offer Pentium® Processor System

- 75-100MHz Pentium® Processor
- 8MB RAM - 525MB HDD
- 1MB DRAM Stealth 64 Video Card
- 15" FST - Low Radiation N/I Monitor

- Fast EIDE PCi Hard Disk Controller
- 256KB Cache Memory
- Free Slots: 1 PCi, 1 PCi or ISA & 3 ISA
- Fast IDE Hard Disk Controller
- 1.44MB Floppy disk Drive
- Desktop Case w/200W PSU
- 1 Parallel & 2 Fast Serial Ports
- 102 Key UK Keyboard
- New Microsoft Mouse
- Windows for Workgroups 3.11
- MS DOS 6.22
- Lotus Organizer for Windows

75MHz	£ 1218
90MHz	£ 1299
100MHz	£ 1381

1GB EIDE HDD Upgrade Add £115

Other Configurations

Based on the above specification with 14" Monitor and your choice of hard disk & CPU.

14"	Intel486 Processor DX2/50	DX2/66	DX4/100
260MB	£ 920	£ 942	£1023
420MB	£ 929	£ 951	£1032
525MB	£ 940	£ 962	£1043
850MB	£ 981	£1003	£1084
1GB	£1059	£1081	£1162
SCSI 1.04GB	£1365	£1387	£1468
SCSI 2.10GB	£1678	£1700	£1781

(SCSI systems have one PCi slot less)

Other Configurations

Based on the above specification with 14" Monitor and your choice of hard disk & CPU.

14"	Intel486 Processor DX2/50	DX2/66	DX4/100
260MB	£1062	£1084	£1165
420MB	£1071	£1093	£1174
525MB	£1082	£1104	£1185
850MB	£1123	£1145	£1226
1GB	£1201	£1223	£1304

All prices exclude VAT @ 17.5%. E.&O.E.

Other Configurations

Based on the above specification with 14" Monitor and your choice of hard disk & CPU.

14"	PENTIUM® Processor 75MHz	90MHz	100MHz
420MB	£1175	£1261	£1346
525MB	£1186	£1272	£1357
850MB	£1227	£1313	£1398
1GB	£1305	£1391	£1476
SCSI 1.04GB	£1611	£1697	£1782
SCSI 2.10GB	£1924	£2010	£2095

(SCSI systems have one PCi slot less)

intel inside

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ISO 9002 / EN 29002 (BS 5750 Pt 2)

dan Multimedia

The last year has seen one of the most exciting periods in PC development. The ready availability of advanced sound cards and CD-ROMs has engendered a new wave of software exploiting this new technology.

Multimedia applications on CD ROM can allow you to use an interactive encyclopedia, proofread a spreadsheet or give a command to your PC.

Dan Multimedia Kit 2

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If you want a straight, speedy PC for a sensible price

"Multimedia Systems" Computer Buyer, February '95

from £920

Upgrades
for Custom-Built Systems

Video Card Upgrades

1MB PCi Stealth 64 DRAM Windows Accelerator Upgrade from 1MB S3 Trio 32 £ 14

Upgrades from 1MB Stealth 64 DRAM

2MB PCi Stealth 64 DRAM Windows Accelerator £ 39

2MB PCi Stealth 64 VRAM Windows Accelerator £ 122

4MB PCi Stealth 64 VRAM Windows Accelerator £ 239

Monitor Upgrades from 14" model

15" Monitor Upgrade £ 80

17" TRINITRON Monitor Upgrade £ 393

20" TRINITRON Monitor Upgrade £1185

All the dan 17" and 20" monitors are based on the SONY Trinitron tube for the ultimate screen quality and most relaxing display for your eyes.

IDE HDD VL CACHE

Controller with 2MB Cache £ 130

FAX - Modem add £99

Internal 14.4BPS Modem

This is your gateway to the outside world. You can now send and receive faxes from your PC as well as talk to millions of other computer users through services like CIX, Compuserve, Demon etc (available on subscription). You can 'surf' the INTERNET, find out information on almost any subject and even do some of your shopping.

Delivery cost to most of UK for one system is £15.

dan Desktop Case

Upgrade Kits

PC 2 Multimedia PC

Dan Multimedia Kit 2	Dan Multimedia Kit 3
4x Speed CD-ROM	4x Speed CD-ROM
SoundBlaster 16	SoundBlaster AWE 32 Value 512K
Advanced Speakers 10W PMPO	Hi-Fi Power Speakers 80W PMPO
Microphone	Microphone
dan Software Bundle: Encarta '95, MS Works, MS Money, MS Scenes	dan Software Bundle: Encarta '95, MS Works, MS Money, MS Scenes
Price £209	Price £276

Subtract £36 for 2x Speed CD-ROM instead of the 4X Speed one.

Computer Buyer RECOMMENDED

"Dan does it better! Over the last three years dan has repeated this on almost every machine that's come through the Labs. Dans always have the edge. Our favourite monitor, dan's 15" monitor has full adjustment controls to keep your picture perfect. *Conclusion:* Speedy and with lots of room for expansion. Dan's our number one." ***ComputerBuyer,* RECOMMENDED** *(danPremium 66MM), Feb '95*

WHAT HOME ENTERTAINMENT OUR CHOICE WHAT HOME ENTERTAINMENT

"Direct seller, dan technology, has won numerous awards for both the quality of its machines and its after sales service. Always well to the front technologically, the company builds all of its machines to order. The Norton SI benchtest gave an index of over 100, the only machine in the group to do so, emphasising the performance of the machine as a whole. For all -out pace, dan's Premium system is definitely top dog. It runs all its multimedia titles effortlessly, with the result that it wins the 'OUR CHOICE' Award. If you are after the fastest PC on the block, with a good software bundle, then this is your machine." ***WHAT Home Entertainment,* OUR CHOICE** *(dan Premium/s66MM), Feb '95*

London: 0181 830 1100 Leeds: 0113 259 1200

LONDON: Ironbridge Close, Great Central Way, London NW10 0NW. FAX: 0181-830 1122
LEEDS: 10 Feast Field, Town Street, Horsforth, Leeds LS18 4TJ. FAX: 0113-239 0652

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dan technology plc

The dan server offered the best all-round deal for speed, upgradability, price and on-site maintenance

Winner / Recommended. Expert Buyer: Fileservers Review, PC Direct, Nov '93

Dan Servers for Novell and other Networks

When so much depends on one machine, it makes sense to go for the best in reliability and quality, as well as price and performance. In short, you have to choose the right supplier.

If you are looking for a complete Novell network, **dan** can provide the correct solution with its award winning fileservers. For simple networks up to 20 users, choose the **dan Server**, an entry level fileserver which is based on ISA and PCi Local Bus technology.

More powerful networks on larger sites need to use the **dan EISA Server** with an EISA SCSI controller to cope with the most powerful applications.

Dan has introduced the new top of the range fileserver. The **dantium PCi Server** utilises the Pentium® Processor allowing the fileserver to cope in the most demanding of network environments.

We understand that your business will depend on your network; no one is more reliable than **dan** with its numerous magazine and reader awards.

Delivery cost to most of UK for one system is £15

ISA Intel 486 PROCESSOR

dan PCi Novell Server

Excellent Network Server Performance

486 DX-DX2-DX4 Intel Processor
8MB RAM
16-Bit Ethernet Network Card*
EIDE Hard Disk Controller or
PCi Adaptec AHA-2940 SCSI Controller

- 256KB Secondary Cache Memory
- Free Slots: 2 PCi, 1 PCi or ISA & 1 ISA
  (SCSI systems have one PCi slot less)
- 512kB Video Graphics Card
- 14" Monochrome VGA Monitor
- 1.44MB Floppy disk Drive
- Full Size Tower Case w/250W PSU
- 1 Parallel & 2 Serial Ports
- 102 Key UK Keyboard
- Windows for Workgroups 3.11
- MS DOS 6.22

* *This Card is Novell NE2000 compatible.*

3COM Network Card available as an upgrade

		Intel486 Processor DX2/66	DX4/100	DX/50
	525MB	£ 935	£1016	£1055
	850MB	£ 976	£1057	£1096
	1GB	£1054	£1135	£1174
SCSI	1.04GB	£1360	£1441	£1480
SCSI	2.10GB	£1673	£1754	£1793
SCSI	4.10GB	£1998	£2079	£2118

EISA Intel 486 PROCESSOR

dan EISA Novell Server

Award Winning Fileservers

486 DX-DX2 Intel Processor
8MB RAM
16-Bit Ethernet Network Card *
32-bit EISA
Adaptec AHA-2742 SCSI Controller

- 256KB Secondary Cache Memory
- Free Slots: 1 EISA or VL & 3 EISA/ISA
- 512kB Video Graphics Card
- 14" Monochrome VGA Monitor
- 1.44MB Floppy disk Drive
- Full Size Tower Case w/250W PSU
- 1 Parallel & 2 Serial Ports
- 102 Key UK Keyboard
- Windows for Workgroups 3.11
- MS DOS 6.22

* *This Card is Novell NE2000 compatible.*

EISA Network Card available as an upgrade

		Intel486 Processor DX2/66	DX/50
SCSI	1.04GB	£1522	£1642
SCSI	2.10GB	£1835	£1955
SCSI	4.10GB	£2160	£2280

Because of Novell's memory requirements, all dan Servers with a DAT Tape Streamer, or CD-ROM or more than 1GB HDD must be upgraded to 16MB. Servers with 4.1GB HDD must be upgraded to 32MB.

PCI LOCAL BUS pentium PROCESSOR

dantium PCi Novell Server

Servers with Pentium® Processor

75-90-100MHz Pentium® Processor
8MB RAM
16-Bit Ethernet Network Card *
EIDE Hard Disk Controller or
PCi Adaptec AHA-2940 SCSI Controller

- 256KB Secondary Cache Memory
- Free Slots: 1 PCi, 1 PCi or ISA & 2 ISA
  (SCSI systems have one PCi slot less)
- 512kB Video Graphics Card
- 14" Monochrome VGA Monitor
- 1.44MB Floppy disk Drive
- Full Size Tower Case w/250W PSU
- 1 Parallel & 2 Fast Serial Ports
- 102 Key UK Keyboard
- Windows for Workgroups 3.11
- MS DOS 6.22

* *This Card is Novell NE2000 compatible.*

PCi Network Card available as an upgrade

		PENTIUM® Processor 75MHz	90MHz	100MHz
	525MB	£1146	£1232	£1317
	850MB	£1187	£1273	£1358
	1GB	£1265	£1351	£1436
SCSI	1.04GB	£1571	£1657	£1742
SCSI	2.10GB	£1884	£1970	£2055
SCSI	4.10GB	£2209	£2295	£2380

Network Workstations

All dan PCs can be used as workstations by just adding a network card. The most popular card is the 16-bit Ethernet Novell NE2000 compatible. However the 3COM 509 or the PCi card can give higher performance.

Example of Workstations:

Entry level Station		Best Seller Station		Power User Station	
dan Premium/66sWS		**dantium/75sWS**		**dantium95/100sWS**	
dan Premium/66s	£ 991	*dantium/75s*	£1218	*dantium95/100s*	£1714
16-bit Ethernet card	£ 21	*3COM Ethernet card*	£ 63	*PCi Ethernet card*	£ 131
Workstations price	£1012	Workstations price	£1281	Workstations price	£1845

NOVELL
Authorised Dealer

intel inside

All prices exclude VAT @ 17.5%. E.&O.E.

PC Plus RECOMMENDED

"The dantium 90 machine may look like all other dans, but its turn of speed and software bundle gives it an edge. We must put the dan at the top of the value league and it gets our recommendation for an excellent value Pentium PC".
RECOMMENDED, *PC Plus, (dantium 90MM), October '94*

BEST TEST Windows User

"Yet again it seems dan technology has come up with a winner in the PC performance/price stakes. This is a system which any PC user would be proud to own. From its excellent keyboard and Microsoft mouse, to the 17" clear and stable monitor, the dantium/PCi66 exhibits quality all the way. Couple this to an extremely clean pair of heels throughout the Windows User benchmark tests and you have a great system." *Windows User,* **BEST on TEST** *(dantium 66), Sept '94*

PC Direct

"As users increasingly choose to buy their networks direct, another growth area has been the fileserver market, and direct vendors have met this need with high-power systems designed for the job. One such company is dan Technology, which you selected as your **supplier of choice** with its *dan Novell Server DX/50.* ***PC DIRECT HITS AWARDS,*** *PC Direct* June '94

go direct to dan

"dan is recognised as a solid company with a good background. The dantium/PCi should be on your shortlist"

Pentium Group Test, Highly Commended. dan dantium/PCI. PCW. April '94

from £ 935

Upgrades
for Custom-Built Systems

MultiMedia - CD ROM - Sound Cards

Multimedia MPC2 Upgrade Kits	*Look at Previous page*
Sound Blaster 16 / Advanced Speakers / Mic	£ 71
Sound Blaster AWE 32 Value512K upgrade from SB16	£ 48
Power Speakers upgrade (20Watts PMPO)	£ 15
Hi-Fi Power Speakers upgrade (80Watts PMPO)	£ 40
2x Speed AT CD-ROM with controller	£ 86
2x Speed SCSI CD-ROM w/o controller	£110
4x Speed IDE CD-ROM w/o controller	£111
4x Speed SCSI CD-ROM w/o controller	£289

Monitor (Low Radiation) Upgrades

17" TRINITRON Monitor LR Upgrade from 14"	£ 393
20" TRINITRON Monitor LR Upgrade from 14"	£1185
15" SVGA FST N/I Monitor LR Upgrade from 14"	£ 80
14" Colour Monitor from 14" Mono (for Servers)	£ 76

Network Cards

16-Bit Network Card Ethernet (Novell NE2000 Compatible - Thin Ethernet & Twisted Pair)	£ 21
16-Bit Network Card Ethernet (3COM 509)	£ 63
32-bit EISA Ethernet Card for EISA Servers Upgrade	£124
32-bit PCi Ethernet Card for PCi Servers Upgrade	£110
4 Port 32-bit PCi Ethernet Card for PCi Servers	£468

Uninterruptible Power Supplies - UPS

600VA UPS Off-Line from APC	£ 290
Auto Shut down Software	£ 58
600VA UPS ON-LINE	£ 580
Auto Shut down Software	£ 89

Tape Streamers (tapes not included)

250MB Floppy Tape Streamer with Software	£ 97
250/500MB Tape Streamer Kit incl controller & SYTOS Software - 500MB via compression	£361
All SCSI Tape Streamers require SCSI Controllers	
500MB SCSI Tape Streamer for DOS and Windows with SYTOS Software	£436
2GB DAT Tape Streamer for Windows w/Corel SCSI	£674
4GB DAT Tape Streamer for Windows w/Corel SCSI	£764
No Software supplied for Novell Servers. Use Novell's SBACKUP	
2GB DAT Tape Streamer for Novell Server	£608
4GB DAT Tape Streamer for Novell Server	£698
8GB DAT Tape Streamer for Novell Server	£862

Case Upgrades from Desktop Case

Mini Tower Case	£ 5
Full Tower Case	£ 40

Modems

Internal dan fax/Modem (V 32 bis) with software	£ 99

Miscellaneous

1MB Additional Memory Upgrade	£ 28
5.25" 1.2Mb Floppy Disk Drive	£ 39
Monitor & Keyboard Extension Leads (pair)	£ 20

On-Site Maintenance First 12 Months £ 30
(Buy later with form provided with system)

RUNNER-UP NETWORK FILESERVERS HITS — dan TECHNOLOGY PLC dan for Novell Power Server

WINNER NETWORK FILESERVERS HITS — dan TECHNOLOGY plc dan Novell EISA Server 486DX/50

PC Direct Readers 1993 & 1994 Awards

dan Full Tower Case Option

Warranty

LIFETIME GUARANTEE: First year back-to-base parts & labour. Thereafter labour (excludes monitors and printers) and Hotline telephone support only. Optional 8-working hour response ON-SITE maintenance (£30 first year). **14 DAY MONEY BACK GUARANTEE IF NOT SATISFIED** (excludes printers & Software). dan technology Systems prices and specifications are subject to change without notice. All sales are subject to dan technology plc terms and conditions, a copy of which may be obtained on request. All trademarks acknowledged. Intel, Pentium and OverDrive are trademarks of Intel Corporation in the USA and other countries.

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NAME: _____

COMPANY: _____

POSITION: _____ ADDRESS: _____

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Prices valid for May '95

London: 0181 830 1100 Leeds: 0113 259 1200

LONDON: Ironbridge Close, Great Central Way, London NW10 0NW. FAX: 0181-830 1122
LEEDS: 10 Feast Field, Town Street, Horsforth, Leeds LS18 4TJ. FAX: 0113-239 0652

Opening Hours / Showroom: Mon-Fri 10am-6pm

dan technology plc

Elite Pro 7000 SERIES

BENEFITS OF THE ELITE PRO

- 486 Upgradeable Processor Socket
- V.2 PCMCIA Slot
- Removeable Hard Disk Drive
- 3.5" (1.44Mb) Internal Floppy Disk Drive
- Award Winning Toshiba Display Mono/Dual Scan/TFT
- 4Mb Ram Expandable 16Mb
- 2 Serial/1 Parallel/1 PS2 Mouse Port
- Built-In Trackball
- Autoswitching Mains Battery Charger
- Unique Modula Accessory Feature for Fax Modem, SCSI II Module
- External SVGA Monitor & Keyboard Port
- Slimline Design 28cm x 21cm x 4cm ▲ Weight 5.7lbs
- Carry Case with accessory pockets
- Simultaneous Display (not dual scan models)
- AT Expansion slot for expansion box

Comes With 340Mb Hard Disk & 4Mb Ram

Processor	Mono	Dual Scan	TFT
486SX-25	£849	£1149	£1599
486DX2-66	£899	£1269	£1749
486DX4-100	£1299	£1649	£1999

BENEFITS OF THE POWERBOOK

- PGA Motherboard takes 3.3V or 5V CPU's ▲ 128KB External Cache
- 4Mb Ram Expandable to 32Mb Ram ▲ 32 bit Vesa Local Bus
- Removeable Upgradeable Hard Disk Drive
- 3.5" (1.44Mb) Floppy Disk Drive
- Mono, Dual Scan or TFT 10.4" Screen Options
- Microsoft Sound System
- 8 bit Sound Card, Sound blaster compatible
- Built-In speaker ▲ Built-In 25mm Trackball
- PCMCIA Type IV expansion slot
- External Microphone and speaker connections
- 1 Serial/1 Parallel Port ▲ Autoswitching mains Battery Charger
- External SVGA Colour Monitor Port & External Keyboard Port
- Docking Station Port ▲ 28cm (w) x 22cm (d) x 5cm (h)
- 2 NiMH Batteries with hot swap facility ▲ Carry Case

Powerbook 8000 SERIES

Comes With 340Mb Hard Disk & 4Mb Ram

Processor	Mono	Dual Scan	TFT
486DX-33	£949	£1299	£1949
486DX2-66	£999	£1349	£1999
486DX4-75	£1099	£1449	£2099
486DX4-100	£1199	£1549	£2199
PENTIUM 60	£1399	£1749	£2399
PENTIUM 66	£1499	£1849	£2499

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AS USED BY THE MoD IN OPERATIONAL DEPLOYMENT DURING 1994

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BENEFITS OF THE MEDIA PRO

- Upgradeable processor socket
- 256K External Cache
- 5.25" Built-In Dual Speed CD ROM Drive
- Trackpoint (easier to use than trackball - no cleaning required)
- Two Built-in speakers
- 16 Bit Sound blaster compatible card
- Built-In Microphone and amplifier
- VESA 32 bit Local Bus
- Removeable easily interchangeable Hard Disk
- 4Mb RAM Expandable to 64Mb
- 1xType III or 2xType II PCMCIA Slots
- 3.5" (1.44Mb) Floppy Disk Drive
- Upgradeable Mono/Dual Scan (10.4")/ TFT screen options
- Simultaneous LCD & CRT Display (1280 x 1024)
- External Keyboard Port and SVGA Monitor Port
- 2 Serial/1 Parallel Port/1 Midi Port
- Docking Station Port
- NiMH Battery with special RTG feature for extra life!
- Autoswitching mains Battery Charger
- Carry Case with accessory pockets
- External microphone and speaker ports
- MPEG live video option

MediaPro 9000 SERIES

Comes with 340Mb Hard Disk & 4Mb Ram & CD ROM

Processor	Dual Scan	TFT
486DX-33	£1759	£2359
486DX2-66	£1799	£2399
486DX4-75	£1899	£2499
486DX4-100	£1999	£2599

WHY CHOOSE XITEC ...

- Guaranteed delivery dates at point of order. Same day delivery available
- Lifetime technical support and three year warranty plan
- The independent British company with the largest installed notebook base in the UK
- We are told that we offer the highest level of support on notebook computers in the UK.
- A notebook solution for every requirement. We fulfill contracts from £800 to £2,000,000.
- Our UFS (unique friendly service) ensures that our Sales Team recommends the best notebook for your need.

SOME OF THE UPGRADE OPTIONS AVAILABLE

Upgrade per 4Mb RAM £160	Upgrade to 525Mb Hard Disk £149	Lotus Smartsuite v. 3 £349
Upgrade to 340Mb Hard Disk £49	Upgrade to 810Mb Hard Disk £399	Mini Docking Station £55
Upgrade to 420Mb Hard Disk £99	Docking stations £299	Range of PCMCIA products £CALL

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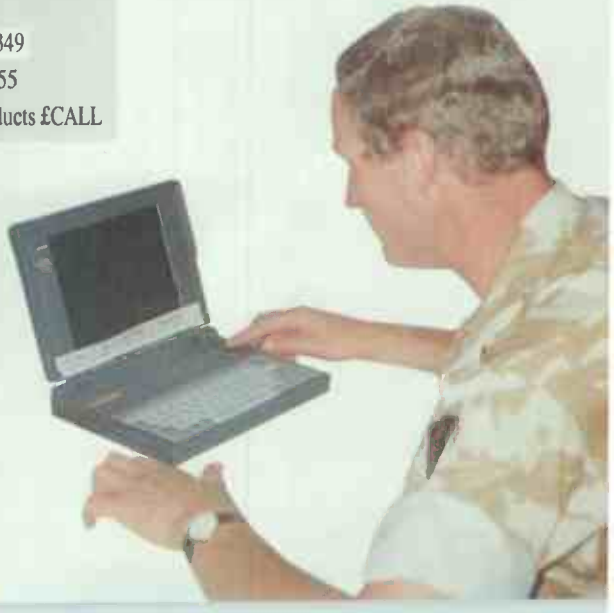

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The Compusys Freestyle range features high specification, quality systems with full support for the small business and home user.

FREESTYLE RANGE

Features:

- Desktop or mini tower case
- VESA architecture with 256K cache
- Range of 486 processors
- Total 4 drive bays
- 1.44Mb floppy disk drive
- Range of IDE hard disk drives
- 4Mb RAM expandable to 128Mb
- Total 7 option slots
- 2 serial, 1 parallel, 1 games interface
- 1Mb accelerated VESA graphic card
- 14" colour non-interlaced, low radiation monitor
- MS-DOS 6.22, Windows for Workgroups 3.11
- Keyboard and mouse
- Choice of accessories – system built to order
- 12 months on-site warranty

	486 PROCESSOR		
HARD DISK	66MHz	80MHz	100MHz
420Mb IDE	£760 £899	£825	£855
540Mb IDE	£825	£845	£875
1Gb IDE	£915	£935	£965

Multimedia systems include – dual speed CD ROM, 16-bit Sound blaster card, 20 CD titles, headphones and speakers

OPTIONS	ADD
8/16Mb RAM	£111/330
PCI architecture	£25.00
High performance 2Mb video card	£87.00
15" monitor	£94.00
17" monitor	£365.00
Portable fax/modem with Internet pack	£120.00
Panasonic KX-P6100 6ppm laser printer	£295.00

Compusys Business Range

Compusys Business systems are fully featured Pentium™ processor systems designed for the best price, performance and quality.

BUSINESS RANGE

Features:

- Desktop or mini tower case
- 4 or 5 disk drive bays respectively
- PCI architecture with 256k cache
- Range of Pentium™ processors
- 1.44Mb floppy disk drive
- Range of IDE and SCSI hard disk drives
- Built in enhanced IDE interface with fast 16550 serial port
- 8Mb RAM expandable to 128Mb
- Total 7 option slots
- 2 serial, 1 parallel, 1 games interface
- 1Mb accelerated PCI graphic card
- 14" colour non-interlaced, low radiation monitor
- MS-DOS 6.22, Windows for Workgroups 3.11
- Keyboard and mouse
- Choice of accessories – system built to order
- 12 months on-site warranty

	PENTIUM™ PROCESSOR			
HARD DISK	66MHz	75MHz	90MHz	100MHz
540Mb IDE	£1,150	£1,199	£1,375	£1,470
1Gb IDE	£1,280	£1,290	£1,470	£1,560
2Gb SCSI	£1,820	£1,830	£2,000	£2,100

OPTIONS	ADD
16Mb RAM	£220.00
High performance 2Mb video card	£65.00
15" monitor	£94.00
17" monitor	£365.00
Midi tower with 8 disk drive bays	£12.00
Full tower with 10 disk drive bays	£39.00
Business multimedia package (see above)	£148.00
Network card	£24.00
Portable fax/modem with Internet pack	£120.00
Panasonic KX-P6100 laser printer	£295.00
420Mb tape backup device	£120.00

Bundle Options Available

Lotus. SmartSuite

Compunote Portable Solutions

Compusys Portable systems combine the latest features with the best in power, usability and modularity – all in a lightweight, compact and rugged case.

NOTEBOOK COMPUTER

Features:

- Range of 486 processors
- Internal 1.44Mb floppy disk drive
- Range of removable IDE hard disk drives
- 4Mb RAM expandable to 20Mb
- Removable mono, DSTN colour or TFT colour screen
- 1Mb accelerated, 32 bit VESA local bus VGA
- PCMCIA type III interface
- Serial, parallel, VGA, keyboard/mouse and docking station I/O
- Built in speakers, soundcard and microphone
- Support for two removable quick charge batteries
- MS-DOS 6.22, Windows for Workgroups 3.11
- Comprehensive power saving features
- Lifetime RTB labour warranty and 12 months parts warranty

	486 PROCESSOR		
SCREEN/HARD DISK	66MHz	75MHz	100MHz
Mono 340Mb	£1,120	£1,185	£1,220
Mono 510Mb	£1,210	£1,275	£1,310
Mono 800Mb	£1,510	£1,575	£1,610
DSTN 340Mb	£1,399	£1,465	£1,499
DSTN 510Mb	£1,490	£1,555	£1,590
DSTN 800Mb	£1,790	£1,855	£1,890
TFT 340Mb	£2,125	£2,190	£2,225
TFT 510Mb	£2,215	£2,280	£2,315
TFT 800Mb	£2,515	£2,580	£2,615

OPTIONS	ADD
8Mb RAM	£145.00
12Mb RAM	£275.00
Dual speed CD-ROM	£279.00
Docking station	£365.00
Portable fax/modem with Internet pack	£120.00

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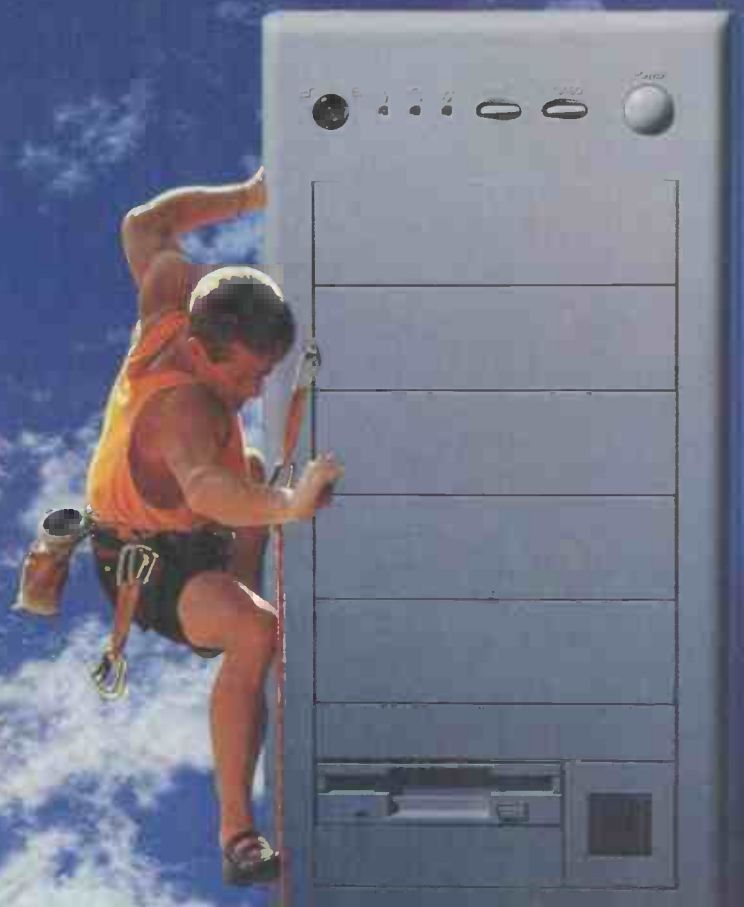

COMPUSYS

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Compusys offers an unrivalled choice of products and a personal service, to meet the differing needs of individual customers. Our BS5750 approved headquarters in Aylesbury, Buckinghamshire manufactures each system to order using the latest industry standard components from approved suppliers.

SALES
Our sales consultants can be contacted between 8.30am and 6.30pm Monday to Friday or 10am to 4pm on Saturdays. For complex requirements, on-site demonstrations and assessments are available free of charge.

DELIVERY
Generally you can expect delivery of your Compusys PC in 10 working days. Charges are £15 per system within the UK mainland. Delivery schedules and costs are quoted on confirmation of your order.

*Due to component price fluctuations call for latest prices

HOW TO PAY
You may pay by credit card (+2%), cleared cheque, or bankers draft. For companies and regular buyers, credit accounts can be set up (subject to status) after a period of trading. For further details please ask for our accounts department.

TECHNICAL SUPPORT
Each system is intensively tested and the software of your choice loaded before despatch. Each PC is delivered ready-to-run and is supported by a free lifetime technical hotline and one year on-site maintenance*. Extended on-site cover is available if required. Systems are covered by a free lifetime labour guarantee.

* Notebook maintenance is back to base.

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Name.....

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We carry large stocks of all advertised brands.

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	4MB Upgrade	8MB Upgrade	16MB Upgrade	Spare Battery	AC Adapter	Car Adapter	Port Replicator	Docking Station
AST								
ASCENTIA 800/810	£170	£440	£925	£85	£55	£55	–	–
ASCENTIA 900/910	£175	£350	£700	£145	£40	£75	£65	£295
IBM								
THINKPAD 340	£185	£368	–	£45	£40	–	–	–
THINKPAD 360	£185	£368	£922	£95	£53	£48	£198 (I)	£536 (I)
THINKPAD 755 – DRAM	£203	£405	£1,031	£135	£53	£48	£72 (II)	£500 (II)
NEC								
VERSA 'S'	£185	£360	–	£75	£65	–	–	–
VERSA 'E'/'V'	£185	£360	£790	£135	£65	£40	£80	£425
VERSA 'M'/'P'	£185	£360	£790	£145	£75	£40	£80	£425
PANASONIC								
CF41	£229	£440	£899	£95	£115	–	–	£399
TOSHIBA								
T19xx/46xx/47xx/48xx	£170	£298	£1,339	£94	£56	–	–	£374 (IV)
T24xx	£192	£340	£1,148	£94	£48	–	£140	
T34xx/36xx	£192	£340	£1,148	£175	£48	–	–	–
TEXAS INSTRUMENTS								
TM4000 'E'	£190	–	£999	£65	£99	–	–	£595
TM4000 'M'	£185	–	£999	£99	£105	–	–	–

CD ROM MULTI MEDIA CHASSIS AVAILABLE FOR: IBM THINKPAD 360/755 CALL FOR OPTIONS
TEXAS INST. 'M' £595
NEC VERSA E/V/M/P £555

AST ASCENTIA 810N

Possibly the Best and Brightest Dual Scan Colour Notebook Computer Yet! Value for Money? – Definitely!!

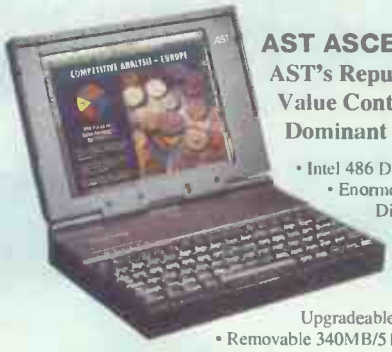
- Powerful 486 DX/2 66MHz Processor
- An Enormous 10.4" Dual Scan Colour Display with 16 Bit Local Bus Accelerated Graphics and 1MB Video RAM
- 4MB RAM Standard Upgradeable to 20MB
- 250MB/340MB/510MB Hard Disk Drives
- Two PC-Card (PCMCIA) Type II Slots (Or One Type III)
- Big 19mm Internal Trackball
- Ports – SVGA/Serial/Parallel/PS/2 Mouse & Keyboard
- NiMH Battery (Up to 3 Hours)/Second Battery Option (Remove FDD) for twice the battery life
- Complete with – AC Adapter & Battery Charger/Microsoft Dos and Windows Plus Lotus Organizer and LapLink Remote Access Software

810N DX/2 66 Dual Scan Colour

250MB **£1,789** 340MB **£1,859** 510MB **£1,979**

AST ASCENTIA 910N

AST's Reputation for Feature Rich Value Continues with the Market Dominant Ascentia 910N!



- Intel 486 DX/2 50 and DX/4 75 MHz Processors
- Enormous 10.4" Dual Scan and TFT Colour Displays with 32 Bit Local Bus Accelerated Graphics and 1MB Video RAM, TFT Features 65,000 Colour Display!
- 8MB RAM Standard Upgradeable to 32MB
- Removable 340MB/510MB/700MB Hard Disk Drives
- Two PC-Card (PCMCIA) Type II Slots (Or One Type III)
- 'Smart Stick' – The User Friendly Internal Pointing Device
- Ports – SVGA/Serial/Parallel/PS/2 Port/Docking Station
- Complete with – Lithium Ion Battery (Up to 10! Hours)/AC Adapter & Battery Charger/Microsoft Dos 6.22 and Windows 3.1 Plus Lotus Organizer
- 3 Year Warranty, Free First Year Exec-Care Rapid Replacement Warranty

910N 50 10.4" Dual Scan Colour 340MB **£2,115**
910N 75 10.4" Dual Scan Colour 510MB **£2,665**
910N 75 10.4" TFT Colour 510MB **£3,215** 700MB **£3,395**

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All major credit cards accepted, we NEVER charge a Credit Card before goods are despatched, corporate credit accounts are available on request and subject to approval.

ALL PRICES ARE SHOWN EXCLUSIVE OF VAT
E&OE PRICES CORRECT AT TIME OF GOING TO PRESS

VISA

IBM THINKPAD 755/755CE/755CD (Shown)

IBM THINKPAD FULL RANGE AVAILABLE

T/P 755 50 Dual Scan Colour 170MB/340MB	£2,255	£2,405
T/P 755 50 TFT Colour 170MB/340MB	£2,630	£2,775
T/P 755 75 Dual Scan Colour 340MB/540MB	£3,010	£3,307
T/P 755 75 TFT Colour 170MB/340MB	£3,233	£3,385
T/P 755 75 TFT Colour 540MB/810MB	£3,684	£4,135
T/P 755CE 100 TFT Colour 340MB/540MB	£4,490	£4,742
T/P 755CE 100 TFT Colour 810MB	£5,211	
T/P 755CD 100 TFT Colour 540MB/810MB	£5,463	£5,915

IBM THINKPAD 360/340

IBM THINKPAD FULL RANGE AVAILABLE

T/P 340 (not shown) Mono 125MB	£ 899	
T/P 360 33 Mono 170MB/340MB	£1,090	£1,245
T/P 360 33 TFT Colour 170MB/340MB	£1,545	£1,665
T/P 360 50 Dual Scan Colour 170MB/340MB	£1,950	£2,095
T/P 360 50 TFT Colour 170MB/340MB	£1,950	£2,095

TEXAS INSTRUMENTS 'M' SERIES

Power Users Notebook and Multimedia Ready Presentation System

- Optional 12cm CD-ROM Chassis
- Intel 486 Processors – 50, 75, and 100 MHz
- 9.5" Dual Scan Colour OR 8.4"/9.5" TFT Colour with 1MB Video RAM and Built-In Graphics Accelerator
- 4MB RAM Standard, Upgradeable to 20MB (See Chart)
- 200MB/340MB/455MB/520MB Hard Disk Drives
- Built-In – Full 16 Bit Sound/Internal Stereo Speakers/ Fast SCSI II
- Two PC-Card (PCMCIA) Type II Slots (Or One Type III)
- 'The Point' Internal Pointing Device
- Ports – SVGA/16 Bit Midi/ Audio In/Audio Out/Fast SCSI II/ Microphone/Serial/Parallel/PS/2 Mouse/PS/2 Keyboard
- Complete With – NiMH Battery (3 to 5 Hours)/AC Adapter & Battery Charger/Microsoft Dos and Windows 3.11 Plus Utilities

TI 'M' 25 TFT Colour 200MB	£1,575	
TI 'M' 50 Dual Scan Colour 200MB/340MB	£1,649	£1,899
TI 'M' 50 TFT Colour 340MB/455MB	£2,199	£2,449
TI 'M' 75 Dual Scan Colour 455MB	£2,449	
TI 'M' 75 TFT Colour 340MB/455MB	£2,799	£2,899
TI 'M' 100 TFT Colour 525MB	£3,699	

See Panel for Options and Upgrades

ER

SHARP PC8660

Big Screen…Big Disk…Knock-Out Price From Sharp – The World Leader in TFT Displays

Intel 486 DX/2 50 MHz Processor
Enormous 9.5" TFT Colour Display with Local Bus Accelerated Graphics and 1MB Video RAM
4MB RAM Standard Upgradeable to 20MB with 320MB HDD
PC-Card (PCMCIA) Type II Slot
Superb Removable Front Mounted Track Ball
Ports – SVGA/Serial/Parallel/PS/2 Port/Port Replicator
Complete with – NiMH Battery (Up to 3 Hours)/AC Adapter & Battery Charger/Microsoft Dos 6.21 and Windows 3.11
12 Month SharpServ Warranty

PC8660 DX/2 50 9.5" TFT Colour 320MB **£1,999**

SHARP PC8900

Featuring 10.4" TFT, Glide Point Mouse and Multimedia Ready, The Next Generation from Sharp – The World Leader in TFT Displays.

Intel 486 DX/4 75 MHz Processor
Enormous 10.4" TFT Colour Display with Local Bus Accelerated Graphics and 1MB Video RAM
8MB RAM Standard Upgradeable to 32MB with 320MB HDD
16 Bit Stereo Sound with Built-In Speakers
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Glide Point and PC Windows, The Ultimate Combination
Ports – SVGA/Serial/Parallel/PS/2 Port/Line In/Line Out/Optional Port Replicator with SCSI II & Two Extra PCMCIA Ports
NiMH Battery (Up to 3 hours)/Second Battery Option (Remove FDD) for twice the battery life
Complete with – AC Adapter & Battery Charger/Microsoft Dos and Windows
12 Month SharpServ Warranty

PC8900 DX/4 75 10.4" TFT Colour 320MB **£3,195**

See Panel for Options and Upgrades

NEC VERSA 'S'

Why Compromise with a Sub-Note, when the Versa 'S' Weighs in at only 4lbs for £845

- Intel 486 Processors – 33 and 50 MHz
- 9.5" Mono, 9.5" Dual Scan Colour or 9.5" TFT Colour with Video RAM and Built-In Graphics Accelerator
- 4MB RAM Standard Upgradeable to 12MB, 210MB/250MB HDD
- Two PC-Card (PCMCIA) Type II Slots (or one Type III)
- NEC 'SurePoint' Internal Pointing Device
- Ports–SVGA/Serial/Parallel/PS/2 Mouse & Keyboard
- Complete with – NiMH Battery (Up to 4 hours)/AC Adapter & Battery Charger/Microsoft Dos and Windows 3.1/Full Media Pack

Versa 'S' i486 33 Mono 210MB	£ 845
Versa 'S' i486 33 Dual Scan Colour 210MB	£1,065
Versa 'S' i486 33 TFT Colour 210MB	£1,539
Versa 'S' i486 50 TFT Colour 250MB	£1,719

NEC VERSA 'V'

The Truly Versatile Notebook Computer NEC – The Leader in Modular Design Technology

- Optional 12cm CD-ROM Multimedia Chassis
- Intel 486 Processor – 50 MHz
- 9.5" Dual Scan Colour or 9.5" TFT Colour with 1MB Video RAM and Built-In Graphics Accelerator
- 4MB RAM Standard Upgradeable to 36MB
- Optional Port Replicator and Docking Station for Genuine Desktop Replacement
- Removable and Easily Upgradeable (Up to 810MB) 250MB/340MB Hard Disk Drives
- Two PC-Card (PCMCIA) Type II Slots (Or One Type III)
- Front Mounted 'Versa Track' Trackball
- Ports–SVGA/Serial/Parallel/PS/2 Port/Docking Station
- NiMH Battery (Up to 3 Hours)/Second Battery Option (Remove FDD) for twice the battery life
- Complete with – AC Adapter & Battery Charger/Microsoft Dos and Windows 3.1/Full Media Pack

Versa 'V' i486 50 Dual Scan Colour 250MB	£1,769
Versa 'V' i486 50 TFT Colour 340MB	£2,299

NEC VERSA 'M' and 'P' SERIES

Massive Power and the First Ever SVGA TFT Notebook Computer with all of the Features of the 'V' Plus:

- Intel DX/4 and Pentium Processors – DX/4 75, DX/4 100, Pentium 75
- The Widest Choice of the best Colour Displays Ever

Model	Screen Type	Max Colours	Max Res
'M' 75 D	DUAL SCAN	256	640 X 480
'M' 75 C	TFT	4,096	640 x 480
'M' 100 C	TFT	4,096	640 x 480
'M' 100 T	TFT	16,700,000	640 x 480
'M' 100 S	TFT	256	800 x 600
'P' 75 C	TFT	4,096	640 x 480
'P' 75 S	TFT	256	800 x 600

- 8MB RAM Standard Upgradeable to 40MB
- Built-In 16 Bit Stereo Sound
- Removable and Easily Upgradeable 340MB/540MB/810MB HDD
- Ports (See 'V') Plus- Line In/Line Out
- Complete with – NiMH Battery (Up to 4 Hours)/Secondary Battery Option (Remove FDD) for twice the battery life/AC Adapter & Battery Charger/Microsoft Dos and Windows 3.1/Full Media Pack

Versa 'M' 75 D Dual Scan Colour 340MB	£2,699
Versa 'M' 75 C TFT Colour 540MB	£3,549
Versa 'M' 100 C TFT Colour 540MB	£3,799
Versa 'M' 100 S TFT Colour 540MB	£4,099
Versa 'M' 100 T TFT Colour 540MB	£4,049
Versa 'P' 75 C TFT Colour 810MB	£4,579
Versa 'P' 75 S TFT Colour 810MB	£4,879

TOSHIBA T4800/T4850 (Shown)/ T4900CT (Shown)

FULL TOSHIBA RANGE AVAILABLE

- Intel DX/4 & Pentium Processors – 75 MHz
- T4800 – 9.5" TFT Colour/T4850 and T4900CT Feature 10.4" TFT 65,000 Colour Display, all with 1MB Video RAM and Built-In Graphics Accelerator
- 8MB RAM Upgradeable to 40MB, 500MB and 810MB HDD
- Optional Docking Station – Desk Station IV
- Two PC-Card (PCMCIA) Type II Slots (Or One Type III)
- Side Mounted Ballpoint Mouse or Toshiba MousePoint Device
- Microsoft Sound System Software with built-in Mic. & Speaker
- Ports – SVGA/Serial/Parallel/PS/2 Port/Docking Station
- Complete with – NiMH Battery (Up to 3.5 hours)/AC Adapter & Battery Charger/Microsoft Dos 6.2 and Windows 3.11

T4800 CT 75 TFT 9.5" Colour 500MB	£3,149
T4850 CT 75 TFT 10.4" Colour 500MB	£4,679
T4900 CT 75 TFT 10.4" Colour 810MB	£4,647

ALL OTHER MODELS AVAILABLE.

PANASONIC CF-41

Internal 12cm CD-ROM, Big Screen, Fast Processors – The Power to Present

- Intel 486 Processors – DX/2-50 and DX/4-100 MHz
- 10.4" Dual Scan Colour or 10.4" TFT Colour with 1MB Video RAM and 65,536 Colours (TFT only)
- 4MB RAM Standard Upgradeable to 32MB
- 240MB/260MB/450MB Hard Disk Drives
- Built-In – Full 16 Bit Sound and Two Speakers
- Two PC-Card (PCMCIA) Type II Slots (or One Type III)
- Big 19mm Internal Trackball
- Ports – SVGA/Audio In/Audio Out/Microphone/Serial/Parallel/PS/2 Mouse & Keyboard/Docking Station
- Complete with – NiMH Battery (Up to 3 Hours)/AC Adapter & Battery Charger/Microsoft Dos and Windows 3.1 Plus Utilities

CF-41 DX/2 50 Dual Scan Colour 240MB	£2,649
CF-41 DX/2 50 TFT Colour 260MB	£3,399
CF-41 DX/4 100 TFT Colour 450MB	£4,199

COMMUNICATE PC-CARD (PCMCIA) MODEMS

Made in the UK – Best of Breed!

2496/Fax	£199
1440/Fax	£349
Cellular 1440/Fax	£499
NEW 2880/Fax	£469
NEW Cellular 2880/Fax	£569

GREY CELL PC-CARD (PCMCIA) ETHERNET

Made in the UK – Best of Breed!

- 100% NE2000 Compatible – Guaranteed
- Automatic Cable Type Detection
- CardDealer Software – Automatic Configuration
- Money Back Guarantee of Compatibility
- PC-Card Fibre Optic Solutions also available

10 Base 2 (BNC)/10 Base T (UTP)

Combo Card **£189**

01256 812720

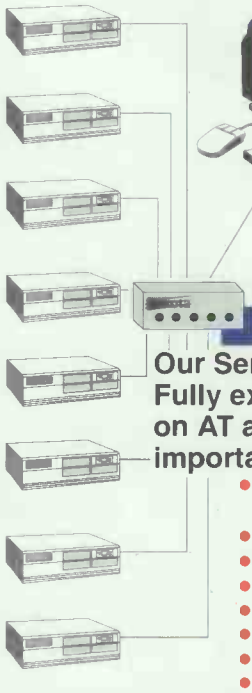
LAPLAND

LapLand UK Limited, Unit 4 Faraday Court, Rankine Road, Basingstoke Hampshire RG24 0PF Fax: 01256 812719

Dakota Computer Solutions

DAKOTA KEYBOARD, MONITOR & MOUSE SWITCHES

Our Dakota Keyboard, Monitor and Mouse switches allows you to control a number of computers with 1 Keyboard, Monitor and Mouse.



- 2, 4, 8 or 12 Computers controlled from 1 Keyboard, Monitor and/or Mouse
- VGA and SVGA Compatible (Up to 1280 x 1024)
- Works with AT/XT & PS/2 Keyboards
- Supports DOS, Windows, Windows NT and OS/2

2 Device Option 2 Computers to 1 Keyboard & Monitor	£29	2 Device Option 2 Computers to 1 Keyboard, Monitor & Mouse	£49
4 Device Option 4 Computers to 1 Keyboard & Monitor	£49	4 Device Option 4 Computers to 1 Keyboard, Monitor & Mouse	£69
8 Device Option 8 Computers to 1 Keyboard & Monitor	£179	12 Device Option 12 Computers to 1 Keyboard, Monitor & Mouse	£329
12 Device Option 12 Computers to 1 Keyboard & Monitor	£249		

SERVEVIEW - KEYBOARD, MONITOR & MOUSE - AUTOMATIC BOOTUP

Our ServeView automatic switch is the ultimate in computer switching devices. Fully expandable, it allows for automatic booting for both keyboards and mice on AT and/or PS/2 computers. A must for anyone where reliability is of prime importance.

New Products

- 4, 8, 12 or 16 Computers controlled from 1 Keyboard, Monitor and Mouse
- VGA, SVGA & EGA Compatible (Up to 1280 x 1024)
- Automatic booting with AT/XT & PS/2 Keyboards
- Automatic booting on Serial & PS/2 Mice
- Scan mode automatically switches between CPUs
- Num Lock, Scroll Lock & Caps Lock for all keyboards
- Supports upto 256 computers
- All commands can be done directly from the keyboard
- Non-Volatile memory stores configuration setup

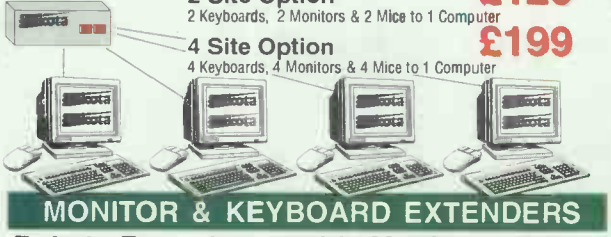
4 Device Option 4 CPUs to 1 Keyboard, Monitor & Mouse	£595
8 Device Option 8 CPUs to 1 Keyboard, Monitor & Mouse	£995
12 Device Option 12 CPUs to 1 Keyboard, Monitor & Mouse	£1395
16 Device Option 16 CPUs to 1 Keyboard, Monitor & Mouse	£1795
6 Device - Non PS/2 Type 6 CPUs (non-PS/2) to 1 Keyboard, Monitor & Mouse	£395

MULTI-ACCESS PC SHARERS

Dakota Multi-Access PC Sharers enable one computer to be shared by up to 4 Keyboards, Monitors and Serial Mice.

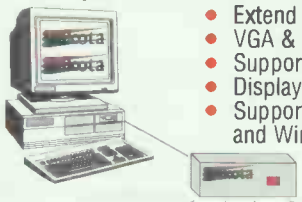
- Extend up to 75 metres away
- VGA & SVGA Compatible
- Up to 1280 x 1024 resolution
- Supports DOS, Windows, OS/2 & NT

2 Site Option 2 Keyboards & 2 Monitors to 1 Computer	£99
2 Site Option 2 Keyboards, 2 Monitors & 2 Mice to 1 Computer	£129
4 Site Option 4 Keyboards, 4 Monitors & 4 Mice to 1 Computer	£199



MULTI-DISPLAY DEVICES

Dakota Monitor Splitters allow up to 16 Monitors to display identical images. Perfect for exhibitions, training, presentations and demonstrations.



- Extend up to 75 metres away
- VGA & SVGA Compatible
- Supports up to 1280 x 1024
- Display on up to 16 Monitors
- Supports DOS, Windows, OS/2 and Windows NT

2 Monitors	£149
4 Monitors	£199
8 Monitors	£299
16 Monitors	£399

MONITOR & KEYBOARD EXTENDERS

Dakota Extenders enable Monitors and/or Keyboards to be used up to 150 metres for Monitors and 75 metres for Keyboards.

Monitor Extender £79 Keyboard Extender £79

PRINTER NET PLUS - PRINTER SHARING

Connect up to 32 PCs to 8 Parallel Printers.

Our Printer Net+ printer sharing devices allows you to connect 32 PCs to 8 printers up to 400m away using cheap telephone type cable. Simultaneous printing and data transfer between PCs.

Starter Kit 2 Tx 2 Rx £149 Transmitters 1 per computer £49 Receivers 1 per printer £49

SPECIAL OFFERS - CABLES

With any purchase get the following items at a very special price! All of our Cables are fully moulded. We stock a complete range of cables for your convenience. Call Now!!

SPECIAL

Parallel Printer Cables 1.8 metre	£ 1.00
Modem Cables 3.0 metre 9F - 25M	£ 2.50
Modem Cables 1.8 metre moulded 25F-25M	£ 1.50
Modem Cables 3.0 metre 25F - 25M	£ 2.50
Data Transfer Parallel Cables 5.0 metre Works with Laplink™ and Interlink.	£ 6.50

NETWORKING PRODUCTS

Reduced Price

- Thin Ethernet or Twisted Pair
- Supports 8 interrupts and 8 I/O addresses
- Auto-sensing 8 or 16 bit
- Complies with IEEE 802.3
- 10 Mbs transmission rate
- Auto configuration setup
- Easy to Install

yes NetWare Tested and Approved

NE2000 Compatible Ethernet Card. Ideal for Novell, IPX, ODI, NDIS & Windows £35 Network Card

Plugs directly into a Parallel Port, has a printer pass through & does not require an external power supply. £79 Pocket LAN

Call for Standard & Custom Cables, Disks & Printer Consumables.

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Ring Now for immediate delivery

Please quote PCW-0695

Not all PCs can stand...

...a close up

When the photographer moves in for a real close-up, only the very best models stand up to the scrutiny of the camera's lens and reveal their true quality.

In the PC industry, it's only the top models who wear the Gateway 2000® brand. And, the closer you look at Gateway, the easier it is to see why we're the value-for-money leaders in America – and in the UK. True value, that means you always get the most for your money – the very best products and services and the latest technology for the lowest possible cost. That's what Gateway mean by "value". It's our founding philosophy and a promise we'll never break. After all, our slogan is "You've got a friend in the business"– and a friend wouldn't sell you something you're not entirely pleased with, now would they?

So take a close-up look at Gateway. Compare our prices, quality, performance and service – Gateway 2000 are one of the few who can really stand up to the test.

Introducing The P5-120 Elite – It's So Fast And Feature-Packed, You'll Hardly Believe Your Eyes!

Gateway's new P5-120 Elite is the final word in power and performance. We're always one of the first to market with the very latest technology and the P5-120 bears testimony to our promise. This truly stunning system is based on Intel®'s latest, fastest CPU ever – the 120MHz Pentium® processor.

With 16MB EDO RAM, the very latest 'pipeline burst' cache technology, quad-speed CD-ROM with a triple-deck CD changer and a huge 1GB IDE hard drive with PCI enhanced IDE interface, ATI Mach 64 graphics with 2MB VRAM, the best speakers in the business and a 17-inch Vivitron™ monitor, the P5-120 from Gateway sets a new standard in personal computing. And at £2,599, it's a standard others will find hard to match.

Lights, camera, action – with Gateway 2000 the first take is a RAP – every time!

GATEWAY2000

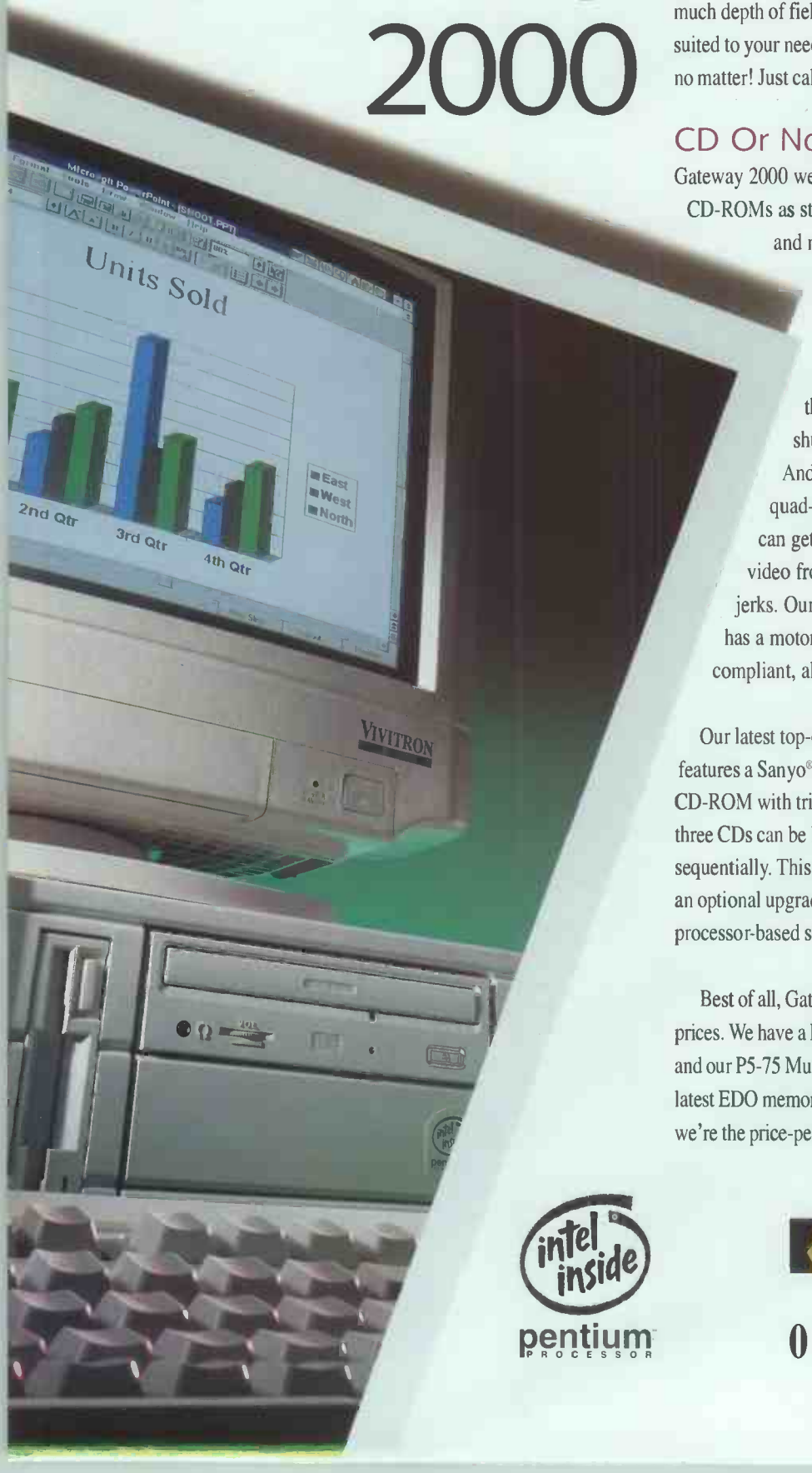
"You've got a friend in the business."

0800 172000

intel inside
pentium
PROCESSOR

No Matter How Close You Look, The Quality Shines Through At

Gateway 2000



We only sell fully equipped, high-performance computers, built with the finest components. We'll never compromise on quality by fitting inferior components or by stripping a machine down to reach what appears to be an appealing price. So when you see our competitors offering a Pentium processor-based system at a price you can hardly believe, take a closer look and see what you'll really get for your money!

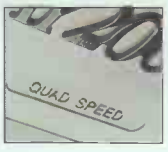
Then focus on our Pentium processor-based systems, there's so much depth of field you'll find it hard to choose the one that's best suited to your needs. And if you can't find what you're looking for – no matter! Just call us and we'll custom-build a system for you.

CD Or Not CD!

Gateway 2000 were the first PC company to introduce CD-ROMs as standard on our Pentium processor-based systems and now we've introduced the quad-speed CD-ROM on all our systems – installing the latest software applications has never been so fast, or so easy! As the name implies, this drive is four times faster than a standard-speed CD-ROM, with a throughput of 600KB per second, it's faster than the shutter speed on a Nikon F2! And remember it's only with a quad-speed CD-ROM that you can get full-screen, full-motion video from a CD – without the jerks. Our quad-speed CD-ROM has a motorised tray and is ATAPI compliant, all ready for Windows '95.

Our latest top-of-the-range P5-120 Elite features a Sanyo® quad-speed CD-ROM with triple-deck CD changer so three CDs can be loaded together and played sequentially. This feature is now available as an optional upgrade on all our Pentium processor-based systems.

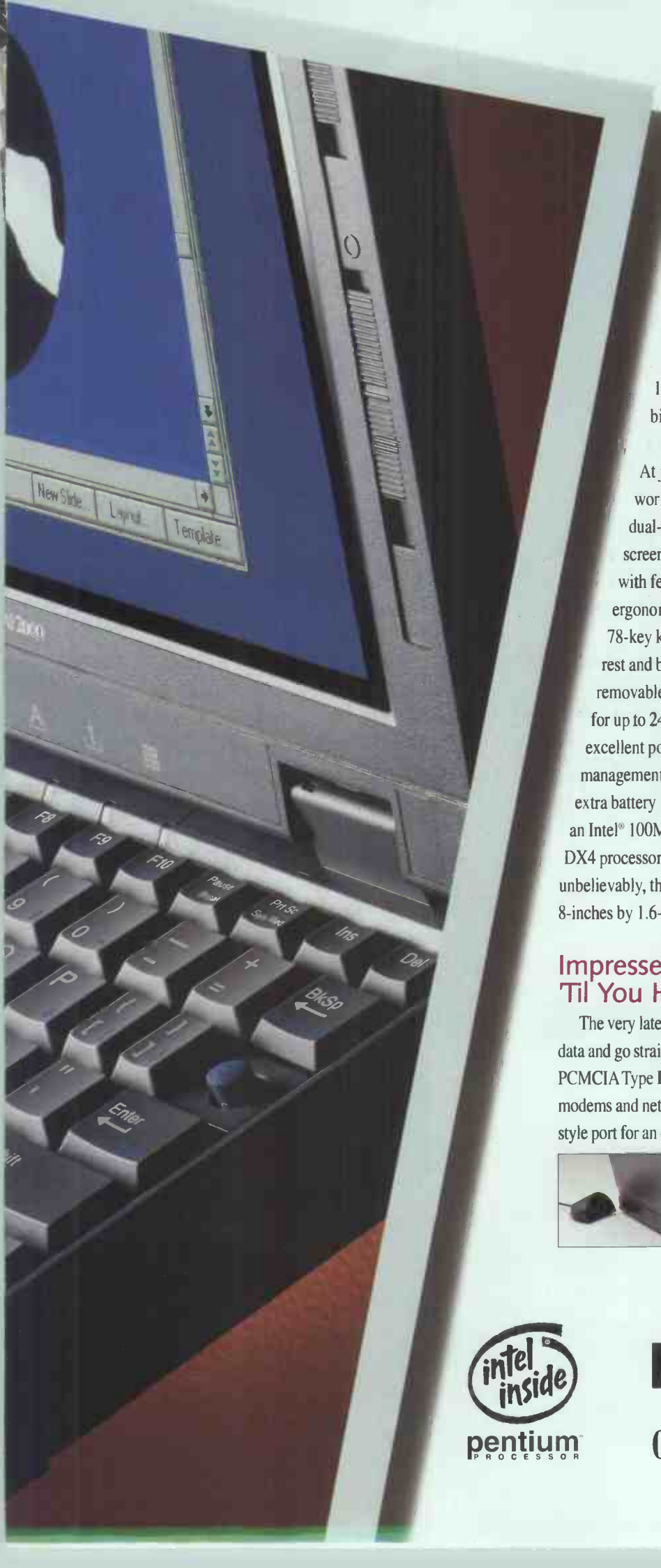
Best of all, Gateway bring you all this technology at unbelievable prices. We have a P5-90 Premium system for £1,999 and our P5-75 Multimedia model with the very latest EDO memory is only £1,499 – it's no wonder we're the price-performance leaders in the industry.



intel inside
pentium PROCESSOR

GATEWAY2000
"You've got a friend in the business."

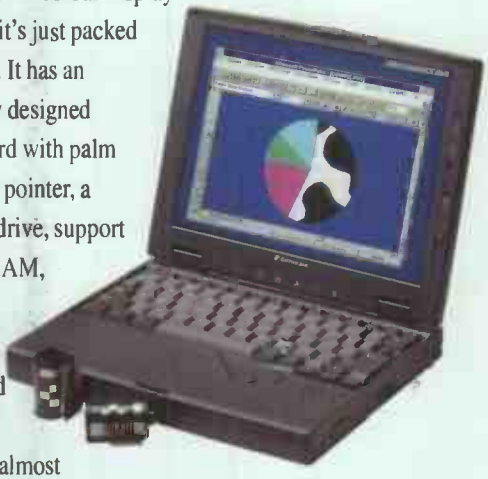
0800 172000



The Gateway 2000 Liberty™ – Closer To Perfection, Whichever Way You Look At It!

Photographer, accountant, lawyer, surveyor, whatever your profession the Liberty gives you the freedom to work anywhere – without compromise or hindrance. It's like having a 100MHz desktop inside a package no bigger than a book and, wow! Is it fast?

At just 4.2 pounds (1.9kg) Gateway's Liberty is the world's first notebook of this weight with a 10.4-inch, dual-scan, STN colour display screen. And it's just packed with features. It has an ergonomically designed 78-key keyboard with palm rest and built-in pointer, a removable hard drive, support for up to 24MB RAM, excellent power management for extra battery life and an Intel® 100MHz DX4 processor. And, almost unbelievably, the Liberty measures only 10-inches by 8-inches by 1.6-inches (25.4 x 20.3 x 4.1cms).



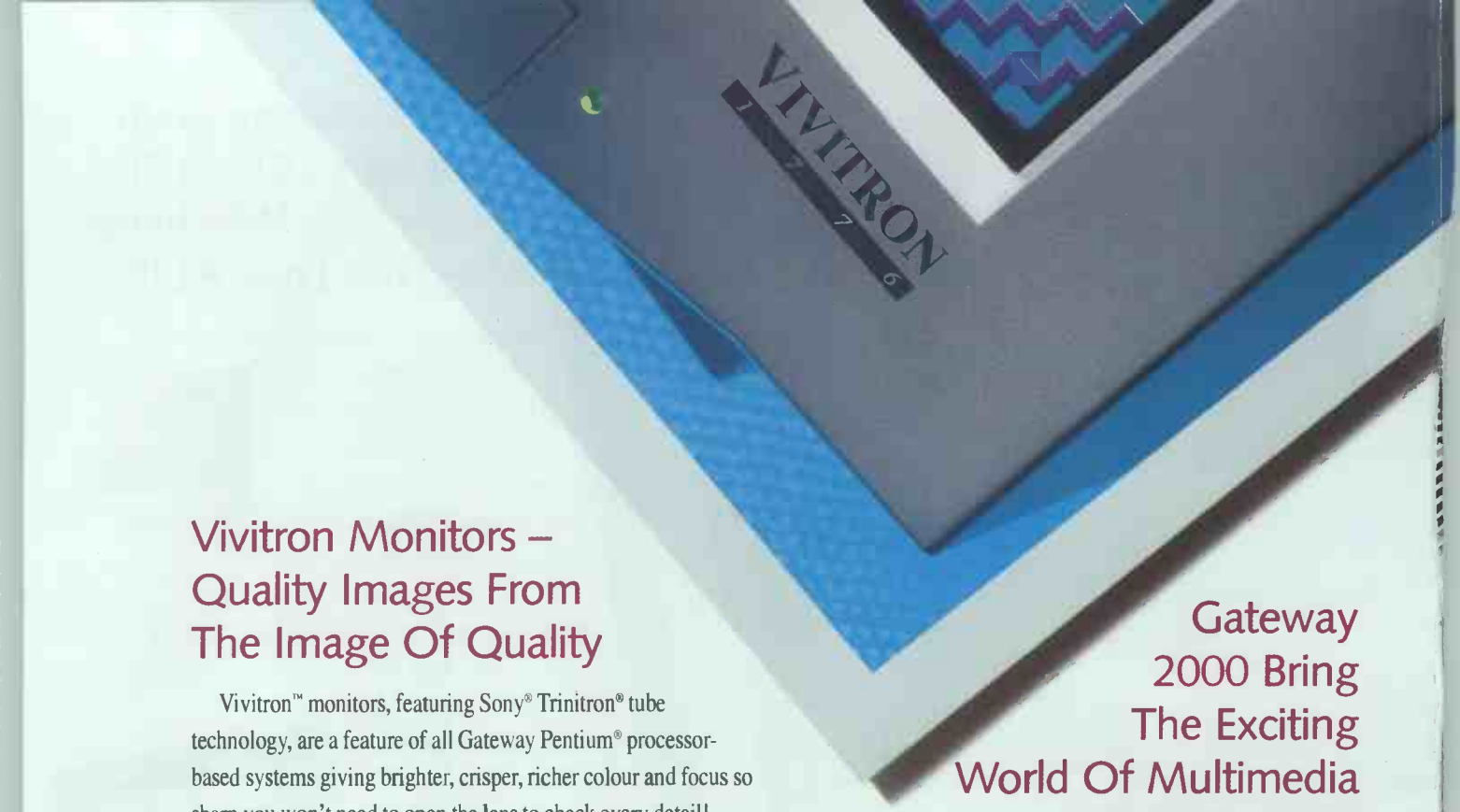
Impressed? Just Wait 'Til You Hear The Rest!

The very latest infrared connectivity lets you swap files, download data and go straight to print – without any wires! Then there are two PCMCIA Type II slots (or one Type III slot) for add-in cards like modems and network cards, plus a serial port, a parallel port, a PS/2-style port for an external keyboard or mouse and a VGA port for an external monitor. There's even a "hot-key" so you can choose to use either the Liberty's display, an external monitor or, wait for it, both at the same time!

intel inside
pentium PROCESSOR

GATEWAY2000
"You've got a friend in the business."

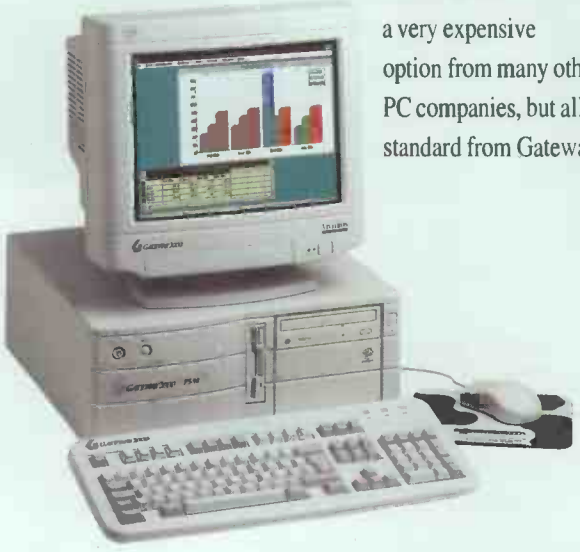
0 8 0 0 1 7 2 0 0 0



Vivitron Monitors – Quality Images From The Image Of Quality

Vivitron™ monitors, featuring Sony® Trinitron® tube technology, are a feature of all Gateway Pentium® processor-based systems giving brighter, crisper, richer colour and focus so sharp you won't need to open the lens to check every detail!

Our standard high-performance video system includes an ATI Mach 64 video card on the PCI local bus and a 17-inch Vivitron colour monitor – a very expensive option from many other PC companies, but all standard from Gateway!



Now take a close look at our P5-90 Premium system, its 15-inch Vivitron monitor gives you the best "view-finder" in the business. With an Intel® 90MHz Pentium processor, 16MB RAM, 256KB cache, quad-speed CD-ROM, a massive 1GB IDE hard drive with PCI enhanced IDE interface and ATI Mach 64 graphics with 2MB DRAM, premium speakers and sound card – would we give you anything less for only £1,999?

It's all part of our commitment to bring you the best products and the best value-for-money, however close you look.

Gateway 2000 Bring The Exciting World Of Multimedia Close To Hand

Whichever way you look at it, 10 x 8, 5 x 4, 2¼ or 35mm, no one is doing more to bring the exciting world of multimedia into the reach of everyone. From the entry level P4D-66I Family PC™ to our top of the range P5-120 Elite, these models have everything you need to start exploring and enjoying multi-media the minute you unpack your system.

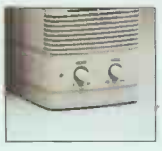
Introduce your family to multimedia with our Family PC, it's the lowest priced model in our family of multimedia systems. It comes with software for all ages including; Microsoft® Encarta, the dynamic multimedia encyclopaedia, Works, Money, Publisher, Golf and Musical Instruments – in fact something for all the family from aiding and encouraging homework to keeping household accounts and enjoying the fun of video games. For the professional user, our P5 Executive and Elite models come with Microsoft Office Professional™, that

includes Word, Excel, PowerPoint® and Access® – everything for the home office or to make the office seem more like home!

All Gateway multimedia systems have a built-in quad-speed CD-ROM drive, giving video

quality so good, it's just like watching television. And the latest feature from Gateway is the triple-deck CD changer, standard on the P5-120 and an optional upgrade on our other multimedia systems, this lets you load three CDs at once and then play them sequentially at will.

So now you can enjoy using your



PC not only for business and educational purposes, but also for your favourite games, programs, animation, video and all your best-loved music on CD. Beethoven to Bernstein, Reggae to Rap, the sound quality from our speakers – with separate sub-woofer on the high-end systems, will blow the mind of even the most demanding hi-fi enthusiast.

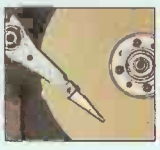
Gateway's super-value multimedia systems could become such a habit, you'll forget all about photography as a pastime!

Getting To The Heart Of The Matter

Some models might flinch at the idea of exposing themselves, but there's no hiding from the truth when you're stripped of all your outer garments! No false modesty at Gateway. We're proud to reveal ourselves and show you what's at the heart of our systems – a motherboard built with pride, built with care and built with the future in mind.

Take this latest Intel® motherboard for example, with Triton chip set and EDO memory, it's characteristic of our P5-75 and P5-120 systems. Future-proofed with three PCI slots, two ISA slots plus one PCI/ISA, expandability and upgradability are inherent – and because our motherboards all use genuine Intel processors, they are all Intel verified for upgradability.

PCI bus? You know it's better and faster than ISA, that's why it's there. RAM and cache? Gateway always give you plenty, so you won't find yourself short when you're trying to work with today's applications. And the very latest pipeline burst technology, standard in our P5-100 and P5-120 systems, gives you processing speed and flexibility previously unheard of. In the burst mode data can be transferred in 1, 2, 4, 8 or full page increments allowing uninterrupted transfer of large amounts of data. And the pipelining technique allows the SDRAM to overlap multiple instructions so that a continuous stream of data is produced.



Hard drives? Well yes they're BIG, FAST and very reliable, giving you all the speed and efficiency you'll need.

Take a close-up look at the heart of Gateway's systems – we've nothing to hide, in fact, with so much physical space around our components, giving you room for expansion and upgrades, we couldn't hide anything even if we wanted to!

With so much quality and value-for-money it's no wonder Gateway 2000, America's number one direct-sell PC manufacturer, is the fifth largest in the world and thanks to our UK customers we're the eighth largest in the UK – after just over a year in the UK market.*

**International Data Corporation, November 1994.*

We've Developed Service That Stands Up To The Closest Scrutiny

At Gateway, we turn the camera on you, because to us our customers are our top models. Gateway's friendly and expert sales and customer services staff will be pleased to answer your questions and assist with your order. And our service continues for as long as you own a Gateway system.

30-Day Money-Back Guarantee

If for any reason you are not entirely satisfied with your Gateway 2000 purchase, we'll happily refund all but the shipping charges when you return your merchandise within 30 days.

Three-Year Warranty And On-Site Service

All components of our desktop and tower PCs are backed for a full three years (portables include a one-year factory service warranty), with one-year on-site service provided at our discretion.

Lifetime Freephone Technical Support

You are welcome to use our freephone technical support hotline for the life of your Gateway system. No matter what the problem with hardware or software we've supplied, we'll always try to help you.

Convenient Payment Options

We offer several convenient ways to pay for your new Gateway 2000 PC, please call and ask for details.

Whether you're a corporate buyer making a multi-system purchase, or an individual with one-off requirements, we invite you to take a close-up of the competition and then compare them with Gateway. For quality, service and honest value-for-money Gateway stand up to the test – no matter how close you look. So call us now, it could be the the most valuable free phone call you'll ever make!

Take A Close-Up Look At Our Prices

Professional Systems

P4D-66I

- Intel® 66MHz 486DX2 Processor*
- 4MB RAM
- 3.5" Diskette Drive
- Quad-Speed CD-ROM
- 540MB 11ms IDE Hard Drive with PCI Enhanced IDE interface
- PCI Integrated Local Bus Graphics with 1MB
- 14" CrystalScan® Colour Monitor
- Mini Desktop Case
- 102-Key Keyboard & MS Mouse
- MS-DOS® 6.22, WFW 3.11
- MS Works for Windows™ 3.0
- MS Money

£849

P4D-66

- Intel 66MHz 486DX2 Processor*
- 8MB RAM,128KB Cache
- 3.5" Diskette Drive
- Quad-Speed CD-ROM
- 540MB 11ms IDE Hard Drive with PCI Enhanced IDE Interface
- PCI Local Bus Graphics with 1MB
- 15" Vivitron® Colour Monitor
- Desktop Case
- 102-Key Keyboard & MS Mouse
- MS-DOS 6.22, WFW 3.11
- MS Office Professional™ 4.3

£1199

P5-75

- Intel 75MHz Pentium® Processor*
- 8MB EDO RAM
- 3.5" Diskette Drive
- Quad-Speed CD-ROM
- 730MB 10ms IDE Hard Drive with PCI Enhanced IDE Interface
- PCI Local Bus Graphics with 1MB
- 15" Vivitron Colour Monitor
- Desktop Case
- 102-Key Keyboard & MS Mouse
- MS-DOS 6.22, WFW 3.11
- MS Office Professional 4.3

£1299

P5-100

- Intel 100MHz Pentium Processor*
- 8MB RAM
- 256KB Pipeline Burst Cache
- 3.5" Diskette Drive
- Quad-Speed CD-ROM
- 1GB 10ms IDE Hard Drive with PCI Enhanced IDE Interface
- ATI Mach 64 Graphics, 2MB DRAM
- 15" Vivitron Colour Monitor
- Desktop Case
- 102-Key Keyboard & MS Mouse
- MS-DOS 6.22, WFW 3.11
- MS Office Professional 4.3

P5-100 · £1599
P5-120 · £1799

Multimedia Systems

P4D-66I FAMILY PC™

- Intel 66MHz 486DX2 Processor*
- 8MB RAM
- 3.5" Diskette Drive
- Quad-Speed CD-ROM
- 540MB 11ms IDE Hard Drive with PCI Enhanced IDE Interface
- PCI Integrated Local Bus Graphics with 1MB
- 16-Bit Sound Card with Speakers
- 14" CrystalScan Colour Monitor
- Mini Desktop Case
- 102-Key Keyboard & MS Mouse
- MS-DOS 6.22, WFW 3.11
- Family PC Software Bundle
- MS Encarta '95

£1099

P5-75 MULTIMEDIA

- Intel 75MHz Pentium Processor*
- 8MB EDO RAM
- 3.5" Diskette Drive
- Quad-Speed CD-ROM
- 730MB 10ms IDE Hard Drive with PCI Enhanced IDE Interface
- ATI Mach 64 Graphics, 2MB DRAM
- Ensoniq Wavetable Sound Card with Premium Speakers
- 15" Vivitron Colour Monitor
- Desktop Case
- 102-Key Keyboard & MS Mouse
- MS-DOS 6.22, WFW 3.11
- MS Office Professional 4.3
- MS Encarta '95

£1499

P5-90 PREMIUM

- Intel 90MHz Pentium Processor*
- 16MB RAM, 256KB Cache
- 3.5" Diskette Drive
- Quad-Speed CD-ROM
- 1GB 10ms IDE Hard Drive with PCI Enhanced IDE Interface
- ATI Mach 64 Graphics, 2MB DRAM
- Ensoniq Wavetable Sound Card with Premium Speakers
- 17" Vivitron Colour Monitor
- Desktop Case
- 102-Key Keyboard & MS Mouse
- MS-DOS 6.22 & WFW 3.11
- MS Office Professional 4.3
- MS Encarta '95

£1999

P5-100 EXECUTIVE

- Intel 100MHz Pentium Processor*
- 16MB RAM
- 256KB Pipeline Burst Cache
- 3.5" Diskette Drive
- Quad-Speed CD-ROM
- 1GB 10ms IDE Hard Drive with PCI Enhanced IDE Interface
- ATI Mach 64 Graphics, 2MB VRAM
- Ensoniq Wavetable Sound Card with Premium Speakers
- 17" Vivitron Colour Monitor
- Tower Case (145 watt)
- 125-Key AnyKey® Keyboard & MS Mouse
- MS-DOS 6.22, WFW 3.11
- MS Office Professional 4.3
- MS Encarta '95

£2199

NEW Top-of-the-Range System

P5-120 ELITE

NEW

- Intel 120MHz Pentium Processor*
- 16MB EDO RAM
- 256KB Pipeline Burst Cache
- 3.5" Diskette Drive
- Triple Deck Quad-Speed CD-ROM
- 1GB 10ms IDE Hard Drive with PCI Enhanced IDE Interface
- ATI Mach 64 Graphics, 2MB VRAM
- Ensoniq Wavetable Sound Card with Premium Speakers
- 17" Vivitron Colour Monitor
- Tower Case (300 watt)
- 125-Key AnyKey Keyboard & MS Mouse
- MS-DOS 6.22, WFW 3.11
- MS Office Professional 4.3
- MS Encarta '95
- MS Money 3.0

£2599

Portables

LIBERTY™ DX4-100

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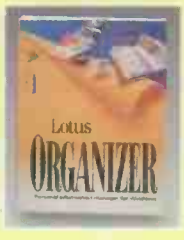

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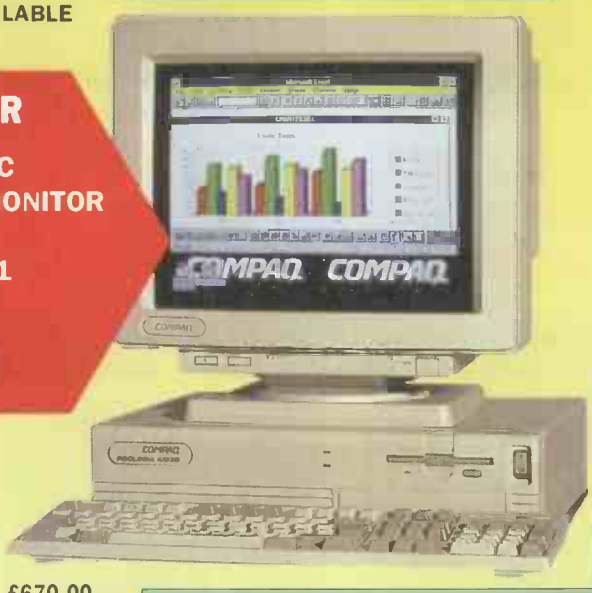

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- 3 year parts and labour warranty (first year on site)
- Operating systems: OS/2 Lan Server SMP, SCO Unix with SMP extns, Windows NT 3.5 (not supplied).

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Accura Integrated RAID with single Intel Pentium® 90 CPU as specified in features	£6899
Accura Integrated RAID with Intel® Pentium® 100 CPU as specified in features	£6999
Accura Modular RAID with single Intel® Pentium® 90 CPU with 8gb total array	£8894
Accura Modular RAID with single Intel® Pentium® 100 CPU with 8gb total array	£8994

Integrated Options

1gb → 2gb fast SCSI-II HDD (per drive)	£399
1gb → 4gb fast SCSI-II HDD (per drive)	£899
Main system memory upgrades per 1mb	£31
RAID cache upgrades per 1mb	£36
Intel Pentium® 90 CPU and active h/sink	£379
Intel Pentium® 100 CPU and active h/sink	£479
5 x1gb RAID → 5 x 2gb RAID 8gb total capacity	£1995
5 x1gb RAID → 5 x 4gb RAID 8gb total capacity	£4495
Motherboard and RAID controller ECC memory upgrade (per 1mb)	£CALL
Large server case with 2 x 300W hot swappable PSU's (u/g from std case)	£1199
4 -16gb DDS-2 DAT backup (internal)	£779
DAT DDS-2 autoloaders	£CALL
Intel Pro 100, 100/10mbps PCI ethernet	£199
Bus mastering 10mbps PCI ethernet	£129
Optical drives and jukeboxes	£CALL
CD-ROM jukeboxes	£CALL

Adams service

Warranty: For your peace of mind Adams offer a 3 year parts and labour warranty on your RAID system. The first year of this warranty is on-site with BS5750 standard eight hour response provided by our partner ICL. All main system components are covered except monitors which are covered by their own manufacturers gurantees. The on site service can be extended up to 3 years, and in certain areas, a four hour response time can be provided. Please call for specific quotations.

Ordering: We are pleased to accept enquiries between 9am and 6pm Monday to Friday. All RAID systems are normally shipped within 2 weeks of order. We accept cheque with order, Visa, Mastercard or American Express. PO's are welcome from FTSE100 listed companies and government departments. Carriage charges at cost, normally around £25 per system. All prices quoted are subject to VAT.

Adams' are the official computer supplier to Williams Renault for 1995

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Adams

Advanced Computer Technology

ADAMS TECHNOLOGY LTD. CITY POINT, CHESTER RD, OLD TRAFFORD, MANCHESTER M32 0RW UK. FAX: 0161 877 8684

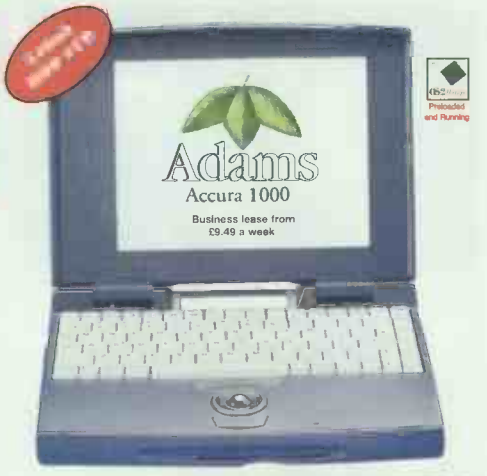
Accura 1000

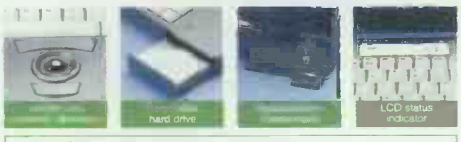
our new value for money, full featured, entry level notebook

Our new Accura 100, represents the *best* in value for money Notebooks. A complete full featured 3.3v CPU based machine with local bus graphics, 2 PCMCIA slots, Ni MH battery and Windows sound system built in. A front mounted trackerball and LCD status display rounds off the feature list on the best value for money portable computer available today. The Accura 1000 comes preloaded with Win OS/2 Warp 3.0 and IBM Works Bonus Pack.

Accura 1000 features

- 3.3v 486DX2-50 SL enhanced CPU upgradeable to 486DX4-100
- 4mb standard memory upgradeable to 32mb
- Quick removable 340mb 2.5" fast IDE hard drive upgradeable to 1gb.
- Sound Blaster® audio compatibility with built in speaker and microphone
- 9.5" Mono LCD with 64 grey levels, Dual Scan Passive Colour or TFT active colour displaying 256 colours, quickly interchangeable
- Local bus graphics accelerator with 1mb RAM giving simultaneous LCD/CRT display and CRT resolutions up to 1024 x 768
- 1.44mb floppy disk drive built in
- BIOS controlled power management with SMM stop clock, suspend to disk function and APM support
- Built in LCD status Indicator
- 19mm trackerball built in
- 2 PCMCIA type II and 1 type III slot (type IV slot)
- NI MH battery standard
- 1 serial port, 1 enhanced parallel port (EPP/EPS), external CRT port, external keyboard port
- Docking Station port
- Full function 84 key UK keyboard
- Multi voltage 90-240v charger power supply (2 hour charge time)
- Weight 2.7kgs with hard drive and battery
- 1 year parts and labour warranty
- 14 day money back guarantee of satisfaction.





Accura 1000 prices

Model	Mono	Dual Scan Colour	TFT Active Colour
486DX2-50	£999	£1399	£1999
486DX4-75	£1099	£1499	£2099
486DX4-100	£1149	£1549	£2149

Accura 1000 options

Memory upgrade to 8mb	£169
Memory upgrade to 12mb	£325
Memory upgrade to 20mb	£695
Upgrade HDD from 340mb - 520mb	£99
Upgrade HDD from 340mb - 810mb	£279
Upgrade HDD from 340mb - 1gb	£439
Additional main battery	£89
Car power adaptor	£55
Docking station	£399
Deluxe carry case	£39
PCMCIA 9600/2400 modem	£139
PCMCIA V32bis fax modem from	£199
3 year on site warranty	£150

Win OS/2 3.0 features

- Fast! Full 32 bit operating system
- Windows kernal included, no need to load Windows
- Compatible! Runs all your OS/2, DOS and Windows applications without having to load another operating system!
- Crash proof! If an application fails to respond simply close the Window you are working in and continue working with OS/2
- Full intuiative tutorial that lets you "have a go" with any feature

Win OS/2 bonus pack features

- IBM works (word processor, spread sheet, database, charting tool and report writer)
- IBM Personal Information Manager (Diary, calendar etc)
- Fax Works (send a fax at the press of a buttton!)
- Also: Internet, Compuserve, Multimedia, Person to Person

Lightweight?

Accura Portable

Our best selling modular notebook

The Accura Portable has proved to be one of the best selling computers we've ever sold. many customers who would only buy big brand names are buying the Accura Portable..why? It truly represents outstanding value for money, with a construction quality better than many of the larger manufacturers, blindingly fast performance with a fully modular design. The Accura Portable is preloaded with Win OS/2 Warp and Bonus Pack.

Accura Portable features

- 486DX2-50 SL 'enh CPU upgradeable to 486DX4-100
- 4mb standard memory upgradeable to 20mb
- Quick removable 340mb 2.5" fast IDE hard drive upgradeable to 1gb.
- Yamaha audio chip providing Sound Blaster® compatibility with built in speaker and microphone
- 9.5" Mono LCD with 64 grey levels, Dual Scan Passive Colour or TFT active colour displaying 256 colours, quickly interchangeable
- Local bus graphics accelerator (WD Rocket Chip) with 1mb RAM giving simultaneous LCD/CRT display and CRT resolutions up to 1024 x 768
- Removable 1.44mb floppy disk drive
- "PICO Power" chipset featuring BIOS controlled power management with SMM stop clock and suspend to disk function and built in battery meter
- 19mm Logitech trackerball built in
- 2 PCMCIA type II and/or 1 type III slot
- Ni MH battery standard (quickly interchangeable)
- 1 serial port, 1 enhanced parallel port (EPP/EPS), external CRT port, external keyboard/mouse port, d/station port
- Full function 86 key UK keyboard
- Multi voltage 90-240v charger power supply (1.5 hour charge time)
- Weight 2.4kgs mono, 2.7kgs colour
- Carry slip and utility disk included
- 1 year parts and labour warranty
- 14 day money back guarantee of satisfaction

Accura Portable Prices

Model	Mono	Dual Scan Colour	TFT Active Colour
486DX2-66	£1099	£1449	£2049
486DX4-75	£1149	£1499	£2099
486DX4-100	£1199	£1549	£2149

Accura Portable options

Memory upgrade to 8mb	£169
Memory upgrade to 12mb	£299
Memory upgrade to 20mb	£699
Upgrade HDD from 340mb - 520mb	£99
Upgrade HDD from 340mb - 810mb	£279
Upgrade HDD from 340mb - 1gb	£439
Additional main battery	£89
Docking station	£375
Deluxe carry case	£39
PCMCIA 9600/2400 modem	£139
PCMCIA V32bis fax modem from	£199
PCMCIA ethernet card from	£149

Adams warranties

Desktop systems: For your peace of mind Adams are pleased to annouce our new 3 year parts and labour warranty on all desktop systems. The first year of this warranty is on-site with BS5750 standard eight hour response provided by our partner ICL. All main system components are covered except monitors which are covered by their own manufacturers gurantees. This package is one of the best warranties on the market. The on site service can be extended up to 3 years. Please call for specific system quotaions.

Portables: Your portable system is coveverd by a 1 year back to base warranty. We have found that in the majority of cases it is quicker and easier to have your notebook returned to our workshop for any service that might be necessary. The exception is the Accura 1000 which has a manufacturers option of a 3 year on site warranty (listed above)

We hope you get many years of satisfaction from your Adams Accura Portable or Desktop System

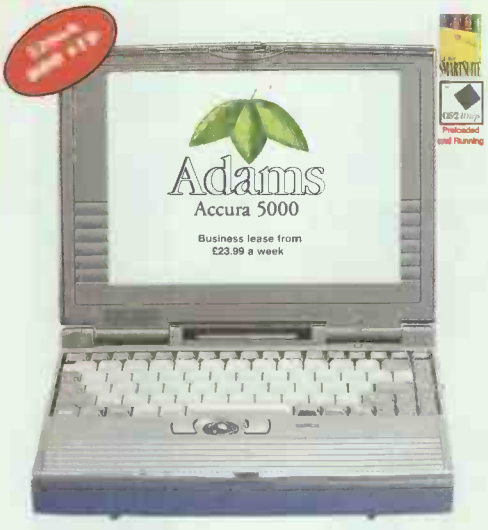
Accura 5000

Pentium 90 Notebook

Accura 5000. Fitted with either 75 or 90 mhz Pentium CPU. With a new 10.3" double refresh colour STN or 10.4" TFT active matrix display. 256k level 2 CPU cache, supports the PCI local bus, hard drive interface and graphics controller. 3 PCMCIA slots, 8mb of RAM, full Soundblaster® compatibility combine to make the Accura 5000 one of the highest performing portable computers avaiable today. The Accura 5000 is preloaded with Win OS/2 Warp and IBM Works Bonus Pack, together with and Lotus Smart Suite for OS/2.

Accura 5000 features

- Intel Pentium P75 or P90 CPU
- 16k level 1 and 256k level 2 cache
- 8mb standard memory upgradeable to 40mb
- 32 bit PCI local bus mode 3 contoller with 520mb 2.5" fast IDE hard drive upgradeable to 720mb.
- Sound Blaster® 16 bit stereo compatibility with built in speakers and microphone
- 10.3" STN double refresh (Quad Scan) Passive Colour or 10.4" TFT active colour displaying 256 colours
- PCI 32 bit local bus graphics accelerator (C&T 65545) with 1mb RAM giving simultaneous LCD/CRT display and CRT resolutions up to 1024 x 768
- Built in 1.44mb floppy disk drive
- Jade GL829X chipset featuring BIOS controlled power management with suspend, suspend to disk function
- 16mm trackerball built in
- 2 PCMCIA type 2 and/or 1 type 3 slot
- Infrared communications port
- Ni MH battery standard (quickly interchangeable)
- 1 serial port, 1 enhanced parallel port (EPP/EPS), external CRT port, external keyboard/mouse port, d/station port
- Full function 86 key UK keyboard
- Multi voltage 90-265v charger power supply (2.0 hour charge time)
- Dimensions(mm) 279w x 218d x 51.5h Weight 3.09kgs
- Carry slip and utility disks included
- 1 year parts and labour warranty
- 14 day money back guarantee of satisfaction



Model	Quad Scan	TFT Active Colour
P75	£2499	£3499
P90	£2649	£3649

Accura 5000 options

Memory upgrade to 16mb	£309
Memory upgrade to 24mb	£679
Memory upgrade to 32mb	£988
Memory upgrade to 40mb	£1358
Upgrade HDD from 520mb - 720mb	£129
Additional main battery	£95
Docking station (with speakers and floppy drive)	£399
Deluxe carry case	£39
Car power adaptor	£65
PCMCIA V32bis fax modem from	£199

Lotus SmartSuite features

- Lotus 1-2-3
- Lotus Freelance Graphics
- Lotus AMI Pro
- Lotus cc:Mail
- Adobe Type Manager included

- Lotus Smart Suite for OS/2 3.0 has more easy to use features than the Windows version
- The same easy to use interface is shared with all Smart Suite applications. Similar menu's, commands and Smart Icons dramatically reduce the learning curve.
- Unique Integration: share all Smart Suite files, create hot live links between applications
- Mail enabled: One click access to cc:Mail from any application
- Drag and drop files into applications to open them
- Drag and drop graphics into frames.
- File names up to 254 characters
- Right mouse button single click access to Workplace Shell
- Crash protection! Crashes don't bring down entire system

Heavyweight!

Accura 6000

Pentium 100 Superbook

Accura 6000. The ultimate Pentium® notebook. The only 100mhz P5 Notebook in production currently. Probably the most expensive notebook available? This machine brings workstation performance to the portable PC. A complete desktop replacement computer with the CPU running on a 64 bit bus linking the 256k cache and 8mb RAM standard memory, a 32 bit PCI bus controls the 340mb fast SCSI-II hard drive and very fast graphics accelerator. The 10.4" TFT LCD displays 65,536 colours, with simultaneous CRT display and with integrated 16 bit stereo sound provides the ideal presentation machine. Their are no problems with cooling as heat is disappated to the cast magnesium alloy case. The Accura 6000 is loaded with Win OS/2 Warp and IBM Works Bonus Pack, together with and Lotus Smart Suite for OS/2.

Accura 6000 features

- Intel Pentium 100mhz CPU
- 16k level 1 and 256k level 2 cache
- 8 mb standard memory upgradeable to 128mb (64 bit)
- 32 bit PCI local bus contoller with 340mb 2.5" fast SCSI-II hard drive upgradeable to 810mb.
- Sound Blaster® 16 bit stereo compatibility with built in speakers and microphone
- 10.4" TFT active colour displaying 65,536 colours
- PCI 32 bit local bus graphics accelerator (WD90C24A2) with 1mb RAM giving simultaneous LCD/CRT display and CRT resolutions up to 1024 x 768
- External 1.44mb ulta-low profile floppy disk drive
- BIOS controlled power management with sleep, suspend & resume functions
- Trackpoint, pointing device integrated into keyboard
- 2 PCMCIA type 1/2 or 1 type 3 slot
- Ni MH battery standard (quickly interchangeable)
- 1 serial port, 1 enhanced parallel port (EPP/EPS), external CRT port, external keyboard/mouse port, d/station port
- Full function 82 key Lexmark UK keyboard
- Multi voltage 110-240v charger power supply (2.0 hour charge time)
- Dimensions(mm) 300w x 216d x 51h Weight 3.4kgs
- Leather carrying case included
- 1 year parts and labour warranty

Made in England for Adams

Accura 6000 options

Accura 6000	TFT Active Colour
P100	£5495

Please call for details on the full range of Accura 6000 configurations and accessories

Terms and conditions: *14 day money back guarantee does not apply to special orders. * 3 year warranty subject to warranty terms and conditions. Carriage charges: Notebooks £12. Systems £20. All prices quoted are subject to change without notice, availability and VAT. Payment by cleared funds, VISA or Mastercard. P.O.'s welcome from FTSE100 companies, universities, government departments and local authorities. Adams Technology was established in 1989 and is already a corporate, university and MOD supplier. E & O.E. *For the faint hearted all machines can be supplied with optional DOS & Windows.

Our pledge

Adams Technology pride ourselves on our products and service. We offer a 14 day money back guarantee* on all Accura Portables and most systems. A direct technical support line and technical information line are available during business hours. We do our best to ship notebooks within 2-3 days and desktops within 7-10 days. Please don't forget to add VAT to all prices quoted. See previous page for ordering details.

We will keep you up to date with the latest technological advances and where possible offer advantageous upgrades to your Accura Computer

Try something different, try Adams Technology for quality, value for money products and a service second-to-none.

VISA · MasterCard

Official Supplier
Williams Touring Car Engineering

Adams' are the official computer supplier to Williams Renault for 1995

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Advanced Computer Technology

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*Warranty and money back guarantee subject to Adams Technology's terms and conditions.

More Speed

With constantly changing software and the ever increasing need for faster, faster and faster hardware, you might be thinking where will this ever end? Who knows? The answer is probably never. Here at Adams we are constantly striving to to stay well ahead of the software development spiral, by provide higher and higher performance computers. Every product we make is continually reviewed with a view to improving not only performance, but reliability, quality and our overall service.

Professional This month we launch our new Professional Desktop systems, based on the Intel Triton® chipset. Not only do these feature new core logic, they have a very fast pipeline burst SRAM secondary cache and also support EDO memory, which gives extra buffering to memory writes. However the Triton® is not the ultimate solution for all. The Neptune and VLSI chipsets still provide significant advantages in other areas for servers and engineering workstations. Please call to find out why.

3 year warranty

All Adams systems come with a three year parts and labour warranty*. The first year is on site BS5750 approved service provided by ICL. After year one your machine is covered for a further 2 years on a return to base service. If desired this can be upgraded to a full 3 year on site service. We have also further improved technical support (hardware) services and have added a technical information line for more routine enquiries.

OS/2 Warp

Adams ship Win OS/2 Warp V3.0 with all our non-server systems. With a Windows® kernel integrated into it, Win OS/2 will run all your OS/2, Windows® and DOS software in a stable crash free environment, without having to buy any additional operating system. IBM Works Bonus Pack is included.

Lotus Smart Suite for OS/2 is bundled with many units in our range. This provides AMI Pro, Lotus 1-2-3, Lotus Freelance Graphics and cc:Mail. A complete suite of applications with many more features than offered by the equivalent Windows versions.

Premium Don't forget our Premium systems are available for those who need a high performance, excellent quality and high value for money system. Call sales now on 0161 877 8822 for further information on the complete Adams' family!

PS: Please check with sales for any price and specification variations.

Accura *Premium*

Premium 486

486DX2-66 £849 + VAT	
486DX4-100 £999 + VAT	

- 486DX2-66 or DX4-100 CPU
- 256k external cache
- 4mb RAM (max 128mb)
- 540mb sub 12ms IDE hard drive with built in IDE controller
- 3.5" 1.44mb floppy drive
- Accelerated local bus graphics engine with 1mb RAM (max 2mb)
- 14" Accuscan energy saving, MPR–II monitor, NI, max res 1024 x 768
- 2 serial, 1 parallel port
- Slim desktop case
- Accutouch 102 key UK keyboard
- Microsoft Ergonomic Mouse
- 3 year parts and labour warranty (first year on site)
- Win OS/2 V3.0 preloaded and running
- IBM Works Bonus Pack preloaded and running

Premium 586

P60 £1299 + VAT	P75 £1349 + VAT
P90 £1499 + VAT	P100 £1599 + VAT

- Intel® Pentium® 60mhz or 75/90/100mhz CPU
- PCI local bus
- 256k external cache
- 8mb RAM (max 128mb)
- 730mb 11ms IDE hard drive with PCI 32-bit IDE controller
- Quad speed multi session CD–ROM drive
- 3.5" 1.44mb floppy drive
- Fast PCI graphics card with 2mb RAM
- 15" Accuscan energy saving, MPR–II monitor, NI, max res 1280 x 1024
- 2 serial, 1 parallel port
- Desktop case with 200w PSU
- Accutouch 102 key UK keyboard
- Microsoft Ergonomic Mouse
- 3 year parts and labour warranty (first year on site)
- Win OS/2 V3.0 with Bonus Pack preloaded and running
- Lotus Smart Suite for OS/2 preloaded and running

Faster...Fast

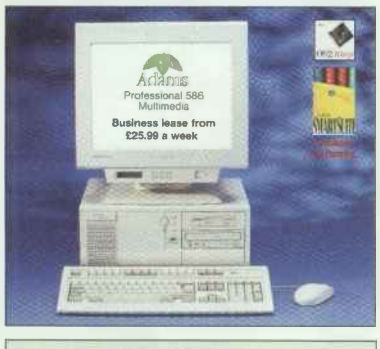
Accura *Professional* Powered by MICRONICS

Professional 586 WS

P90 £2299 + VAT	
P100 £2399. VAT	P120 £2599 + VAT

- Intel Pentium® 90/100/120 mhz CPU
- Intel Triton chipset
- Plug and play compatible with auto configuration
- 256k pipeline burst synchronus SRAM
- 16mb EDO RAM (max 128mb)
- 1.0gb sub 10ms IDE hard drive with PCI 32 bit mode 3/4 enhanced IDE controller
- Quad speed multi session CD–ROM drive
- 3.5" 1.44mb floppy drive
- Diamond Stealth 64 Video PCI graphics card with 2mb VRAM
- 15" Accuscan energy saving, MPR–II monitor, NI, max res 1280 x 1024, 75hz refresh
- 2 serial (16550), 1 parallel port (EPP/ECP)
- Desktop Case with 200w PSU
- Accutouch 102 key UK keyboard
- Microsoft Ergonomic Mouse
- 3 year parts and labour warranty (first year on site)
- Win OS/2 V3.0 with preloaded and running
- Lotus Smart Suite for OS/2 preloaded and running

Professional 586 MM



P90 £2699 + VAT	
P100 £2799 + VAT	P120 £2999 + VAT

- Intel Pentium® 90/100/120 mhz CPU
- Intel Triton chipset
- Plug and play compatible with auto configuration
- 256k pipeline burst synchronus SRAM
- 16mb EDO RAM (max 128mb)
- 1.0gb sub 10ms IDE hard drive with PCI 32 bit mode 3/4 enhanced IDE controller
- Quad speed multi session CD–ROM drive
- Soundblaster® AWE32 sound card and pro-dig spkrs
- 3.5" 1.44mb floppy drive
- Diamond Stealth 64 Video PCI graphics card with 2mb VRAM
- 17" Idek MF8617 energy saving, MPR–II monitor, NI, max res 1600 x 1200, max refresh 100hz
- 2 serial (16550), 1 paralle port (EPP/ECP)
- Desktop Case with 200w PSU
- Accutouch 102 key UK keyboard
- Microsoft Ergonomic Mouse
- 3 year parts and labour warranty (first year on site)
- Win OS/2 V3.0 with preloaded and running
- Lotus Smart Suite for OS/2 preloaded and running

superb quality and value for money

Premium 586 Work Station

P60 £1749 + VAT	**P75 £1799** + VAT
P90 £1949 + VAT	**P100 £2049** + VAT

- Intel® Pentium® 60mhz or 75/90/100mhz CPU
- PCI local bus with 256k external cache
- 16mb RAM (max 128mb)
- 1gb sub 10ms IDE hard drive with PCI 32-bit mode 3 enhanced IDE controller
- Quad speed, multi session CD–ROM drive
- 3.5" 1.44mb floppy drive
- Ultra fast 64 bit PCI graphics card with 2mb DRAM
- 15" Accuscan energy saving, MPR–II monitor, NI, max res 1280 x 1024
- 2 serial, 1 parallel port
- Desktop case with 200w PSU
- Accutouch 102 key UK keyboard
- Microsoft Ergonomic Mouse
- 3 year parts and labour warranty (first year on site)
- Win OS/2 V3.0 with Bonus Pack preloaded and running
- Lotus Smart Suite for OS/2 preloaded and running

Premium 586 Multi Media

P60 £1999 + VAT	**P75 £2049** + VAT
P90 £2199 + VAT	**P100 £2299** + VAT

- Intel® Pentium® 60mhz or 75/90/100mhz CPU
- PCI local bus with 256k external cache
- 16mb RAM (max 128mb)
- 1.0gb sub 10ms IDE hard drive with PCI 32-bit IDE controller
- Quad speed, multi session CD–ROM drive
- Soundblaster® Pro 16 and speakers
- 3.5" 1.44mb floppy drive
- Ultra fast 64 bit PCI graphics card with 2mb DRAM
- 17" Accuscan MPR–II monitor, NI, max res 1280 x 1024
- 2 serial, 1 parallel port
- Desktop case with 200W PSU
- Accutouch 102 key UK keyboard
- Microsoft Ergonomic Mouse
- 3 year parts and labour warranty (first year on site)
- Win OS/2 V3.0 with Bonus Pack preloaded and running
- Lotus Smart Suite for OS/2 preloaded and running

Accura options

Premium

540mb IDE → 730mb 10ms IDE HDD	£49
730mb IDE → 1gb 10ms IDE HDD	£119
Memory upgrades per 1mb	£31
Fast PCI graphics 2mb → Ultra fast 64 bit graphics with 2mb DRAM	£69
Ultra fast 64 bit graphics with 2mb DRAM → Stealth 64 Video 2mb VRAM	£109
VRAM upgrades 2mb → 4mb	£185
14" → 15" Accuscan Monitor 1280 x 1024, MPR-II	£80
15" → 17" Accuscan Monitor 75hz refresh, MPR-II	£269
Sound Blaster Pro 16 (includes Speakers)	£109
NE2000 compatible ethernet card	£49

Professional

1gb IDE → 1gb 8.5ms fast SCSI-II including 32 bit DPT 2024 PCI fast SCSI-II controller (cache and RAID upgradeable)	£299
1gb fast SCSI-II → 2gb 9ms fast SCSI-II	£399
DPT CM4000 cache module (0 mb) for DPT 2024	£369
Memory for CM4000 (per 1mb)	£36
DPT DM4000 RAID module for DPT2024	£369
Diamond Stealth 64 Video 2mb VRAM → Matrox Impression 2+, 2mb VRAM	£39
Matrox Imp+ → Imp+ 220 with 2mb VRAM	£99
2mb → 4mb VRAM upgrade	£185
17" Idek → 21" Idek MF-9121 Diatron Pro 1600 x 1200, MPR-II	£899

PLEASE CALL FOR MANY MORE OPTIONS

er...Faster...!

the best no compromise system

Professional 586 Server

P90 £2799 + VAT
P100 £2899 + VAT

- Intel Pentium® 90/100mhz CPU
- Plug and play compatible with auto configuration (PCI and ISA bus)
- 512k external cache
- 16mb RAM (max 192mb)
- 2.0gb 8.0ms fast SCSI–II hard drive with DPT PCI 32-bit bus mastering SCSI controller (caching and RAID upgradeable)
- Quad speed multi session SCSI CD–ROM drive
- 3.5" 1.44mb floppy drive
- Fast PCI graphics card with 1mb RAM
- 14" Accuscan energy saving, MPR–II monitor, NI, max res 1024 x 768
- 2 serial (16550), 1 parallel port (EPP/ECP)
- 32 bit PCI bus mastering ethernet card
- Tower case with 250w PSU
- Accutouch 102 key UK keyboard
- Microsoft Ergonomic Mouse
- 3 year parts and labour warranty (first year on site)
- Operating systems: OS/2 Lan Server, Novell, SCO Unix, Windows NT (not supplied).

Professional 586 Dual Server

P90 £3399 + VAT
P100 £3599 + VAT

- Two Pentium® 90/100mhz CPU's
- Plug and play compatible with auto configuration (PCI and EISA bus)
- 512k external cache
- 16mb RAM (max 192mb)
- 2.0gb 8.0ms fast SCSI–II hard drive with DPT PCI 32-bit bus mastering SCSI controller (caching and RAID u/g)
- Quad speed multi session SCSI CD–ROM drive
- 3.5" 1.44mb floppy drive
- Fast PCI graphics card with 1mb RAM
- 14" Accuscan energy saving, MPR–II monitor, NI, max res 1024 x 768
- 2 serial (16550), 1 parallel port (EPP/ECP)
- 32 bit PCI bus mastering ethernet card
- Server case with 300 W PSU
- Accutouch 102 key UK keyboard
- Microsoft Ergonomic Mouse
- 3 year parts and labour warranty (first year on site)
- Operating systems: OS/2 Lan Server SMP, SCO Unix with SMP extns, Windows NT 3.5 (not supplied).

ordering

Adams Technology sales lines are open from 9am till 6pm from Monday to Friday. Technical sales staff are available to answer questions on any of our products to help you with any differing requirements that you might have. Please add VAT to all prices quoted. We welcome payment by Visa, Mastercard and American Express, or on a cheque with order basis. We charge £20 for carriage on all systems and servers and £12 for portables. A 14 day money back guarantee* is offered on all purchases.

All sales are subject to Adams Technology Ltd's terms and conditions of sale. These are available on request. Please call for any further information you may require.

VISA · MasterCard

Adams' are the official computer supplier to Williams Renault for 1995

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Adams

Advanced Computer Technology

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*Warranty and money back guarantee subject to Adams Technology's terms and conditions.

A MAGNIFICENT MULTIMEDIA PACKAGE AT A SPECTACULAR PRICE

A COMPLETE 8MB MULTIMEDIA SYSTEM INCLUDING MICROSOFT SOFTWARE FROM £1109

A Multimedia PC that combines the latest in high performance hardware with a selection of Microsoft's latest world beating titles.

Hard Disk	486 DX2-50	486 DX2-66	Pentium® 75	Pentium® 90
540Mb	£1109	£1139	£1335	£1509
850Mb	£1174	£1204	£1400	£1574
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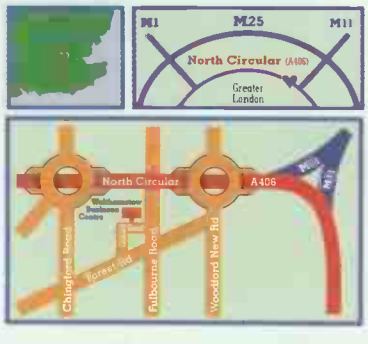

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- 2 Fast (16C550) Serial Ports, 1 Bi Directional Parallel Port
- 3.5" Floppy Drive
- Cherry Keyboard
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- MS Compatible Mouse
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- 1Mb Tseng ET4000 W32 PCI Graphics Accelerator
- 14" SVGA Low Radiation NI Col Monitor (MPRII)
- 2 Fast (16C550) Serial Ports, 1 Bi Directional Parallel Port
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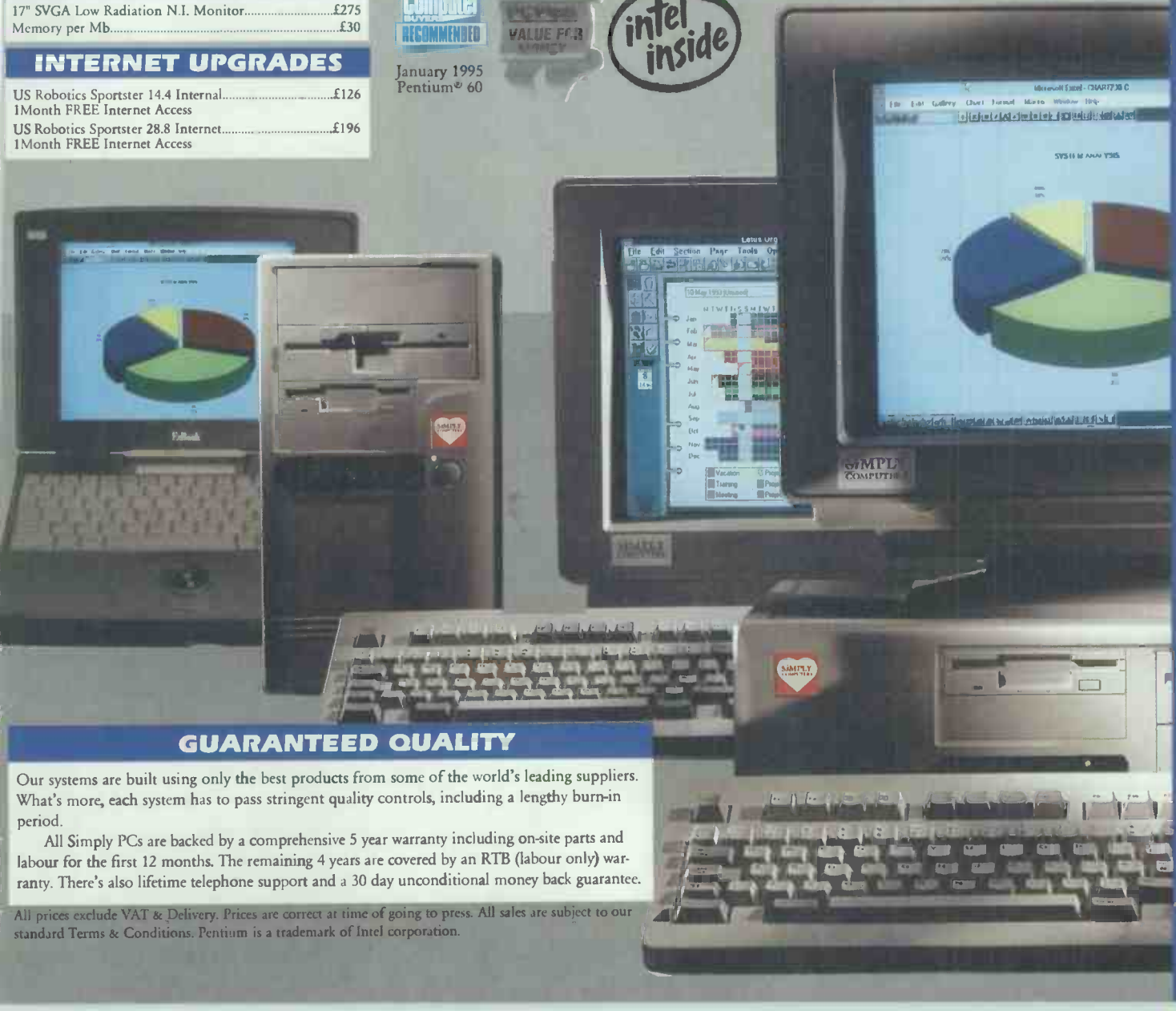

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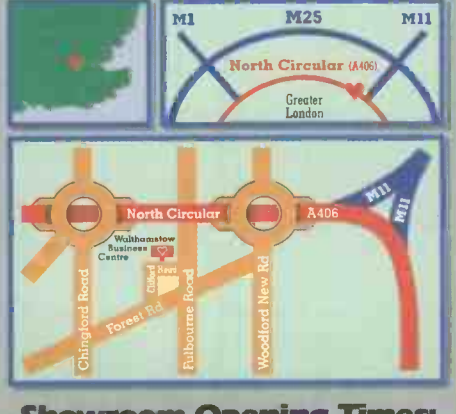
May 1995 Price List
All sales are subject to our standard terms and conditions. All prices exclude VAT and Delivery. E&OE. Prices are correct at time of going to press.



Showroom Opening Times:
Mon-Fri 10.00am to 6.00pm
Sat 10.00am to 4.00pm

SiMPLY COMPUTERS
HOTLINE 0181 523 4020
Simply Computers Ltd,
28 Walthamstow Business Centre, Clifford Road, Walthamstow, London E17 4SX.

SIMPLY COMPUTERS TEL 0181 523 4020 FAX 0181 523 4002

CD ROM KITS

CREATIVE Sound Blaster Multimedia Home CD

- Sound Blaster 16 ASP Card
- Speakers
- Quad Speed IDE Drive
- MS Works
- MS Publisher
- MS Encarta '95
- MS Bookshelf '94
- MS Ancient Lands
- MS Dangerous Creatures
- MS Scenes
- MS Musical Insruments
- MS Cinemania '95
- MS Golf
- Syndicate
- Ultima VIII
- Strike Commander
- Wing Commander II

£295

CREATIVE Sound Blaster CD16 Discovery Pack

- Dual Speed CD ROM Drive
- 9 CD Titles
- 16 Bit Sound
- Speakers

£195

CREATIVE Sound Blaster GameBlaster CD

- Dual Speed CD ROM Drive
- 10 CD Titles
- 16 Bit Sound
- Speakers

£219

CREATIVE Sound Blaster 16

- 16 bit Stereo Sound
- Mitsumi Quad Speed CD
- Screen Beat Speakers
- Photo Access CD

£169

CREATIVE Sound Blaster 16

- 16 bit Stereo Sound
- Mitsumi Quad Speed CD
- Screen Beat Speakers
- Photo Access CD
- MS Encarta 1995 CD

£189

CREATIVE Sound Blaster 16

- 16 bit Stereo Sound
- Mitsumi Quad Speed CD
- Screen Beat Speakers
- Photo Access CD
- MS Works & Money
- MS Golf
- MS Scenes
- MS Dangerous Creatures
- MS Encarta 1995 CD

£219

CREATIVE Sound Blaster 16 SCSI

- 16 bit Stereo Sound
- Pioneer DRU-102X CD
- Screen Beat Speakers
- Photo Access CD

£275

CREATIVE Sound Blaster 16 SCSI

- 16 bit Stereo Sound
- Screen Beat Speakers
- Toshiba 3601B SCSI *(Quad Speed)*
- Photo Access CD

£355

CD DRIVES

AT Interface

Panasonic CR562 Dual Speed AT.....£80
(inc. Sound & Data Cable)

Creative 563CD with 2 CD's.....£89
(Contains Aldus Photostyler & Encyclopedia on CD)

Panasonic/Sony/Mitsumi Interface Kit.....£15
Panasonic Interface Kit.....£10

IDE Interface

MITSUMI CRMC-FX400D QUAD SPEED IDE £109

Mitsumi IDE ATAPI CD Interface Card.....£13
NEC Quad Speed CD IDE (Bare Drive).....£129
NEC Quad Speed CD IDE Special Offer.....£149
(Includes Encarta '95 CD & Photo Access CD, Cable & Screws)

Orchid Dual Speed IDE + 2 CD Titles.....£95
Panasonic CR-571B Dual Speed IDE CD.....£89
Sony CDU55E 2.4x EIDE 250ms.....£89
Toshiba XM5302B Quad Speed ATAPI IDE CD.....£135
Wearnes CDD-120X 2.5 Speed IDE.....£79
Wearnes CDD-220 Quad Speed IDE.....£129

PIONEER DR-UA124X 4.4x CD ROM DRIVE £145

SCSI Interface

NEC *"Take a giant leap into the incredible world of Multispin CD-ROM."*

NEC 3XI Internal Triple Speed SCSI Drive.....£215
NEC 3XP+ Triple Speed Portable.....£245
NEC 4XI Internal Quad Speed Drive.....£249
NEC 4X External Quad Speed Drive.....£365
NEC AT SCSI Interface Kit.....£59
NEC AT Parallel/SCSI Interface Kit.....£95

PLEXTOR 6PLeX 6 SPEED CD ROM DRIVE £479

Pioneer DR-U124X 4.4x CD-ROM SCSI-2.....£179

Toshiba XM5201 SCSI -2 -
Triple Speed Bare Internal.....£149

Toshiba XM-3601B SCSI -
Quad Speed Bare Internal 4.4x.....£225

Toshiba XM-3601B SCSI -
Quad Speed Bare Internal kit 4.4x.....£335

Toshiba XM-3601B SCSI -
Quad Speed Bare external Kit 4.4x.....£435

Parallel CD ROM Drives

Backpack CD ROM/DS Dual Speed Parallel.....£299
Backpack CD ROM/4S Quad Speed Parallel.....£339

JukeBox CD Drives

Nakamichi MBR-7 Dual Speed 7 Disk Stacking.....£279
Pioneer DRM-602X Dual Speed 6 Disk Jukebox.....£395
Pioneer DRM-604X Quad Speed 6 Disk Jukebox.....£865
Pioneer 1804X Quad Speed 18 Disk Jukebox.....£1,349

Writeable CD ROM Drives

Kodak Photo CD Writer 225.....£2,249
Kodak Multi-Write Publishing Software.....£749
Kodak Writable CD Media.....£9
Philips CDD522 CD Recorder Ext.....£1,799

CD Storage

12 Disk Capacity CD Wallets.....£6
24 Disk Capacity CD Wallets.....£9
48 Disk Capacity CD Wallets.....£12
10 Disk Capacity CD Storage Cases.....£5
30 Disk Capacity CD Storage Cases.....£10

SOUND CARDS

SOUND BLASTER

Sound Blaster V2.0 Value.....£32
(Includes 2 free Games & Free Speakers)

Sound Blaster Pro Value.....£52
(Includes 2 Free games & Free Speakers)

Sound Blaster 16 Value.....£62
(Now available with IDE or Panasonic CD Interface)

Sound Blaster 16 Pro.....£89
(Now available with IDE or Panasonic CD Interface)

Sound Blaster 16 SCSI-2.....£114
External SCSI Connector.....£25
(Converts Internal SCSI connector to External SCSI)

Sound Blaster 16 Pro AdSP.....£110
Sound Blaster 16 ASP SCSI-2.....£134
Sound Blaster AWE 32 Value Edition.....£129
Sound Blaster AWE 32 Full Edition.....£165
3DO Blaster.....£285
Wave Blaster II.....£95
Midi Blaster.....£105

ORCHID

Orchid SoundDrive 16 EZ.....£62
Orchid SoundDrive 16 EZ + SCSI.....£79
Orchid Gamewave 32 Plus.....£99
Orchid Soundwave 32 Pro.....£135
Orchid Soundwave 32 Pro SCSI.....£149
(Free NASCAR Racing CD while stocks last)
Orchid Wavebooster 2Mb + CueBase Lite.....£119
Orchid Wavebooster 4Mb + CueBase Lite.....£155
Orchid Wavebooster 4Mb + FX + Midisoft.....£179

GRAVIS

Gravis Ultrasound Card.....£98
Gravis Ultrasound Max Card.....£142
Gravis Ultrasound Midi Kit.....£29
Gravis Ultrasound ACE Wavetable Add-in Card.....£75

MICROSOFT

Microsoft Windows Software & Microphone.....£39
Microsoft Windows Sound Card.....£105

OTHERS

Portable Sound Plus.....£129
(Sound Blaster compatible connects to Parallel Port)

SPEAKERS

Small Speakers.....£5
Screen Beat 4 Speakers.....£8
Screen Beat 5 Speakers.....£10
Screen Beat 3 Speakers.....£12
Screen Beat Pro 50.....£29
Creative 20W Speakers.....£79
Labtec CS-600 Speakers.....£19
Small Mains Powered Amp Speakers.....£19
Medium Mains Powered Amp Speakers.....£25
Large Mains Powered Amp Speakers.....£49
Pro Digital Speakers.....£29
Soundisk SD-100 Speakers for 5.25".....£15
Yamaha Sub Woofer.....£75
Yamaha Multimedia Speakers YST-M5.....£39
Yamaha Multimedia Speakers YST-M10.....£55
ZIFI 2 Speakers.....£25
ZIFI Pro 2 Speakers.....£45

ACCESSORIES

Headphones.....£5

LEISURE

JOYSTICKS

Warrior 5 Joystick.....£9
Warrior 5 Plus Joystick.....£12
Mach 1 Joystick.....£12
Mach 1 Plus Joystick.....£16
Mach 2 Joystick.....£21
CH Flightstick.....£27
CH Flightstick Pro.....£48
CH Virtual Pilot Flight Yoke.....£63
CH Virtual Pilot Pro Flight Yoke.....£79
CH Pro Pedal for Flight Sims.....£85

Gravis Analog.....£24
Gravis Professional Analog.....£32
Gravis Phoenix Flight & Weapon Control System.....£95
Gravis Advanced Game Pad.....£17
Gravis PC Game Pad & FIFA International Soccer (CD).....£30

Logitech Wingman.....£23

LOGITECH WINGMAN EXTREME £31

Dual Joystick Splitter Cable.....£9

GAME CARDS

Gravis Game Card (50Mhz Max).....£25
CH Gamecard III Auto up to 80Mhz.....£28
CH Gamecard III MCA 50Mhz.....£32
IBM Game Card & Joystick 50Mhz.....£19

MULTI-MEDIA CARDS

Canon Ion PC Camera.....£395
Captivator Pro TV.....£239
Compro LaserWave Movie Studio - MPEG Video Board.....£239

CREATIVE

Creative MP400 (MPEG Player).....£199
Creative TV-Coder External.....£129
Creative TV-Coder Internal.....£103
Creative Video Blaster "FS200".....£239
Creative Video Blaster RT300.....£279
Creative Video Spigot.....£89

Diamond Videostar.....£279
Fast Aviator MN502010.....£185
Fast Movie Machine.....£238
Fast Movie Machine Pro.....£465
Flexicam Desktop TV Camera.....£395

£265

HAUPPAUGE WIN/TV CELEBRITY

■ Frame Grabbing on the fly ■ Teletext
■ NTSC/PAL Compatible ■ Scaleable viewing window from icon to full screen
FREE OS/2 Warp & Internet Software

Hauppauge Win/TV Cinema.....£199
Hauppauge Win/Tv Prisma.....£159
Intel Smart Recorder Pro.....£295
Logitech Photoman Plus.....£382
Orchid 1Mb Kelvin MPEG.....£249
Orchid 2Mb Kelvin MPEG.....£295
Orchid Vidiola.....£249
Orchid Vidiola Premium.....£569
Orchid Vidiola Pro.....£439
Reelmagic Full Version.....£325
Reelmagic Lite.....£199
Rombo Media Pro HI-RES.....£209
Rombo Media Pro Plus.....£189
Rombo PC Tuner.....£65
Rombo TV Buster External.....£45
Rombo TV Buster Internal.....£45
Rombo TV Tuner with Teletext.....£99
Screen Machine II.....£659
Spea Showtime (MPEG Player).....£299
Videologic 1Mb 928 Movie ISA.....£189
Videologic 1Mb 928 Movie ISA Sound.....£259
Videologic 1Mb 928 Movie VLB.....£189
Videologic 1Mb 928 Movie VLB Sound.....£259
Videologic 1Mb 928 Movie with MPEG Player ISA.....£425
Videologic 1Mb 928 Movie with MPEG Player VLB.....£425
1Mb Upgrade Kit for 928 VRAM.....£85
Videologic 2Mb PCI Movie.....£329
Video Logic Captivator.....£165
Video Logic Captivator Pro.....£189
Videologic MPEG Player for VMC.....£239

VIDEO CONFERENCING

CREATIVE LABS SHAREVISION PC 3000

£995

Intel ProShare Video System 200.....£1,849
Intel ProShare Premiere Edition SFW.....£199

SOFTWARE AND BOOKS

MS-DOS 6.22 Upgrade.....£38
MS Win for Workgroups 3.11 Upgrade.....£44
MS-Windows for Workgroups 3.11.....£89
D.I.Y. Book.....£5
All the information you need to build or update a PC

MODEMS

External V34 28.8 Fax/Modem.....£149
Internal V34 28.8 Fax/Modem.....£149
External V32 14400 Fax/Modem.....£110
Internal V32 14400 Fax/Modem.....£69
Internal 9624 Fax/Modem.....£35
(The above modems are prohibited from direct or indirect connection to public telecommunications systems. Action may be taken against anyone so connecting this apparatus).

Simply Modems
Simply 14400 PCMCIA Fax Modem.....£219
Simply V34 External Fax Modem.....£179
Simply V34 Internal Fax Modem.....£179
Simply 14400 Internal Fax Modem.....£109
Simply 14400 External Fax Modem.....£109
Simply 9624 Pocket Fax Modem.....£58
Simply Modems are BABT approved and come with Windows software.

RoadRunner Rocket Bundles
Silver Pack.....£119
(Includes V32bis Modem, Serial Cable, BT Lead, PSU, no Software)
Gold Pack.....£135
(As above plus BT 'T' Piece, 9-25 way adaptor and TRans-Send WinDOS Lite Software)
Gold RocketBoard Bundle.....£149
(As Gold Pack plus Rocketboard dual 16C550 High Speed Serial Card)
Platinum Pack.....£169
(As Gold Pack but with 19,200bps V32Terbo RoadRunner Rocket)
Andest VPA V22 BIS.....£349
Andest VPA V32 BIS + RocketBoard.....£449
Andest RocketBoard - High Speed 16C550 Serial Card.....£59

US Robotics
US Robotics Worldport Dual Standard Cellular.....£165
US Robotics Worldport 2496 + Fax PCMCIA.....£129

US Robotics® SPORTSTER®

US Robotics Sportster 28.8 V34 Fax EXT.....£195
US Robotics Sportster 28.8 V34 Fax INT.....£195
US Robotics Sportster 14.4 Fax EXT.....£125
US Robotics Sportster 14.4 INT.....£126

Psion Dacom
Gold Card V34 + Fax PCMCIA Modem.....£315
Gold Card V32 bis + Fax PCMCIA Modem.....£215

Pace
Pace Microlin fx 34 PC Internal Fax Modem.....£299
Pace Linnet 34 fx Desktop V34 Fax Modem.....£265
Pace Microlin fx 34 Pocket Fax Modem.....£289
Pace Microlin fx 34 PCMCIA V34 Fax Modem.....£329
Pace Microlin fx 32 Plus Internal Fax Modem.....£134
Pace Linnet 32 Plus-fx V32 Desktop Fax Modem.....£175
Pace Microlin fx 32 Plus Pocket Fax Modem.....£169
Pace Microlin fx NB 32 Plus PCMCIA Fax Modem.....£189
Pace Message Desk.....£259
(Voice functionality intergrated with Data and Fax. Fax Back & Fax forward with enhanced audio standard. Internal Microphone)

Hayes
Hayes Optima 28.8 VFC & Fax.....£449
Hayes Optima 288 VFC + Fax Value Pack.....£689
2 Hayes Optima 288 - 2 Enhanced Serial Ports (Free upgrade to V34)
Hayes Optima 14.4 + Fax 144.....£309
Hayes Optima 144 - Fax 144 PCMIA.....£225
Hayes Accura 28.8 + Fax VFC V32bis.....£225
Hayes Accura 14.4 + Fax V32bis.....£165
(The above Modems APPROVED for connection to telecommunications systems specified in the instructions subject to the conditions set out in them).

Cables
9 to 25 Pin Modem Cable.....£9
25 to 25 Pin Modem Cable.....£9

Automatic Fax Switches
Andest MSL Manager 1100 Fax/Phone.....£89
Andest MSL Manager 3300.....£105
Andest MSL Manager 3300M.....£125
Andest MSL Manager 7700.....£145

SCANNERS

Andest
Andest FaxScanner (Win).....£59
(Converts Fax Machine into A4 Scanner)

Dexxa
Dexxa Handheld Colour Scanner.....£129
Dexxa Sheetfed Colour Scanner.....£225

Epson
Epson GT6500 Parallel.....£399
(Photoshop LE, OmniPage Direct, Pagekeeper)
Epson GT6500 SCSI.....£479
(Photoshop LE, OmniPage Direct, Pagekeeper)
Epson GT8500 Parallel.....£509
(Photoshop LE, OmniPage Direct, Pagekeeper)
Epson GT8500 SCSI.....£585
(Photoshop LE, OmniPage Direct, Pagekeeper)
Epson GT8500 SCSI *(Adobe Photoshop V3 Full)*.....£799
Epson GT9000 SCSI.....£695
(Photoshop LE, OmniPage Direct, Pagekeeper)
Epson GT9000 SCSI *(Adobe Photoshop V3 Full)*.....£889
Epson Bi-Directional Parallel Port.....£35

Genius
Scanmate/256.....£69
Scanmate/Colour.....£139

Logitech
Logitech Scanman 32 DOS.....£60
Logitech Scanman 32 WIN.....£60

LOGITECH SCANMAN 32 WIN & PAGEPLUS V3.0

£69

Logitech 256 Scanner.....£78
Logitech Easy Touch Scanner.....£105
Logitech Scanman Colour.....£165
Logitech Scanman Power Page.....£315

Sicos
Sicos Colour Page Scanner.....£239

Trust
Trust 1200dpi Flatbed Scanner.....£305
Trust 2400dpi Flatbed Scanner.....£395

Other
ScanFX - Scanner, Fax, Copier.....£399
(Colour/BW 1200 x 1200dpi Scanner with Fax & Copying. Comes with Wordscan OCR & Picture Publisher LE)

May 1995 Price List
All sales are subject to our standard terms and conditions. All prices exclude VAT and Delivery. E&OE. Prices are correct at time of going to press.

We welcome Official Purchase Orders from customers in the Public Sector/Education establishments and quoted companies. All other orders are accepted on a cash with order basis. We accept cash, cheques (7 days clearance) and most major credit & debit cards.

PLEASE NOTE: Prices are changing so rapidly they can go up or down at any time. We will always endeavour to offer you the best prices. We aim to offer all goods from stock. Orders received before 15.00 will be despatched the same day. Our carriage charges are as follows: 1st Class Recorded Post....£5 ; 1st Class Registered Post....£7; Next - Day Courier....£10 - £15 (dependant upon the number of parcels). If we haven't got the goods in stock, you will be informed by our salesperson before taking your order. You will be given the the expected shipping date. With the exception of Mice and joysticks, all our goods are supplied with 12 months RTB warranty. And there's a 14 day "no-quibble" money back guarantee on all goods except printers. This guarantee only applies to un-opened software packages.

Showroom Opening Times:
Mon-Fri 10.00am to 6.00pm
Sat 10.00am to 4.00pm

SIMPLY COMPUTERS
HOTLINE 0181 523 4020
Simply Computers Ltd,
28 Walthamstow Business Centre, Clifford Road, Walthamstow, London E17 4SX.

SIMPLY COMPUTERS TEL 0181 523 4020 FAX 0181 523 4002

Customer Services 0181 498 2160 - Technical Support 0181 498 2170 - Corporate Fax 0181 498 2159 - General Fax 0181 523 4002

VGA CARDS

ISA

Generic
256K VGA 800 x 600 16C.....£22
512K VGA 1024 x 768 16C.....£26
1Mb Trident 8900D 1024 x 768 256C.....£44
1Mb Cirrus Logic 16.7 Win Accelerator.....£49
1Mb Tseng ET4000 16.7m Colours.....£65

Hercules
1Mb Hercules Dynamite Pro.....£145

Matrox
2Mb MGA Impression Plus ISA.....£259
2Mb MGA Impression Plus 200/220.....£309

Orchid
1Mb Kelvin 64.....£98
2Mb Kelvin 64.....£135

Taxan
1Mb Taxan GTS WinBoost.....£119
2Mb Taxan GTS WinBoost.....£145
2Mb Taxan WinTurbo 64.....£245
4Mb Taxan WinTurbo 64.....£395

Techworks
1Mb Thunderbolt.....£59
1Mb Warp 20 VRAM.....£139
2Mb Warp 20-2 VRAM.....£189

VESA LOCAL BUS

Generic
1Mb Cirrus Logic 5429 Win ACC VLB.....£69
(35% Faster than 5428 Chipset)
1Mb Tseng ET4000/W32 VLB.....£79
1Mb Cardex 90C33.....£89
2Mb Tseng ET4000/W32 VLB.....£109

Diamond
1Mb Diamond Stealth SE VLB.....£79
1Mb Diamond Stealth 64 Dram VLB.....£79
2Mb Diamond Stealth 64 Dram VLB.....£127
2Mb Diamond Stealth 64 Vram VLB.....£225
4Mb Diamond Stealth 64 Vram VLB.....£329

Hercules
1Mb Hercules Stingray VLB.....£100
1Mb Hercules Dynamite Pro VLB.....£140
2Mb Hercules Dynamite Power VLB.....£195
2Mb Hercules Graphite Terminator 64 VLB.....£265
4Mb Hercules Graphite Terminator 64 VLB.....£379

Matrox
2Mb MGA Impression Lite VLB.....£195
2Mb MGA Impression Plus VLB.....£330

NUMBER NINE VISUAL TECHNOLOGY

1Mb 9FX Vision 330 VLB.....£99
2Mb 9FX Vision 330 VLB.....£145
1Mb 9FX Motion 531 VLB.....£139
2Mb 9FX Motion 531 VLB.....£189
2Mb 9FX Motion 771 VLB.....£279
4Mb 9FX Motion 771 VLB.....£399
4Mb Imagine 128 1280 VLB.....£759
4Mb Imagine 128 1600 VLB.....£949
8Mb Imagine 128 VLB.....£1,399

Orchid
1Mb Orchid Kelvin EZ VLB.....£89
1Mb Orchid Kelvin 64 VLB.....£99
1Mb Orchid Fahrenheit 64 VLB.....£119
2Mb Orchid Kelvin 64 VLB.....£135
2Mb Orchid Fahreheit 64 VLB.....£159
2Mb Orchid Fahrenheit Pro 64 VLB.....£245
4Mb Orchid Fahrenheit Pro 64 VLB.....£349

Spea
1Mb Spea Videoseven Mirage VLB.....£85
1Mb Spea Videoseven Mirage P64 VLB.....£125
2Mb Spea V7 Mercury P64 VLB.....£239

STB
2Mb Lightspeed VLB.....£145
1Mb Powergraph VLB-24.....£145
2Mb STB Velocity 64V MPEG.....£245
4Mb STB Velocity 64V MPEG.....£395

Taxan
1Mb Taxan GTS WinBoost VLB.....£119
2Mb Taxan GTS WinBoost VLB.....£145
2Mb Taxan WinTurbo 64 VLB.....£245
4Mb Taxan WinTurbo 64 VLB.....£395

VGA CARDS Cont.

TECHWORKS

1Mb Thunderbolt VL.....£99
2Mb Thunderbolt VL.....£139

Videologic
1Mb GraphixStar 300 VLB.....£99
2Mb GraphixStar 300 VLB.....£139
1Mb GraphixStar 500 VLB (inc AVI Scaling).....£135
2Mb GraphixStar 500 VLB (inc AVI Scaling).....£189
2Mb GraphixStar 700 VLB.....£269
2Mb GraphixStar 700 VLB.....£389

PCI

Generic
1Mb Tseng ET4000/W32P PCI.....£79
1Mb Cirrus Logic 5434 PCI.....£79
1Mb Advanced Logic AL2301 PCI.....£89
2Mb Tseng ET4000/W32P PCI.....£109
2Mb Cirrus Logic 5434 PCI.....£115

Diamond
1Mb Diamond Stealth SE PCI.....£78
1Mb Diamond Stealth 64 Dram PCI.....£95
2Mb Diamond Stealth 64 Dram PCI.....£135
2Mb Diamond Stealth 64 Vram PCI.....£230
4Mb Diamond Stealth 64 Vram PCI.....£340

Hercules
1Mb Hercules Stingray PCI.....£100
2Mb Hercules Dynamite Power PCI.....£195
2Mb Hercules Graphite Terminator 64 PCI.....£265
4Mb Hercules Graphite Terminator 64 PCI.....£379

Matrox
2Mb MGA Impression + PCI.....£259

NUMBER NINE VISUAL TECHNOLOGY

1Mb 9FX Vision 330 PCI.....£99
2Mb 9FX Vision 330 PCI.....£145
1Mb 9FX Motion 531 PCI.....£139
2Mb 9FX Motion 531 PCI.....£189
2Mb 9FX Motion 771 PCI.....£279
4Mb 9FX Motion 771 PCI.....£399
4Mb Imagine 128 1280 PCI.....£759
4Mb Imagine 128 1600 PCI.....£949
8Mb Imagine 128 PCI.....£1,399

Orchid
1Mb Orchid Kelvin EZ PCI.....£89
1Mb Orchid Kelvin 64 PCI.....£99
2Mb Orchid Kelvin 64 PCI.....£135
1Mb Orchid Fahrenheit 64 PCI.....£119
2Mb Orchid Fahrenheit 64 PCI.....£159
2Mb Orchid Fahrenheit Pro 64 PCI.....£245
4Mb Orchid Fahrenheit Pro 64 PCI.....£349

STB
2Mb Lightspeed PCI.....£145
1Mb Powergraph PCI-24.....£145
2Mb Nitro 64 PCI.....£145
2Mb STB Velocity 64V MPEG.....£245
4Mb STB Velocity 64V MPEG.....£395

Taxan
1Mb Taxan GTS WinBoost PCI.....£119
2Mb Taxan GTS WinBoost PCI.....£145
2Mb Taxan WinTurbo 64 PCI.....£245
4Mb Taxan WinTurbo 64 PCI.....£395

TECHWORKS

1Mb Thunderbolt-T PCI.....£89
2Mb Thunderbolt-T PCI.....£139

Videologic
1Mb GraphixStar 300 PCI.....£99
2Mb GraphixStar 300 PCI.....£139
1Mb GraphixStar 500 PCI (inc AVI Scaling).....£135
2Mb GraphixStar 500 PCI (inc AVI Scaling).....£189
2Mb GraphixStar 700 PCI.....£269
2Mb GraphixStar 700 PCI.....£389

MONITORS

14" Mono VGA Monitor.....£75
14" Crystal Colour SVGA Interlaced.....£165
15" Crystal Colour Monitor N-I MPRII.....£245
17" Crystal 17HQ 1280 x 1024 N-I.....£509

CTX
14" CTX 1451LR N-I MPRII.....£175
15" CTX CPS-1565GN N-I SVGA MPRII.....£235
17" CTX 1765GM SVGA MPRII .28 1024 x 768.....£449
17" CTX 1785GM SVGA MPRII .26 1280 x 1024.....£495
LMT 1000 16 Grey Scale LCD VGA Screen 9.4".....£499
LMT 5020 4096 Colour LCD VGA Screen 9.4".....£1,999
All the above monitors come with one year on-site Warranty

Sony
Sony 15" CPDSF1 1024 x 768 NI .25.....£309
Sony 17" GDM-17SEI SVGA N-I.....£835
Sony 20" GDM20 SEV 1280 x 1024 N-I.....£1,325
Sony 20" GDM20 SE1 1280 x 1024 N-I.....£1,459
Sony CSS-B100 Computer Speaker System.....£75

Philips
14" Philips Mono Monitor.....£89
14" Philips Enhanced VGA Color Monitor 14C.....£168
14" Philips Color Monitor 14A.....£204
15" Philips Brilliance Autoscan Colour Monitor 15B.....£254
15" Philips Brilliance Autoscan N-I Colour Monitor 15A.....£285
(Built in Stereo for Multimedia Applications)
17" Philips Autoscan Colour Monitor 17C.....£425
(Built in Stereo for Multimedia Applications)
17" Philips Autoscan Colour Monitor 17B.....£569
20" Philips Autoscan Colour Monitor 20C.....£849
21" Philips Autoscan Colour Monitor 21B.....£1,439
21" Philips Brilliance Autoscan -
Colour Monitor with Cyberscreen Technology 21A.....£1,749

NEC *New NEC Multisync X Series - FullScan Flat Square Technology, Plug & Play & AccuColor Colour Control System.*

NEC XV14 14" 1024 x 768.....£229
NEC Multisync XV15 15" 1024 x 768 80Hz.....£285
NEC Multisync XV17 17" 1024 x 768 80Hz.....£579
(Free MS Cinemania CD with all XV monitors)

NEC Multisync XE15 15" 1024 x 768 80Hz.....£405
NEC Multisync XE17 17" 1024 x 768 80Hz.....£715
NEC Multisync XE21 21" 1152 z 1070 75Hz.....£1,335

(Free MS Space Simulator CD with all XE monitors)
NEC Multisync XP17 17" 1280 x 1024 76Hz.....£935
NEC Multisync XP21 21" 1600 x 1200 70Hz.....£1,759
(Free MS Art Gallery CD with all XP monitors)

Above offers apply only while stocks last

Mitsubishi
(MITS) 15" SD5520 Diamond Scan 15FS.....£339
(MITS) 17" FFY7705 Diamond Scan 17FS.....£595
(MITS) 17" TFG8705 Diamond Pro 17TX.....£920
(MITS) 21" THZ8155 Diamond Tron 21T.....£1,335
(MITS) 21" THN9105 Diamond Pro 21TX.....£1,299

Taxan
14" Taxan Ergovision 400LR Interlaced.....£185
14" Taxan Ergovision 410LR N-I.....£195
14" Taxan Ergovision 420LR N-I.....£299
15" Taxan Ergovision 580 LR 1024x768 N-I.....£285
17" Taxan Ergovision 880 LR 1024x768 N-I.....£520
17" Taxan Ergovision 885 LR 1280x1024 N-I.....£625
17" Taxan Ergovision 895 LR 1280x1024 N-I.....£835
20" Taxan Ergovision 1080 1280 x 1024 N-I.....£910
21" Taxan Ergovision 2100 LR 1600 x 1200 N-I.....£1,530

Panasonic
15" Panasync (TX-T1537) 1024 x 768 NI.....£315
17" Panasync (TX-D1732) -
1024 x 768 NI 1280 x 1024 Max.....£535
17" Panasync (TX-D1751) 1280 x 1024 NI.....£775
20" Panasync (TX-D2032) 1280 x 1024 NI.....£1,125
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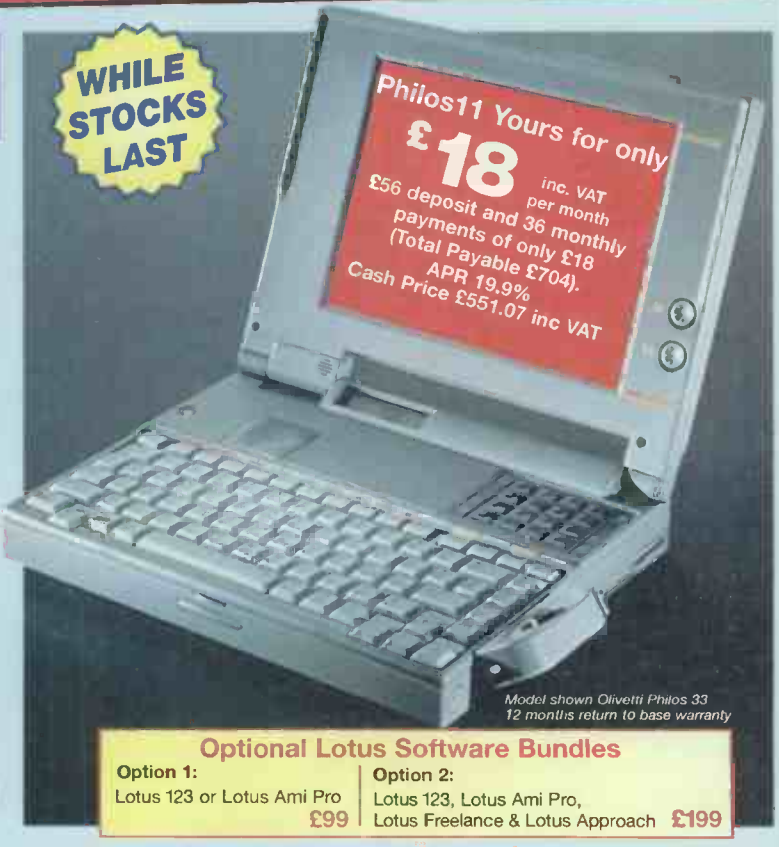

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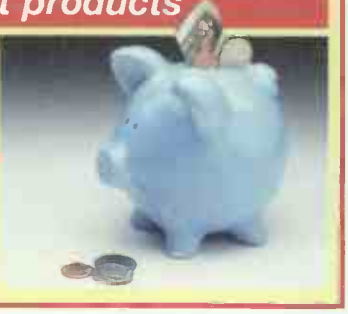

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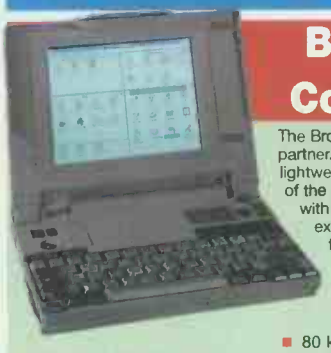

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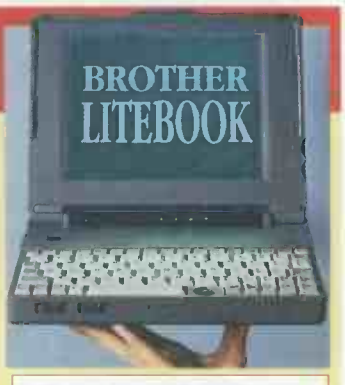

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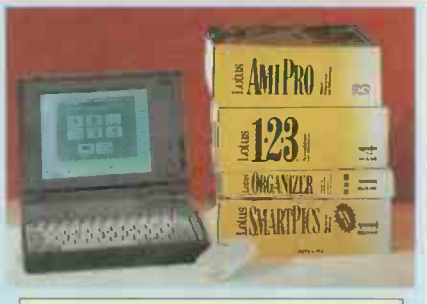

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- 256K cache
- 14" SVGA colour monitor (0.28)
- VESA local bus motherboard
- Windows accelerator with 1Mb Video RAM
- 3.5" 1.44Mb floppy disk drive
- 2 serial, 1 Parallel, 1 games port
- Keyboard and mouse
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- Microsoft Family CD Bundle
- Windows™ 3.11, MS-DOS® 6.2

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- *15" SVGA Monitor add £150*
- *Add £100 for 8Mb version*

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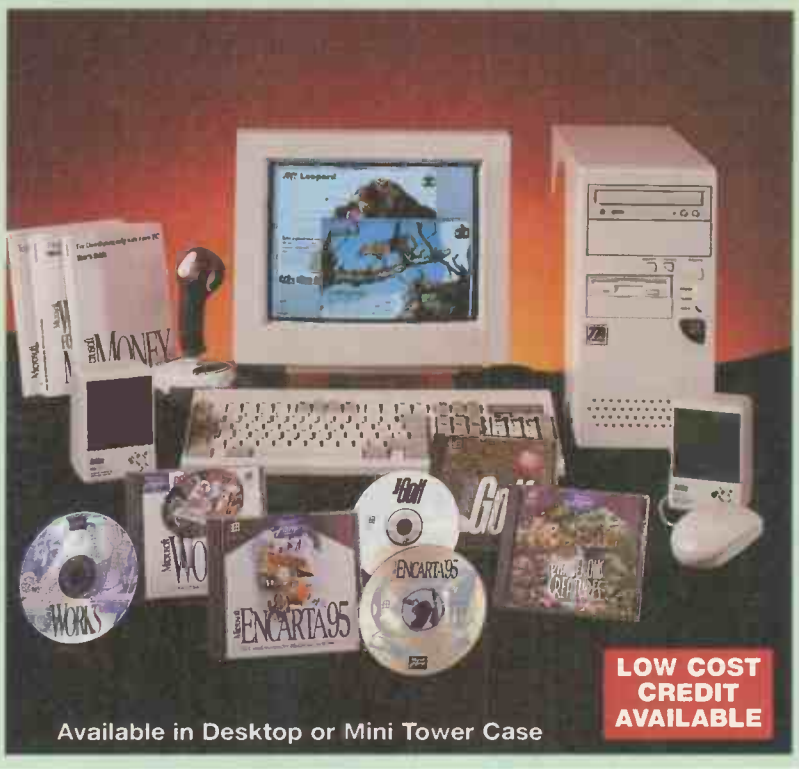
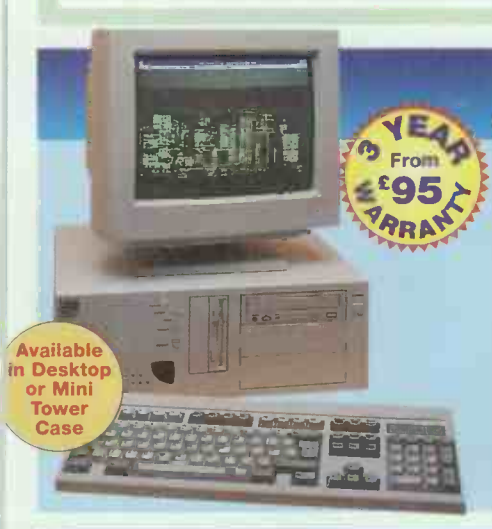


Available in Desktop or Mini Tower Case

LOW COST CREDIT AVAILABLE

ADLER 486 SYSTEMS



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- VESA local bus motherboard
- Windows accelerator with 1Mb Video RAM
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- 102 key keyboard and MS compatible mouse
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ADLER 486DX 100MHz

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For today's advanced software applications the Adler Walkstation notebook provides ample power, but at a low voltage thus consuming little energy. The NICd battery gives up to six hours usage on a single charge, giving instant use even when no power supply is available. The battery can be recharged in under two hours.

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Adler 4/50DX2	486DX2	50MHz	340Mb	4Mb	£899
Adler 4/50DX2 D/Scan Colour	486DX2	50MHz	250Mb	4Mb	£1099
Adler 4/50DX2 D/Scan Colour	486DX2	50MHz	340Mb	4Mb	£1199
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BROTHER HL-631 LASER £369
as above with1Mb RAM

BROTHER HL-660 LASER
True 600dpi resolution, 6ppm, 2Mb RAM expandable to 8Mb, HP LaserJet™ 4 Epson FX-850 and IBM Proprinter XL emulations, GDI mode for Windows, Microfine toner. £479

BROTHER HL-1260 LASER NEW
12ppm, 600dpi print speed, 2Mb RAM upgradeable to 26Mb, BR-Script and PCL5e emulation, Duplex and Network options, 75 scalable fonts. £899

BROTHER HJ-400 INKJET
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Optional Colour Kit Available £29.95

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12ppm, 25MHz RISC-based processor with cache, 600dpi, Adobe PostScript™ level 2, 80 scalable typefaces, 6Mb RAM, LocalTalk, Ethernet. £1289

HP LASERJET 4V NEW
From postcard to A3 size paper, 600dpi at 16ppm, 33MHz RISC Process. 4Mb, 350 sheet capacity. £1399

HP LASERJET 4MV NEW
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HP LASERJET 4Si
Automatic network switching, 600dpi at 16ppm, 2 x 500 sheet paper trays. £2099

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CANON BJ10SX BUBBLEJET
110cps LQ, 220cps draft, 37K memory, bi-directional printing, prints onto ordinary plain paper letter headed paper and envelopes, 360 x 360dpi. Optional sheet feeder available £142

CANON BJ-30 BUBBLEJET NEW
Compact portable mono Bubblejet printer, Auto 30 sheet paper feeder, 720 x 360 - 360 x 360 dpi, prints upto 2.2 ppm. £169

CANON BJ200ex BUBBLEJET NEW
Bubblejet printing at 3ppm, 360 x 360 dpi with added smoothing giving 720 x 360, inc Windows driver, auto emualtion switching, Auto 100 sheet paper feeder, 20 TrueType scalable fonts. £189

CANON BJC-70 BUBBLEJET NEW
Compact colour portable printer, auto sheet feeder, 720 x 360 - 360 x 360 dpi, prints upto 3.3 ppm. £239

CANON BJ230 BUBBLEJET
Qulet, high quality desktop printer offering136 column printing small footprint, 360dpi,80 sheet feeder up to A3 paper, OHP film and envelopes. £249

CANON BJC4000 COLOUR
360dpi resolution for sharper print and superior colours, 2 cartridges for black only and colour on the same page, Windows compatible, built-in 100 sheet feeder, prints on OHP film, special papers and envelopes, quiet and compact. £249

CANON BJC600 COLOUR
Bi-directional Bubblejet printing at 360dpi, built-in 100 sheet feeder, auto cleaning function, full colour or black and white printing. New print control without "banding effect". *NEW LOW PRICE* £339

CANON LBP4i LASER
300 x 300dpi, 4ppm, 100 sheet paper tray, parallel (centronics) interface, PCL5 page description language. 1Mb RAM memory, 8 built-in scalable fonts. £399

OLIVETTI

OLIVETTI JP360 INKJET NEW
New Compact Design, 300dpi, 180cps draft, 120cps LQ, 70 sheet auto feeder, 25 TrueType fonts, low-cost refillable inkjet. £169

OLIVETTI JP360
with colour option £209

OLIVETTI JP50
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OLIVETTI JP450
300dpi, 300cps NLQ, 160cps LQ, 150 auto sheet feeder, 30 resident fonts. 25 scalable fonts, 5ppm, 1 expansion slot, PCL 3 + language. £209

OLIVETTI JP450
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OKI

OKI 400EX LED *NEW LOW PRICE*
4ppm, 300 x 300dpi, Now 1Mb memory, 25 resident fonts, 1 font card slot, 16 chr LCD, HP Laserjet™ Series II, IBM ProPrinter XL emulation, optional 2nd paper tray. £289

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4ppm, 600 dpi, HP LaserJet™ Series III and IBM ProPrinter III XL emulation. 1Mb memory, 8 scalable fonts, 42 bitmapped fonts, 1 font card slot, 2nd paper tray option. Centronics and RS232 serial interfaces. £399

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JPR 7825 WS INKJET
300dpi, 180cps draft, 120cps LQ, parallel centronics interface, 50K buffer, HP Deskjet + (PCL3) emulation. £129

Optional sheet feeder *(as shown)* £49

JPR 7840 INKJET
300dpi, 180cps draft, 120cps LQ, 80 chr at 10cpi line length, parallel centronics interface, 13 bitmapped fonts, 25 scalable true typefonts £149

SDR 7706S LASER
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Desktop fax with built-in telephone, on-hook dialling, 10 number speed dial, auto fax/phone switching.

BT DF100 £209
Auto fax/phone switch, on hook dialling, 5 page document feed, 10 one-touch dialling, fine resolution.

SAMSUNG SF500 £209
Auto fax/tel switch, mercury button, 8 one-touch speed dialling, 5 sheet feeder, supports answerphone.

OKI FAX 450 £229
18 sec transmission, auto paper cutter, 10 one-touch dialling,voice assisted auto switch over, TAD interface, 10 sheet auto document feeder.

BROTHER FAX 470 £229
Automatic paper cutter, anti-curl system, 15 sec Transmission, fax/telephone auto switch, TAM interface, 15 station auto dialler, auto document feeder.

What to Buy for Business BEST BUY

BROTHER FAX 370 £239
Built-in telephone, 16 grey scales, 10 sheet feeder, 5 one-touch dialling, auto answer, supports answerphone.

BROTHER FAX 475M £299
15 page memory, 32 grey scales, 15 sheet feeder, 20 one-touch dialling, auto answer, broadcasting, supports answerphone.

Fax/Answerphones

BT DF200 £269
Fax/Phone/Digital answering machine in one, auto fax-phone switch, 5 page document feed, PBX compatibility.

BROTHER FAX 390-DT *Memory Fax* £329
Digital answering machine, 14 min message storage, paging/fax forwarding.Anti-curl system, quick scan & multi copying.

BROTHER FAX 490-DT *Memory Fax* £359
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Plain Paper Faxs

SPECIAL OFFER
OKI Plain Paper LED Fax

£779

OKI FAX 1000 *LED Fax*
16 page memory, TAD interface, voice assisted fax/tel switch. Use as printer, scanner and PC fax with optional interface.

BROTHER FAX 1000P ▲ £449
60 one-touch speed dialling, fax/tel switch, mercury button, 10 page memory, 32 grey scales, 200 A4 sheets

TRIUMPH ADLER FX630 £499
Plain paper fax using bubblejet technology, compact design, 15 page memory, 16+16 one touch, 16 shades of grey

BT BF800 *Laser Fax* £749
Laser printing, 6 secs transmission, TAD interface, 25 page memory, 250 A4 sheets, RS232C I/F, 114 broadcast locations.

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CANON STARWRITER 30 £249
360dpi, 40cps, 12 line display, 28K text memory, 50,000 word dictionary.

CANON STARWRITER 400 £359
Bubblejet, 12 line display, 3½" FDD, 700 print variations, 30 clipart images.

CANON STARWRITER 500 £399
Bubblejet, 16 line display, spreadsheet, 3½" FDD, 60K memory, 220 cliparts.

CANON STARWRITER 95 £479
Bubblejet printing, 360dpi, 160cps, optional scanner, 60K memory.

TA GABRIELE INKWRITER II £329
Using Inkjet technology, 64K memory, backlit 14 lines x 18 chr, LCD display, 3.5" 1.44Mb floppy, 80,000 word spellcheck.

BROTHER LW-450 £279
96K text memory, 12" display, MS-DOS compatibility, 3.5" drive

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CANON FC 310 NEW LOW PRICE £299
6 copies per min, no warm up time, compact cartridge, single feeder.

CANON FC 530 £529
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CANON PC11 £799
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TRIUMPH ADLER TA2004 £389
Compact personal copier, preset 1-9 copies, 4 A4 copies per min, no warm up time, 50 sheet stack.

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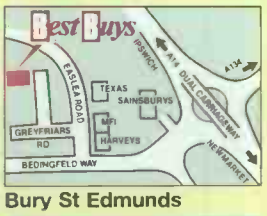

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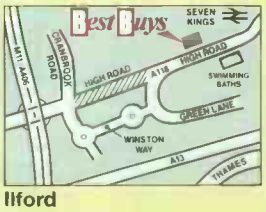

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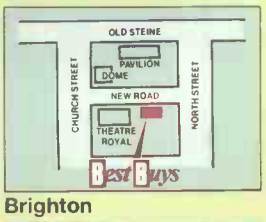

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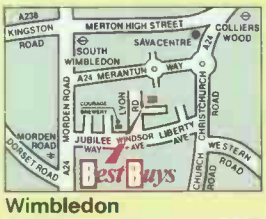

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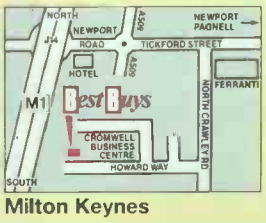

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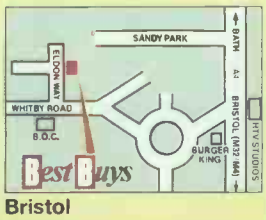

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T630 - This new three pass colour scanner offers an outstanding specification at an incredible price! 600x300 optical scan resolution for up to 4800 dpi output. Includes Photoshop LE software, SCSI interface, and all cables. Available now at this promotional price **£449**

T630 PRO - Includes transparency adaptor and full version of Adobe Photoshop. **£815**

VISTA S6 - The award winning scanner (PC PRO recommended) with single pass scanning for greater speed. (600x300 optical scan resolution, 4800dpi interpolated). Includes Photoshop LE software. New lower price **£529**

VISTA S6 PRO - A complete scanning solution capable of scanning negatives and including transparency adaptor (compare other manufacturers prices) and a full version of Adobe Photoshop (RRP £795) Great value at just **£889**

VISTA S8 - This new model delivers an optical scan resolution of 800x400 dpi and a maximum resolution of 6400dpi with interpolation. Includes Adobe Photoshop LE software **£649**

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UC1260 PRO - As above with transparency adaptor. A high quality, high speed complete package for just **£1359**

POWERLOOK PRO - Designed to replace the traditional drum scanner. Inc full Photoshop and transparency adaptor. Please call for prices on this top of the range pre-press scanner.

OMNIPAGE DIRECT OCR software- just add £40

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GTX8500 SCSI *NEW!*	£593
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GTX9000 SCSI	£696
GTi8500 SCSI *NEW!*	£780
GTi9000 SCSI	£880

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A brilliant 800dpi true colour hand scanner:

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- Photo Finish 3.0 image software
- Smart Page Direct OCR software
- Fully TWAIN compliant
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- Excellent value for money

ColorPage-I

A high quality colour flat bed scanner:

- Brilliant 24 bit colour
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- Photo finish 3.0 image software
- Recognita Plus OCR software
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- Optional Auto Document Feeder
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JX-610

A3 flat bed scanning is here! This 24 bit colour scanner (as shown above) handles any size up to A3 at speed. Functions such as adjustment white balance, edge emphasis for sharpness control, negative scanning for image processing and Gamma correction for complete control over 256 gradations of each colour provide precise colour control to the user. The colour accuracy source for this scanner is 36 bits for colour and 12 bits for greyscales for professional colour reproduction. The scanner is supplied as standard with a transparency adapter and image editing software. The recommended retail price is £7,495 although Tech Direct are pleased to offer this professional solution with an incredible £2,000 discount. £5,495

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CPD 17 SF1	17"	£575
GDM 17 SEIT	17"	£815
GDM 20 SEIT	20"	£1405
GDM 20 SEV	20"	£1295

PANASONIC

TX-T1537	15"	£315
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TX-D1732	17"	£495
TX-D2032	20"	£1125
TX-D2051	20"	£1149
TX-D2131	20"	£1355

NEC

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XE17	17"	£692
XP17	17"	£935
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KYOCERA FS-400 LED

4 pages per minute print speed
100 page sheet feeder
Enhanced 300 x 1200 dpi
79 bitmapped, 13 scalable fonts
Cartridge free design
12 month warranty
Energy Star compliance
Draft print mode
Optional Postscript emulation
Low cost per page output

At the heart of this super economic printer from Kyocera is a cartridge free design. Kyocera is the company pushing the boundaries of low cost printing and on this unit the only consumable needed is toner, thus lowering print costs. The replacement toner kit for this printer is just £15.95 for around 1200 pages at 5% coverage. The FS-400 is still equipped with a wealth of features including Laserjet III emulation and options such as single and multi-protocol network connectivity expansion and Postscript emulation whilst being fully Windows compatible. A second paper cassette and font ROM to upgrade to 59 scalable fonts are also available. This attractive personal page printer has a small footprint and is available from Tech Direct at our usual unbeatable pricing. Look after the planet and your wallet with a Kyocera FS-400 printer!!

For speed and economy the FS-1550 leads the pack. A blistering 10 pages per minute makes short work of most office requirements whilst the resolution enhancement ensures all your work is clear and precise. Included are Laserjet III and optional Postscript emulations, network connectivity options and as your requirements grow so can the paper handling options - extra paper trays, a duplex unit or even a sorter/collater. Where this printer really shines is in offering substantial savings on running costs compared with other manufacturers. Taken over the life of the printer the cost of consumables can be far more important than the original purchase price. Purchase a three year on-site warranty for £199 for total peace of mind, and look forward to years of trouble free service and low running costs.

KYOCERA FS-1550 LASER

10 page per minute print speed
250 page sheet feeder
HP Laserjet III emulation
IBM and EPSON emulation
Enhanced 300 x 1200 dpi
79 bitmapped, 13 scalable fonts
Optional network interface
Optional RS-232C interface
Optional Postscript emulation
Optional paper handling units
Low, Low running costs

Panasonic

BRAND NEW GDI LASER LAUNCHED !

The Panasonic range of Ultra Compact printers moves from strength to strength with the launch of the KX-P6100 (pictured right). This is Panasonic's first GDI laser printer. Designed specifically for use under Windows applications this printer utilises the processing power of your PC via its Graphical Device Interface (GDI) to avoid unnecessary translations of commands, reducing document processing time and therefore ensuring a fast throughput time for the first page. As the printer has no internal memory you need never worry about costly upgrades for your printer memory in the future. This printer is also ready for the launch of the new Windows 95 operating system when released. Available now from tech direct this printer represents exceptional value for money.

KX-P6100 LASER

Fast 6 pages per minute output
Large 100 sheet input tray
One years on-site maintenance
Full GUI software included
Low running costs
True GDI laser
Resolution enhancement
600 x 300 dots per inch
Compact design
Laser printing at an inkjet price

KX-P4401 LED

4 pages per minute print speed
100 sheet multi-purpose tray
50 sheet output tray
1 Mb RAM (upgrades to 5Mb)
1 Years on-site maintenance
8 internal scaleable fonts
28 bitmap fonts
Compatible with HP PCL5
Silent in stand-by mode
Power save mode

Presenting the Panasonic KX-P4401, (pictured left) the ultra compact LED page printer that puts power printing at your side on your desk. Producing crisp, clear laser quality output on plain paper at a rapid 4 pages per minute would normally require a much heavier, bulkier printer; but the compact, upright design and tiny footprint of the KX-P4401 leaves you with both working space and elbow room. With 1MB of RAM, Windows Driver and HP PCL5 compatibility included as standard you can produce sharp text and graphics immediately and easily. Including an energy efficient "sleep mode", your Panasonic printer is completely silent when not printing and is therefore comfortable to live with at home or in the office. With a KX-P4401, your documents will be as distinctive as your printer.

Please see opposite page for prices on other Panasonic and Kyocera printers

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What we don't know about PCMCIA, computers isn't worth sharing.

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- Immediate use
- Mainstream performance
- Data security

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SUPERPORTABLE PC

Technology for freedom. No other PCs are as ready to go or as easy to use right out of the box.

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- Smallest notebook PC available (11.1x7.28x1.57")
- 4MB and 8MB RAM, Upgradeable
- VGA-Out Port
- Comes with external 3.5" Floppy disk drive
- Infra red data transfer
- 3 year warranty
- Up to 4 hours battery life
- 1.72kg (3.8lb) weight

MODELS & CONFIGURATIONS

MODEL	PROCESSOR	HARD DISK	RAM	SCREEN	PRICE
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260	i486 DX2/50	260MB	4MB	8.5 DSTN	£1924
170	i486 DX4/75	170MB	8MB	8.5 DSTN	£2139
260	i486 DX4/75	260MB	8MB	8.5 DSTN	£2399

HP Omnibook 4000

- 486, up to 100MHz DX4
- 4 or 8MB RAM. Up to 32Mb
- Up to 520MB HDD
- Built-in stereo sound
- 10.3" DSTN or 10.4" TFT
- Centered Trackball
- Infra-red port, serial, parallel, audio
- PCMCIA Type II Slot
- Enhanced Port Replicator
- 3 year warranty
- Full PC functionalities
- Modularity & flexibility
- Connectivity convenience
- Up to 3.5 hours battery life
- Sleep & hybernation mode
- MS-DOS 6.2, Windows 3.11
- 3.1kg (6.9lb) weight

Omnibook 4000 From **£1978**

MODELS & CONFIGURATIONS

MODEL	PROCESSOR	HARD DISK	RAM	SCREEN	PRICE
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340	i486 DX2/50	340MB	8MB	10.3 DSTN	£2329
520	i486 DX2/50	520MB	8MB	10.3 DSTN	£2699
340	i486 DX2/50	340MB	8MB	10.4 TFT	£2999
520	i486 DX2/50	520MB	8MB	10.4 TFT	£3399
340	i486 DX4/100	340MB	8MB	10.3 DSTN	£2749
520	i486 DX4/100	520MB	8MB	10.3 DSTN	£2999
340	i486 DX4/100	340MB	8MB	10.4 TFT	£3399
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Casio XL7000

- 1MB RAM
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- 3 x AA batteries gives approx 100 hours use
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Psion Series 3a

- 80 Characters x 17 Lines
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- HP Financial Calculator
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PC-3100 **£299.95**

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DRAM expansion cards allow you to increase the resident RAM storage in your mobile computer without physically modifying the computer. Increasing RAM greatly improves program operation and efficiency.

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PCMCIA – Your Questions Answered

What are PCMCIA Cards?
Also called PC Cards, they are the size of a credit card. PC Cards enhance your computers capabilities. All PC Cards conform to the PCMCIA standard making it possible in theory to swap from one machine to another. In practice, as with any any evolving standard, there are some compatibility issues.

What is Type I, II and III?
There are three types of PC Card with varying thicknesses, which determines its peripheral function.
Type I Cards – (3.5mm thick) are used for memory expansion (DRAM) to give your notebook extra memory to run programs. SRAM or Flash Cards give you additional data storage. These work in the same way as floppy disks.
Type II Cards – (5mm thick) are the most versatile. Generally used for products such as modems, network connections, sound cards and SCSI connections for CD ROM and Multimedia.
Type III Cards – (10mm thick) are the newest introduction to the PC Card technology. The extra thickness of this card allows it to have rotating parts, and are thus used for mini hard disks.

What are Card and Socket Services?
In the same way that attaching a network card or another peripheral to your PC requires software to operate the device, Card and Socket Services are the software drivers which control the PC Cards. There are three main vendors of this software: Phoenix, Systemsoft and Award. This software allows you to configure your card to suit your machine and system setup.

My PCMCIA Modem can be installed without Card and Socket services, I thought I always needed Card and Socket Services?
Some PC cards have software direct enablers which mean they do not need Card and Socket Services. This makes installation even easier and also saves on system memory.

Can I use my PC Card on my PC?
Simply add a PCMCIA slot to your PC with a card reader, either internally through an interface adaptor or externally through the parallel port. The slots act as additional drives, so you can copy and fax to your PC Card. To run Type II products through your PC you need an internal PCMCIA reader.

How do I link my mobile system to a CD ROM using my PCMCIA slot?
Use a PCMCIA SCSI card link to a CD ROM drive or other SCSI devices such as scanners, cameras and multimedia products.

What is the difference between SRAM and Silicon disk?
SRAM cards are battery backed storage cards with a battery life of over 2 years. Silicon disks have no battery and operate like mini hard disks.

I have heard people mention 32 bit bus cards & Berlin. What's it all about?
The PCMCIA committee will soon issue the next release of specifications (Version 3, code-named BERLIN and now called the PC Card standard) and this will bring with it several new and exciting features. The most important of these are 32 bit card bus capabilities and dual function cards. Basically 32 bit will give faster throughput than the current cards which are 16 bit. As is implied, dual function cards will be able to perform more than one task.

I'm very confused about the whole issue of PCMCIA cards, Socket Services, enablers, SRAM, Flash. What happens if I need help?
Simply ring and speak with our Technical support department, who will be able to give both Pre & Post sales advice and support. And don't forget we guarantee that all the PC Cards listed and sold by Pico Direct will work with the appropriate card slot.

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For high definition, 16-bit stereo sound for presentations, text to speech, Voice Command Navigation, videogames and MIDI applications.
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- Motorized tray loading, no caddy required
- MSCDEX compatible
- Supports CD-DA, CD-ROM mode 1 and 2, CD-XA, Multi-session Photo CD and CD-I
- 16bit, 44.1kHz sampling Audio output with front volume control
- Data intergrity 1 error in 10^{16} bits

Only £299

IBM/PICO ETHERNET ADAPTOR CARDS

10Base-T and 10Base2 Ethernet. LAN cards for portable computing applications.
- PCMCIA Version 2.
- MS Windows compatible.
- Novell certified.
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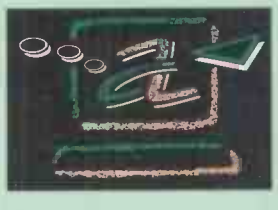

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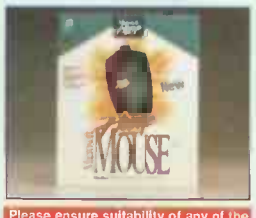

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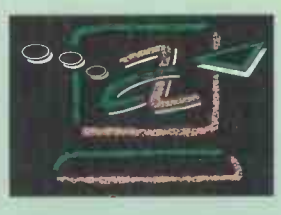

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Model	Mono	Dual Scan Colour	TFT Active Colour
486DX2-50	£1082	£1377	£2058
486DX2-66	£1111	£1406	£2087
496DX4-75	£1137	£1431	£2112
486DX4-100	£1183	£1478	£2159

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PRINTERS at novatech

Dot Matrix

EPSON

LX300	£88
LX1050	£172
FX870	£221
FX1170	£279
LQ100	£96
LQ300 *New !*	£141
LQ570+	£186
LQ870	£352
LQ1070+	£283
LQ1170	£401

PANASONIC

KX-P1150	£89
KX-P2023	£108
KX-P2135 Colour	£126
KX-P2124	£198
KX-P3626	£252

Plotters

CALCOMP

TechJet Colour	A4-A0	£4431
DesignMate	A4-A0	£2007
Digitising Tablet	A4	£216

HEWLETT PACKARD

DesignJet 220 A4-A1	*	£1465
DesignJet 220 A4-A0	*	£1925
DesignJet 600 A4-A1	*	£2765
DesignJet 600 A4-A0	*	£3295
DesignJet 650C A4-A1	*	£3778
DesignJet 650C A4-A0	*	£4465
3 Years On-site Maintenance		£295

Cables

PARALLEL TO PRINTER

1.8 M Printer Cable	£4
3 M Printer Cable	£6
5 M Printer Cable	£10
10 M Printer Cable	£15

M - M CENTRONICS

2 Metre M-M	£5
3 Metre M-M	£8
5 Metre M-M	£10
10 Metre M-M	£15
2 Way Manual switch Box	£17

Inkjet Printers

CANON

BJ30 *New !*		£154
BJ70 Colour *New !*		£225
BJ200ex		£174
BJ230		£239

BJC4000 Colour		**£232**
BJC600e *New !*		£336
BJ300	*	£358
BJ330	*	£398
BJC800	*	£1079
BJC820	*	£1225

EPSON

Stylus Colour 720dpi	£325
Stylus Colour 720 dpi Paper	£Call
Stylus 800+	£168
Stylus 1000	£311

HEWLETT PACKARD

DeskJet 320	£163
DeskJet 320+SheetFeed	£177
DeskJet 320 Colour Kit	£28
DeskJet 320 Battery Pack	£27
DeskJet 540 *New!*	**£208**

DeskJet 660C *New!*	**£294**
DeskJet 850C *New!*	£387
DeskJet 1200C	£597
DeskJet 1200 PS	£985
DeskJet 1600C *New!*	£824
DeskJet 1600PS *New!*	£1227

HP for APPLE MAC

DeskWriter 320	£169
DeskWriter 320+SheetFeed	£182
DeskWriter 540 *New!*	£212
DeskWriter 660C *New!*	£297

No of * = No of years On-Site Maint.

Laser Printers

BROTHER

HL630		£324
HL631		£365
HL660		£465
HL1260	*	£919

CANON

LBP4I	*	£409
LBP1260*New !*	*	£907

EPSON

EPL5200	*	£462
EPL5600	*	£594
EPL9000 12ppm A3	*	£1064

HEWLETT PACKARD

LaserJet 4L	£353

LaserJet 5P *New !*	**£587**
LaserJet 5MP *New !*	**£704**
LaserJet 4+	£935
LaserJet 4M+ Pscript	£1258
LaserJet 4V A3	£1368
LaserJet 4MV Pscript A3	£1972
LaserJet 4Si *	£2054
LaserJet 4Si MX *	£2927
LaserJet Colour *New !*	**£4199**

NEC

SuperScript 610 Plus	*	£289
SuperScript 660	*	£416
SuperScript 660i	*	£569
SuperScript Color 3000	*	£669

PANASONIC

KX-P6100 *New!*	*	£268
KX-P4400	*	£278
KX-P4401	*	£279

QMS *Fast* Adobe Postscript

PS1060 A4 600x600 12Mb	£1576
PS1660 A3 1200x600 12Mb	£2891

STAR

Wintype 4000	£288

No of * = No of years On-Site Maint.

Printer Ribbons

		2+	12+
AMSTRAD			
DMP2000/3000/3160	RN	1.80	1.70
PCW9512	MS	2.30	1.99
EPSON			
LQ100,LQ150 Original	DN	5.25	4.95
LQ300/570/850/870	DN	3.05	2.75
LQ1070/1170	DN	3.50	3.10
LX300/400/850	FN	2.85	2.55
LX1050,FX1170	FN	3.10	2.75
PANASONIC			
KXP1123/1124	RD	2.30	2.20
2123/2124 BLACK	RD	3.95	3.70
2123/2124 COL	RD	7.95	7.50
STAR			
LC10/100	FN	1.60	1.40
LC24-1/2/300,XB24	DN	2.30	2.10

Ink Cartridges

	1+	6+
CANON		
BJ10E,BJ20	14.75	13.95
BJ200/BJ230	16.95	15.45
BJ300/BJ330	13.00	12.00
BJC600 Black Long Life	7.00	6.00
BJC600 Colours	8.00	7.00
BJC4000 BC21Black	8.00	7.00
BJC4000 BC21Colour	14.00	13.00
BJC4000 BC20 Black	23.00	21.00
EPSON		
Stylus 400,800,1000	10.00	9.00
Stylus 800,1000 Long Life	19.00	17.00
Stylus Colour Black	12.00	11.00
Stylus Colour	29.00	27.00
HEWLETT PACKARD		
DeskJet 310,320	16.75	15.95
DeskJet 500,520,540,560	19.75	18.95
DeskJet Colour	21.00	19.00
DeskJet 1200 Black	19.00	18.00

Laser Toner

	1+	3+
HEWLETT PACKARD		
LaserJet IIP,IIIP	48.00	46.00
LaserJet II,III,IIID	49.00	47.00
LaserJet 4L,4ML,4P	46.00	44.00
LaserJet 4,4M,4+	71.00	69.00
LaserJet 4V,4MV	91.00	89.00
NEC		
SuperScript 610,660	78.00	76.00
STAR		
Laser 5 All Models	67.00	65.00
WinType 4000	68.00	62.00

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PERIPHERALS at novatech

Monitors

GOLDSTAR

GS1455D 14" 800x600	£137
GS1466DM 14" 1024x768 NI LR	£168
GS1505DM 15" 1024x768 NI LR	£195
GS1520DM 15" 1024x768 NI LR	£229
GS1727DM 17" 1024x768 NI LR	£455

NEC

Value Series	
XV15 15" 1024x768 NI LR	£279
XV17 17" 1024x768 NI LR	£559
Efficiency Series	
XE15 15" 1024x768 NI LR	£389
XE17 17" 1024x768 NI LR	£697
XE21 21" 1152x870 NI LR	£1329
Professional Series	
XP17 17" 1152x870 NI LR	£909
XP21 21" 1360x1024 NI LR	£1749

PHILIPS

14M 14" VGA Mono LR	£89
14C 14" 1024x768 I LR	£163
14B 14"1024x768 NI LR	£179
15B 15" 1024x768 NI LR Stereo	£254
17C 17" 1024x768 NI LR Stereo	£423
17T 17" 1280x1024 Trinitron	£546
17A 17" 1280x1024 NI LR	£636
20C 20" 1280x1024 NI LR	£779

SONY

CPD-15SF1 1024x768 NI LR	£309
CPD-17SF1 1024x768 NI LR	£587
GDM 17SE1 1280x1024 NI LR	£811
GDM 20SE1 1280x1024 NI LR	£1403

Keyboards

Silitek 102 Key Tactile £17

MS Natural Keyboard £59

Scanners

CANON

Ion PC Camera RC260 Kit	£359
IX-4015 Colour + SCSI Interface	£529

EPSON Colour Scanners

SCANNER PACKAGES

Both packages Includes Scanner withall interfaces, cables & software required +

GTX inlcudes:
- Adobe Photoshop LE
- Omni Page Direct OCR

GTX6500 Parallel	£388
GTX6500 scsi	£468
GTX8500 Parallel *New !*	£498
GTX8500 scsi *New !*	£578
GTX9000 Parallel *New !*	£604
GTX9000 scsi	£679

GTI package includes:
- Adobe Photoshop full version

GTI8500 scsi *New !*	£753
GTI9000 scsi	£862

HEWLETT PACKARD

ScanJet 3P PC	£314
ScanJet IIcx	£674

Please specify interface - PC, MCA, or MAC

LOGITECH

ScanMan 32 for Dos + OCR	£56
ScanMan 32 for Wind OCR	£56
ScanMan 256 PC	£78
ScanMan EasyTouch	£106

ScanMan COLOUR £169

PowerPage £299

PLUSTEK

ScanPlus 6000 Colour *New !* £179

A4 Sheet fed Includes Pict Pub LE + WordScan OCR

Tape Streamers

COLORADO

DJ-20 250Mb Internal	£89
DJ-35 350Mb Internal	£104
DJ-25 700Mb Internal	£165
FC-20 Tape Controller	£48
Trakker 250Mb External	£188
Trakker 350Mb External	£217
Trakker 700Mb External	£304
250 Mb Tapes	£12
350 Mb Tapes	£18
700 Mb Tapes	£22

Please Call for Quantity Tape Prices

Mice

LOGITECH

Pilot Serial Mouse	£17
Mouseman Serial (Rht Hand)	£33
Mouseman Cordles	£49
Trackman II	£43
Trackman Portable	£35

MICROSOFT

Mouse 2 Serial & PS/2 Intellipoint	£35
Home Mouse	£29

Joysticks

CH

Flight Stick	£27
Flight Stick Pro	£49
Virtual Pilot Yoke	£63
Multi I/O with Game Port	£14

Faxes

SAMSUNG

SF40	*	£177
SF500	*	£188
SF800	*	£246
SF1505	*	£247
SF2800 *New !*	*	£292

HEWLETT PACKARD

FAX 900	£526
FAX 950	£678
3Yrs On-Site Warranty	£70

Modems

PACE	Internal	External
Microlin FX32+	£136	£149
Microlin FX34	£229	£229
Microlin FX32+ PCMCIA		£189
Microlin FX34 PCMCIA		£Call

Mobifax 32+ 14.4 + Fax	£92
Linnet Message Centre	£218

US ROBOTICS

Sportster 28.8+fax	£189
Sportster 14.4+fax	£125
Sportster 14.4+fax Internal	£126
Worldport 14.4 +CellPhone	£167
Worldport PCMCIA 2496+fax	£129
Worldport PCMCIA 14.4 +Cell	£194
Worldport PCMCIA V34	£219
Courier v34 External	£255
Courier v34 Internal	£262

Modem Cable 9 or 25 pin £9

APPROVED connection to telecommunications specified in the instructions subject to the conditions in them

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SOFTWARE at novatech

Accounts

Microsoft Money 3	£25

Quicken Deluxe Home Pack 4	**£46**
Quicken Deluxe Business Pack 4	**£46**
Quicken for Windows 4.0 *New !*	£29
Quicken for DOS	£33
Quick Books v 3.0 *New !*	£86

SAGE STERLING for DOS

Book Keeper	£56
Accountant	£160
Accountant Plus	£242
Financial Controller	£319
Financial Controller LAN	£506
Payroll II	£129

STERLING + 2 for Windows

Book Keeper +2	£79
Accountant +2	£190
Accountant Plus +2	£272
Financial Controller + 2	£354
Financial Controller + 2 LAN	£549
Payroll for Windows	£129
Instant Accounting for Windows	£79
Instant Payroll for Windows	£69

Databases

Lotus Approach r3	£82
DataEase 5.0 Dos	£372
DataEase 5.0 Windows	£372
DataEase 4.53 LAN 3 User	£449
dBase 5 Windows	£228
dBase 5 Windows Version Upg	£89
dBase 5 Dos	£298
dBase 5 Dos Ver Upg	£89
MS Access v2.0	£218
MS Access v2.0 CCP Upgrade	£78
MS Foxpro v2.6 Std. Dos or Win	£72
MS Foxpro v2.6 Prof. Dos or Win	£276
Paradox v5 for Win Upgrade	£117

Edutainment

DORLING KINDERSLEY

My First Amazing Dictionary	£27
The Way Things Work	£41
Ultimate Human Body	£41
Eyewitness Science Encyclopedia	£41

MICROSOFT

Ancient Lands	£29
Art Gallery	£29
Bookshelf	£61
Cinemania 1995	£29
Dangerous Creatures	£29
Dinosaurs	£29

Encarta 1995	**£56**
Musical Instruments	£29
Magic School Bus - Human Body	£29
Magic School Bus - Solar System	£29
Gahan's Ultimate Haunted House	£29

Graphics

Adobe Illustrator v4	£345
Adobe Photoshop v3.0	£398
Aldus Page Maker Classic	£44
Aldus Page Maker 5	£389
Aldus Photostyler v1.1	£386

Corel Draw 3 CD Only	**£45**
Corel Draw 4 CD Only	**£86**
Corel Draw 5 CD Only	**£287**
Corel Draw 3 - 5 Upg CD Only	**£208**
Corel Draw 4 - 5 Upg CD Only	**£116**
Corel Ventura 5 CD Only *New !*	£195
Corel Ventura 5 Upgrade CD Only	£66
Corel Gallery	£26
Corel Flow	£46
Microsoft Publisher 2	£63
MS Creative Artist	£29
Quark Express v3.3	£554
Serif PagePlus 3	£43
Visio 3	£86
Visio 3 Upgrade	£59

Integrated

Claris Works & Quicken windows	£59
Lotus SmartSuite 3.0	£315
Lotus SmartSuite 3.0 Ver Upg	£158
Lotus SmartSuite 3.0 Comp Upg	£243

Microsoft Office 4.2	**£319**
MS Office 4.2 CCP Uprade	£151
MS Office v4.2 Trade In	£230
MS Office Professional v 4.3	£418
MS Office Prof v4.3 CCP Upgrade	£227
MS Office Prof v4.3 TradeIn	£267
MS Works 3 for Dos	£83
MS Works for Windows v3	£82
Perfect Office 3.0 Comp Upg	£145
Perfect Office 3.0 Version Upg	£119

Languages

Borland Delphi *New !*	£187
Borland Turbo C++ v3 Dos	£45
Borland Turbo C++ v3 Windows	£64
Borland Pascal v7 Dos	£64
Borland Pascal for Windows	£78
CA Visual Objects *New !*	£429
MS Visual C++ Standard	£53
MS Visual C++ Pro CD for Win NT	£249
MS Visual Basic Standard	£78
MS Visual Basic Pro	£193

Netware

Novell Personal Netware	£44
Novell Netware v3.12 5 User	£415
Novell Netware v3.12 10 User	£946
Novell Netware v3.12 25 User	£1398
Novell Netware v4.1 5 User CD	£415
Novell Netware v4.1 10 User CD	£946
Novell Netware v4.1 25 User CD	£1398
Novell Netware v4.1 50 User CD	£1898

See Next Page for Great Prices on 3Com Network Cards

Systems

MS DOS 6.2 Upgrade	£37
Microsoft Windows 3.1	£64
MS WorkGroups for Windows 3.11	£91
MS WFWG 3.11 Add On	£43
Novell Personal Netware	£44
OS/2 WARP 3.5"	£56
OS/2 WARP CD	£44

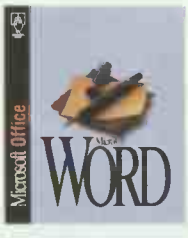
Spreadsheet

Microsoft Excel 5	£219
Microsoft Excel 5 CCP Upgrade	£78
Lotus 123 for Windows 5	£219

SuperCalc for Windows	**£39**

WP

Lotus Ami Pro v3.1	£85
Locoscript Pro 2	£62
MS Creative Writer	£29



Word for Windows 6	**£221**
Word for Windows 6 CCP Upg	**£78**
WordPerfect for Windows 6.1	£165
WP Windows 6.1 Version Upg	£62
WP Windows 6.1 CompetitiveUpg	£79

Utilities

Borland Sidekick + Dashboard	£37
Caere PageKeeper 2 *New !*	£72
Central Point PC Tools Win v2	£47
Dr Solomons Anti Virus Dos	£58
Dr Solomons Anti Virus Windows	£70
Delrina WinComm Pro	£55
Delrina Winfax Pro v4	£53
Delrina Winfax Pro v4 Upgrade	£33
Landmark WinProbe	£45
Laplink Pro v 5 Dos	£59
Laplink Pro v 5 Windows	£84
Lotus Organiser v2	£79
Norton Utilities v8	£87
PC Anywhere v5 DOS (host+Rem)	£87
PC Anywhere Windows	£89
Procomm Plus Windows	£55
QuarterDeck CleanSweep	£27
QuarterDeck Qemm v7.5	£45
Stacker 4.0	£59
Stacker 4.0 Upgrade	£36
Xerox Textbridge OCR	£66

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COMPONENTS at novatech

Hard Drives

CONNER IDE

CFS420A	420Mb	13ms	£113
CFS540A	540Mb	15ms	£123
CFA850A	850Mb	12ms	£229
CFA1275A	1.2Gb	12ms	£279

QUANTUM IDE

MV540AT	540Mb	14ms	£132
LT730AT	730Mb	11ms	£172

SEAGATE IDE

ST3491A	428Mb	15ms	£112
ST3660A	545Mb	14ms	£119
ST3780A	725Mb	12ms	£189
ST5850A	850Mb	11ms	£173
ST31220A	1Gb	12ms	£228

WESTERN DIGITAL IDE

AC-2420	420Mb	12ms	£117
AC-2540	540Mb	12ms	£147
AC-2700A	730Mb	10ms	£162
AC-2850A	850Mb	12ms	£178
AC-31000A	1Gb	10ms	£249
AC-31200A	1.2Gb	10ms	£269

Other Drives

5.25" 1.2Mb	£33
3.5" 1.44Mb	£22

Interface Cards

CONTROLLER CARDS

IDE 2Hdd 2Fdd 1Parr 2 Ser 1Game	£14
IDE 4Hdd 2Fdd 1P/1G/2 16550 Serial	
Mode 3+4 VL Bus	£22
Promise	
DC2300 VL IDE 1P/1G/2 16550 Ser	£39
DC200 ISA IDE Cache	£69
DC4030 VL IDE Cache	£79
DC5030 PCI IDE Cache	£105

ADAPTEC SCSI Controllers

1522 Hdd/Fdd	£95
1542C kit ISA Hdd/Fdd	£179
1640kit PS/2 MCA Hdd/Fdd	£189
2742kit EISA Hdd/Fdd	£259
2842kit VL Bus Hdd/Fdd	£172
2940kit PCI Hdd	£194
T460kit PCMCAI fast SCSI2	£179

Soundcards

CREATIVE LABS

Sound Blaster 16 Value	£64
Sound Blaster 16 Value IDE	£68
Sound Blaster 16 MCD	£82
Sound Blaster 16 SCSI	£103
Sound Blaster 16 MCD AdSP	£109
Sound Blaster 16 SCSI AdSP	£124
Sound Blaster AWE32 Value	£122
Sound Blaster AWE32 MCD	£163
Sound Blaster AWE32 IDE	£175

ORCHID

Soundrive 16	£59
GameWave 32 +	£93
SoundWave 32 Pro	£131
SoundWave 32 Pro SCSI 2	£143

ZIFI SPEAKERS

Zi-Fi Speakers	£25
Zi-Fi Pro Speakers	£39

Graphics Cards

CLICK

Cirrus 5422 16.7m Col 1Mb ISA	£49

DIAMOND

Stealth 64 1Mb Dram	£92
Stealth 64 2Mb Dram	£132
Stealth 64 2Mb Vram	£217
Stealth 64 4Mb Vram	£309

Piese specify ISA, VLB, or PCI when ordering

ORCHID

Fahrenheit VA ISA	£69
Fahrenheit 64 1Mb	£114
Fahrenheit 64 2Mb	£155
Fahrenheit Pro 64 2Mb VLB	£235
Fahrenheit Pro 64 4Mb VLB	£345

Kelvin 64 1Mb	£98
Kelvin 64 2Mb	£129

Piese specify ISA, VLB, or PCI when ordering

CD Kits

CREATIVE LABS

Sound Blaster16 Cracker Pack	£165
16 Bit Stereo Sound Card	
Panasonic CR563 Dual Speed CD Rom	
Aldus Photostyler SE	
Grolier Encyclopaedia	
Battery Powered Speakers	
SoundBlaster CD16 Discovery	£209
SoundBlaster MultiMedia Office	£399

CD Drives

CREATIVE LABS

563 MultiMedia Upgrade	£92
Includes Grolier Ency + PhotoStyler	

GOLDSTAR

GCDR520D Dual Speed IDE	£72
GCDR540D Quad Speed IDE	£103

Price Includes Interface, Cable & Driver

NEC

3Xp Plus	£247
4Xi	£226
4Xe	£367
AT Bus SCSI Interface	£43
Parallel to SCSI Interface	£95

PANASONIC Multi-SessionCD

CR562 Bare Drive	£79
Interface Kit inc Cables	£8

TOSHIBA

XM3601B int Quad speed	£229

PIONEER

DRU -104X Quad Speed	£179
DRM-602X 6CD Double Speed	£487

Network cards

3COM Etherlink III 3C509B

Connection	Bus	1 Pack	5 Pack
BNC	ISA	£66	£293
RJ45	ISA	£65	£276
BNC & RJ45	ISA	£75	£325

Memory

1Mb 70ns 30 Pin	£27
4Mb 70ns 30 Pin	£115
4Mb 70ns 72 Pin	£118
8Mb 70ns 72 Pin	£229
16Mb 70ns 72 Pin	£379
32Mb 70ns 72 Pin	£829

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Drives Plus...

*See below

SCSI

Controller cards

TMC1610MCD		16bit	£59
DTC3280	Kit	16bit	£99
Adaptec 1510		16bit	£59
Adaptec 1515	Kit	16bit	£69
Adaptec 1542	Kit	16bit	£167
Adaptec 1542+	Kit	16bit	£215
Adaptec 2842VL	Kit	VESA	£167
Adaptec 1640	Kit	MCA	£212
Adaptec 2742	Kit	EISA	£249
Adaptec 2940	Kit	PCI	£192
SP360VL		VESA	£129
SP382VL	128k buffer	VESA	£179
SP296	Cache	EISA	£279
MCS700DNK	PS/2	MCA	£69

Cables

Single drive internal	£8
Dual drive internal	£10
Triple drive internal	£15
Centronic 50 - Centronic 50	£18
Centronic 50 - 25 pin	£18
Centronic 50 - Micro D 50	£35
Micro D 50 - Micro D 50	£38

Floptical Drives

Iomega	
Drive	£195
Kit	£259
Parallel port kit	£399

These 21Mb optical-based drives are ideal for storing large graphics or database files for quick and easy access. Having both read and write compatability with standard 1.44Mb floppy disks they can replace your existing floppy drive.

Terminators

External	
Active	£25
Passive	£10

Corel software

Version 2	£67
Network manager	£285

Floppy Disk Drives

3.5"	1.44Mb	£29
5.25"	1.2Mb	£39
3.5" / 5.25"	Dual	£89

Single drive cable	5.25"	£8
Dual drive cable	3.5"/5.25"	£10

Bracket and fascia - fits 3.5" drive into 5.25" bay £8

SMC INFO GUIDE

The SCSI interface is necessary for very large drives or certain multi-user operating systems. SCSI is ideal for controlling multiple devices such as hard drives, CD-ROMS, tape drives and optical drives from one controller card as you can mix up to seven different drives from various manufacturers.
Please note: Active terminators are recommended for SCSI-2 and Wide SCSI devices and essential for Fast SCSI devices.

SCSI hard disk drives

Size	Manufacturer	Model	Access time	Cache / buffer	Fast SCSI-2	Warranty	Price
270Mb	Quantum	MV270S	14ms	128k	•	2yr	£125
290Mb	Maxtor	7290S	16ms	64k		1yr	£149
345Mb	Seagate	ST3390N	12ms	256k	•	3yr	£219
365Mb	Quantum	LT365S	12ms	128k	•	2yr	£129
400Mb	HP	C2235					£199
528Mb	Seagate	ST5660N	12ms	256k	•	3yr	£217
532Mb	Fujitsu	M2684S	14ms	256k	•	2yr	£153
540Mb	Conner	CFA540S	12ms	256k		1yr	£225
540Mb	Quantum	MV540S	14ms	128k	•	2yr	£159
540Mb	Quantum	LT540S	11ms	128k	•	2yr	£172
730Mb	Quantum	LT730S	11ms	128k	•	2yr	£185
1.0Gb	Fujitsu	M1606SA	10ms	512k	•	2yr	£375
1.0Gb	HP	C3323S	11ms	512k	•	5yr	£366
1.0Gb	IBM	Pegasus	9ms	512k	•	5yr	£359
1.0Gb	Seagate	ST31230N	10ms	512k	•	5yr	£369
1.0Gb	Seagate	ST31250N	8ms	1Mb	•	5yr	£519
2.0Gb	Fujitsu	M2903S	11ms	512k	•	5yr	£789
2.0Gb	Micropolis	MIC4221	9ms	512k	•	5yr	£725
2.0Gb	Fujitsu	M2654SA	12ms	512k	•	5yr	£1085
2.0Gb	IBM	Alleycat	9ms	512k	•	5yr	£739
2.1Gb	HP	C2490S	9ms	256k		5yr	£717
2.1Gb	Quantum	LPS2100	10ms	512k		2yr	£729
2.1Gb	Seagate	ST12400N	10ms	512k	•	5yr	£729
2.1Gb	Seagate	ST32430N	9ms	256k	•	5yr	£685
2.1Gb	Seagate	ST32550N	8ms	512k	•	5yr	£785
3.0Gb	Fujitsu	M2909S	11ms	512k	•	5yr	£1069
3.0Gb	Micropolis	MIC1936	13ms	256k	•	5yr	£829
4.0Gb	IBM	Wildcat	9ms	512k	•	5yr	£1529
4.0Gb	Seagate	ST15230N	10ms	512k	•	3yr	£1185
4.0Gb	Seagate	ST15150N	10ms	512k	•	5yr	£1419
4.35Gb	Micropolis	MIC3243	9ms	512k	•	5yr	£1095
9.0Gb	Micropolis	MIC1991	12ms	12ms	•	3yr	£1976
9.0Gb	Seagate	ST410800N	9ms	1Mb	•	5yr	£2489

External Drive Boxes

- For 1 to 4 SCSI devices
- Choice of open or closed front panels
- Suitable for:
  - Hard drives
  - Tape drives
  - Optical drives
  - CD ROM
  - DAT drives
  - Floptical drives
  - Syquest drives
- Available with Centronics 50 way, Wide SCSI and Micro D interfaces
- 3 year warranty
- UL / TUV / CSA approved
- Free fitting of any SCSI device when purchased at the same time

EB310	1 x 3.5"	LP/HH	£99
EB320	2 x 3.5"	LP/HH	£112
EB451	1 x 5.25"	FH	£155

Audio / Video drives

These high-performance drives are designed to give higher data transfer rates for multimedia applications. Ideal for animations, audio and MIDI recordings, digital video editing etc.

2.1Gb	Micropolis	MIC4221AV	8.5ms	512k	•	5yr	£775
4.3Gb	Micropolis	MIC3243AV	8.5ms	512k	•	5yr	£1193
9.1Gb	Micropolis	MIC1991AV	12ms	512k	•	5yr	£2285

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Your 1st choice for hard drives

WINNER Which? HARD DISK DRIVES SMC Computers

THE UK'S BIGGEST HARD DRIVE RETAILER

IDE

3.5" IDE hard disk drives

Size	Manufacturer	Model	Access time	Cache / buffer	E-IDE F-ATA	W'ranty	Price
270Mb	Quantum	MV270AT	14ms	128k	•	2yr	£112
320Mb	Maxtor	7345A	15ms	64k		1yr	£127
365Mb	Quantum	LT365AT	11ms	128k	•	2yr	£119
420Mb	Conner	CFS420A	13ms	32k		1yr	£119
425Mb	Western Digital	AC2420A	12ms	64k	•	3yr	£119
428Mb	Seagate	ST3491A	15ms	120k	•	3yr	£115
532Mb	Fujitsu	M2684T	14ms	256k		2yr	£133
540Mb	Conner	CFS540A	15ms	256k	•	1yr	£132
540Mb	Western Digital	AC2540A	12ms	128k	•	3yr	£149
540Mb	Quantum	MV540AT	14ms	128k	•	2yr	£135
540Mb	Quantum	LT540AT	10ms	128k	•	2yr	£155
545Mb	Seagate	ST3660A	14ms	120k	•	3yr	£133
540Mb	Maxtor	7540A	12ms	256k	•	1yr	£149
725Mb	Seagate	ST3780A	12ms	256k	•	3yr	£179
730Mb	Quantum	LT730AT	11ms	128k	•	2yr	£176
730Mb	Western Digital	AC2700A	10ms	128k	•	3yr	£163
850Mb	Western Digital	AC2850A	12ms	128k	•	3yr	£175
850Mb	Seagate	ST5850A	11ms	256k	•	3yr	£189
850Mb	Maxtor	7850A	12ms	64k	•	2yr	£239
850Mb	Conner	CFA850A	12ms	256k	•	1yr	£195
1.0Gb	IBM	84G8998	11ms	512k	•	3yr	£275
1.0Gb	Maxtor	71050A	12ms	256k	•	1yr	£339
1.0Gb	Seagate	ST31220A	12ms	256k	•	3yr	£275
1.0Gb	Western Digital	AC31000A	10ms	128k	•	3yr	£ 269
1.2Gb	Conner	CFA1275A	12ms	256k	•	1yr	£269
1.2Gb	Western Digital	AC31200A	10ms	128k	•	3yr	£299
1.2Gb	Maxtor	71260A	12ms	256k	•	2yr	£355

2.5" IDE hard disk drives

127Mb	Seagate	ST9150AG	16ms	32k		3yr	£154
135Mb	Toshiba	MK1522FC	15ms	64k		1yr	£149
172Mb	Seagate	ST9190AG	16ms	128k		3yr	£169
209Mb	Seagate	ST9240AG	16ms	64k		3yr	£193
262Mb	Seagate	ST9300AG	16ms	120k		3yr	£219
262Mb	Toshiba	MK1724FC	13ms	128k		1yr	£195
340Mb	Toshiba	MK1824FC	12ms	128k		1yr	£239
341Mb	Seagate	ST9385AG	16ms	120k		3yr	£249
455Mb	Seagate	ST9550AG	16ms	120k		3yr	£369
520Mb	Seagate	ST9655AG	10ms	120k		3yr	£399
532Mb	Toshiba	MK2526FC	12ms	128k		1yr	£359

Break your BIOS limitations

ADP60

The remarkable ADP60 card contains its own intelligent BIOS which allows IDE drives up to 512Mb to run on any PC - no more configuration worries!

If your PC does not have a 'user defineable' option for hard disk drives then you ned the ADP60. Available with or without floppy control, the card will fit into any AT ISA bus on 286, 386 or 486-based systems.

ADP60	HDD	£35
ADP60F	HDD/FDD	£39

Disk Manager

Ideal for 'branded' PC systems - such as those by Compaq, IBM, Amstrad etc - and other manufacturers whose BIOS does not allow for large hard disk drives.

This easy to install software will Initialise, partition and prepare virtually any hard disk drive. Disk Manager eliminates restrictions set by DOS and CMOS, allowing you to extend partitions beyond the parameters set by DOS and giving you complete storage access without the need for adittional drivers.

DOS version

£29

When purchased with a hard drive

Other versions available are:

DOS	£49
Novell	£249
Macintosh	£39

IDE Upgrade Kits

Each kit contains all you need to upgrade to an IDE drive including:- Multi I/O controller, cable and 3.5" to 5.25" adaptor brackets.

ISA	£30
VESA	£45

Cables

Single drive	£8
Dual drive	£10

Note: Dual drive cables are 14" long with a space of 3.5" between connectors. Please check for compatablity with your system before ordering. We can custom make cables to order - please call with measurements.

Controller Cards

C&C ISA Multi I/O	£15
C&C VESA Multi I/O	£29
Seagate ST08A ISA	£25
Promise DC-200 ISA cache	£89
Promise DC-4030 VESA cache	£95

The recent deaths of Qual Technology and Innovision Technology have prompted us to ask "Who's next?"

Our recent warnings have now been graphically highlighted with the demise of these companies leaving their customers with no backup and no support. There are still companies who advertise false claims about their capabilities and size while cutting prices to levels which threaten their very existence.

Ask yourself: *What use is a cheap price and a three year warranty if the supplier goes bust next week?*

SMC Computers *IS* the UK's largest hard drive reseller - and one of the country's leading PC Mail Order companies - with the backup and commitment to service which ensures that we will still be here long after others have suffered the same fate as Qual Technology and Innovision.

Speed up data transfer rates by up to 80%

£12

When purchased with a hard drive

Available separately £17

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Drives Plus...

Removable Drives

SMC INFO GUIDE

Unlimited hard disc drive space!

With one of our Syquest system installed, you have an ever-expanding hard disc drive. Fast-access, low-cost cartridges mean you can build a library of applications that can be used and changed in seconds without turning your system off.

Suitable for PC and Macintosh systems.

Syquest 3.5"

105Mb	SCSI drive	£165
	Parallel port	£389
	Media	£40
270Mb	IDE drive	£269
	SCSI drive	£272
	Parallel port	£455
	Media	£47

- 14.5ms access time
- 32k intelligent look-ahead buffer
- Up to 4Mb/s transfer rate
- Air filtration system provides Winchester Class environment

Syquest 5.25"

88Mb	SCSI drive	£177
200Mb	SCSI drive	£272
Media	44Mb	£35
	88Mb	£50
	200Mb	£60

- 88Mb drive unit can read and write to 44Mb cartridges
- 20ms access time
- Less than 1 non-recoverable error in 10^{12} bits read
- Over 4 million cartridges sold worldwide
- 32k Intelligent look-ahead buffer

For external drives - any size - add: £100

SPECIAL OFFER

Buy 5 or more media cartridges and get **£2 off** each

Parallel Port Drives

SMC INFO GUIDE

These compact, portable units connect to any standard parallel port making them ideal for notebooks and laptops with no or little expansion capabilities. The easy to install software can be loaded on to several systems allowing units to be transferred between systems.
All these devices have a pass-through port to connect parallel printers.

Colorado Trakker

250Mb tape drive	£188
350Mb tape drive	£215
700Mb tape drive	£273
Trakker carry case	£39

- Conforms to QIC standards
- Supplied with DOS and Windows backup software
- Up to 8Mb/min backup speed

Backpack CD ROM drive

Quad speed £259

- Up to 300kb/s transfer rate
- 190ms access time
- Dust proof mechanism
- Built-in audio circuit with headphone and line out sockets
- Motorised tray loading
- Photo CD compatible
- Weighs only 4lb

Backpack tape drive

240Mb	£219
900Mb	£355

- Conforms to QIC standards
- Weighs only 5lb
- Macro recording for unattended backup
- Novell Netware compatible

Backpack floppy drives

3.5"	1.44Mb	£119
3.5"	2.88Mb	£175
5.25"	1.2Mb	£125

- 1.44Mb model also accepts 720k disks
- 2.88Mb model also accepts 720k and 1.44Mb disks
- 1.2Mb model also accepts 360k disks
- Background formatting software included
- 32k data buffer

Notes:
360Kb disks that have been written by a 1.2Mb drive may not be readable on a 360Kb drive.
2.88Mb format requires special extra density diskettes

Backpack hard disk drives

420Mb	£329
850Mb	£409
1.2Gb	£514

- 14ms access time
- Security password option
- Automatic support for enhanced parallel ports (EPP)
- Up to 600kb/s transfer rate
- Switching power supply reduces heat and power consuption
- Weighs less than 3lbs
- Chains to any other Backpack product

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Your 1st choice for components

DAT Drives

Hewlett Packard

SMC INFO GUIDE

Digital Audio Tape (DAT) offers fast, high quality, secure backups to those with large data archiving needs.
DAT drives are very compact making them ideal for sharing between several computers and their capacity will suit almost any network.

35470A £545
- 2Gb data storage capacity
- 183 Kb/s (max) transfer rate (11Mb per minute)
- Fastsearch feature finds any file in an average 30 seconds
- Supports both 60m and 90m cartridges

35480A £629
- Up to 8Gb data storage capacity
- Up to 732Kb/s (max) transfer rate (44Mb per minute)
- Can store 1Gb in under 30 mins
- Fastsearch feature finds any file in an average 30 seconds

C1553A Autoloader £1565
- Holds up to 6 tapes
- Up to 48Gb data storage
- Cartridge swap in under 15 seconds
- File access in average 90 seconds including tape swaps
- 10 character status display on front panel

Note: Termination not supplied with internal version. See SCSI hard disk drive page.

C1533A £749
- Up to 16Gb data storage capacity
- 1.5Mb/s (max) sustained transfer rate (90Mb per minute)
- 200,000 MTBF rating
- Files accessed in an average 40 seconds
- Fully compatible with all DDS, DDS-2 and DDS-DC format drives
- Can use 120m, 90m and 60m cartridges

Note: Termination not supplied with internal version. See page 4.

For external versions of any HP DAT drive add £100

HP external kits

These kits are direct JetStor equivalents and are supplied complete with Adaptec controller, backup software and all necessary cables and manuals.

HP2000-1	2.0Gb	1 user	£999
HP2000-25	2.0Gb	25 user	£1199
HP5000-25	4.0Gb	25 user	£1339
HP5000-UL	4.0Gb	Unlimited	£1679
HP6000-25	8.0Gb	25 user	£1559
HP6000-UL	8.0Gb	Unlimited	£1899

Jetstor drives

JS2000	2.0Gb	£639
JS5000	4.0Gb	£719
JS6000	8.0Gb	£879

External options for above add: £100

Jetstor external kits

JS2000XK	ARCSolo s/w	£879
JS5000XKD	ARCServe DOS	£1579
JS5000XKW	ARCServe Win	£1825
JS6000XKW	ARCServe Win	£2189

WangDAT

3100 £622
- 2Gb capacity
- Built-in self-activated head cleaner
- 30 second file search time

3200 £662
- 4Gb capacity with DDS compression
- Up to 732Kb/s data transfer rate
- Built-in self-activated head cleaner

3400DX £829
- Up to 8Gb capacity with DDS2 compression
- Up to 732Kb/s data transfer rate
- 1Mb buffer

External versions add £100

E06R

Tape Drives

Colorado Jumbo

DJ20	120/240Mb	£92
DJ35	170/340Mb	£109
DJ25	350/700Mb	£169
DJ50	680/1.36Gb	£255
External versions		add £75

- All drives offer up to 6:1 compression with an average of 2:1
- Uses QIC format compatible tapes
- Internal versions can be attatched to floppy controller - even with two floppy drives installed
- Dedicated controllers are available for top performance

Jumbo accessories

AB 11	External port	£25
FC-20	8bit controller	£49
TC-15	16bit controller	£115
SK7	Windows software	£45
SU53J	Unix / Xenix software	£79
SK1	Sytos Plus for OS/2	£85

New DJ50 includes FC20 controleIr card

Wangtek

5150PK kit*		£324
5525ES		£379
5100OES		£495
External versions		add £100

Wangtek's 5000 Series tape drives offer you leading price/performance in advanced quarter-inch tape drives. With capacities from 150 megabytes to 1 gigabyte, 5000 Series drives are an ideal match to a wide range of system data backup requirements.

** Note: 5150PK uses proprietary interface*

- Uses QIC format compatible tapes
- Quick-File-Access (QFA) feature for fast data retrieval
- Compatible with most popular data backup software packages
- PK kits are supplied with proprietary controller card, software, data cartridge and cable

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*See below

Memory Modules

Not sure which module to use?
Our Sales Team can quickly identify the right memory upgrade for your system.

100% system compatible

Quality matched for performance

5 year warranty on most modules

Many more memory upgrades available
Please call with your system details for a quotation

IBM

PS/2 35LS, 35SX, 40SX
4Mb £148
8Mb £288

PS/2 50Z
1-2Mb £84

PS/2 55SX, 55LS, 65SX
4MB £158

PS/2 L40SX
4MB £148
8MB £288

Valuepoint 6381
4Mb £136
8Mb £268

Pentium Valuepoint
8Mb £288
16Mb £548

Thinkpad 750, 755
4Mb £178
8Mb £348

Thinkpad CL57SX
4Mb £138
8Mb £268

Toshiba

T1000
2Mb £88

T1800,T2000
2Mb £88
4Mb £158
8Mb £288

T3300SL
2Mb £88

T1200XE
2Mb £65

T4400, T6400, T6600
4Mb £168
16Mb £486

T1900, T1910, T1950, T4500, T4600, T4700, T4800, T4900
4Mb £174
8Mb £328
16Mb £628

T5200, T8500
2Mb £93
8Mb £348

Compaq

Deskpro 386/20, 25
4Mb £158

Deskpro 386/20e, 25e
4Mb £208

Systempro, Deskpro L
8Mb £298
32Mb £1398

Deskpro 386N
2Mb £84
4Mb £144

Deskpro M (non-Pentium)
Expansion board £95
4Mb £144
8Mb £285

Deskpro XL
4Mb £166
8Mb £318

Deskpro 5/90
8Mb £298

Prolinea (basic)
4Mb £144
8Mb £285

Proliant 1000, 2000, 4000
4Mb £161
8Mb £285
16Mb £555

LTE Lite 386
2Mb £128
4Mb £188
8Mb £348

LTE Lite 486
4Mb £188
8Mb £348
16Mb £688

LTE Elite
4Mb £184
8Mb £348

Contura 400
8Mb £284

Contura 386
2Mb £84
4Mb £158
8Mb £298

Concerto 4/25
8Mb £388
16Mb £1188

Printer Memory

Hewlett Packard

LaserJet II,IID
2Mb £88
4Mb £158

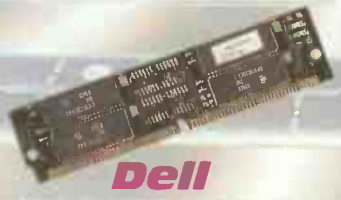
LaserJet III, IIIP,IIID,IIP
2Mb £81
4Mb £148

LaserJet IIISi
4Mb £146

LaserJet 4L
1Mb £75

DeskJet 500,500C
256Kb £48

DesignJet 600,650
4Mb £144



Dell

Powerline
4Mb £188
8Mb £288
16Mb £488

Power Desktop (Low Profile)
8Mb £276
16Mb £488

NL20,25
2Mb £112

Zenith

Mastersport SL, SLe
2Mb £108

Z-note L series
1Mb £113
2Mb £398

Z-server/station 425, 433, 450
8Mb £278

Z-sport 420S, 425S
4Mb lower/upper module £178

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Your 1st choice for memory

SIMM Memory

SMC INFO GUIDE

NOTE: Some 386 and 486-based PCs require SIMM upgrades in multiples of four. Please check your PCs documentation if in doubt about memory bank configuration. Older PCs may only support 9-chip SIMMs due to supporting firmware. Please call for advice.

Warning.

Memory modules and processor chips are sensitive to static electricity and can easily be damaged. When fitting memory ensure you have discharged any static by wearing an anti-static wrist strap (preferred) or by touching your PC case (providing it is connected to mains electricity but not switched on).

		60ns	70ns
1Mb			
1Mb x 3	30 pin	£30	£28
1Mb x 9	30 pin	£35	£32
2Mb			
512k x 36	72 pin	(na)	£74
4Mb			
4Mb x 3	30 pin	£116	£112
4Mb x 9	30 pin	£120	£114
1Mb x 36	72 pin	£138	£134
8Mb			
2Mb x 36	72 pin	£278	£254
16Mb			
16Mb x 9	30 pin	£598	£578
4Mb x 36	72 pin	£528	£478

SPECIAL OFFER

Buy 5 or more SIMMs and **save £1 per Mb**

EG: 5 off 1Mbx3 = £135
Full price: £140

Buy 13 or more SIMMs and **save £1.75 per Mb**

EG: 13 off 1Mbx3 = £341.25
Full price £364

Processors

Intel CPUs

486sx-25		£49
486sx-33		£59
486DX-33		£109
486DX2-50	requires fan	£107
486DX-50	requires fan	£195
486DX2-66	requires fan	£139
486DX4-100	requires fan	£199
Pentium 60	requires fan	£295
Pentium 66	requires fan	£355
Pentium 90	requires fan	£445

Intel Over-drive Chips

ODSX25CP	SX-25 to DX2-50	£107
ODDX250SS	DX-25 to DX2-50	£95
ODDX250DS	DX-25 to DX2-50	£95
ODDX266SS	DX-33 to DX2-66	£129
ODDX266DS	DX-33 to DX2-66	£129

Note: SS = Single Socket
DS = Dual Socket

CPU Heat sinks

486	Standard	£9
486	With fan	£15
Pentium 60/66	With fan	£22
Pentium 90	With fan	£25

Motherboards

Pentium ®

Processor fitted

Intel 'Plato' £629

- 90Mhz CPU fitted
- 256K cache
- Maximum 128Mb RAM
- 2 fast serial ports
- 1 enhanced parallel port
- 2 PCI slots
- 4 ISA slots
- 1 PCI/ISA option slot
- IDE controller

F06R

Processor ready

VESA/PCI 60/66 £179
VESA/PCI 90 £189
EISA/VESA 66 £255

- 256k cache
- 3 VESA , 3 ISA , 3 PCI slots (60/66)
- 2 VESA , 3 ISA , 4 PCI slots (90)
- 2 VESA , 6 EISA slots (66)
- Maximum 128Mb RAM

486 Processor ready

VESA £67

- 256k cache
- 3 VESA, 4 ISA slots
- 30 and 72 pin SIMM sockets
- Maximum 128Mb RAM
- 3.3V
- DX4 compatible

VESA / EISA £199

- 256k cache
- 2 VESA, 5 EISA slots
- 30 and 72 pin SIMM sockets
- Maximum 128Mb

Note: All 486 and Pentium processor motherboard prices exclude CPU. See above for processors.

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*See below

Sound Cards

SoundBlaster AWE-32

Full pack £162

- Built-in AdSP and EMU 8000 sound processors
- 1Mb ROM for MIDI samples and 512kb RAM for downloadable samples - upgradable to 28Mb
- 32-voice wave table built-in
- CD ROM interfaces for Panasonic, Mitsumi and Sony drives

Value pack £122

- Upgrade port for AdSP chip
- 1Mb ROM for MIDI samples and 512kb RAM for downloadable samples
- 32-voice wave table built-in
- CD ROM interfaces for Panasonic, Mitsumi and Sony drives

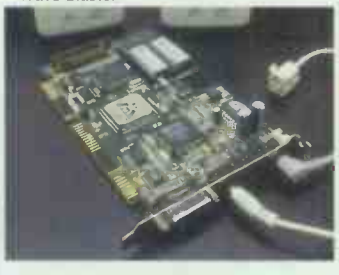
Gravis Ultrasound £99

- Stereo recording and playback
- 256k RAM upgradeable to 1Mb
- Real recorded sounds for wave table synthesis
- CD ROM interfaces for Sony, Mitsumi and LMSI drives

SoundBlaster 16

Value pack	£59
Value IDE	£75
Pro	£95
Pro AdSP	£119

- 16-bit stereo recording and playback
- Supports IDE or Creative Labs CD ROM drive
- Pro also has Creative CD ROM interface AdSP upgrade socket and connector for Wave Blaster



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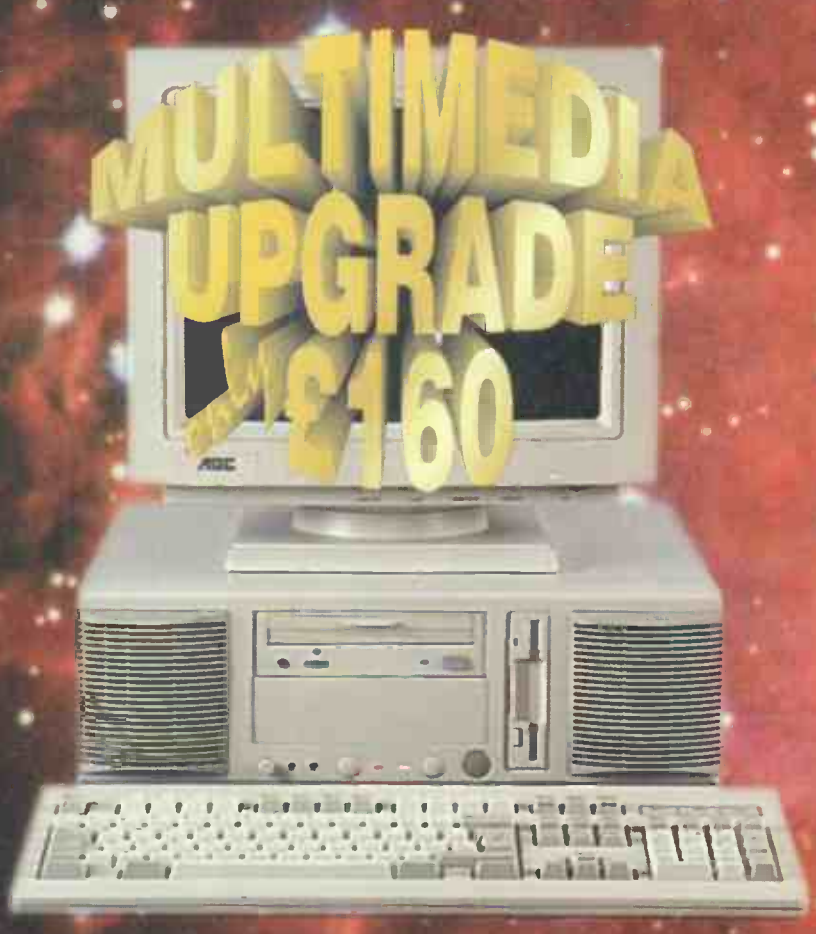

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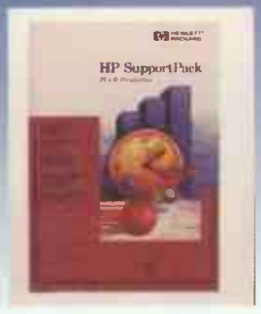

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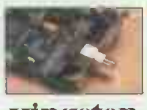

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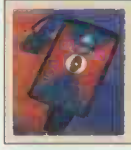

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MGA Impression Lite £195

- Includes 3 free 3D games - SENTO, Spectre MGA and ICE HAWK
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Logitech Mouseman Bus	£39
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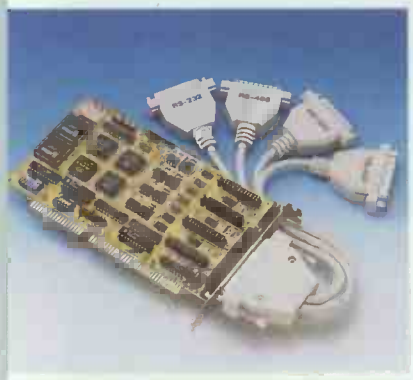

4-Port RS232/RS422/RS485 Serial Card

High Quality AT Bus 4-Port Serial Communications Card. Shown above. Each port can be individually set for RS232, RS422 or RS485. Supplied with 16550 UARTs for baud rates to 115Kbps.

- Port address 100H - 3F8H
- Interrupts IRQ2-7, 10-12, 15
- LED indicators for transmit & receive
- Automatic data flow in RS485 mode
- Compatible with Arnet 4-Port Card
- Can be used for adding 4 ports to Windows and SCO Unix
- Supplied with 4-way cable set

£149

Dual 16550 Serial Card + bi-directional Parallel

Ideal for hardware requiring high speed communications.

- Two 16550 serial ports COM1-COM4, IRQ2-5
- Bi-directional Parallel Port LPT1-LPT3, IRQ5,7
- Optional games port
- Enable/disable any port

£50

Isolated Dual Port RS232/ Current-Loop Card

Providing 2 Isolated RS-232 or current loop serial ports with baud rates up to 56Kbps.

- Supplied with 16550 UARTs
- Provides 500VDC isolation
- Port address 200H - 3F8H
- Interrupts IRQ2-7, 10-12, 15
- 16-Bit AT bus

£119

Synchronous Serial Card

Single channel, multi-protocol communications adapter which uses an AMD 85C30-10 serial communications controller (SCC) as standard.

- RS232 interface
- Synchronous mode to 1.23M baud
- IRQ2-7, 10-12, 14-15
- DMA Channels 1 - 3

£220

Also Synchronous RS422/RS485 £220

DigiBoard Serial Cards

The Best Engineered Multi-Channel Boards on the market today. The DigiCHANNEL PC/X is ideal for use in multi-user environments, most operating systems are supported with drivers available for DOS, XENIX, UNIX, OS/2, and many more.

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The DigiCHANNEL PC/Xe range are intelligent multi-port RS232 high speed communication boards with on-board 80186 processor and 64K memory for increased throughput. Drivers available for DOS, Windows NT, Windows, OS/2, Xenix and UNIX.

PC/2e	2-Port Intelligent Card	£189
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PC/8e	8-Port Intelligent Card	£495
PC/16e	16-Port Intelligent Card	£795

Digiboard ISDN Card

Enables remote users to log in to a Novell File Server over a Digital Telephone Line (ISDN). Requires one card for the remote user and one card for the Server.

- Transfer rate 128Kbps
- Support for Novell Netware and Windows NT Remote Access Server
- Transparent connection
- BT Approved

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AT bus Serial Card

Provides access to additional interrupts and any port address

- 2 RS232 serial ports
- 16 bit AT bus
- Interrupts IRQ2-7, 10-12, 14-15
- Selectable and shareable interrupt features

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Add £20 for 16550 option

Dual RS422/RS485 Card

Offering 2 high speed serial ports for transmissions up to 4000 feet

- 2 RS422/RS485 serial ports
- Supplied with 16550 UARTs
- Up to 115K baud
- Port address 200H-3F8H
- IRQ2-7, 10-12, 15
- 16 bit AT bus

£89

Also Isolated RS422/RS485 Card £109

Remote Data Acquisition Modules for RS485 Network

ADAM Modules (shown below) are compact intelligent sensor-to-computer interface units designed specifically for reliable operation in harsh environments. Their built-in microprocessors, encased in rugged industrial grade plastic packages, let them independently provide intelligent signal conditioning, analog I/O, digital I/O, data display and RS485 Communication.

Isolated RS232/RS485 Converter

ADAM modules need only 2 wires to communicate with their controlling host computer over a multidrop RS-485 network. ADAM modules also accept any power source between 10V and 30V and are protected against power reversal.

- Automatic control of data flow
- Input RS232 (4-wire)
- Output RS485 (2-wire)
- Baudrate 1.2K to 38.4K

£99

Analog Input module

ADAM modules can accommodate multiple types and ranges of analog input. You select type and range remotely by issuing ASCII commands from your host computer.

- Input for thermocouple, mV, V, or mA
- Input range 15mV to 2.5V, 20mA
- 10 samples per second
- 1 digital input / event counter
- 2 digital outputs
- Baudrate 1.2K to 19.2K

£165

ADAM Modules

ADAM 8ch Analog Input Module	£210
ADAM 8ch Thermocouple Module	£225
ADAM Analog Output Module	£165
ADAM Digital I/O Module	£119
ADAM Relay Output Module	£119
ADAM Counter/Frequency Module	£210
ADAM IP66 Industrial Enclosure	£85
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PC-104 Modules

PC-104 Modules (shown below) allow easy development of PC-based controllers for embedded applications. The PC-104 modules simply stack together to produce compact modular PC-based systems without the need for backplanes or card cages. Many of the modules can also be added to our range of Industrial CPU Cards. Such systems are perfect for applications such as vending machines, laboratory instruments, telecomms, medical equipment and portable analyzers.

PC-104 386SX CPU Module

The PC-104 386SX/33 CPU Module is a low power, high performance single board computer for embedded control applications.

- Very low power consumption
- CPU type AMD 386SX/SXL-33
- Watchdog timer
- Precision power monitoring
- Requires only single power supply +5V @ 540mA
- 512Kb Memory on-board

£229

Also with 1Mb £299, 2Mb £390, 4Mb £550

PC-104 SVGA Display Module

The PC-104 Super VGA Module is a 16-bit hi-res display controller.

- 16-bit data bus
- Tsend Labs ET4000AX
- Requires single power supply +5V @ 580mA
- 1Mb DRAM for high-speed memory access

£169

PC-104 Ethernet Module

The PC-104 Ethernet Module is a 16-bit communication controller that complies with IEEE 802.3 CSMA/CD and is fully NE2000 compatible.

- Hardware and software compatible with Novell NE2000
- 10Mbps throughput
- Remote boot ROM socket
- Requires only single power supply +5V @ 400mA
- Base address 300H-360H
- IRQ2-7, 10-12

£109

Embedded PC Modules

PC-104 Super I/O Module	£99
PC-104 RAM/ROM Disk Module	£89
PC-104 PCMCIA Memory Card Module	£250
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- 12 bit 40KHz
- 16 single-ended or 8 differential A/D inputs
- 1 D/A output
- 16 digital inputs
- 16 digital ouputs
- Pacer Clock
- Timer/Counter
- DMA and Interrupt
- Wiring Terminal Board

£199

High Performance DAS Card

The complete and cost-effective solution for your PC based automation needs.

- 12 bit 100KHz
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- Built in 1K word FIFO
- Amplifier x0.5 to x1000
- 1 D/A Output
- 16 digital inputs
- 16 digital outputs
- Timer/counter
- Pacer Clock
- DMA and Interrupt
- Wiring Terminal Board

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The simple solution for providing digital I/O and timer functions

- 32 digital inputs TTL
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- 3 channel programmable counter/timer
- User configurable clock source
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- Buffered circuits for higher driving capacity than the 8255
- Interrupt handling
- Output status readback

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We offer a full 12 months warranty and if you have any problems or questions you can call us for Technical Support.

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Rugged heavy duty workstation for 19" rack or panel mounting.

- Highly integrated PC Workstation
- 1024 x 768 Colour CRT Monitor
- 27-key membrane keypad
- IP56/IP52 sealed hardened front panel
- Heavy duty aluminium and steel chassis
- 250-watt power supply
- 8 ISA slots
- 19"W x 14"D x 16.2"H

£1600

Industrial Workstation with 9.4" LCD Display

Rugged heavy duty workstation with flat-panel LCD display and 80-key membrane keypad.

- Highly integrated PC Workstation
- 640 x 480 colour TFT display
- 19" rack/panel mount
- IP56/IP52 front panel
- 200-watt power supply
- 8 ISA slots
- 19"W x 10.5"D

£3400

Also with B/W LCD display	*£1400*
Also with EL display	*£2550*

Relay Actuator and Isolated Digital Input Card

Offering 8 programmable electro-mechanical relays for ON/OFF control or small power switching, and 8 opto-isolated inputs which can be used as digital input under noisy environment or floating potential.

- 8 on-board SPDT relays
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- 8 opto-isolated digital input channels
- Easy to use and program

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Industrial Wiring Kit	£30
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Isolated Digital input board 24ch	£109
Relay Board 16ch, 120V 1A	£115
Relay Board 24ch, 120V 1A	£135
Relay Board 16ch, 250V 5A	£130
Relay Board 24ch, 250V 5A	£165
SSR Module Carrier Board 8ch	£70
SSR Module Carrier Board 16ch	£80
SSR Module 280V AC 3A	£9
SSR Module 60V DC 3A	£9

Industrial 19" Chassis

The rugged all steel chassis conforms to the 19" rack mounting standard. The unit includes a 14 slot passive backplane and a high efficiency switching power supply (250W) in a dual-fan cooled chassis.

- Supports 286/386/486 CPU Cards, Optional PCI bus for Pentium
- Mounting for up to 4 drives
- Hold down clamp to protect plug in cards from vibration
- Positive air pressure inside generated by dual (push-pull) cooling fans
- Removable air filters

£550

Flash/RAM/ROM Disk Card

Half-size disk card which can use up to 3Mb of SRAM, EPROM or Flash memory chips to replace a floppy disk drive. It offers faster access times and better protection from vibration, vapors and contaminants than physical drives.

- Emulates drive A,B,C or D
- Boots when emulating drive A
- Accepts 128Kx8 or 512Kx8 EPROMs, Flash Memory or SRAM.
- Simple installation
- No software required

£110

Industrial CPU Cards

Industrial Grade CPU Cards designed to be highly reliable in harsh industrial environments. Built to ensure high end stability under extremes of temperature, shock and vibration. Special features include watchdog timers, RAM/ROM disk, PC-104 interface, floppy/IDE interface, bi-directional EPP/ECP parallel port and high speed RS232/RS485 serial ports.

Half-size Cards	
CPU Card 286/16	£190
CPU Card 386SX/25	£240
CPU Card 486SX2/50	£375
CPU Card 486DX2/66	£455
Full-size Cards	
CPU Card 486SX2/50 256K cache	£410
CPU Card 486DX2/66 256K cache	£490
CPU Card 486DX4/100 256K cache	£590
CPU Card Pentium/66 256K cache	£1400

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Passive Backplane 3 slot	£30
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Passive Backplane 8 slot	£50
Passive Backplane 12 slot	£60
Passive Backplane 14 slot	£70
Passive Backplane 20 slot	£130

Display and Keyboards

14" SVGA Colour Monitor	£250
Rack Mount Kit for 14" Monitor	£250
SVGA Piggyback for CPU Cards	£149
SVGA Display Card 1Mb	£80
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Compact keyboard	£60
Standard Keyboard	£40

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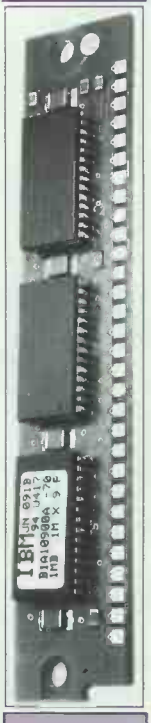

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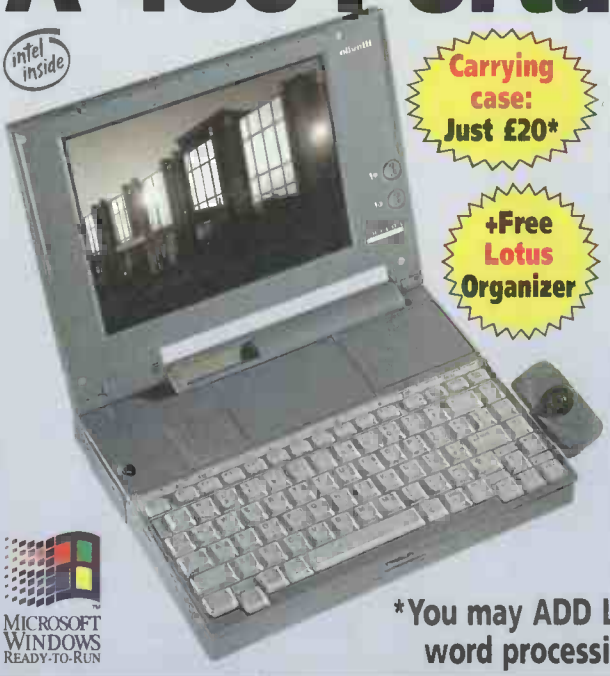

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- Intel 486SL, 25Mhz, (3.3v) Microprocessor
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- Backlit, VGA passive Matrix Mono LCD screen with:
  - 64 grey shades
  - 8.4" diagonal size
- 82/83-key, PS/2 compatible keyboard
- Rechargeable 15 Watt NiCad battery. (Battery life is from 3 to 6 hours depending upon peripherals used.)
- Integrated Pop-Up Trackball
- Serial port (RS232-C compatible)
- Parallel printer port
- External VGA video proprietary interface
- External keyboard/mouse port (PS/2 compatible)
- MS DOS 5.0 (or later)
- MS Windows 3.1
- Lotus Organizer for Olivetti
- Online manuals
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- RAM expandable to 32Mb
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- 1.44Mb removable 3.5" floppy disk drive
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- On-board video controller with 512KB of video RAM
- Resolution: 640 x 480 in 256 colours on integrated LCD TFT display, or up to 1024 x 768 in 16 colours on external monitor - simultaneous display in 640x480 mode
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- 98/99 key keyboard
- Integrated pop-up trackball mouse
- Interfaces: 1 serial, 1 parallel, external monitor & PS/2 standard mouse / keyboard socket, dock box connector port
- Nickel-Metal-Hydride (NiMH) battery pack
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- Intelligent peripheral time-outs and suspend mode
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- Integrated Trackball mouse
- DOS 6.2, Windows 3.1, Lotus Organizer
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- 2.5 to 4 hours battery life
- Weighs just 1.6 Kg including battery
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- 1Mb of Video RAM providing 1024 x 768 resolution on optional external monitor
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- Intel 486DX2 microprocessor
- 50Mhz clock speed
- 4Mb RAM expandable to 28Mb
- 260Mb hard disk
- 1.44Mb floppy
- SVGA graphics adapter
- 9.5" mono dual scan STN display
- 64 greyscales on STN display
- External monitor port (256 colours)
- 640 x 480 pixel resolution
- 2 x PCMCIA Release 2.0 Type II slots
- PS/2 keyboard/mouse port
- Optional Port Replicator
- Toshiba Trackpoint
- 84 full-size keys & 12 function keys
- Built-in autosensing AC adapter
- MS DOS 6.2 & Windows version 3.11
- Rechargeable NiH2 4.5 hour battery
- Three years international warranty

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The Toshiba T2100CS

- Intel 486DX2 microprocessor
- 50Mhz clock speed
- 4Mb RAM expandable to 28Mb
- 350Mb hard disk
- 1.44Mb floppy
- SVGA graphics adapter
- 10.4" colour dual scan STN display
- 256 colours on 640 x 480 STN display
- 640 x 480 x 64,000 colours or 1024 x 768 x 256 colours on external monitor
- 2 x PCMCIA Release 2.0 Type II slots
- PS/2 keyboard/mouse port
- Optional Port Replicator
- Toshiba Trackpoint
- 84 full-size keys & 12 function keys
- Built-in autosensing AC adapter
- MS DOS 6.2 & Windows version 3.11
- Rechargeable NiH2 3.5 hour battery
- Three years international warranty

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The Toshiba T2100CT

- Intel 486DX2 microprocessor
- 50Mhz clock speed
- 8Mb RAM expandable to 32Mb
- 350Mb hard disk
- 1.44Mb floppy
- SVGA graphics adapter
- 8.4" colour TFT display
- Up to 64,000 colours on 640 x 480 TFT display
- External monitor port
- 2 x PCMCIA Release 2.0 Type II slots
- PS/2 keyboard/mouse port
- Optional Port Replicator
- Toshiba Trackpoint
- 84 full-size keys & 12 function keys
- Built-in autosensing AC adapter
- MS DOS 6.2 & Windows version 3.11
- Rechargeable NiH2 3.5 hour battery
- Three years international warranty

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The Toshiba T2150CDS

- Intel 486DX4 microprocessor
- 75Mhz clock speed & 16Kb cache
- 4Mb RAM expandable to 28Mb
- 260Mb hard disk
- Integrated IDE CD ROM drive
- External 1.44Mb floppy included
- Sound system built-in
- 10.4" colour dual scan STN display
- 256 colours on 640 x 480 STN display
- 640 x 480 x 64,000 colours or 1024 x 768 x 256 colours on external monitor
- 2 x PCMCIA Release 2.0 Type II slots
- PS/2 keyboard/mouse port
- Optional Port Replicator
- Toshiba Trackpoint
- Built-in autosensing AC adapter
- MS DOS 6.2 & WFWG 3.11
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- 520Mb hard disk
- Integrated IDE CD ROM drive
- External 1.44Mb floppy included
- Sound system built-in
- 10.4" colour TFT display
- 64,000 colours on 640 x 480 TFT display
- 640 x 480 x 64,000 colours or 1024 x 768 x 256 colours on external monitor
- 2 x PCMCIA Release 2.0 Type II slots
- PS/2 keyboard/mouse port
- Optional Port Replicator
- Toshiba Trackpoint
- Built-in autosensing AC adapter
- MS DOS 6.2 & WFWG 3.11
- Rechargeable NiH2, 2 hour battery
- Three years international warranty

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- Integrated trackball mouse and palm rest area
- 8Kb internal cache memory
- PCMCIA 2.1 type III or II slot (2 x type II slots in DX2 50)
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- Long life Nickel-Metal-Hydride (NiMH) Battery
- Serial and parallel port
- MS DOS 6.22 and Windows for Workgroups 3.11 pre-installed
- Windows '95 ready
- Free Lotus Organizer
- Weighs under 2.5kg
- 3 year return to base warranty

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- Serial and parallel port
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- 4Mb RAM expandable to 12Mb on planar board
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- 200Mb hard disk drive
- 1.44Mb floppy drive
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IBM ThinkPad 340CSE

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- Up to 4 minutes per page in colour
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- Built-in sheet feeder
- 3 years warranty
- Warranty extendable to on-site with Hewlett-Packard SupportPack

HP DeskJet 540	£209
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COMPAQ

NEW PRESARIO

New Multimedia systems from Compaq with quad speed CD Drives in a range of case styles with 486DX2-66, 486DX4 and Pentium Processors.

- 486DX2-66, 486DX4-90 or Pentium 75 Processor
- 8MB RAM expandable to 64MB
- 420MB Hard Disk (720Mb on P75)
- 3.5" 1.44MB floppy Drive
- Local Bus SVGA Graphics
- Compact, Standard Desktop or Mini-Tower Cases
- Serial parallel, Joystick, MIDI and Mouse ports
- 14" Integral Low Radiation NI
- SVGA Colour Screen
- 16-bit stereo soundcard, Microphone & Speakers
- Quad Speed Multisession CD-ROM Drive
- Integrated 9600/2400 Fax/Data Modem with telephone answering & Compuserve on 486 models only.
- MSDOS 6.2, Windows 3.1, Tabworks, Welcome Centre, Control Centre and Learning Centre
- Microsoft Works v3, MS Money and MS Entertainment Pack
- Microsoft Encarta CD & The Ultimate Human Body CD
- 3 Year Compaq Warranty

CDS 524 486DX2-66 Compact ..... £Call
CDS 742 486DX4-90 Desktop ..... £Call
CDS 942 486DX4-90 Tower ..... £Call
CDS 972 Pentium 75 Tower ..... £Call

Please call for latest prices and availability on Presario models

£CALL

PROLINEA

See Desktop Section for New Prolinea Range

The new enhanced Compaq ProLinea provides excellent performance at truly remarkable prices.

- Intel 486SX-33, 486DX2-66 or 486DX4-100 processor
- Pentium technology upgradeable
- 128K external cache on DX4
- 4Mb RAM (8Mb on DX4) Upgradeable to 100Mb
- 200Mb, 340Mb or 525Mb hard disk
- 3.5" 1.44Mb floppy drive
- Enhanced Local Bus Graphics with 1Mb VRAM.Monitor options see below
- 3 drive bays and 3 free ISA slots
- Parallel port, mouse port & 2 serial ports
- Compaq keyboard & mouse
- Security & energy saving features
- DOS 6, Windows 3.1, Tabworks software
- 3 year Compaq warranty

4/33S 486SX-33 200Mb ■164552-A22 ..... £641
4/33S 486SX-33 340Mb ■171602-A23 ..... £702
4/66 486DX2-66 525Mb ■164652-A24 ..... £1049
4/100 486DX4-100 525Mb 8Mb ■164702-A24 ..... £1178

Options
Colossus 14" 0.28 SVGA NI LR £149
Compaq 14" SVGA Screen £239
4Mb SIMM Upgrade £160
SX-33 to DX2-66 Upgrade £149

£641

CONTURA AERO

The ideal subnotebook with mono or colour screens and PCMCIA. 40% smaller and 33% lighter!

- Intel 486SX-25 or 486SX-33 (SL versions)
- 4Mb RAM expandable to 12Mb
- 170 or 250Mb hard disk
- Includes FREE external 1.44Mb floppy drive
- 8" mono or 7.8" VGA colour screen
- PCMCIA 2.0 type II slot
- Serial, parallel & Compaq base ports
- MS DOS 6 & Windows 3.1
- Lotus Organizer & Winlink with cable
- Rechargeable NiMH battery, AC adaptor/charger & slipcase
- 3 year Compaq warranty

4/25 mono 250Mb £849
4/33 colour 170Mb £1020
4/33 colour 250Mb £1190

Options
4Mb RAM module ■190532-001 ..... £139
Intel PCMCIA modem £99
Aero battery (DR19) ■190528-001 ..... £62
Car adaptor ■190530-001 ..... £45

£849

CONTURA 410

New 486DX2-50 model with mono, STN colour or TFT colour screens

- Intel 486DX2-50 processor
- 4Mb RAM upgradeable to 20Mb
- 3.5" 1.44Mb floppy drive
- 250Mb or 350Mb IDE hard disk
- SVGA Graphics with 1Mb Local Bus video
- VGA 9.5" TFT mono, 9.5" STN colour or 8.4" TFT colour screen
- 2 PCMCIA type II or one type III slot
- Parallel, serial & docking base ports (docking base includes other ports)
- Powered by NiMH battery with upto 5 hour life, advanced power management or AC/power adaptor
- Status panel with 'dashboard' display
- Dimensions: 22.6cm x 5.1cm x 30.4cm. Weight 2.7Kg
- DOS 6, Microsoft Windows 3.1, Lotus Organizer & Tabworks
- Integral Compaq trackball mouse
- 3 year Compaq warranty

410 mono 250Mb ■189100-033 ..... £1271
410 STN 350Mb ■140100-034 ..... £1696
410 TFT 350Mb ■140300-034 ..... £2206

Options
4Mb RAM module ■147653-001 ..... £178
Docking base ■147619-001 ..... £108
Docking base with E/Net ■147667-001 ..... £183
NiMH Battery ■190529-001 ..... £85
Intel PCMCIA modem £99

£1271

CONTURA TFT

The amazing high quality Compaq Contura TFT colour notebook with Intel 486DX processor and excellent TFT screen. Simply the best buy!

- Intel 486DX-25 processor
- 4Mb RAM upgradeable to 20Mb
- 3.5" 1.44Mb floppy drive
- 120Mb or 209Mb IDE hard disk
- Superb 8.4" VGA TFT active matrix colour screen with 256 colours
- Parallel, mouse, serial, ext. keyboard and ext. SVGA ports
- Integral Compaq trackball mouse
- Powered by battery with advanced power management or AC/power adaptor
- Dimensions: 22.6cm x 4.8cm x 29.7cm. Weight 3Kg
- DOS 6 & Microsoft Windows 3.1 pre-loaded
- Compaq Tabworks Software
- 3 year Compaq warranty

4/25cx 120Mb TFT £1399
4/25cx 209Mb TFT £1599
4/25cx 340Mb TFT (check availability) £1799

FREE FAX / DATA MODEM

Options
4Mb RAM module £146
Contura car adaptor £65
NiCAD battery £52

£1399

LTE ELITE

The high performance colour notebook with built-in AC adaptor, PCMCIA and advanced docking facilities

- Intel 486DX2-40, DX2-50 or DX4-75 processor
- 4Mb RAM (8Mb-DX2-50 & DX4)
- 3.5" 1.44Mb floppy drive
- 170Mb, 340Mb, 510Mb or 810Mb IDE hard disk
- SVGA Graphics with 1Mb Local Bus video
- 9.5" STN Dual Scan colour or 8.4"/9.5" TFT colour screen
- Two PCMCIA type II or one type III ports
- Parallel, serial, keyboard/mouse & docking base ports (docking base includes ports)
- Powered by battery with upto 5 hour life with advanced power management or Integral AC/power adaptor
- DOS 6 & Microsoft Windows 3.1
- Integral trackball mouse
- 3 year Compaq warranty

486DX2-40 Dual Scan 170Mb ■149700-032 ..... £1781
486DX2-40 TFT 8.4" 170Mb ■194000-032 ..... £2036
486DX2-40 TFT 8.4" 340Mb ■194000-035 ..... £2206
486DX2-50 TFT 9.5" 340Mb 8Mb ■197800-035 ..... £2631
486DX4-74 TFT 9.5" 340Mb 8Mb ■149500-035 ..... £1971
486DX4-75 TFT 9.5" 510Mb 8Mb ■149500-036 ..... £3141
486DX4-75 340Mb STN ■189850-035 ..... £2376
486DX4-75 510Mb STN ■189850-036 ..... £2546
486DX4-75 TFT CXL 510Mb ■197900-036 ..... £3566

Options
4Mb RAM module ■199013-001 ..... £207
Battery ■149729-001 ..... £118
Ministation Base Ethernet ■195570-031 ..... £209
Smartstation Base ■195600-031 ..... £421
Intel PCMCIA modem £99

£1781

TDR12B

All prices exclude delivery and VAT (17.5%). Delivery:- Systems £19, Lasers and large items £15, software and small items £10. Visa /Access/ American Express /Switch and Government orders welcome. Prices, specifications and offers are subject to change and subject to our conditions of sale copies of which are available on request. Mail order only. No collections please. Goods are normally despatched within 7 days. All orders will be fulfilled within 28 days unless otherwise specified. E&OE.

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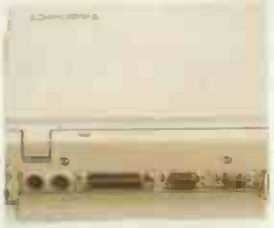
The new Microsoft Ballpoint V2.0 with Quickport is standard on T1900 models (no cables!)

The easy to use integral Mousepoint on T4900, T2400, T3400, T2100 and T3600 models



All systems include standard ports (PS/2 mouse, external PS/2 keyboard parallel printer, serial and external SVGA ports.)

Port replicator (mini docking station) option is available for the T3400/T3600/T2400/T2100

COMMON TOSHIBA FEATURES

Toshiba notebooks are unbeatable in terms of quality, advanced features, performance and ease of use. Do not consider a low quality clone-buy the best. The following common features are standard with all models:-

SCREENS
Mono notebooks include a high quality sidelit Super Twist Nematic (STN) mono LCD capable of 64 grey scales and VGA resolution. STN colour portables utilise the latest advanced STN (Dual Scan) screens for enhanced contrast and faster response. Thin Film Transistor (TFT) or active matrix screens provide the best displays with 256 bright colours, ultra fast response and the ability to use motion video.

KEYBOARD
Ergonomically designed 84 key full-size keys with 12 function keys and overlay numeric keypad. Dedicated cursor control keys.

INTERFACES
Standard ports include centronics parallel, RS- 232C serial, PS/2 ext. keyboard, PS/2 mouse and VGA/SVGA for ext. monitor. Either Quickport port with bundled Ballpoint mouse or integral MousePoint device included. Other ports and PCMCIA details see individual notebook.

POWER
Autosensing AC adaptor (100 to 240V) suitable for world wide usage provides power for notebook and recharges batteries. Removable rechargeable batteries are standard (type of battery and life varies as shown).

SOFTWARE
Microsoft MS DOS 6.2 with Toshiba notebook enhancements, Windows 3.1 (Rel 3.11) or WFWG 3.11 are pre-loaded. CardWare PCMCIA support provides transparent use of PCMCIA cards without incompatibility problems and supports 'insertion'.

SPECIAL FEATURES
Intel 3.3v SL technology with low power consumption. Reset button for warm reboot. AutoResume puts your systems in standby mode for upto 7 days. AutoSave automatically saves your data if your battery power is running out. LIM EMS/XMS/Hard RAM support. MaxTime Power Management can be set to switch off your disk drive, screen, keyboard and CPU after a certain time. Advanced Power Management is also supported.
Flash BIOS allows easy upgradeability in the future. Kensington Cable Lock Provision for physical security. Password/MultiSafe security with various levels of protection.

MONO/COLOUR 486SX-33

T1910/T1910CS

The ideal entry level mono 486 notebook with fast 33MHz processor, 200Mb hard disk and PCMCIA

- Intel 486SX- 33 processor
- 4Mb RAM expandable to 20Mb
- 200Mb IDE hard disk
- 3.5" 1.44Mb floppy drive
- VGA (640 x 480) Graphics
- 9.5" STN LCD VGA mono screen with 64 grey scales (256 colour on 1919CS models)
- 84 key keyboard and standard ports
- PCMCIA Rel 2.0 Type III or type II slot
- 11.8" x 8.4" x 2" with 2.9Kg (6.4lb) weight (6.9lb on T1910CS model)
- NIH2 battery (4 hours use)
- 12mth warranty extendable to 3 years
- Microsoft Ballpoint quickport mouse
- MSDOS 6.2 and Windows 3.1

T1910CS Colour £1269

Options
4Mb RAM (PA2012U) £170
8Mb RAM (PA2013U) £298
16Mb RAM (PA2014U) £1339
NiH2 Battery (PA2429UR) £94

£846

MONO 486DX2-50

T2100

This powerful 486DX2 notebook combines ultra-fast 50MHz with innovative ergonomics. An advanced high-resolution 9.5" mono STN screen enhances the level of performance yet further.

- Intel DX2-50 processor
- 4Mb RAM expandable to 28Mb
- 260Mb hard disk
- Internal 3.5" 1.44Mb floppy drive
- VGA/SVGA (640 x 480 pixel resolution) 9.5" diagonal display
- 84 key keyboard with mouseport and overlay numeric keypad
- Standard ports
- 11.8" x 8.9" x 1.9" with 3.0Kg (6.6lb) weight
- Built-in autosensing AC adaptor
- NiH2 removable battery. Up to 4 hours usage.

Options
4Mb RAM (PA2012U) £170
8Mb RAM (PA2013U) £298
16Mb RAM (PA2014U) £1339
NiH2 Battery (PA2429UR) £94

£1015

TFT COLOUR DX4-75

T2450CT

High performance TFT colour notebooks with fast 486DX-75 processor, 8Mb RAM, 320Mb or 500Mb hard disk and multimedia options.

- Intel 486DX4-75 processor
- 8Mb RAM expandable to 24Mb
- 320Mb or 500Mb IDE hard disk
- 3.5" 1.44Mb floppy drive VESA Local Bus
- VGA/SVGA Graphics
- 1Mb video RAM and Graphics Accelerator
- 9.5" TFT VGA colour screen
- 84 Key keyboard and Integral MousePoint device
- Standard ports, SCSI-2 ports and 120 pin replicator port (for mini-docking station)
- Sound card port for portable soundcard
- PCMCIA Rel 2.0 slots (one type III and one type II)
- 11.8" x 8.4" x 2.1" with 3.2Kg (6.9lb) weight
- NIH2 battery (3.5 hours use)
- 3 year warranty
- MS DOS 6.2 and Windows 3.11 for Workgroups

T2450 CT 500Mb £3059

Options
4Mb RAM (PA2019U) £192
8Mb RAM (PA2020U) £340
16Mb RAM (PA2023U) £1148
NiH2 Battery (PA2429UR) £94
Soundcard (PA2807G) £102

£2851

COLOUR DX4-75 CD ROM

T2150CDS

The fast 486DX4-75 processor, is a high performance colour notebook, it includes a built-in full-size CD ROM drive and sound system enhancing its multimedia and reference capabilities.

- Intel DX4-75 processor
- 4Mb RAM expandable to 28Mb
- 260Mb hard disk
- Dual Spin internal 5.25" CD-ROM
- Internal 3.5" 1.44MB floppy drive
- VGA/SVGA (640x480 pixel resolution) STN 10.4" diagonal display
- 84 Key keyboard with mouse point
- Standard ports, and port replicator
- Built in AC Adaptor
- PCMCIA Rel 2.0 two Type II or one Type III
- 11.8" x 8.9" x 2.1" with 3.2kg (7 lb) weight
- Soundblaster Pro compatibale sound system
- NIH2 battery (3 hours use)
- MS DOS 6.22 and Windows 3.11

T2150CDS/520 ..... £2545

Options
4Mb RAM (PA2026U) £215
8Mb RAM (PA2027U) £365
16Mb RAM (PA2028U) £1185
Port Replicator (PA2708U) £126
Battery (PA2437UY) £95
Battery charger (PA2436UY) £149

£2290

TFT COLOUR DX4-75 CD-ROM

TC2150CDT

The DX4-75 notebook offers spectacular performance using a 520Mi.b hard disk drive and top of the range TFT colour LCD 10.4" screen

- Intel DX4-75 processor
- 8Mb Ram expandable to 32Mb
- 520Mb hard disk
- Dual Spin internal 5.25" CD-ROM
- External 3.5" 1.44Mb floppy drive
- VGA/SVGA (640x480 pixel resolution) TFT 10.4" diagonal display
- 84 key keyboard and mousepoint
- Standard ports, and port replicator
- Built-in AC adaptor
- PCMCIA Rel 2.0 two Type II or one Type III
- 11.8" x 8.9" x 2.1" with 3.2kg (7 lb) weight
- Soundblaster Pro compatibale sound system
- Built in speakers and microphone
- NIH2 removable battery 3 hours use
- MS Dos 6.2 and MS windows 3.11

Options
4Mb RAM (PA2026U) £215
8Mb RAM (PA2027U) £365
16Mb RAM (PA2028U) £1185
Port Replicator (PA2708U) £128
Battery (PA2437UY) £95
Battery charger (PA2436UY) £149

£3395

TOSHIBA

Two PCMCIA slots on all models provide ultimate expansion. Intel fax/data modem at an incredible £99

Built-in Microsoft Sound System on T4700, T4800 T4850, T4900, T6600, 2150CDS/CDT lets you record live

QuickRead 'Dashboard' LCD icons display on many models shows the status of your PC

Deskstation IV turns your T4700, T4800, T4850 and T4900 notebooks into expandable desktop systems

COLOUR 486DX2-50

T2100 CS

A superb large colour 10.4" dual scan screen. Local bus video makes this 486DX2-50 the ideal platform for high-quality graphics and mobile presentations.

- Intel DX2-50 processor
- 4Mb RAM expandable to 28Mb
- 350Mb hard disk
- Internal 3.5" 1.44Mb floppy drive
- VGA/SVGA (640 x 480 pixcel resolution) STN 10.4" diagonal display
- 84 Key keyboard
- Standard ports and port replicator
- PCMCIA Rel 2.0 one type III or two type II)
- 11.8" x 8.9" x 2.1" with 3.1Kg (6.8lb) weight
- NIH2 removable battery (4 hours use)
- MS DOS 6.22, MS Windows 3.11

Options

4Mb RAM (PA2026U)	£215
8Mb RAM (PA2027U)	£385
16Mb RAM (PA2028U)	£1185
Port Replicator (PA2708U)	£128
Battery (PA2437UY)	£95
Battery charger (PA2436UY)	£149

£1610

TFT COLOUR DX2-50

T2100CT

This state-of-the-art 486DX-50 processor with TFT colour screen and two type or one PCMCIA slots offer a choice of increased storage, communication and network capabilities.

- Intel DX2-50 processor
- 8Mb RAM expandable to 32Mb
- 350Mb hard disk
- Internal 3.5" 1.44Mb floppy drive
- VGA/SVGA (640x480 pixel resolution) TFT 8.4" diagonal display
- 84 Key keyboard and MousePoint device
- Standard ports, & port replicator
- Built in AC Adaptor
- PCMCIA Rel 2.0 two Type II or one Type III
- 11.8" x 8.9" x 2.0" with 3.1kg (6.8lb) weight
- NIH2 removable battery 4 hours use
- MS DOS 6.2 and MS Windows 3.11

Options

4Mb RAM (PA2026U)	£215
8Mb RAM (PA2027U)	£385
16Mb RAM (PA2028U)	£1185
Port Replicator (PA2708U)	£128
Battery (PA2437UY)	£95
Battery charger (PA2436UY)	£149

£2205

TFT COLOUR SUBNOTE

T3600CT

Superb TFT colour ultra notebook with fast 486DX2-50 processor, 8Mb RAM, 250Mb hard disk, and just 2Kg Weight

- Intel DX2-50 processor
- 8Mb RAM expandable to 20Mb
- 250Mb IDE hard disks
- VGA/SVGA VESA Local Bus Graphics
- 1Mb video RAM and Graphics Accelerator
- 8.4" TFT VGA colour screen
- 84 Key keyboard and Integral MousePoint device
- Parallel, serial, 72 pin replicator and single SIMM memory ports
- Port replicator (Mini-Docking Station) option with standard Ports
- PCMCIA Rel 2.0 Type II slot
- 9.8" x 7.9" x 1.8" with 2.0Kg (4.4lb) weight
- Lithium Ion battery (4 hours use).
- 3 year Toshiba Warranty
- MS DOS 6.2 and Windows 3.11 for Workgroups

Options

4Mb RAM (PA2019U)	£192
8Mb RAM (PA2020U)	£340
16Mb RAM (PA2021U)	£1148
Li Ion Battery (PA2841U)	£175
External 3.5" FDD (PA2606R)	£128

£2634

TFT COLOUR DX4-75

T4850CT

The DX4-75 has all the power you will ever need out on the road - even for multimedia applications. Whatever your requirements, the T485CT is perfectly equipped to handle them all.

- Intel DX4-75 processor
- 8Mb RAM expandable to 40Mb
- 500Mb hard disk
- Internal 3.5" 1.44Mb floppy drive
- VGA/SVGA (640x480 pixel resolution) TFT 10.4" diagonal display
- 84 full size keys with overlay numeric keypad, 12 function keys
- Standard ports
- PCMCIA Rel 2.0 one Type II or one Type III
- 11.7" x 8.3" x 2.2" with 3.2kg (6.9 lb) weight
- NiH_2 removable battery 3.5 hours use
- MS DOS 6.2 and MS Windows 3.11

Options

4Mb RAM (PA2012U)	£170
8Mb RAM (PA2013U)	£298
16Mb RAM (PA2014U)	£1339
NiH2 Battery (PA2429UR)	£94
DeskStation IV	£374

£3399

TFT COLOUR PENTIUM

T4900CT

The T4900CT is the first notebook to have Intel 3.3volt 75MHz Pentium processor. It takes mobile computing into a spectacular new dimension offering unsurpressed performance for all power-hungry applications.

- Intel Pentium P75 processor
- 8Mb RAM expandable to 40Mb
- 810Mb hard disk
- Internal 3.5" 1.44Mb floppy drive
- VGA/SVGA (640 x 480 pixel resolution) TFT 10.4" diagonal display
- 84 key keyboard with mouse point
- Standard Ports
- PCMCIA Rel 2.0 one Type II or one Type III
- 11.7" x 8.3" x 2.2" with 3.1kg (6.8 lb) Weight
- Soundblaster Pro compatibale sound system
- Built in speakers and microphone
- NIH2 removable battery 3 hours use
- MS DOS 6.2 and MS Windows 3.11

Options

4Mb RAM (PA2012U)	£170
8Mb RAM (PA2013U)	£298
16Mb RAM (PA2014U)	£1339
NiH2 Battery (PA2429UR)	£94
DeskStation IV	£374

£4585

TOSHIBA OPTIONS

External Battery Charger:
- T3400/T3600 (2482U) £166
- Others (PA2422U- E) . .£107

ExtraUniversal AC Adaptor:
- T1910, T1950, T4700, T4800 (PA2478U £56
- T2400 (PA2430U) £48
- T4600 (PA2411U) £48
- T3400, T3600 (PA2426U-E) £48

Toshiba PCMCIAcards:
- PCMCIA 14.4 modem (TPCV32BFUK) £255
- PCMCIA ethernet adaptor (PCE- 10BC) £192
- PCMCIA V34 Modem . .£332

Other Options:
- Carry case T6600C (T239L) £39
- Carry case others (T202L) £34
- Ballpoint Quickport mouse (PA2805U) £73
- Portable SCSI CD ROM (HR- CD400) . . . . . £306 CD-ROM requires PCMCIA SCSI adaptor on most notebooks (just SCSI to SCSI D Cable on T2400)
- Deskstation IV . . . . . £374 (Docking station for T4600, T4700 and T4800 models. It includes all standard ports, two full-size 16-bit slots, . . . 5.25" drive bay, power supply and monitor stand).

THIRD PARTY OPTIONS

PCMCIA Options
- Intel 2496 Fax/data Modem £99
- New media Bus Toaster SCSI Adapter £173
- New Media Visual SCSI adaptor £149
- New Media 16-bit Soundcard £196
- New Media Combo Ethernet Card £125
- MiniStore 130Mb hard drive £399

Parallel Port Devices
- Backpack DS CD-ROM Drive £299
- Backpack 5.25" floppy drive £149
- Logitech Scanman Easytouch Scanner . £142
- Trakker 250Mb Tape backup £208

Keyboards & Mice
- External COL 130 key keyboard (needs PS/2 adaptor) £29
- PS/2 to DIN keyboard adaptor £9
- Microsoft Natural keyboard £69
- IMSI PC Stylus PS/2 . . £29
- IMSI Mini Thumball . . . £24
- Logitech Trackman Portable £32

Portable Printers
- HP DeskJet 320 . . . . .£175
- Canon BJ10sx £141

Other Options:
- Universal third party car adaptor £99
- Laplink XL & serial cable £39
- Laplink Pro v5 for Win . £74
- Time external speakers £18

TDR16A

All prices exclude delivery and VAT (17.5%). Delivery:- Systems £19, Lasers and large items £15, software and small items £10. Visa /Access/ American Express /Switch and Government orders welcome. Prices, specifications and offers are subject to change and subject to our conditions of sale copies of which are available on request. Mail order only. No collections please. Goods are normally despatched within 7 days. All orders will be fulfilled within 28 days unless otherwise specified. E&OE.

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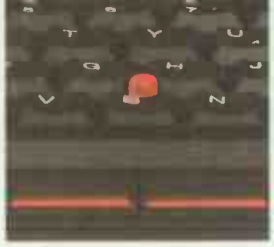
The keyboard flips up with easy access to memory slot, batteries, floppy drive and hard disks, all of which are removable on 360 & 755 models

Port Replicators I & II (mini-docking stations) provide standard ports and cable convenience (Replicator I also has additional PCMCIA III or two type II slots.)



The unique easy to use TrackPoint II or III pointing device provides better cursor control than any mouse! Equally good for right & left handers.

Portable Dock I has standard ports, SCSI, Speakers, one ISA slot, one 5.25" drive bay (suitable for CD-ROM) and a handle. Shown with ThinkPad attached.

COMMON THINKPAD FEATURES

The IBM ThinkPad range of notebooks are the most advanced notebooks money can buy. In terms of quality, innovation, useability and technology, these systems are way ahead of the competition.

CASE
Elegant yet robust case made from special carbon fibre re-inforced plastic for extra durability, yet incredible light weight. The ThinkPad 340 CSE is only 2.2Kgl

TRACKPOINT
IBM's innovative red device situated in the middle of the keyboard has no moving parts and responds naturally to your finger's pressure. Easier to use than any mouse or trackball!

SCREENS
High quality screens open to 180 degrees and feature edge to edge display with contrast and brightness control.
-Mono screen available on the and 360 provide a high quality Mono STN LCD capable of 64 grey scales and VGA resolution.
-STN colour screens on 340 CSE & some 360 & 755 models provide 9.5" diagonal, 256 colours and utilise the latest advanced sidelit STN (Dual Scan) technology for enhanced contrast and faster response.
-TFT or active matrix screens (8.4" on 360; 10.4" on 755 & 701/CS) provide the best displays with 256 bright colours, ultra fast response and the ability to use motion video.
-New Black Matrix on array 10.4" TFT colour screens on 755CE & 755CD reduce glare, give the brightest and clearest display and 65 thousand colours.

GRAPHICS
All 360, 701 & 755 models include VESA Local Bus graphics with 1Mb RAM and Windows accelerator. Simultaneous display to external SVGA screen.

MODULAR DESIGN
All models (except 340CSE) allow removable hard disk (170Mb to 810Mb), floppy drive and battery. The keyboard easily flips up for access. (EXT FDD on 701 range)

KEYBOARD
Ergonomically designed, quiet, 85 key full-size keys with 12 function keys and overlay numeric keypad. New TrackWrite keyboard on 701 range.

INTERFACES
Standard ports include enhanced centronics parallel, RS 232C serial, PS/2 ext. keyboard/mouse and SVGA for external monitor. One type III PCMCIA slot (also functions as two type II on 360/755 or one type II on 340CSE.

POWER & MANAGEMENT
Powerful rechargeable batteries coupled with Advanced Power Management and non-disruptive battery exchange allow you to work a whole day without being near a powerpoint. Fuel gauge provides an indicator of battery life. AC adaptor provides power for notebook and recharges batteries with quick charge facility (1.5 hours). Minimum battery life figure shown is for full use whilst top figure is for typical use with power management.

SECURITY
Hard disk is removable (except 340) and lockable in the computer and can be protected by a password.

SOFTWARE
IBM PC DOS 6.3, Windows 3.1 plus additional software as shown. Various utilities including PC Card Director with Auto Configuration, Hot PCMCIA insertion (Easy Playing) and Automatic Memory Device Driver.

DOCKING OPTIONS
360 & 755 models have ability to use 4 docking stations; port replicator 1 for economical expansion and cable management, replicator 2 also has additional PCMCIA slots. Portable DOCK 1 and larger DOCK 2 full size docking stations provide extra drive bays and expansion slots and room for multimedia options in addition to port replication. Intelligent software allows docking when your system is on!

IBM SERVICE & SUPPORT
12mth IBM HelpWare hotline support. 12mth warranty with 3 year warranty on 755 models.

WHICH THINKPAD IS FOR YOU?

ThinkPad 340 CSE. The entry level ThinkPad with colour screen and 200Mb hard disk. Has limited expansion and modularity. Ideal for home and small business use.

ThinkPad 360 All the modularity, expansion capability, security and versatility with a wide choice of screens, hard drives, processors and docking facilities. Ideal for the corporate sales team, fleet use and other general business requirements.

ThinkPad 701/701CS. These two new subnote type models are designed to provide unique and powerfull, lightweight solutions with full size 85-key keyboards & 10.4" Dual Scan or TFT displays.

ThinkPad 755. All the features of the ThinkPad 360 plus multimedia sound, larger screens and faster processors. Ideal for presentations and business uses where performance is important.

ThinkPad 755CE & 755CD. The ultimate mobile computers with innovative technology, the world's best BMA TFT screen, 100Mhz processor, full-feature multimedia and modem facilities, and InfraRed communications. Ideal for the top executive.

THINKPAD 340CSE

340CSE

The ideal entry level 486 colour notebook with fast 50MHz processor, 200Mb hard drive PCMCIA and dual scan colour

- Fast IBM 486SLC2-50 processor
- 16K internal CPU Cache
- 4Mb RAM expandable to 12Mb
- 200Mb IDE fixed hard disk
- 3.5" 1.44Mb floppy drive
- VGA (640 x 480) Graphics
- 9.4" (diagonal) dual Scan VGA colour display
- Quiet full size 85 key keyboard with TrackPoint III and built in numaric keypad function
- Standard Ports
- PCMCIA Rel 2.0 Type III Slot (or one type II)
- 48mm x 297mm x 210mm with 2.2Kg Weight
- ThinkPad 340CSE NiMH battery pack
- 35W worldwide AC/DC power adaptor, internal quick charger (1.5 Hrs)
- 12mth warranty extendable to 3 years
- Integral Trackpoint II pointing device
- Preinstalled IBM DOS 6.3, Windows 3.1 & diskette factory software

Options

4Mb RAM	£186
8Mb RAM	£369
NiCad battery	£41
AC adaptor	£36

£1336

THINKPAD 701/701CS/755

Common Features
ThinkPad 755 range is available with a range of processors, large 9.5" Dual Scan or 10.4" TFT colour screens, various hard disks and software pre-loads.
The ThinkPad 701C & 701CS include IBM's new TrackWrite expandable full sized keyboard & 10.4" displays.
All systems have a modular design with multimedia capability included as standard. All the features of the 360 are included such as Trackpoint II, lightweight design and built-in modularity.

- 4Mb or 8Mb base RAM expandable to 20Mb using one 4, 8 or 16Mb IC DRAM card or 36Mb/40Mb (using DIMM adaptor which provides two slots, which can be fitted with two 16Mb DIMM modules)
- Removable 3.5" 1.44Mb floppy drive (to reduce weight) (701 range has external 3.5" 1.44Mb FDD)
- VESA Local Bus Graphics with 1Mb RAM, Windows Accelerator and Dual VGA support for external SVGA display (256 colours at 1024 x 768) 701 models (600 x 480).
- 85 key keyboard which flips open to provide access to battery, removable hard disk and floppy bays (701 range has Trakwrite full size 85-key keyboard 19mm keys and advance TrackPoint III)
- Standard ports include enhanced parallel, serial, PS/2 for mouse or keyboard
- PCMCIA type III slot (can be used as two type II slots)
- Soundcard is included as standard (701 range has SoundBlaster Compatibility)
- Expansion bus port for dock 1, dock 2, port replicator 1 and port replicator 2 (701 range is Dock II Compatible, adaptor kit requierd)
- Sizes, weights, battery (NiMH) life vary as shown

755CE and 755CD include 486DX4-100 processor, 8Mb base RAM, extra multimedia/modem features, Trackpoint III, Black Matrix on array TFT screens, motion video support, infra-red comms, and 5.25" CD on 755CD model

Popular 755 Options

2Mb DRAM (35G2314)	£117
4Mb DRAM (35G2315)	£203
8Mb DRAM (35G2316)	£405
16Mb DRAM (6656574)	£1031
DIMM Adapter (provides 2 slots) IBMTOMMADP	£72
4Mb DIMM (TOMMD04)	£203
8Mb DIMM (TOMMD08)	£599
16Mb DIMM (TOMMD16)	£1031
360 NiMH Battery	£96
750 NiMH Battery	£135
750 Battery Safety Cover	£12
NiMH Battery Pack II (755CE/CD) IBMTOBATII	£117

Other options: See General Options

701CS 486 DX2-50/DX4-75 STN/TFT

ThinkPad 701CS

Open a ThinkPad 701 and you'll find IBM's new TrackWrite expandable full sized keyboard. The display screen is equally uncompromising Dual Scan or TFT, both are 10.4" colour panels

- General specification as shown under common features
- Intel DX2-50 or 486DX4-75
- 4Mb or 8Mb RAM upgradeable to 20Mb
- 360Mb, 540Mb or 720Mb hard disk
- VGA/SVGA 1Mb VESA LB 10.4" diagonal display All models
- External 3.5" 1.44Mb floppy disk drive
- Trackwrite full size 85-key Keyboard, full size 19mm keys including 12 full-size PF keys. TrackPoint III
- Standard ports, and 160 pin expansion bus
- Internal Super NiCad rechargeable battery pack 1.5 hour charge auto sensing AC adaptor
- PCMCIA Rel 2.0 two Type II or one Type III
- 44mm H x 247mm W x 201mm D
- Soundblaster & Soundblaster Pro compatibale sound system
- MS Dos 6.22 MS windows 3.11

701CS DX2-50 360/4Mb	£2551
701CS DX2-50 540/4Mb	£2772
701CS DX4-75 360/8Mb	£3209
701CS DX4-75 540/8Mb	£3430
701CS DS4-75 720/8Mb	£3645
701C DS2-50 360/4Mb	£2989
701C DX2-50 540/4Mb	£3209
701C DX4-75 360/8Mb	£3645
701C DX4-75 540/8Mb	£3865
701C DX4-75 720/8Mb	£4085

£2551

486DX2-50/DX4-75 TFT COLOUR

ThinkPad 755C

Powerful TFT colour ThinkPad 755 models with 486DX2-50 or 486DX4-75 Processor and a range of hard disks. (shown with Dock 2 & matching keyboard options)

- General specification as shown under common features
- 4Mb RAM upgradeable to 36Mb
- 10.4" TFT colour display with 256 colours and 100:1 contrast ratio
- 170Mb, 340Mb, 540Mb or 810Mb removable hard disks
- 51h x 297w x210d in mm
- 2.9Kg weight with battery and drives
- IBM PC DOS 6.3, Windows 3.1, Lotus Organizer and PC Card Director
- Battery life 3.1 to 8 hours
- Built-in soundcard with audio jacks, microphone and speaker
- IBM 3 year warranty

755C TF1 486DX2-50 170Mb	£2574
755C TF2 486DX2-50 340Mb	£2723
755C TF4 486DX4-75 170Mb	£3164
755C TF5 486DX4-75 340Mb	£3312
755C TF6 486DX4-75 540Mb	£3605
755C TF6 486DX4-75 810Mb	£4046
755CS DS1 486DX2-50 170Mb	£2768
755CS DS2 486DX2-50 340Mb	£2916
755CS DS5 486DX4-75 340Mb	£3209
755CS DS6 486DX4-75 340Mb	£3501

£2574

IBM ThinkPad

Matching black monitor and black keyboard are available to complement your IBM ThinkPad. Shown with monitor stand and Dock 2 (2 ISA slots, 2 bays & PCMCIA slots).

Various nylon and leather cases are available for ThinkPad and Portable Dock I.

A plethora of high quality multimedia, comms & productivity software for the mobile professional comes pre-loaded on many models

The Communicate Connexion 1440C PCMCIA type II fax/data modem attaches to the Motorola Micro TAC II mobile phone (and others e.g. BT Pearl, Vodac VP130, Ford Compact).

THINKPAD 360

Common Features

ThinkPad 360 Range is available with a range of Processors, Screens, Hard Disks and Software Pre-loads. All systems have a modular design and full docking capabilities

- Standard Thinkpad features such as Trackpoint II, lightweight design and built-in modularity
- 4Mb base RAM expandable to 20Mb using one 4, 8 or 16Mb IC DRAM card (fits into memory slot)
- Removable 3.5" 1.44Mb floppy drive (to reduce weight)
- VESA Local Bus graphics with 1Mb RAM, Windows Accelerator and Dual VGA support for external SVGA display (256 colours at 1024 x 768)
- 85 key keyboard which flips open to provide access to battery, removable hard disk and floppy bays.
- Standard ports include enhanced parallel, serial, PS/2 for mouse or keyboard (adaptor allows use of both)
- PCMCIA type III slot (can be used as two type II slots)
- Soundcard port for optional soundcard (only to special order - factory fitted)
- Expansion bus port for dock 1, dock 2, port replicator 1 and port replicator 2
- Sizes, weights, battery (NiMH) life vary as shown
- Pen model is also available

Popular 360 Options

4Mb RAM (TONPM04) £186
8Mb RAM (TONPM08) £369
16Mb RAM (TONPM16) £923
360 NiMH battery 66G2846 ..... £95
750 NiMH battery 66G2846 ..... £135
750 battery safety cover 66G0027 ..... £12
Other options: See General Options

MONO/DUAL SCAN COLOUR

CALL FOR NEW LOWER PRICES

ThinkPad 360/360CS/CSE

Popular mono or Dual Scan colour ThinkPad 360 models with 486SX-33 or 486DX2-50 processor and a range of hard disks. Shown with optional modem & mobile phone

- General specification as shown under common features
- 4Mb RAM upgradeable to 20Mb
- 9.5" STN Dual Scan colour display with 256 colours and 20:1 contrast ratio
- Mono model has 9.6" STN LCD monochrome display with 64 grey scales and 18:1 contrast ratio
- 170Mb or 340Mb removable hard disks
- 51h x 297w x210d in mm
- 2.8Kg weight with battery & drives
- IBM PC DOS 6.3, Windows 3.1 & PC Card Director
- Lotus Organizer, Lotus SceenCam, Lotus cc:Mail Mobile, OAG FlightDisk, Triton CoSession Host (Organizer only with 486SX-33 Models)
- Battery life 3 to 10 hours

Mono

360 M01 486SX-33 170Mb £1067
360 M02 486SX-33 340Mb £1215

Dual Scan Colour

360CS DS1 486SX-33 170Mb £1773
360CS DS2 486SX-33 340Mb £1922
360CSE DS3 486DX2-50 170Mb £1949
360CSE DS4 486DX2-50 340Mb £2097

£1067

TFT COLOUR

ThinkPad 360C/CE

Superb TFT Colour ThinkPad 360 models with 486SX-33 or 486DX2-50 Processor and a range of hard disks

- General specification as shown under common features
- 4Mb RAM upgradeable to 20Mb
- 8.4" TFT active matrix colour display with 256 colours and 100:1 contrast ratio
- 170Mb or 340Mb removable hard disks
- 47h x 297w x210d in mm
- 2.8Kg weight with battery & drives
- IBM PC DOS 6.3, Windows 3.1 & PC Card Director
- Lotus Organizer, Lotus SceenCam, Lotus cc:Mail Mobile, OAG FlightDisk, Triton CoSession Host (Organizer only with 486SX-33 Models)
- Battery life 3.2 to 7 hours

360C TF1 486SX-33 170Mb £1508
360C TF2 486SX-33 340Mb £1656
360CE TF3 486DX-50 170Mb £1949
360CE TF4 486DX-50 340Mb £2097

£1508

486DX4-100 BMA TFT COLOUR

ThinkPad 755CE

Powerful TFT colour notebook with 486DX4-100 processor, large TFT BMA screen, Advanced Multimedia/Modem and Infra-red Comms

- General specification as shown under common features
- 8Mb RAM upgradeable to 40Mb
- 10.4" TFT Black Matrix on array colour display with 65,000 colours, reduced glare and excellent visibility even in daylight. 100:1 contrast ratio
- Trackpoint III pointing device with improved rubber grip and drag & drop features
- 340Mb, 540Mb or 810Mb removable hard disks
- 50h x 297w x210d in mm; 2.9Kg weight with battery & drives
- IBM PC DOS 6.3, Windows 3.1, & PC Card Director
- Software Suite including Lotus Organizer 1.1, ScreenCam, cc:Mail Mobile, Audiofile TalkWorks, Asymetrix Presentation PE, Puma TranXit, OAG FlightDisk, Video for Windows runtime.
- Built-in 16-bit soundcard with audio jacks, headphone jack, microphone and speaker
- Battery life 3.5 to 7 hours
- Built-In IRDA compatible Infra-red ports
- Integrated Mwave DSP unit which can function as stereo soundcard with WAV & MIDI support, audio compression or integrated 14.4 data/fax modem with Telephony support (Speaker phone or Telephone answering)

755CE CE2 486DX4-100 340Mb £3902
755CE CE3 486DX4-100 540Mb £4194
755CE CE4 486DX4-100 810Mb £4635

£3902

486DX4-100 BMA TFT COLOUR & MPC2

ThinkPad 755CD

Ultimate TFT colour fully MPC2 compliant multimedia notebook with 486DX4-100 processor, Large TFT BMA screen, advanced stereo multimedia/modem, built-in CD ROM, and Infra-red Comms

- General specification as shown under common features
- 8Mb RAM upgradeable to 40Mb
- 10.4" TFT Black Matrix on array colour display with 65,000 colours, reduced glare and excellent visibility even in day light. 100:1 contrast ratio.
- Trackpoint III pointing device with improved rubber grip and drag & drop features
- 540Mb or 810Mb removable hard disks
- 57h x 297w x210d in mm; 2.9Kg weight with battery & drives
- IBM PC DOS 6.3, Windows 3.1, & PC Card Director
- Software Suite including Lotus Organizer 1.1, ScreenCam, cc:Mail Mobile, Audiofile TalkWorks, Asymetrix Presentation PE & Digital Video Producer, Puma TranXit, OAG FlightDisk, Video for Windows runtime
- Built-in soundcard with audio jacks, headphone jack, MIDI/Joystick port, microphone and stereospeakers
- Video capture/overlay features and Composite (video) in; video out to TV ports
- Battery life 3.5 to 7 hours
- Built-in IRDA compatible InfraRed ports
- Integrated Mwave DSP unit which can function as stereo soundcard with WAV & MIDI support, audio compression or integrated 14.4 data/fax modem with Telephony support (speaker phone or telephone answering)
- Built-in 5.25" double speed multi-session CD-ROM Drive

755CD CD3 486DX4-100 540Mb £5333
755CD CD4 486DX4-100 810Mb £5774

£5333

GENERAL OPTIONS

Additional Removable Hard Drives

170Mb £441
340Mb £590
540Mb £882
810Mb £1323

PCMCIA type II Cards

Intel fax/data modem £99
Communicate Connexion 1440C ..... £Call

IBM PCMCIA options

-3270 Card £269
-14.4 fax/data modem £324
-Modem UK DAA for above £63
-16/4 Token Ring card £360
-10Base2 Ethernet card £190
-10BaseT Ethernet card £180

Docking Options (360 & 755)

Port Replicator 1 66G3515 ..... £198
Port Replicator 2 66G3530 ..... £72
Portable Dock I 53G9721 ..... £536
-Includes 5.25" bay, one ISA slot, one special slot for A to D adaptor for motion video, two integral speakers, SCSI port, and standard ports.
Dock I carry case 66G3565 ..... £77
Dock I display stand 66G3517 ..... £77
Ext. floppy enclosure 66G3697 ..... £32
Dock I CD-ROM kit 66G3506 ..... £414
Dock I Anal to Digit. video card 66G3509 ..... £563
Dock I audio cable 66G3521 ..... £18
Dock I SCSI install kit 66G3513 ..... £41
Dock I IDE install kit 66G3502 ..... £45
Dock II TODD2UK £500
Dock II display stand TODSHEU £50
Dock II 555Mb tape backup TOTBUUK £473

Carry Cases

Deluxe leather overnight 8130922 ..... £176
Deluxe leather 8130921 ..... £104
Deluxe nylon 79F0981 ..... £72
Nylon 07G1530 ..... £38

Black Matching Extras

Black 15X FST SVGA screen £432
Black external keyboard £140
Black Keypad for keyboard £45
Black mouse £30

Other Options

Keyboard/mouse connector cable £23
KeyGuard £63
Numeric keypad £22

AC adaptor 40W £48
AC adaptor 50W £108
Car battery adaptor £48
Quick charger (can take 2 batteries) £176

Microphone kit £36
Laplink XL & serial cable £39

755CE/CD only options

Headset £95
DAA/telephone kit £104
FDD bay PCMCIA cartridge £41

701/701 CS Options

4Mb RAM SO-DIM £169
8Mb RAM SO-DIM £369
Super NiCad battery £49
NiMH Battery pack £59
Multiport II £119
Dock II adaptor kit £75
Leather portfolio case £49
Leather carrycase £11

TDR17A

All prices exclude delivery and VAT (17.5%). Delivery:- Systems £19, Lasers and large items £15, software and small items £10. Visa /Access/ American Express /Switch and Government orders welcome. Prices, specifications and offers are subject to change and subject to our conditions of sale copies of which are available on request. Mail order only. No collections please. Goods are normally despatched within 7 days. All orders will be fulfilled within 28 days unless otherwise specified. E&OE.

TIME DIRECT

Granville House, Blackburn Road, Simonstone, Burnley, Lancashire BB12 7GT

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SALES LINES OPEN
Monday - Friday 9.00am - 6.00pm

Networking/Volume enquires Telephone 01282 77 00 99

MITAC 486

Mitac 486DX2-66 and 486DX4-100 stand alone and networked systems shown here include fast 540Mb hard drives, and superb 14" Non-interlaced MPRII SVGA colour screens.

- 486DX2-66 or 486DX4-100 processor
- 4Mb RAM expandable to 64Mb
- 540Mb hard disk
- Quad speed CD-ROM drive (shown) is £120 extra
- Pentium technology ready
- 256K external SRAM cache
- 3.5" 1.44Mb floppy drive
- 1Mb VESA bus graphics
- 14" SVGA 0.28dp colour screen
- IDE hard and floppy controller
- Parallel, 2 serial & keyboard ports
- Expandable Mitac desktop case
- 5 drive bays and 7 slots (2 VESA)
- 102 Enhanced keyboard
- Microsoft compatible mouse
- Select operating system from below.

486DX2-66 ..... **£689**
486DX4-100 ..... **£739**

Mitac Only Options
RAM upgrade per 4Mb £120
DOS 6.3 & Windows 3.11 ..... £40
MS DOS 6.22 & Windows 3.11 for workgroups £70
16-bit ethernet combi card £50
15" Screen ..... £80 Extra
850Mb hard drive ..... £60 Extra
Double speed CD-ROM £80
Quad speed CD-ROM £120
Approved fax/data modem £40

£689

COMPAQ PROLINEA 486

New Compaq Prolinea models come with 3 case styles and PCI graphics. All except 486-50 include a minimum of 8Mb of RAM.

- 486DX2-50, 486DX2-66 or 486DX4-100 processor
- 8Mb RAM (4Mb on 486DX2-50 model)
- 128K Cache on 486DX4-100
- Integrated 1Mb PCI local bus graphics
- Triflex/PCI bus
- 270Mb, 420Mb or 720Mb
- PCI IDE hard disks
- User friendly: plug & play bios, easy to open with sliding motherboard & swinging drive cage.
- Compaq keyboard & mouse
- MSDOS, Windows 3.1 & Compaq utilties
- CDS models include quad speed CD & 16-bit business sound
- Slimline models : 3 bays & 3 slots
- Standard desktop: 4 bays & 4 slots
- Mini-Tower: 5 bays & 5 slots

Select screens from below

Slimline (3/3) Models
486DX2-50 (3/3) 270Mb £710
486DX2-66 (3/3) 420Mb £982
486DX4-100 (3/3) 420Mb £1143
Desktop (4/4) Models
486DX2-66 (4/4) 420Mb £1016
486DX4-100 (4/4) 420Mb £1177
Mini-Tower (5/5) Models
486DX2-66 (5/5) 420Mb £1058

Options
14" 1024 NI Mitac £170
15" 1024 NI Taxan £250
14" SVGA Compaq £199
14" 1024 Compaq £238
15" 151FS Compaq £323

£710

IBM APTIVA

IBM Aptiva provides the ideal solution for the business user and comes complete with software and SVGA colour screen.

- Intel 486SX-25, 486SX-33, 486DX2-66 or 486DX4-100 processor
- Intel overdrive upgradeable 4Mb RAM, max 64Mb/128Mb
- 170Mb, 270Mb or 540Mb local bus IDE hard fisk
- VESA local bus technology
- 3.5" 1.44Mb floppy drive
- Integrated VESA local bus graphics
- 4 Drive bays & 4 slots parallel, serial and mouse ports
- 14" SVGA colour screen
- MS compatible mouse & 102 keyboard
- Rapid resume energy saver, password.
- PC DOS 6.3 & MS Windows 3.1
- Microsoft Works v3 & AptivaWare software
- 12 Month warranty extendable to 3 years.
- IBM helpline support.

486SX-25 170Mb **£599**
486SX-33 270Mb **£699**
486DX2-66 540Mb **£899**
486DX4-100 540Mb **£999**

Aptiva Options
RAM upgrade per 4Mb £130
16-bit ethernet combi card £50
Approved fax/data modem £40
Double speed CD-ROM £80
Quad speed CD-ROM £120

£599

MITAC 586

Mitac Pentium processor based system include enhanced PCI IDE drives and superb PCI graphics. Prices shown here include 8Mb RAM, 540Mb hard drives and superb NI SVGA MPRII screens.

- Intel Pentium 60, 75, 90, 100 processor
- 8Mb RAM expandable to 128Mb
- 256K external cache
- 540Mb enhanced IDE hard disk
- Quad speed CD-ROM drive (shown) is £120 extra
- 3.5" 1.44Mb floppy drive
- PCI bus with 4 PCI slots
- 1Mb PCI bus graphics exp to 2Mb
- 14" SVGA 0.28dp colour screen
- PCI IDE hard and floppy controller
- Parallel, 2 serial & keyboard ports
- Expandable Mitac desktop case
- 5 drive bays and 7 slots
- 102 Enhanced keyboard
- Microsoft Compatible Mouse
- Select operating system from below.

Mitac P60 540Mb 8Mb 14" £1069
Mitac P75 540Mb 8Mb 14" £1129
Mitac P90 540Mb 8Mb 14" £1329
Mitac P100 540Mb 8Mb 14" £1429

Mitac Only Options
15" Screen ..... £80 Extra
850Mb hard drive ..... £60 Extra
1GB hard drive ..... £130 Extra
Double speed CD-ROM £80
Quad speed CD-ROM £120
Video RAM upg. to 2Mb £50
RAM upgrade per 4Mb £120
DOS 6.3 & Windows 3.11 ..... £40
MS DOS 6.22 & Windows 3.11 for workgroups £70
16-bit ethernet combi card £50
Approved fax/data modem £40

£1069

COMAQ PROLINEA 586

Compaq 586 systems use Intel Pentium 75, 90 and 100 processors and come in 3 case styles.

- Intel Pentium 75, 90 or 100 processor
- 8Mb RAM (16Mb on 720Mb models)
- 256K Cache
- Integrated 1Mb PCI Local bus graphics. (Pentium 100 has Qvision 2000+ Matrox 2Mb 64bit card) Triflex/PCI bus
- 420Mb or 720Mb PCI IDE hard disks
- User Friendly: plug & play bios, easy to open with sliding motherboard & swinging drive cage.
- Compaq keyboard & mouse
- MS DOS, Windows 3.1 & Compaq utilties
- CDS models include Quad speed CD & 16-bit business sound
- Slimline models : 3 bays & 3 slots
- Standard desktop: 4 bays & 4 slots
- Mini-Tower: 5 bays & 5 slots

Select screens from below

Slimline (3/3) Models
Pentium-75 (3/3) 420Mb £1262
Desktop (4/4) Models
Pentium-75 (4/4) 420Mb £1296
Pentium-90 (4/4) 420Mb £1441
Pentium-90 (4/4) 720Mb £1696

Mini-Tower (5/5) Models
Pentium-75 (5/5) 420Mb £1339
Pentium-75 (5/5) 420Mb CDS £1543
Pentium-90 (5/5) 420Mb £1483
Pentium-90 (5/5) 420Mb CDS £1687
Pentium-90 (5/5) 720Mb £1738
Pentium-100 (5/5) 720Mb £2104

Options
14" 1024 NI Mitac £170
15" 1024 NI Taxan £250
14" SVGA Colour £199
14" 1024 Compaq £238
15" 151FS Compaq £323

£1269

COLLOSSUS FILE SERVER

The Colossus file server is a true powerhouse with 10 drive bays, 400W power supply, multiple fans and secure covered cable routing. Ideal for demanding requirements.

- Intel Pentium 75, 90, 100 or 120 processor
- 16Mb RAM expandable to 128Mb
- 256K external Cache
- Heavy duty server case with 10 drive bays
- Large 400W power supply
- Multiple fans and secured covered cable routing
- 3.5" 1.44Mb floppy drive
- PCI bus with 4 PCI and 3 ISA slots
- 1MB 64-bit PCI bus graphics exp to 2Mb
- 14" SVGA 0.28dp colour screen
- PCI IDE hard and floppy controller
- Parallel, 2 serial & keyboard ports
- 102 Enhanced keyboard
- Microsoft compatible mouse
- 16-bit ethernet network controller (32 bit optional)

Select hard drive & Novell operating system

P75 Server 16Mb £1399
P90 Server 16Mb £1599
P100 Server 32Mb £2199
P120 Server 32Mb £2499

Server Options
850MB IDE hard drive £180
1GB IDE hard drive £250
Adaptec 2940 PCI SCSI II controller £200
1GB SCSI II drive £300
2GB SCSI II drive £600
4GB SCSI II drive £1100
RAM Per extra 4Mb £120
Fitted dual speed CD £80
32-bit PCI network controller instead of 16-bit £120

£1399

DESKTOPS & NETWORKING

NETWORKING - THE TOTAL SOLUTION

Popular networks can be divided into simple peer-to-peer (WorkGroup) networks or more complex client-server (Server based) networks. Frequently a combination of both is used.

PEER-TO-PEER

Peer-to-peer networks simply connect the PC systems together in your office/department and increase productivity by allowing you to:-
-Share files, directories, hard disks and access information from your colleagues
-Share peripherals such as laser printers, scanners, CD ROM drives and fax modems
-Use electronic mail for faster communication

Usually all systems will include network interface cards linked via ethernet cables. Network software (Windows for Workgroups 3.11 or Novell Personal Netware) will be required for each user. Peripherals (printers, scanners, plotters), storage devices and modems can be connected to any PC and can be shared by all or selected users.

CLIENT SERVER NETWORKS

Server based networks are essential for sharing data eg accounts/order processing systems as well as other resources and provide better security. Peripherals, modems and storage devices are normally attached to the server or workstations dedicated for this purpose. Many solutions are available. For most uses we recommend industry standard Novell Netware based ethernet solutions. These accounts for over 70% of networks, are tried and tested and provide the best value.

SERVER

Usually a tower system with fast hard disk controller, 32 bit network card, large fast hard disks, plenty of RAM and large power supply. Server performance is more related to hard disk system, RAM and network card and not the processor speed. A Pentium 90 system with network card can be slower than an optimised 486 purpose-built server.

WORKSTATIONS

These need to be powerful 486 (or Pentium) systems with network card, and good performance. We recommend at least 8Mb RAM, Local Bus graphics and 0.28dp screen if using Windows applications. Nowadays we strongly recommend a local hard disk in each workstation.

SERVER BACK-UP

An uninteruptable power supply with software monitoring is essential for the server to allow it to shut down safely should there be a power failure.

TAPE BACK-UP

There are two options:-
-Network wide back-ups of server and local PC drives with tape streamer (usually SCSI DAT drive) Installed in server together with Cheyenne ARCServe server software
-Fileserver back-up only via tape unit installed in a workstation.

COMMUNICATIONS

There are two options:-
-A fax/data modem installed in the fileserver together with network fax software eg Cheyenne FAXServe software
-Fax/Data modem installed in a workstation which functions as a dedicated fax server. This could also be used for remote support of the network using PC Anywhere software.

PERIPHERALS

These may be attached to the server, workstations which function as print servers or dedicated small network devices called print servers. Some network printers eg HP LaserJet with HP JetDirect card can also connect directly to the network without the use of a workstation/print server.

CABLING

Thin co-axial ethernet for small networks. 10Base-T cabling provides better cable management and is recommended for larger networks.

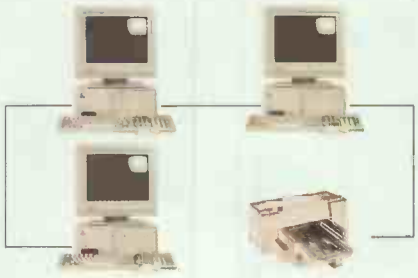
APPLICATIONS

Popular network applications include wordprocessing, spreadsheets, databases, accounts and electronic mail. We can provide solutions from Lotus, Microsoft or Novell tailored to your requirements.

SERVICES

Purchasing the network components alone will not allow you to be functional with a networks system. Our experienced network services team will provide you with the complete solution tailored to your individual requirements. We can provide you with an initial quotation. Once you are happy with this, we can provide a more detailed plan taking account of your service requirements with final quotation and installation plan. This may involve a site survey. The simple example network prices shown here do not include service elements such as installation, cabling and training.

3 USER WORKGROUP NETWORK



WORKSTATIONS

3 Mitac 486DX2-66 4Mb RAM, 540Mb 14" SVGA Workstations with 16-bit network card, MS DOS 6.2 & Windows 3.11 for workgroups

APPLICATION SOFTWARE

Each includes Lotus software bundle comprising of:-
-Lotus 1-2-3 v5
-Lotus Ami Pro v3.1
-Lotus Organizer v2
-Lotus Approach
-Lotus SmartPics
-Lotus individual training for Ami Pro, 1-2-3 and Approach

NETWORK SOFTWARE

Peer-to-Peer software: Windows for WorkGroups 3.11

PRINTER

HP DeskJet 540 colour printer with autosheet feeder

CABLES

3 sets of 5m cables, connectors and two terminators.

Power Network: As above but with 486DX4-100 540Mb 8Mb RAM Workstations.
3 user £3299
Additional users £1019

Additional Users **£849**

£2799

COMPAQ SERVER NETWORK

SERVER

- Compaq Prosignia VS Fileserver with 1Gb SCSI II hard drive and 486DX2-66 processor
- 32-bit ethernet card, 8Mb RAM and SVGA colour screen

NETWORK SOFTWARE

- Novell Netware 4.1 5 User

WORKSTATIONS

- 3 Compaq Prolinea Workstations (486DX2-50 4Mb, 270Mb) with Compaq 14" SVGA screens

APPLICATION SOFTWARE

- Lotus software on each workstation including 1-2-3, Ami Pro, Approach, SmartPics, Organizer and Lotus training

PRINTER

- HP LaserJet 4 Plus 12ppm 600dpi laser printer with HP JetDirect card

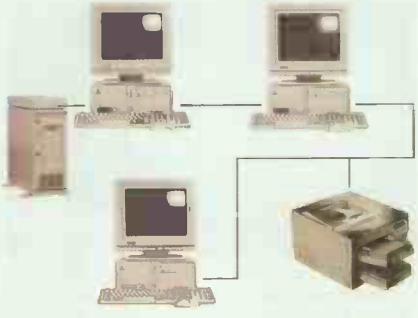
CABLES

- 5m cables, connectors and terminators

Additional Users **£998**

£6799

MITAC SERVER NETWORK



SERVER

Colossus Pentium 90 Server (see specification opposite) with 1GB hard drive and 16Mb RAM

WORKSTATIONS

Mitac Pentium 75 Workstations (850Mb, 8Mb, 15" SVGA NI Colour, MS DOS 6.22 & Windows 3.11 for WorkGroups with 16-bit ethernet cards)

NETWORK SOFTWARE

Novell Netware 4.1 5 user

APPLICATION SOFTWARE

Lotus software suite including Lotus 1-2-3, Ami Pro, Approach, Organizer 2 and SmartPics

PRINTER

HP LaserJet 4Si 16ppm 600dpi network laser printer

CABLES

5m cables, connectors and terminators

Additional P75 Workstations **£1399**

£8699

GENERAL OPTIONS

SERVER OPTIONS

Novell Netware 4.1
- 5 user £479
- 10 user £949
- 25 user £1749

Cheyenne ARCServe 5 Tape backup software
- 5 user £249
- 10 user £499
- 25 user £899
- 2Gb SCSI DAT tape drive only £689

Cheyenne FAXServe software
- 5 user £299
- 20 user £499
- 14.4 fax data modem (server modem) £199

Uninteruptable Power Supplies
- APC Smart-Ups 600 ..... £299
- APC Smart-Ups 900 ..... £399
- APC Smart-Ups 1250 ..... £599
- PowerChute Plus for Novell £50
- DCB interface cable £19
- Mouse port interface cable £19

WORKSTATION OPTIONS

14.4 fax data modem £119
PC Anywhere host/remote for DOS £99
250Mb tape back-up unit £100
700Mb tape back-up unit £230
2Gb DAT back-up unit (drive only) £689

CABLING & ACCESSORIES

Lan Research Combi network card £50
5m thin ethernet cable with connectors £15
Terminators £5
10BASE-T ethernet hubs
-8 port hub £299
-16 port hub £499

SERVICES

Prices will vary on individual requirements

Workshop Build

Novell fileserver build and workstation build with
-Netware installation on server
-Netware configuration with creation of logins and user access
-Application installation

On-site Build

-Site survey (if not conducted earlier)
-Site cabling
-On-site hardware installations
-On-site network implementation with possible links to mini/mainframe and ISDN
-On-site application implementation
-On-site training
-Support: modem, hotline and on-site support

TDR20A

All prices exclude delivery and VAT (17.5%). Delivery:- systems £19, lasers and large items £15, software and small items £10. Visa /Access/ American Express /Switch and Government orders welcome. Prices, specifications and offers are subject to change and subject to our conditions of sale copies of which are available on request. Mail order only. No collections please. Goods are normally despatched within 7 days. All orders will be fulfiled within 28 days unless otherwise specified. E&OE.

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Granville House, Blackburn Road, Simonstone, Burnley, Lancashire BB12 7GT

01282 77 00 99
SALES LINES OPEN: Monday-Friday 9.00am-6.00pm
FAX No : (01282) 77 06 08

NETWORKING/VOLUME ENQUIRES ONLY

HP DeskJet 320

The portable DeskJet printer for the mobile user. Full featured 600 x 300 dpi printing offers high quality text and graphics as fast as most desktop printers - up to 3 ppm

- 600 x 300 dpi resolution yields clear, sharp, professional documents
- Optional colour kit uses HP's ColorSmart technology to produce the finest colour output (16.7m colours). Colour resolution 300 x 300 and speed 4·7 minutes per page. 256 levels of greyscale for dramatic black graphics
- Optional cut-sheet feeder holds upto 60 sheets or 20 transparencies and folds down for compact storage and portability
- Fast print speeds of upto 3 ppm is as fast as most office printers
- Built-in portrait and landscape typefaces (many faces with 84 size and style combinations) plus 14 TrueType scalable fonts for Windows
- 48K print buffer, Centronics interface, HP PCL 3 language
- Built-in auto-sheet feeder with capacity of 100 sheets
- Automatic envelope sensor: no need to make a manual adjustment. Up to 50 transparencies at a time, and stacks of up to 20 envelopes
- Media flexibility: plain paper, glossy paper, transparencies and a wide range of paper sizes (A4, letter, legal paper and envelopes)
- Small size (310x65x147mm) and light weight (1.96Kg)
- Windows compatibility
- 3 year return to HP warranty

Options

Sheet feeder (C3005A) £59
Colour kit (C3569A) £38
European battery (C3059A) £34
Carry case (C3050A) £63
Rapid recharger (C3062A) £71
Black ink cartridge (51633A) £17.50
3 year on-site support (H5463A) £40
Paper prices as per DeskJet 520

£169

With Sheet feeder bundle £207

HP DeskJet 540

The HP Deskjet 540 offers sharp, clear 600 x 300 dpi black printing. And HP's ColorSmart technology gives clear , vivid colours at touch!

- 600 x 300 dpi resolution yields clear, sharp, professional documents
- Fast print speeds of upto 3 ppm for fast, time-saving output
- Built-in portrait and landscape typefaces (6 faces with many size and style combinations) plus 14 TrueType scalable fonts for Windows
- 16K print buffer, Centronics interface, HP PCL 3 language and built-in Proprinter emulation
- Built-in auto-sheet feeder with capacity of 100 sheets
- Automatic envelope sensor: no need to make a manual adjustment. Up to 50 transparencies at a time, and stacks of up to 20 envelopes
- Media flexibility permits you to print on plain paper, glossy paper, a wide range of paper sizes (A4, letter, legal paper and envelopes & Transparencies)
- 256 levels of greyscale for dramatic black graphics for Windows. Water-resistant ink for smudge proof printing
- Windows Print Manager compatibility increases personal productivity with fast return to computer while printer is printing
- 3 year return to HP warranty

Options

CX A4 cutsheet paper 200 (51630Z) £16.50
CX Lett. cutsheet paper 200 (51630Y) £15.70
LX A4 glossy paper 50 (51636J) £43.50
LX Lett. glossy paper 50 (51636H) £45
LX A4 transparency film 50 (51636G) £40.50
LX lett. transparency film 50 (51636F) £42
Black double ink cartridge (51626A) £23
256Kb RAM memory (22707B) £133
3 year on-site support (H5463A) £40
Colour option for 540 ..... £Call

£210

HP DeskJet 560C

The HP DeskJet 560C offers quality colour printing using ColorSmart technology for clear and vivid colour output automatically

- All the features of DeskJet 520 plus HP's ColorSmart technology produces clear vivid colour output
- Resident colour and black cartridges for convenient black and colour printing without switching cartridges
- 600 x 300 dpi resolution (mono) 300 x 300 (colour) yields clear, sharp, professional documents
- Fast print speeds of upto 3 ppm for mono and an average of 4 minutes per page for colour
- Built-in portrait and landscape typefaces (6 faces with many size and style combinations) plus 14 TrueType scalable fonts for Windows
- 80K print buffer, Centronics parallel interface, HP PCL 3 language
- Built-in auto-sheet feeder with capacity of 100 sheets
- Automatic envelope sensor: no need to make a manual adjustment. Up to 50 transparencies at a time, and stacks of up to 20 envelopes
- Media flexibility permits you to print on plain paper, glossy paper, a wide range of paper sizes (A4, letter, legal paper and envelopes & transparencies)
- 256 levels of greyscale for dramatic black graphics for Windows
- 3 year return to HP warranty

Options

Black double ink cartridge (51626A)..£23
Colour print cartridge (51625A) £25.50
256Kb RAM memory (22707B) £133
3 year on-site support (H5466A) £65
Paper prices as per DeskJet 520

£329

HP DeskJet 500C (check availability) £219
HP DeskJet 660C £335
HP DeskJet 850C £395

HP LaserJet 4 Plus

This 12 ppm, 600 dpi resolution printer gives your office the advantage of superior looking documents and a wide assortment of built-in scalable fonts

- 600 dpi plus HP Resolution Enhancement and Microfine Toner
- 12 ppm print speed (RISC CPU with cache) and 20,000 pages per month usage
- Enhanced PCL5 language with 10 TrueType and 35 Intellifont internal scalable fonts with additional download facility
- Two input trays (1 x 100 sheets and 1 x 250 sheets) with 500 sheet options
- 10 envelope handling capacity with 75 envelope power feeder option
- 250 sheet output tray with 1000 sheet tray output stacker option
- A4, letter, legal, exec and envelope paper sizes
- Media flexibility with copier, bond, recycled, envelopes, transparencies and labels
- 2Mb RAM with memory enhancement to effectively double RAM
- RAM expandable to 66Mb via 4 SIMM memory slots
- Optional duplex printing facility
- Bi-tronics parallel and serial interfaces. Modular I/O slot
- Auto print switching. HP JetDirect card option
- 421 x 297 x 403mm dimensions and 1 year HP warranty

Options

HP toner (92298A) £109
Multisize tray 250 (C2085D) £88
Letter tray 250 (C2085E) £88
A4 tray 250 (C2085F) £88
500 sheet multi-tray +base (C2063D) £265
500 sheet repl. tray (C2084C) £114
Power envelope feeder (C2082B) ...£257
Duplex assembly (C3157A) £530
1000 sheet output stacker (C2806A) .£273
1Mb, 2Mb, 4Mb, 8Mb SIMMS as LaserJet 4P
16Mb SIMM (C3146A) £991
Postscript level 2 (C3129A) £312
HP JetDirect ethernet (J2552A) £350
3 year on-site support (H5479A) £170

£939

Postscript Model 4M Plus

With Adobe Postscript (takes up 1 SIMM slot) with autoswitching, 80 scalable fonts (10 TrueType, 35 Intellifont & 35 Adobe PS), 6Mb RAM (2Mb base RAM plus 4Mb SIMM 2 slots free) and network ready with integrated ethernet and Mac LocalTalk interface (in addition to the others with autoswitching) **£1259**

HP LaserJet 4V

The new 16 ppm, 600 dpi resolution printer that sets a new standard for workgroup printers, offering A4/A3 paper size printing and the most advanced printer management capabilities

- 600 dpi plus HP Resolution Enhancement and Microfine Toner
- 16 ppm print speed (33MHz RISC CPU) and 35,000 pages per month usage
- Enhanced PCL5 language & HP GL/2 with 10 TrueType and 35 Intellifont internal scalable fonts with additional download facility
- Two input trays (1 x 100 sheets and 1 x 250 sheets) with 500 sheet options
- 1 envelope handling capacity
- 250 sheet output tray
- A3, A4, letter, legal, exec, envelope and custom paper sizes
- Media flexibility with copier, bond, recycled, envelopes, transparencies and labels
- 4Mb RAM expandable to 68Mb via 4 SIMM memory slots
- Bi-tronics parallel interface modular I/O slot. Auto print switching. HP JetDirect card option
- 459 x 317 x 522mm dimensions and 1 year HP warranty

Options

500 sheet multi-tray +base (C3760A)..£345
HP toner (C3900A) £151
A4/lett multisize tray (C3160A) £114
A3/lett multisize tray (C3161A) £114
Legal (C3162A) £114
500 sheet repl. tray (C3761A) £114
1Mb, 2Mb, 4Mb, 8Mb SIMMS as LaserJet 4P
Postscript Level 2 (C3159A) £383
HP JetDirect ethernet (J2552A)..... £350
3 year on-site support (H5492A) £499

£1379

Postscript Model 4MV

With Adobe Postscript (takes up 1 SIMM slot) with autoswitching, 80 scalable fonts (10 TrueType, 35 Intellifont & 35 Adobe PS), 12Mb RAM (4Mb base RAM plus 8Mb SIMM- 2 slots free) and network ready with Integrated ethernet and Mac LocalTalk interface (in addition to the others with autoswitching) **£1979**

HP LaserJet 4Si

The 16 ppm, 600 dpi resolution, high speed, high volume LaserJet printer for small businesses with large workloads, or networks supporting thousands of nodes in multiple environments

- 600 dpi plus HP Resolution Enhancement and Microfine Toner
- 16ppm print speed (Intel RISC CPU) and 75,000 pages per month usage
- Enhanced PCL5 language with 10 TrueType and 35 Intellifont internal scalable with additional download facility
- Two input trays (2 x 500 sheets) with 1500 sheet options
- 1 envelope handling capacity with 100 envelope power feeder option
- 500 sheet output tray with 2000 sheet output stacker option
- A4, letter, legal, exec and envelope paper sizes
- Media flexibility with copier, bond, recycled, envelopes, transparencies and labels
- 2Mb RAM expandable to 34Mb via 4 SIMM memory slots
- Bi-tronics parallel interface modular I/O slot. Auto print switching. HP JetDirect card option
- Duplex printing option available
- Network ready with integrated Ethernet and Mac LocalTalk interface (in addition to the others with autoswitching) Also includes 2 JetDirect slots
- 545 x 418 x 763mm dimensions and 1 year on-site HP warranty

Options

HP toner (92291A) £125
Letter tray (92291B) £115
Legal tray (92291C) £115
A4 tray (92291D) £86
Executive tray (92291E) £115
1500 sheet input tray (C2920A) £479
100 power envelope feeder (C2060A) ..£369
Duplex printing assembly (C2061A) ..£515
2000 sheet output stacker & cabinet (C2801A) £1150
Printer cabinet (C2917A) £295
A5 Paper feeder 450 sheet (LENT-80795) .£78
1Mb, 2Mb, 4Mb, 8Mb SIMMS as DeskJet 1200
Postscript Level 2 SIMM (C2013A)... £614
HP JetDirect Ethernet (J2552A) £350
3 year on-site support (H5492A) £499

£2089

Postscript Model 4Si MX

With Adobe Postscript (takes up 1 SIMM slot) with autoswitching, 80 scalable fonts (10 TrueType, 35 Intellifont & 35 Adobe PS) and 10Mb RAM (2Mb base RAM plus 8Mb SIMM 2 slots free) **£2969**

HEWLETT-PACKARD

HP DeskJet 1200C/1600

The combination of high quality black text, using HP's Resolution Enhancement technology, plus full featured colour in a single, affordable printer satisfies the full range of printing needs in the office

- All the features of DeskJet 560C with 600x300 dpi black text and 300 dpi full colour printing using ColorSmart technology. Fast 7 ppm black and 1 ppm colour speed
- Operation with four print cartridges (cyan, magenta, yellow, and black) gives millions of colour with full Pantone support.
- Fully HP LaserJet compatible with Colour PCL5 language, slot for HP LaserJet cartridges and 3 memory slots (one may be used for Postscript SIMM)
- 45 internal scalable typefaces (35 Intellifont and 10 TrueType) and line printer font. Optional Postscript SIMM provides 35 scalable Adobe Postscript fonts (standard on Postscript model)
- 2Mb RAM expandable to 26Mb using 8Mb SIMMS (4Mb expandable to 20Mb with 1200/PS model)
- Automatic 180 sheet feeder with 100 sheet output tray
- 1200/PS includes postscript level 2 SIMM and HP JetDirect Localtalk card
- HP 1600/1600CM includes 600x600 dpi black 300x300dpi colour manual feed for envelopes and labels Memory 4Mb Max 100Mb upto 70Mb with PostScript upgrade installed. (6Mb Max 70MB on HP 1600CM (Additional 35 Scalable Adobe Postscript Type 1 typeface's with DJ 1600CM)

Options

Black cartridge (51640A) £21.50
Cyan cartridge (51640C) £25
Yellow cartridge (51640Y) £25
Magenta cartridge (51640M) £25
Postscript SIMM (C2865A) £651
1Mb SIMM (C2063A) £91
2Mb SIMM (C2064A) £159
4Mb SIMM (C2065A) £259
8Mb SIMM (C2066A) £480
Ethernet JetDirect card (J2552A) £350
3 year on-site support (H5473A) £100
Paper prices as per DeskJet 520

£639

HP DeskJet 1200/PS £999
HP DeskJet 1600C £839
HP DeskJet 1600CPS £1235

HP LaserJet 4L

This 4 ppm, 300 dpi resolution printer combines great print quality and a very small footprint to offer the ideal printing solution for the desktop or small office

- 300 dpi plus HP Resolution Enhancement and Microfine Toner
- 4 ppm print speed and 8,000 pages per month usage
- Enhanced PCL5 language with 26 Intellifont Internal scalable fonts with additional download facility
- One 100 sheet input tray and 50 sheet output tray
- 1 envelope handling capacity. A4, letter, legal, exec and envelope paper sizes
- Media flexibility with copier, bond, recycled, envelopes, transparencies and labels
- 1Mb RAM with memory enhancement to effectively double RAM
- RAM expandable to 2Mb via one memory slot.
- Bi-tronics parallel Interface
- HP Explorer software, One button control panel and Econmode feature to use less toner
- 362 x 164 x 358mm dimensions and 1 year HP warranty

Options

HP toner (92274A) £68
1Mb SIMM (C2024A) £76
Ext. HP JetDirect ethernet (J2382B) .. £275
3 year on-site support (H5473A) £100

£389

Postscript Model 4ML

With Adobe Postscript as well as HP PCL5 with autoswitching, 80 scalable fonts, 4Mb RAM and Mac LocalTalk interface (in addition to Centronics with autoswitching) **£739**

HP LaserJet 5P

This 4 ppm printer offers superb 600 dpi resolution print quality at a price and size that are perfect for the desktop, small office and workgroup

- 600 dpi plus HP Resolution Enhancement and Microfine Toner
- 6 pages per minuet Average 4000 pages. Upto 12,000 pages monthly usage
- Enhanced HP PCL 5, 45 scalable typeface's, 65 scalable typeface's on disk for windows with additional download facility
- 1 internal bitmapped font and one cartridge slot
- One 250 sheet input tray
- 1 envelope handling capacity
- 100 sheet output tray
- A4, letter, legal, exec, envelope and custom paper sizes
- Media flexibility with copier, bond, recycled, envelopes, transparencies and labels
- 2Mb RAM with memory enhancement to 50Mb RAM
- Bi-tronics parallel and serial interfaces
- Bi-directional parallel large type B connector and small type C connector One localTalk and one IrDA-compliant infrared
- HP Explorer software, DOS & Windows drivers, eight button control panel and Econmode feature to use less toner
- PowerSave energy save feature
- W:15.8", D:17.5", H:7.9" dimensions and 1 year HP warranty

Options

HP toner (92274A) £68
1Mb SIMM (C3130A) £91
2Mb SIMM (C3131A) £159
4Mb SIMM (C3132A) £236
8Mb SIMM (C3133A) £442
Postscript level 2 (C2049A) £234
Ext. HP JetDirect ethernet (J2382B) .. £275
3 year on-site support (H5476A) £135

£585

HP LaserJet 5MP £709

HP Color LaserJet

The new HP LaserJet that does colour. A 10 ppm black and white, 2 ppm colour printer that meets the demands of today's shared office environments by offering both fast black and white, and colour printing, paper handling flexibility and connectivity options for network use

- 300 dpi plus HP Resolution Enhancement and 4 toner cartridges (Black, Yellow, Magenta and Cyan)
- HP ColorSmart produces crisp, clean and sharp colour images in 16.7m colours
- Separate colour toner supplies and imaging units are replaced only as needed
- 10 ppm print speed (mono) with 2 ppm Colour and 15,000 pages per month usage
- Enhanced PC5 language with colour, 10 TrueType and 35 Intellifont internal scalable fonts with additional download facility
- Two internal bitmapped fonts
- One input trays (1 x 250 sheets) with additional 250 sheet tray options
- 1 envelope handling capacity option
- 100 sheet output tray
- A3 (mono only) A4, letter, legal, exec and envelope paper sizes
- Media flexibility with copier, bond, recycled, envelopes and transparencies
- 8Mb RAM expandable to 72Mb via 4 SIMM memory slots Bi-tronics parallel Interface modular I/O slot. Auto print switching. HP JetDirect card option
- HP Explorer software, eight button control panel and Econmode feature to use less toner PowerSave energy save feature
- 620 x 375 x 490mm dimensions and 1 year onsite HP warranty

Postscript Printing: We recommend Postscript SIMM, additional 4Mb RAM (at least), HP JetDirect card for network and rear feed tray options.

Options

Separate colour toner and consumables please call for prices

£4199

HP Scanners

HP ScanJet II CX

HP's affordable colour/greyscale flat-bed scanner with impressive features and software bundle

- 400 dpi optical resolution (1600 dpi enhanced resolution)
- Scan text, drawings and illustrations and photographic images
- Recognises over 16m colours and 256 levels of greyscale
- HP ColorSmart technology optimises output for HP colour printers
- HP Accupage technology via Calera Wordscan OCR software recognises text down to 4 point
- TWAIN support, OCR aware, automatic brightness and contrast settings. Fast preview and final scan, powerful image editing tools, user selectable resolutions from 4% to 400% in 1% increments, on-line learning, and easy setup and installation
- Scans transparencies from 35mm to other media up to A4. Up to 50 pages at a time with optional document feeder
- PC bundle includes SCSI adaptor, cable, power cord, scanner, HP DeskScan II for Windows scanning utility, Calera Wordscan OCR package and Aldus Photostyler SE image editing software
- 1 year HP warranty

£679

HP ScanJet 3P

Entry level flat-bed mono scanner with 256 greyscales and up to 1200 dpi enhanced resolution. Similar specification to the colour model but with 300 dpi optical (1200 dpi enhanced) resolution and 256 greyscale levels. Includes HP Picture place image editing and Calera WordScan 3. **£339**

Options

50 page autosheet feeder IIcx (C1751A) £399
Transparency adaptor IIcx (C2501A) £569
20 page autosheet feeder 3P (C1791A) £169
Scanner stand for 3P (C2576A) £54
3 year on-site support 3P (H5468A) £85
3 year on-site support IIcx (H5475A) £135

HP Plotters

Leading inkjet technology coupled with 600 dpi resolution, excellent colour, fast speeds and ability to vary line thickness means that InkJet plotters will quickly replace traditional pen plotters. HP's DesignJet range offers the best value

All models are available with A0 or A1 size, 600 dpi resolution in mono on plain paper. AutoCAD and Windows drivers included. RS232C and Centronics interfaces with autoswitching. One year on-site warranty

DesignJet 220: Desktop mono InkJet plotting with ability to take sheets only (Legs optional). 600 dpi and 2Mb RAM as standard.

DesignJet 600: Mono InkJet plotters with sheet or roll feed and legs as standard. 600 dpi and 4Mb RAM as standard

DesignJet 650: Colour and mono inkjet plotters with sheet or roll feed, legs as standard. 600 dpi (mono mode) and 300 dpi (colour). 4Mb RAM buffer expandable to 20Mb. Four ink cartridges with ink level indicators

DesignJet 220 A1	**£1746**	DesignJet 600 A0	**£3920**
DesignJet 220 A0	**£2291**	DesignJet 650C A1	**£4487**
DesignJet 600 A1	**£3279**	DesignJet 650C A0	**£5289**

Options

DesignJet 220 legs & bin (A1) (C3185A) .. £310
DesignJet 220 legs & bin (A0) (C3186A) .. £360
4Mb SIMM (C2065A) £259
8Mb SIMM (C2066A) £480
16Mb SIMM (D2297A) £674
32Mb SIMM (D2298A) £1735
Manual cutter (17291C £6
Mono double ink cart. 220/600 (51626A) .. £23.50
Black cartridge 650C (51640A) £21.50
Cyan cartridge 650C (51640C) £30
Magenta cartridge (51650M) £30
Yellow cartridge (51650Y) £30
JetDirect ethernet card (J2552A) £350
3 year on-site support (H5486A) £300
HP special colour plotting paper ..... £Call

TDR18A

All prices exclude delivery and VAT (17.5%). Delivery:- Systems £19, Lasers and large items £15, software and small items £10. Visa /Access/ American Express /Switch and Government orders welcome. Prices, specifications and offers are subject to change and subject to our conditions of sale copies of which are available on request. Mail order only. No collections please. Goods are normally dispatched within 7 days. All orders will be fulfilled within 28 days unless otherwise specified. E&OE.

TIME DIRECT

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Networking/Volume enquires Telephone 01282 77 00 99

TEXAS INSTRUMENTS

TravelMate 4000M

Multimedia ready notebook computers with built-in 16-bit soundcard. (shown with optional CD-ROM dock)

- Intel 486DX2-50, 486DX4-75. or DX4-100
- 4Mb expandable to 20Mb
- 1.44Mb floppy drive
- 340Mb, 455Mb or 520Mb hard disks
- 9.5" Advanced STN Dual Scan (DS) or TFT colour 8.4"/ 9.5" screens with simultaneous external SVGA output, 1Mb video and windows acceleration
- 16-bit soundcard with internal speakers & microphone
- Ports: audio in, audio out, Fast SCSI II, microphone, 16-bit MIDI with joystick port, PCMCIA type III (two type II), serial, parallel, SVGA, PS/2 mouse, PS/2 external key board ports
- 21.6 x 27.9 x 4.6 cm. Weight 2.7 to 2.9Kg
- MS DOS 6.2 & Windows for Workgroups 3.11 & utilities
- The point internal pointing device
- Battery charger/AC adaptor
- NiMH Battery life 3-5 hours

486DX2-50 340Mb Dual Scan 9.5" ■SCT128	£1499
486DX4-75 455Mb Dual Scan 9.5" ■SCT124	£1799
486DX2-50 455Mb 8.4" TFT ■SCT129	£1999
486DX4-75 340Mb 8.4" TFT ■SCT118	£2199
486DX-75 455Mb 8.4" TFT ■SCT134	£2299
486DX4-100 520Mb 9.5" TFT ■SCT130	£2999

Options

4Mb RAM	£149
16Mb RAM	£945
NiMH battery	£65
CD-ROM docking	£499
Leather case	£29

£1499

HEWLETT-PACKARD

HP Omnibook 600

The new small, light colourful notebook PC from Hewlett Packard with incredible power

- Intel 486DX2-50 or 486DX4-75 processor
- 4Mb RAM or 8Mb upgradeable to 12/16Mb
- 3.5" 1.44Mb slim external floppy drive
- 170Mb or 260Mb 1.8" rugged removable PCMCIA IDE hard disk (upto 520Mb capacity)
- Vacant PCMCIA type III (two type II) slot
- Unique built-in pop-up mouse
- VESA Local Bus graphics with 1Mb RAM
- Full-size 85 key keyboard with 12 function keys
- Superb 8.5" Crisp Dual Scan VGA colour screen
- Parallel, serial, ext. SVGA, Infra-red, floppy drive and port replicator ports
- Powered by NiMH battery (4 hours) or AC/power adaptor. Suspend when closed & instant on feature when lid lifted
- Dimensions:7.3x11.1x1.6 in, Weight 1.7Kg
- MS DOS 6.2 & Windows for Workgroups 3.11, Flash BIOS, Laplink remote access, appointments book & calculator
- 3 year HP warranty

600C 4/50 170Mb 4Mb ■F1065A	£1517
600C 4/50 260Mb 4Mb	£1742
600C 4/75 170Mb 8Mb ■F1066A	£1865
600C 4/75 260Mb 8Mb	£2082

Popular Options

4Mb module ■F1065A	£239
8Mb module ■F1055A	£327
NiMH battery ■F1058A	£56
Car adaptor ■F1064A	£58
Port replicator ■F1071A	£Call
Double battery charger ■F1063A	£30

£1517

HEWLETT-PACKARD

HP Omnibook 4000

Superb new notebooks with built-in multimedia, modularity and docking options

- Intel 486DX2-50 or 486DX4-100
- 8Mb RAM expandable to 32Mb (260Mb 4/50 model has 4Mb)
- Removable 3.5" 1.44Mb floppy drive (can be replaced by second battery)
- 260, 340 or 520Mb removable hard disks
- 1Mb VESA Local Bus graphics
- 10.3" Dual Scan colour or 10.4" TFT colour screens
- 85 Key keyboard & large trackball with wrist rest.
- Parallel, serial, Infra-red IRDA, PS/2 mouse/keyboard, PCMCIA type III (or two type II) and expansion bus for port replicator and docking station
- Multimedia: 16-bit soundcard with two built-in stereo speakers and microphone. Ports for audio in, audio out & microphone jack
- NiMH battery with advanced power management, standby and switchable battery charger/ AC adaptor
- LCD status icons, Flash BIOS, Weight 3.2Kg
- MS DOS 6.2 and Windows for Workgroups 3.11, Laplink remote access, & information manager
- Automatic PCMCIA recognition with hot insertion
- 3 year HP warranty

Dual Scan Colour Models

4000C 4/50 260Mb ■F1081A	£1831
4000C 4/50 340Mb ■F1082A	£2014
4000C 4/50 520Mb ■F1083A	£2367
4000C 4/100 340Mb ■F1086A	£2384
4000C 4/100 520Mb ■F1087A	£2626

TFT Colour Models

4000CT 4/50 340Mb ■F1094A	£2613
4000CT 4/50 520Mb ■F1095A	£2945
4000CT 4/100 340Mb ■F1088A	£2928

Options

Port Replicator ■F1090A	£177
NiMH battery ■F1073A	£77
4Mb RAM ■F1076A	£206
8Mb RAM ■F1077A	£413
16Mb RAM ■F1078A	£1124
Removable hard disks	£Call

£1831

MITAC MONO NOTEBOOKS

The amazing new high specification 486DX2-66 and 486DX4-100 notebooks from Mitac provide an incredible specification and quality at remarkable prices from just £ 899!

- 486DX2-66 or 486DX4-100 processor
- 4Mb Ram Expandable 20Mb
- 320Mb or 520Mb hard disk
- 3.5" removable floppy disk 1.44Mb
- VESA Local Bus graphics with windows acceleration
- Sharp 9.5" LCD VGA display (640 x 480).
- PCMCIA Type II or one type III
- Built in 25mm trackball.
- Parallel port, serial port VGA port & PS2/port
- Integral 79-key keyboard.
- Size 268mm x 204mm x 45mm weight 4.4lbs
- 3.5 hour battery life with power management.
- Includes MS Dos 6.22 and Windows 3.11
- 12 months warranty.

486DX2-66 320Mb Mono	£ 899
486 DX2-66 520Mb Mono	£ 999
486DX4-100 320Mb Mono	£ 1099
486DX4-100 520Mb Mono	£ 1199

Options

4Mb RAM module	£ 169
8Mb RAM module	£ 299
Intel PCMCIA Modem	£ 99
Pocket 96/24 Modem	£ 40

£899

Intel PCMCIA Modem

High quality Intel PCMCIA type II fax and data modem complete with line adaptor module, 2m line cord, RJ-11 connector excellent software and Intel 3 year warranty

- Modem: 2400 bps, CCITT v.22 bis, v.21; upto 9600 bps with V.42/V.42 bis, MNP 1-5.
- Fax: Upto 9600 bps send/ receive, CCITT Group (V.29, V.27ter, V.21); Class 1. Hayes AT Compatible
- Intel card manager software lets you insert and remove your card without leaving your application
- Winfax Lite for Windows lets you send and receive faxes easily
- Hyperaccess comms software for Windows will handle all your communication needs

£99

MITAC DUAL SCAN COLOUR

Mitac Dual Scan Colour notebooks utilise the latest technology to give you sharp crisp screens with 256 colours and superb performance

- 486DX2-66 or 486DX4-100 Processor
- 4Mb Ram Expandable 20Mb
- 320Mb or 520Mb hard disk
- 3.5" removable floppy disk 1.44Mb
- VESA Local Bus graphics with windows acceleration
- Sharp 9.5" LCD VGA Dual Scan Colour display (640 x 480) in 256 colour.
- PCMCIA Type II or one type III
- Built In 25mm trackball.
- Parallel port, serial port VGA port & PS2/port
- Integral 79-key keyboard.
- Size 268mm x 204mm x 45mm. weight only 4.8lbs
- 3.5 hour battery life with power management.
- Includes MS dos 6.22 and Windows 3.11
- 12 months warranty.

486DX2-66 320Mb Colour	£ 1199
486 DX2-66 520Mb Colour	£ 1299
486DX4-100 320Mb Colour	£ 1399
486DX4-100 520Mb Colour	£ 1499

Options

4Mb RAM module	£ 169
8Mb RAM module	£ 299
Intel PCMCIA Modem	£ 99
Pocket 96/24 Modem	£ 40

£1199

TWINHEAD

New Slimnote Series 3 & 5

The new high specification models from Twinhead

- Intel SL Enhanced 486DX4-100 (slimnote 5) or 486DX2-50 (slimnote 3) Processor
- 8Mb RAM on 486DX4-100 or 4Mb on 486DX2-50 expandable to 32Mb
- Removable 1.44Mb 3.5" floppy disk drive
- Removable 520Mb or 260 Mb hard disk drive
- 1Mb (486DX4-100) or 512K (486DX2-50) VESA local bus video display.
- Screen fully upgradeable.
- 9.4" Dual Scan colour or 8.4" TFT colour screen with 256 simultaneous colours
- 86 keyboard, 12 function keys
- Large 25mm trackball mounted below keyboard. PS/2 type.
- One DB-25 pin parallel port. Bi-directional with EPP/ECP support. One 9 pin serial port (16550 UART), Keyboard, external monitor & mouse ports PS/2 type. Series 5 (486DX4-100) models have additional ports for docking and optional IRDA and TV tuner modules.
- Two speakers built-in (Sound Blaster & Windows Sound System 2.0 compatible). Built-in microphone, audio in audio out jacks, Microphone jack. Soundcard is fitted on 486DX4-100 TFT model and optional extra on others.
- Two type II, or one type III PCMCIA slot
- LCD Icon indicators
- 1800mAh nickel metal hydride (NiMH) battery, 120/240 auto-switching adaptor. Full APM support. System supports suspend to RAM and suspend to disk functions.
- Pheonix Systems BIOS, Flash upgradeable. Includes setup in ROM, user-defined power managment options
- 8.85"(D) x 11.62"(W) x 1.97"(H). Weight 6.2 pounds
- MS DOS 6.2, Windows 3.1, PCMCIA & Trackball utilities are all Pre-loaded.

Slimnote 3

486DX2-50 Dual Scan 260Mb 4Mb	£1499

Options

4Mb Ram upgrade	£179
8Mb Ram upgrade	£329
16Mb Ram upgrade	£699
12v DC Car Adaptor	£90
Additional NiMH battery	£99

Slimnote 5

486DX4-100 Dual Scan 520Mb 8Mb	£Call
486DX4-100 TFT 520Mb 8Mb	£2999

Special options for Slimnote 5

Docking station	£329
SMART battery pack	£120
TV tuner module, Infra-red & Port Repicator	£TBA

£1499

US ROBOTICS

SPORTSTER RANGE

Sportster 14,400 Fax

Operating at the 14,400 bps standard for business communications, the Sportster 14,400 is 50% faster than the 9600 bps modems and with error control and data compression through-put can easily reach 57,600 bps.

SPORTSTER 14.4 EXTERNAL **£121**

SPORTSTER 14.4 INTERNAL ..... **£Call**

Sportster 28,800 Fax

The new Sportster 28,800 v.34 fax/data modem operates at the 28,800 bps standard for business communications, this modem is 100% faster than 14,400 bps modems. With error and data compression, throughput can easily reach115,200bps. External only. Complete with fax and data software.

THE NEW LATEST VERSION **£199**

WORLDPORT RANGE

Complete data and fax transmission capabilities for the mobile user. Available as either PCMCIA or portable.

WorldPort Pocket

The WorldPort Dual Standard Cellular Fax is ideal for high volume data transmissions for anyone who regularly needs to transfer data from their portable. Features include fax and data at 14,400 bps. HST Cellular is also included and allows connections over cellular lines at up to 12,000 bps.

WORLDPORT POCKET 2496 ..... **£159**

WORLDPORT POCKET DUAL STD 14.4 ..... **£169**

WorldPort PCMCIA

..allows you to send and receive faxes at speeds of upto 14400 bps. Data transmission is supported at 2400 bps giving you the option to access on-line services such as Compuserve. This is available as 2496 (v22 bis) or Dual STD (14.4 v32 bis)

WORLDPORT PCMCIA 2496 ..... **£129**

WORLDPORT PCMCIA DUAL STD 14.4 ..... **£199**

COURIER RANGE

The Courier range offers advanced performance for the professional at an affordable price. The Courier Dual Standard is available In both internal and external versions.
Features include data connection speeds of up to 28,800 bps, dial security with passwords provides optimum security for access to sensitive data and HST Cellular allows you to reliably transmit data across cellular lines at up to 12,000 bps.
Also supplied with a 5 year warranty from US Robotics.

COURIER TERBO V34 EXT **£260**

COURIER TERBO V34 INT **£260**

US Robotics®

The Intelligent Choice in Data Communications

MICROSOFT

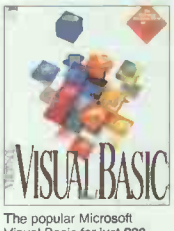
OPERATING SYSTEMS

Windows 3.1	£Call
Windows 3.1 Upg	£42
Win for Workgroups 3.11	£91
Win for Workgroups 3.11 Upg	£43
WFWG Add-on MLP1	£34
WFWG Add-on MLP20	£690
Windows NT	£265
Windows NT Upg from 3.1	£225
Windows Printing System	£86
Windows Sound System 2	£48
Win Sound System 2 +Card	£132
MS DOS 6.22	£37
MS DOS 6.2 MLP1	£38
MS DOS 6.2 MLP20	£620

Windows 3.1 - The essential Windows operating system **£Call**

LANGUAGES

MS Delta Ver Cont system	£235
MS Fortran v5.1 DOS/WIN	£123
MS Fortran v5.1 DOS/Win Educ	£56
MS Fortran Powerstation	£234
MS Macro Assembler v6.11	£99
MS Quick Basic DOS	£83
MS Test	£399
MS Visual C++ for Win	£58
MS Visual C++ Pro for Win	£205
MS Visual C++ Pro CD v2	£282
MS Visual Control Pack Win	£79
MS Visual Tools Suite Win	£188
MS Visual Basic Std DOS	£80
MS Visual Basic Pro DOS	£195
MS Visual Basic Std for Win	£80
MS Visual Basic Prof Kit for Win	£195



The popular Microsoft Visual Basic for just **£80**

APPLICATIONS

MS Money v3 for Win	£25
MS Publisher for Win	£63
MS Works DOS	£85
MS Works v4 for Win	£84
MS Works v4 for Win Upg	£52
MS Works v4 for Win MLP1	£74
MS Works v4 Win MLP20	£1329
MS Office Assistant	£93
MS Schedule Plus for Win	£89
MS Access v2 Upg	£89
MS Access v2 Comp Upg	£129
MS Access v2 for Win	£221
MS Access v2 MLP1	£199
MS Access v2 MLP20	£3779
MS Excel v5 version Upg	£89
MS Excel v5 Comp Upg	£129
MS Excel v5	£224
MS Excel v5 MLP1	£199
MS Excel v5 MLP20	£3779
MS Foxpro v2.6 for DOS STD	£72
MS Foxpro for DOS Pro	£276
MS Foxpro for WIN STD	£72
MS Foxpro for Win comp Upg	£129
MS Foxpro for Win Pro	£276
MS PowerPoint version Upg	£89
MS PowerPoint comp Upg	£129
MS PowerPoint 4 for Win	£224
MS Project comp Upg	£129
MS Project	£285
MS Word v6 for DOS	£179
MS Word v6 for Win version Upg	£89
MS Word v6 for Win comp Upg	£129
MS Word v6 for Win	£221
MS Office 4.2 Upg	£169
MS Office 4.2 Comp Upg.	£269
MS Office 4.2	£337
MS Office 4.2 CD	£337
MS Office 4.2 MLP1	£289
MS Office 4.2 MLP20	£5489
MS Office Pro 4.3 Upg	£269
MS Office Pro 4.3 Upg CD	£269
MS Office Pro 4.3 Comp Upg	£299
MS Office Pro 4.3	£442
MS Office Pro 4.3 CD	£442
MS Office Pro 4.3 MLP1	£359
MS Office Pro 4.3 MLP20	£7139
MS Open Licence Packs	£Call

Windows 3.11 for Workgroups - Upgrade to this faster version for **£43**

Microsoft Works v4 integrated package. Buy now & upgrade to Office later **£84**

Microsoft Word 6, the leading Windows wordprocessor. Upgrade from others **£129**

Microsoft Excel 5, the leading Windows Spreadsheet. Upgrade from others **£129**

PowerPoint 4 for Windows Presentation Package. Upgrade from others **£129**

MICROSOFT

EDUCATIONAL

MS Access v2 for Win	£129
MS Creative Writer for Win	£27.30
MS Fine Artist for Win	£27.30
MS Dos 6.22	£35
MS Excel v5 for Win	£129
MS Fortran for Win	£52
MS Foxpro v2.6 for Win	£69
MS Foxpro v2.6 for DOS	£69
MS Mail PC 3.2 Server	£173
MS Mouse Combi Dual	£27
MS Office v4.2 for Win	£173
MS Office v4.2 for Win MLP1	£129
MS Office v4.2 for Win MLP20	£2127
MS Office v4.2 Upg	£98
MS Office Pro v4.3	£218
MS Office Pro v4.3 MLP1	£173
MS Office Pro v4.3 MLP20	£2658
MS Powerpoint v4 for Win	£129
MS Project v4 for Win	£129
MS Publisher v2 for Win	£66
MS Visual Basic v3 for Win	£52
MS Visual Basic v1 for DOS 10PK	£132
MS Visual C++ STD	£52
MS WFWG Add-on	£37
MS Word v6 for Win	£129
MS Word v6 for Win MLP1	£75
MS Word v6 for Win MLP20	£1152
MS Word v6 for DOS	£66
MS Works v3 for Win	£66
MS Works v3 for Win MLP1	£44
MS Works v3 for Win MLP20	£709
MS Works v3 for DOS	£61

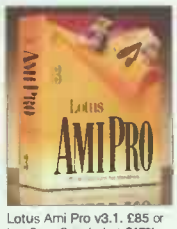
Microsoft Office Pro - price for users of Works or included applications **£275** Others **£325**

Microsoft Office - price for users of Works or included applications **£169** Others **£269**

Lotus 1-2-3 Spreadsheet. Upgrade for just **£89** or buy SmartSuite for just **£179!**

LOTUS

Lotus 1-2-3 v2.4 for DOS	£235
Lotus 1-2-3 v4 for DOS	£288
Lotus 1-2-3 Rel v5 Upg	£89
Lotus 1-2-3 Win Rel 4.01 cu	£139
Lotus 1-2-3 Rel 5	£236
Ami Pro v2 for Windows	£19
Ami Pro v3.1	£85
Approach v3 for Windows	£83
Freelance v4 for DOS	£270
Freelance v2-Version Upg.	£89
Freelance v2-cu Upg	£139
Freelance v2 for Windows	£270
Improv for Windows	£87
Lotus Market Power	£295
Organizer v1.1	£84
Organizer v2.0	£39
Lotus Write v2	£49
SmartPics Clipart	£84
SmartSuite Upgrade	£169
SmartSuite Comp upg	£249
SmartSuite bundles from	£179
Lotus Notes	£Call
Lotus cc:Mail Platform Pack	£Call



Lotus Ami Pro v3.1. **£85** or buy SmartSuite for just **£179!**

SmartSuite **£169** for Lotus users, £249 for others! Includes 1-2-3, Ami Pro, Approach 3, Freelance & Organizer!

NOVELL

OFFICE APPLICATIONS

Quattro Pro for Windows v5	£37
Quattro Pro for Windows v6	£Call
Perfect Office Standard C.U.	£179
Perfect Office STD Upg	£149
WP Presentations DOS	£214
WP Present. comp Upg DOS	£99
WP Presentations Win v2	£214
WP Present. comp Upg Win	£99
WordPerfect 6 for DOS	£210
WordPerfect 6 DOS Upg	£74
WordPerfect 6 DOS com Upg	£97
WordPerfect 6.1a for Win	£210
WordPerfect 6.1a Win Upg	£74
WordPerfect 6.1a Win com Upg	£97

Upgrade to Perfect Office at special price **£149**

WordPerfect **6.1** for Windows is the latest version of the world's best selling WP **£Call**

TDR21A

All prices exclude delivery and VAT (17.5%). Delivery:- Systems £19, Lasers and large items £15, software and small items £10. Visa /Access/ American Express /Switch and Government orders welcome. Prices, specifications and offers are subject to change and subject to our conditions of sale copies of which are available on request. Mail order only. No collections please. Goods are normally despatched within 7 days. All orders will be fulfilled within 28 days unless otherwise specified. E&OE.

TIME DIRECT

Granville House, Blackburn Road, Simonstone, Burnley, Lancashire BB12 7GT

01282 77 00 66

SALES LINES OPEN
Monday - Friday 9.00am - 6.00pm

Networking/Volume enquires Telephone 01282 77 00 99

KYOCERA

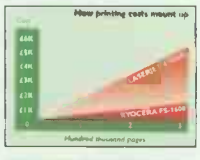
ABOUT KYOCERA

KYOCERA printers offer a different approach to running costs. Other page printers use disposable cartridges which contain one of the printer's key components - its print drum - along with toner and numerous complex moving parts. Every 5,000 pages or so they are thrown away.

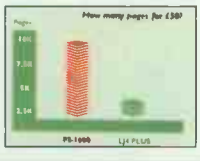
KYOCERA printers are cartridge free, because their print drum lasts the rated life of the printer, the only consumable needed is toner. Replacing just the toner is a great deal cheaper. So much cheaper, in fact, that over a lifetime of 300,000 pages, an **ECOSYS** printer can save you up to £ 9,000.

KYOCERA printers can also be network ready with the inclusion of the appropriate Ethernet interface card.

With one exception, the cost of using your printer is more than twice the cost you paid for it. It turns out that the showroom figure is not so much a price, more a down payment.



The market-leading page printer's printing cost is 1.82 pence per page. Little enough - until you total it up over a typical printer lifetime of 300,000 pages.



In printing costs, the market-leading page printer can short-change you by almost 75%. You could be paying nearly four times more than you need - simply for the privilege of using it.

KYOCERA PERSONAL PRINTERS

KYOCERA FS-400

A compact 4ppm personal page printer that also offers full system printer capabilities and savings on print due to its cartridge-free design.

As standard, this printer is an advanced personal page printer that has a wealth of features, including 300dpi resolution enhanced to 300 x 1200dpi by Kyocera resolution technology, 13 scalable in-built fonts, and for additional cost savings, Energy Star compliance and draft print mode.

- Print speed of 4ppm
- Resolution 300dpi
- 1Mb RAM
- Standard emulations with optional PostScript
- 13 Internal scalable typefaces
- Centronics parallel interface.
- 100 Sheet paper feeder.

Options

250 Sheet paper feeder (PF-8) .....£Call
50 Sheet output tray (PT-1).....£Call
Postscript upg (PK-1) .....£Call

£489

SYSTEM/NETWORK PRINTERS

KYOCERA FS-1550

The low cost 10ppm system printer that offers industry beating savings on printing costs. Part of the ECOSYS range, the FS-1550 offers substantial savings on running costs compared with competitive printers.

As the entry-level model, the FS-1550 also offers a low capital cost with no sacrifice of ECOSYS versatility. It is ideal for word processing, database and spreadsheet printing, and with resolution enhancement, graphics.

- Print speed of 10ppm
- Resolution 300dpi
- 1Mb RAM
- Standard emulations with optional PostScript
- 13 Internal scalable typefaces
- Centronics parallel interface
- 250 Sheet paper feeder

OPTIONS

500 Sheet paper feeder(PF-5).....£243
Duplex unit(DU-1).....£405
Envelope feeder(EF-1).....£153
500 Sheet output tray(HS-1).....£135
Document manager(SO-6).....£1279
PostScript upg(PK-2).....£202
Serial Interface(HB-9).....£99

£971

KYOCERA FS-1600

The high speed 600 dpi printer that combines high resolution output with industry beating printing costs.

To these cost-saving benefits, the FS-1600 adds 600dpi capability - making it ideal for high resolution text and graphics applications, with fast processing through its 25 MHz CPU.

- Print speed of 10 ppm
- Resolution 600 dpi
- Standard emulations and optional postScript
- 45 Internal scalable typefaces
- Centronics parallel interface
- 250 Sheet paper feeder

OPTIONS

500 Sheet paper feeder(PF-5).....£ 243
Duplex unit (DU-1).....£ 405
Envelope feeder (EF-1).....£ 153
500 Sheet output tray (HS-1).....£ 135
Document manager (SO-6).....£ 1279
PostScript upg (PK-2).....£ 202
Serial Interface (HB-9).....£ 99

£1189

KYOCERA FS-3400

The ECOSYS FS-3400 high volume, 18ppm network printer offers unbeatable cost savings, unparalleled productivity and environmental safety.

- Print speed of 18ppm
- Resolution 300dpi
- Standard emulations and optional postScript
- 13 Internal scalable typefaces
- Centronics parallel interface
- 250 Sheet paper feeder

FS-3600 .....£1919

- Print speed of 18ppm
- Resolution 600dpi
- Standard emulations and optional postScript
- 45 Internal scalable typefaces
- Centronics parallel interface
- 250 Sheet paper feeder

OPTIONS

500 Sheet paper feeder(PF-5).....£243
Duplex unit (DU-1).....£405
Envelope feeder (EF-1).....£153
500 Sheet output tray (HS-1).....£135
Document manager (SO-6).....£1279
Postscript upg (PK-3).....£202
Serial Interface (HB-9).....£99

£1506

KYOCERA OPTIONS

KYOCERA printer enhancement products simply clip on and can be used to produce a tailor made network printer solution.

UNIVERSAL FEEDER UF-1

Automatic feeder for paper, light card, laser labels, overhead transparencies and envelopes from A5 to A4 and letter size. The UF-1 does not support duplex printing.

£178

POWER ENVELOPE FEEDER EF-1

Enables convenient, automatic feed for envelopes in six sizes including DL and C5. 70 envelope capacity.

£153

PAPER CASSETTE PF-5

Up to two additional paper cassettes may be added to each printer to give an input capacity of up to 1250 sheets. As well as catering for large print volumes, this enables different paper types such as letterheads and continuation sheets to be selected from the host. Universal size accepts A4, A5, B5, letter and legal.

£243

HIGH CAPACITY PAPER FEEDER PF-7

Provides 2,000 sheet variable size input for paper, light card, laser labels and envelopes. (Not available for FS-1500)

£429

DUPLEX UNIT DU-1

Provides a double-sided print facility to reduce paper use and postage costs and enhance document presentation. Requires HS-1.

£405

DOCUMENT MANAGER SO-6

Comprises 1 x 500 sheet face-down stacker plus 15 x 50 sheet face-down trays, providing an intelligent document management facility in network environments. In multi-user mailbox mode, up to 15 users can each have their own individual output tray. Insorter mode, up to 15 copies of a single document may be printed In one operation. Requires HS-1.

£1279

FACE-UP OUTPUT STACKER HS-1

Provides a low-cost bulk output stacker for applications where the order of documents Is not critical, such as mailshots. Also required to transfer paper to DU-1 and SO-6.

£135

HIGH CAPACITY OUTPUT STACKER HS-3

2,000 sheet, variable width face-up motorised output stacker. Provides straight paper path when used with PF-7. Can be used with two PF-5's and UF-1 or EF-1 Duplex option not available.

£429

All prices exclude delivery and VAT (17.5%). Delivery:- Systems £19, Lasers and large items £15, software and small items £10. Visa /Access/ American Express /Switch and Government orders welcome. Prices, specifications and offers are subject to change and subject to our conditions of sale copies of which are available on request. Mail order only. No collections please. Goods are normally despatched within 7 days. All orders will be fulfilled within 28 days unless otherwise specified. E&OE.

TDR15B

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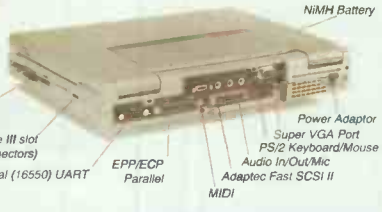
TEXAS INSTRUMENTS

The TravelMate 4000M Series provides everything you'd expect in state-of-the-art, high performance notebook computers.

Texas Instruments newest notebooks pack in additional performance with exceptional features that include a 16-bit sound card that is compatible with Sound Blaster Pro and much more.

Rear View



Dual Scan Colour

The UK's best value multimedia notebook - incredible specification at just £1499

- 486DX2-50 or DX4-75 Processor
- 4Mb RAM, 20Mb max
- 8Kb Internal Cache
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- 640 x 480 Resolution
- 1Mb Video RAM
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- Sound Capabilities: 16-Bit Media Vision Jazz 16 Sound Card, Thunderboard, CD Multisession Photo, CD Audio and Pro Audio 16, Internal Microphone, Internal Speaker and Bi- directional MIDI Interface
- NiMH Battery (3-5 Hours)
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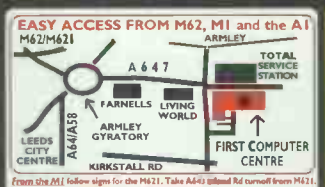

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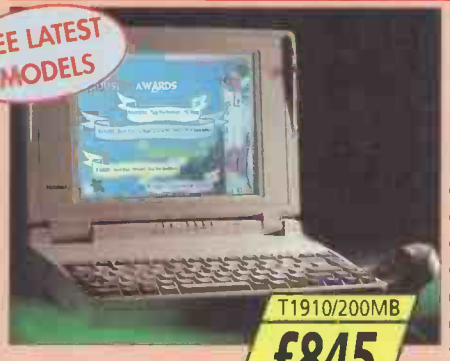

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T2100	486DX2/50	4MB	260MB	MONO	77282-E	£1015
T2100CS	486DX2/50	4MB	350MB	STN COL	77283-E	£1610
T2100CT	486DX2/50	8MB	350MB	TFT COL	77284-E	£2199
T2150CDS	486DX4/75	4MB	260MB	STN COL	77285-E	£2289
T2150CDS	486DX4/75	4MB	520MB	STN COL	77286-E	£2545
T2150CDT	486DX4/75	8MB	520MB	TFT COL	77287-E	£3395

DESCRIPTION	PROCESSOR	RAM	DISK	SCREEN	ITEM NO.	PRICE
T2450CT	486DX4/75	8MB	320MB	TFT COL	76999-E	£2845
T2450CT	DX4/75	8MB	500MB	TFT COL	77004-E	£3055
T3600CT (ex.FDD)	486DX2/50	8MB	250MB	TFT COL	75480-E	£2630
T4850CT	486DX4/75	8MB	500MB	TFT COL	76569-E	£3395
T4900CT LOW	PENTIUM/75	8MB	810MB	TFT COL	76570-E	£3989
T6600C	486DX2/66	8MB	510MB	TFT COL	74012-E	£4135

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4/75C M340/W 486DX4/75	8MB/340MB	77032-E	£2369
4/75C M510/W 486DX4/75	8MB/510MB	77033-E	£2539
4/75CX M340/W 486DX4/75	8MB/340MB	75020-E	£2959
4/75CX M510/W 486DX4/75	8MB/510MB	75021-E	£3125
4/75CXL M510/W 486DX4/75	8MB/510MB	77034-E	£3545
4/75CXL M810/W 486DX4/75	8MB/810MB	77035-E	£3795

CONTURA 410	RAM/HD	Item No.	Price
410 486DX2/509.5" MONO STN	4MB/170MB	77010-E	£1269
410C 486DX2/509.5" COL STN	4MB/250MB	77011-E	£1695
410CX 486DX2/508.4" COL TFT	4MB/250MB	77012-E	£2199
AERO with 3½" External floppy drive			
4/25 MONO 486SX/25	4MB/250MB	77102-E	£845
4/33C COLOUR 486SX/33	4MB/170MB	75468-E	£1015
4/33C COLOUR 486SX/33	4MB/250MB	76021-E	£1185

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S/33D i486SX/33 DUAL COL	4MB/210MB	75359-E	£1065
S/33C i486SX/33 TFT COL	4MB/210MB	75192-E	£1185
V/50D i486DX2/50 DUAL COL	4MB/250MB	75193-E	£1669
V/50C i486DX2/50 TFT COL.	4MB/340MB	75361-E	£1995
M/75D i486DX4/75 DUAL COL	8MB/340MB	75794-E	£2259
M/75C i486DX4/75 TFT COL	8MB/540MB	75196-E	£2945
M/100C i486DX4/100 TFT COL	8MB/540MB	75795-E	£3799
M/100T i486DX4/100 TFT COL (16.7M COLS)	8MB/540MB	75796-E	£4049
M/100S i486DX4/100 SVGA LOCAL	8MB/540MB	77066-E	£4145
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P/75S PENTIUM/75 SVGA LOCAL	8MB/810MB	77014-E	£4699

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486SX2/50 8.2" TFT Colour	4MB/340MB	76089-E	£2389
486DX2/50 9.5" Dual Scan Colour	4MB/340MB	76583-E	£1589
486DX2/50 8.4" TFT Colour	4MB/455MB	76584-E	£1989
486DX4/75 9.5" Dual Scan Colour	4MB/455MB	76090-E	£1889
486DX4/75 8.4" TFT Colour	4MB/340MB	76091-E	£2389
486DX4/75 8.4" TFT Colour	4MB/455MB	71812-E	£2489
486DX4/100 9.5" TFT Colour	4MB/520MB	76585-E	£2989

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742 486DX2/66 14" SVGA LOC	8MB/420MB	77894-E	£1399
942 486DX4/90 14" SVGA LOC	8MB/420MB	77895-E	£1439

PROLINEA (MONITOR REQUIRED)	RAM/HD	Item No.	Price
PROLINEA V3 4/50	4MB/270MB	77339-E	£710
PROLINEA V3 4/66	8MB/270MB	77341-E	£925
PROLINEA V3 4/66	8MB/420MB	77342-E	£985
PROLINEA V3 4/100	8MB/270MB	77344-E	£1085
PROLINEA V3 4/100	8MB/420MB	77343-E	£1145
PROLINEA V3 5/75	8MB/270MB	77345-E	£1199
PROLINEA V3 5/75	8MB/420MB	77346-E	£1265
PROLINEA V4 4/66	8MB/270MB	77347-E	£954
PROLINEA V4 4/66	8MB/420MB	77348-E	£1019
PROLINEA V4 4/100	8MB/270MB	77349-E	£1179
PROLINEA V4 5/75	8MB/420MB	77350-E	£1295
PROLINEA V4 5/90	8MB/420MB	77351-E	£1439
PROLINEA V4 5/90	16MB/720MB	77352-E	£1695
PROLINEA V5 4/66	8MB/270MB	77353-E	£999
PROLINEA V5 4/66	8MB/420MB	77354-E	£1059
PROLINEA V5 5/75	8MB/270MB	77355-E	£1339
PROLINEA V5 5/75	8MB/420MB	77356-E	£1549
PROLINEA V5 5/90	8MB/420MB	77357-E	£1489
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486DX2/50 14" SVGA LOC	4MB/340MB	76032-E	£974
486DX2/66 14" SVGA LOC.	4MB/420MB	76034-E	£1062
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MicroScan 4GP	15" 0.28 FST	✓	72014-E	£269
MicroScan 5EP	17" 0.28 FST	✓	72015E	£469
MicroScan 5AP	17" 0.28 FST	✓	72017-E	£479

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1024 Colour LR	14"	1024x768 ni	74934-E	£255
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171FS Colour LR	17"	1024x768 ni	74789-E	£675

GOLDSTAR	Size	Display	Item No.	Price
GS1462 DM	14" LR	SVGA	75166-E	£169
GS1520 DM	15" LR	1280x1024 ni	75168-E	£259
GS1725 DM	17" LR	1280x1024 ni	75169-E	£450

NEC	Size	Display	Item No.	Price
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XV-15	15" LR	MultiSync	76970-E	£285
XE-15	15" LR	MultiSync	76971-E	£389
XV-17	17" LR	MultiSync	76972-E	£565
XE-17	17" LR	MultiSync	75973-E	£695
XP-17	17" LR	MultiSync	76974-E	£895
XE-21	21" LR	MultiSync	76975-E	£1355
XP-21	21" LR	MultiSync	76976-E	£1749

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PHILIPS	Size	Display	Item No.	Price
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14A/4CM4279 LR	14"	1024x 768 ni	75317-E	£210
143 14" Touch Screen	15"	1024x768 ni	77489-E	£875
15A/4CM8274 LR Bril.	15"	1024x768 ni	75654-E	£289
15B/	15" LR		77094-E	£275
17A/	17" LR		75656-E	£659
17B/	17" LR		77095-E	£545
17C/4CM4770 LR	17"	1024x768 ni	75655-E	£445
17A/4CM6282 LR	17"	1280x1024 ni	75656-E	£659
20B/	20" LR		77096-E	£925

LOW PRICES

TAXAN	Size	Display	Item No.	Price
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Ergovision 580+ LR	15"	1280 x 1024	77807-E	£289
Ergovision 880 LR	17"	1280 x 1024	76301-E	£525
Ergovision 885 LR	17"	1600 x 1200	93812-E	£625
Ergovision 895 LR	17"	1280 x 1024	77808-E	£845
Ergovision 1080 LR	20"	1600 x 1200	76302-E	£925
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4100 B Colour	16 True	640 x 480	94532-E	£1365
4850 Colour	1.4m True	640 x 480	75475-E	£2045
6150 Colour	16.7m True	640 x 480	76290-E	£2885
6450 Colour	16.7m True	640 x 480	76291-E	£3315

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BT DF300, Dark grey	76118-E	*£389
Panasonic UF-V40	93938-E	*£275
SAMSUNG SF 40	93801-E	*£199
SAMSUNG SF 500	92016-E	*£198
SAMSUNG SF1505	76268-E	*£239

FAX/ANSWERING		
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BT DF200 Dark grey	93669-E	*£249
BT DF400, Dark grey	76116-E	*£325
BT DF400, Alpine	76117-E	*£389
Panasonic KX-F2300BE	93685-E	*£279
Panasonic KX-F2400BE	93682-E	*£312
Panasonic UF-V60	93939-E	*£359

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BT BF800	93782-E	*£795
Canon B320	76342-E	*£699
Canon B340	76343-E	*£825
HP FAX-900	93761-E	≠£628
HP FAX-950	93762-E	≠£748
Panafax UF-321	93725-E	*£649
Panafax UF-322	93726-E	*£769

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Conner TapeStar 420, 420MB, 9.5MB/min, QIC-80		74448-E	£86
TapeStar 850, 850MB, 9.5MB/min, QIC-3010MC		76773-E	£179

PARALLEL PORT		Item No.	Price
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Jumbo Trakker 700, 680MB, 9.3MB/min, QIC-3010		76295-E	£285
Conner TapeStar 420, 420MB, 9.5MB/min, QIC-80		74446-E	£215
TapeStar 850, 420MB, 9.5MB/min, QIC-3010-MC		76774-E	£275

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DEXXA	Item No.	Price
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GT8500 PC, SCSI-2 (inc. Photoshop LE)	77613-E	†£575
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400VA	92687-E	£104
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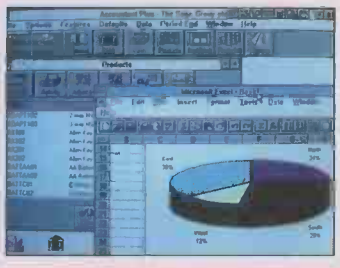

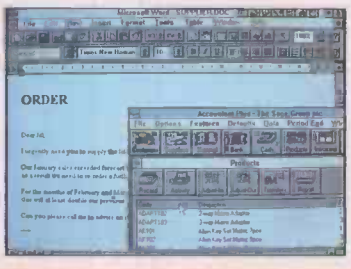

COMPAQ

THE COMPAQ PROLINEA PC

Compaq have just launched a complete new range of their popular **ProLinea PC range**. This builds on the previous range by offering increased hard disk capacities, Pentium versions, a choice of three cases and the latest PCI bus.

The **ProLinea V3** range of PCs are supplied in the standard three bay three expansion slot case. With processors now available ranging from 50MHz 486DX2 to 75MHz Pentium these machines would grace any desktop.
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PRODUCT HIGHLIGHTS:

- ✔ DX/2 50, DX/2 66, DX/4 100, Pentium 75MHz, 90MHz and 100MHz processors.
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- ✔ Integrated 1MB PCI Local Bus graphics controller with optional 1MB upgrade.
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- ✔ TriFlex/PCI Architecture for enhanced IDE drive increased performance and storage capacity.
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- ✔ Cable select for automatic configuration of Compaq IDE hard drives.
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NOTE: Monitor is not included. See opposite line listings for models and pricing on Compaq PCs and monitors.

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Always quote the Product Item No. when you contact us.

SPECIAL LIMITED OFFER

*Full details of how to order and our address are available on **Software III** at the end of this Ad.*

All prices exclude delivery and VAT at 17.5%

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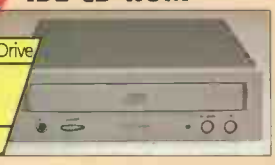
MULTIMEDIA

CD ROM DRIVES

Aztech CDA268-031 EP IDE CD-ROM

QUAD STOCKED



IDE CD-ROM Drive

£85

Item No. 72234-E

- ✔ Easy to install
- ✔ Internal, double speed
- ✔ 350ms average access time
- ✔ 337ms seek time
- ✔ Audio CD compatible
- ✔ Tray loading mechanism
- ✔ Low noise levels
- ✔ Ultra CD cache
- ✔ Cables & Software provided

Aztech	Item No.	Price
CDA 268-031, double Internal, IDE.	72234-E	£85
CDA 486-011. quad Internal IDE	76027-E	£135
Mitsumi		
Mitsumi FX-300, triple Internal, IDE	76761-E	£122
Mitsumi FX-400, quad Internal, IDE	77113-E	£129
NEC (SCSI 1 & 2 I/F)		
3Xp + Portable	76194-E	†£245
4xe External	76196-E	†£369
4xi Internal FREE MS ENCARTA	76195-E	†£256
NEC (SCSI 1 & 2 I/F KITS)		
AT ISA Bus	73050-E	£41
Parallel Port	72930-E	£85
PANASONIC (without I/F kit)		
CR-503, 320ms, 306KB/sec, Internal SCSI-2	75665-E	£109
CR-562, 320ms, 306KB/Sec Internal, ISA	75664-E	£83
CR-5628, Dual, Parallel Port	77868-E	£159
PIONEER		
DRM 104x, Internal, 190ms, 614KB/sec, SCSI-2	76394-E	£195
DRM-604X, 300MS, 614KB/sec External	75175-E	£769
SONY (with IDE I/F)		
CDU-55E, Internal, 250ms,300KB/sec, IDE	76982-E	£99
CDU-55S, Internal, 250ms, 300KB/sec, SCSI-2	76983-E	£110
TOSHIBA LOW PRICE		
CD 400A Portable (SCSI-2 I/F kit inc.)	75615-E	£264
XM-3601B, 150ms, min 660 KB/sec, NEW Internal, SCSI-2 (w/out I/F)	77278-E	£219
XM-3601B, 150ms, min 660 KB/sec, NEW External, SCSI-2 (w/out I/F)	77279-E	£289
KT-3601BA, 150ms, min 660 KB/sec, Internal, SCSI-2 (with AT I/F)	77404-E	£265
KT-3601SA, 150ms, min 660 KB/sec, Internal, SCSI-2 (with AT I/F)	77405-E	£312

SOUND CARDS, SPEAKERS

CREATIVE LABS (12 months warranty)		
SoundBlaster Pro Value, 8-bit	75373-E	£36
SoundBlaster 16 Value, 16-bit	75374-E	£63
SoundBlaster 16 Multi-CD Value, 16-bit	75375-E	£89
SoundBlaster 16 Multi-CD Value, 16-bit with ADSP	75928-E	£108
SoundBlaster 16 SCSI-2 Value, 16-bit	75376-E	£110
SoundBlaster 16 SCSI-2 Value, 16-bit with ADSP	75929-E	£129
SoundBlaster AWE32	91926-E	£169
Midi Adaptor (1 in, 1 out)	74342-E	£20
MICROSOFT SOFTWARE		
MS Sound System 2 (3½" disks)	31988-E	£40
ORCHID (4 year warranty)		
SoundWave 32, 16-bit + speakers + mic	75170-E	£125
SOUND GALAXY		
Waverider 32+(inc. mic., headphones & software)	76540-E	£95
BXII Extra, 8 bit sound (inc. Speakers & Software)	76022-E	£37
Pro 16, 16 bit sound; (4 software titles)	76023-E	£63
Nova 16 Extra, 16 bit sound; (headphones, mic & 15 software titles)	76024-E	£77
CREATIVE LABS		
SBS-300 Speakers	77904-E	£69
Pro Digital Speakers	75780-E	£28
Screenbeat speakers for Sound Blaster only	74625-E	£15
Pro Digital Speakers	75780-E	£28
SONY SPEAKERS		
SRS-PC30	77900-E	£33
SRS-PC50	77901-E	£50
YAMAHA SPEAKERS		
YST-M5	77902-E	£36
YST-10	77903-E	£43

UPGRADE KITS

SoundBlaster CD 16 Discovery Kit	75398-E	£219
SoundBlaster EZ16 Discovery Kit	77899-E	£312

VIDEO CAPTURE CARDS

CREATIVE LABS		
VideoBlaster MP400	77907-E	£174
VideoBlaster SE100	77905-E	£169
VideoBlaster RT300	77906-E	£255
HAUPPAUGE (See feature above)		
Win/TV Celebrity	75197-E	£262
Win/TV Cinema	75012-E	£182

VIDEO CONFERENCING

CREATIVE LABS		
Creative Labs ShareVision PC300	77930-E	£923

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DIGITISERS & PLOTTERS

Summagraphics

NEW

Summagraphics brings you their new range of colour and mono Large format InkJet Plotters. Prices so competitive offering you colour where the competition price their mono.

SummaJet 2 Series Plotter

The SummaJet offers the kind of cost-effective plotter solution with flexible upgrade options required by todays CAD professionals

✔ Increased plotter productivity ✔ Equipped for Workgroup use ✔ 12 months On-Site warranty ✔ Reduce operating costs ✔ Easy upgrade.

THE PRODUCT RANGE

Make/Model	ITEM NO.	PRICE
SummaSketch III A4	72547-E	£229
SummaSketch III A3	72548-E	£435
Summagrid IV 1824	76046-E	£955
Summagrid IV 2436	76047-E	£1265
HiPlot 7100	76048-E	£1545
HiPlot 7200	76049-E	£1975
SummaJet A1 mono	71130-E	£2235
SummaJet A0 colour	71285-E	£3245

MODEMS

INTERNAL/PCMCIA

EUROVIVA – 5 year warranty		
14.4I-V32bis, ISA, FAX	75038-E	£130
HAYES		
Optima 144 PCMCIA 2.II V32bis, FAX	76129-E	£199
PACE – 5 year warranty		
MICROLIN FX 32 +, PC 8-BIT ISA V32BIS, FAX	73889-E	£129
MICROLIN FX NB32 PCMCIA 2.II V32BIS, FAX	74703-E	£180
PSION DACOM – 2 year warranty		
GOLD CARD QUAD PCMCIA 2.II V22BIS, FAX LOW PRICES	74971-E	£139
GOLD CARD V32Bis PCMCIA 2.II-V32BIS, FAX	74526-E	£195
GOLD CARD V.34 PCMCIA V34, FAX	77568-E	£325
TOSHIBA – 1 year warranty		
ADVANCED PCMCIA 2.II-V32BIS, FAX	71814-E	£215
WORLDPORT – 5 year warranty		
2496 PCMCIA 2.II-V22BIS, FAX	74301-E	£129
DUAL STANDARD CELLULAR PCMCIA 2.II	76611-E	£184
US ROBOTICS – 5 year warranty		
SPORTSTER 14.4 WITH FAX V32bis, FAX	91885-E	£126
SPORTSTER 28.8 WITH FAX, VFAST ISA	76714-E	£189
ZOOM – 5 year warranty		
ZOOM 14.4I V32BIS, FAX	74186-E	£125

PORTABLE

PACE – 5 year warranty		
MICROLIN QUAD FX V22BIS, FAX	94835-E	£88
MICROLIN FX 32 PLUS V32BIS,FAX	72169-E	£148
MOBI-FAX 24	75580-E	£74
MOBI-FAX 144	76397-E	£94
ZOOM – 5 year warranty		
ZOOM 14.4X – V32BIS, FAX	74185-E	£125

DESKTOP

CRAY (was DOWTY) – 1 year warranty		
QUATTRO 144 V32BIS, FAX	72953-E	£245
EUROVIVA – 5 year warranty		
EUROVIVA 14.4 V32BIS FAX	72919-E	£134
HAYES – 2 year warranty		
ACCURA 144, V32BIS, FAX	75092-E	£135
ACCURA 288, V.FAST, FAX	75093-E	£173
OPTIMA 144, V32BIS FAX	74774-E	£249
OPTIMA 288, V.FAST FAX	74775-E	£339
OPTIMA 288 VALUE PACK	76270-E	£645
ESP COMMUNICATIONS ACCELERATOR V2.0 (16-BIT SERIAL BOARD, ISA PC'S & WINDOWS)	74307-E	£59
MULTITECH – 2 year warranty		
MT1432BLK V32BIS, FAX	91011-E	£312
MT1932 ZDXK V32bis, FAX	74941-E	£112
MT2834 ZDX-K V.34, FAX	77806-E	£210
MT2834BLK V.FC – VFAST, FAX	76234-E	£395
PACE – 5 year warranty		
LINNET QUAD V228IS, FAX	74345-E	£82
LINNET 32 PLUS V32BIS, FAX	74346-E	£155
LINNET 32 PLUS V32BIS, VOICE/FAX	76592-E	£225
LINNET FX V.34, FAX	77303-E	£219
ULTRALINK 32 PLUS V32BIS	94527-E	£312
US ROBOTICS – 5 year warranty		
SPORTSTER 14.4 WITH FAX V32BIS, FAX	91017-E	£125
SPORTSTER 28.8 WITH FAX	76610-E	£192
COURIER V.FC PLUS DUAL STD-VFAST, FAX	75573-E	£258

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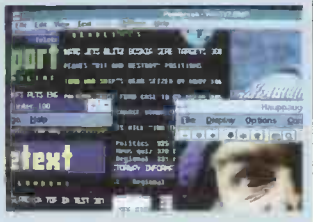
Hauppauge – Video Capture Cards

view Teletext, TV or video on your PC at home or at work

WIN/TV Prisma



Features:

- ✔ SVGA compatible; requires feature connector
- ✔ Resolution support – from 640 x 480 up to 800 x 600
- ✔ Video input for Camcorder, Video Recorder connection
- ✔ 122 Channel PAL tuner with on-board Teletext
- ✔ DDE and Subpage support allows fast Teletext information retrieval
- ✔ 4.1.1 YUV colour separation for home presentations
- ✔ Audio-Line-Out requiring no extra sound card
- ✔ Video for Windows Compatible (MCI)
- ✔ US designed and manufactured

NEW

WIN/TV Prisma **£145** Item No. 77926-E

Win/TV Celebrity

Features:

- ✔ 16.7m colours
- ✔ **VIDEO-OUT OPTION**
- ✔ SVGA compatible ; no feature connector required
- ✔ Resolution from 640 x 480 up to 1280 x 1024, 100HZ
- ✔ 122 channel PAL tuner with on-board Teletext
- ✔ DDE and Subpage support allows fast Teletext information retrieval
- ✔ Reuters 1000 ready (subscription service available on CNN text)
- ✔ 4.2.2 YUV colour separation for high impact presentations
- ✔ Two additional video inputs and Audio-Line-Out requiring no extra sound card
- ✔ Full-screen AVI playback
- ✔ US designed and manufactured

Win/TV Celebrity **£262** Item No. 75197-E

APRIL SPECIAL

SPORTSTER 28.8 + FAX

£192 Item No. 76610-E

FREE £10 Whitbread Leisure Voucher (Pizza Hut, Threshers & Beefeater, et al)

Limited offer while stocks last

SPORTSTER 14.4 + FAX **£125** Item No. 91017-E

FREE £5 Whitbread Leisure Voucher (Pizza Hut, Threshers & Beefeater, et al)

Limited offer while stocks last

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MODEMS/MULTIMEDIA

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TravelMate 4000M - Multimedia-ready Notebooks

A NEW Dimension in Notebook Computing

TEXAS INSTRUMENTS

MOVING MULTIMEDIA

Texas Instruments powerful range of notebook PCs offers many unique features and is available at very competitive prices.

The **TravelMate 4000M** is a state of the art Multimedia PC offering the processing power and specifications to more than match its competitors. It is available with a variety of processor options and it is supplied with built in 16-bit sound card which is SoundBlaster Pro compatible, a 16-bit MIDI port, a fast SCSI II port plus an internal speaker and microphone. Versions are available with both colour dual scan and active matrix LCD displays. Plus it features an integrated pointing device conveniently located at the base of the keyboard. The above processing power and features make it ideal for use with multimedia presentations. If you wish to connect a CD-ROM drive the TravelMate 4000M offers a unique solution. Its Docking Station features an internal CD-ROM drive, stereo speakers and NiMH battery. All this is contained in a package weighing under 2kgs and it shares the same footprint as the 400M making this one of the neatest multimedia solutions available.

Personal Computer World EDITOR'S CHOICE

PRICES FROM £1589

CD-ROM Docking Station

Model	4000M SX2/50	4000M DX4/75
Processor (speed)	486SX2 (50MHz)	486DX4 (75MHz)
RAM	4MB expandable to 20MB	
Hard drive	200MB or 340MB	455MB or 340MB
Floppy drive	3.5" 1.44MB	
Display	Colour dual scan LCD or colour active matrix LCD	
Keyboard	84 key with integrated numeric keypad	
Ports	Parallel, serial, SVGA, PS/2 mouse, SCSI II, audio in/out	
Power supply	100-240V AC auto-sensing adaptor	
Battery	Rechargeable NiMH	
Operating System	DOS 6.2 and Windows for Workgroups V3.11	
Dimensions (W x D x H)	279x216x49mm	
Weight	2.9kg	
Warranty	12 months return to Texas Instruments	

EXPANSION SLOTS

- 1 x PCMCIA type III or 2 x type II

ACCESSORIES SUPPLIED

- AC adaptor and mains lead
- Rechargeable NiMH battery
- DOS 6.2, Windows for Workgroups V3.11

Call for full DX2/50 & DX4/100 specification

TRAVELMATE 4000M	DISPLAY	RAM/HD	ITEM NO.	PRICE
486SX2/50	9.5" Dual Scan Colour	4MB/200MB	76087-E	£1789
486SX2/50	8.2" TFT Colour	4MB/340MB	76089-E	£2389
486DX2/50	9.5" Dual Scan Colour	4MB/340MB	76583-E	£1589
486DX2/50	8.4" TFT Colour	4MB/455MB	76708-E	£1989
486DX4/75	9.5" Dual Scan Colour	4MB/455MB	76090-E	£1889
486DX4/75	8.4" TFT Colour	4MB/340MB	76091-E	£2389
486DX4/75 NEW	8.4" TFT Colour	4MB/455MB	77175-E	£2489
486DX4/100	9.5" TFT Colour	4MB/520MB	76585-E	£2989

ACCESSORIES	ITEM NO.	PRICE
4MB RAM Upgrade	76277-E	£155
16MB RAM Upgrade	76279-E	£995
Rechargeable NiMH Battery	76280-E	£90
CD-ROM Docking Station	76281-E	£499
Deluxe Carry Case	76282-E	£45

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EPSON Just the ticket - the Epson EPL range of Laser Printers

The EPL-3000+ and EPL-5200 are versatile printers suitable for a wide range of office printing requirements. Comprehensive emulations ensure wide compatibility and both models offer a host of features suitable for first time buyers as well as experienced users.

EPL 5200+

NEW

- ✔ 6ppm
- ✔ PCL5e, Epson LQ/FX emulations
- ✔ 1MB RAM (5MB)
- ✔ 300x300dpi
- ✔ 14 bitmapped & 8 scalable fonts
- ✔ 12 months office cover warranty

EPL 5200+ **£464** Item No. 77661-E

EPL 3000

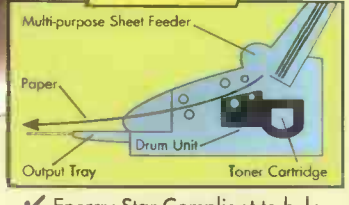
- ✔ 4ppm
- ✔ PCL5e
- ✔ 300dpi RITech
- ✔ 1MB RAM
- ✔ 5 bitmapped fonts & 22 outline fonts
- ✔ 12 months home/office cover warranty

EPL 3000 **£385** Item No. 65849-E

Get All The Benefits of GDI Printing From Brother!!

Brother's latest laser printer offers you GDI flexibility and with PCL 4 emulation the ability to work within a DOS environment. All you need is a Windows PC and it's GO GDI.

Brother HL-630 **£325** Item No. 76038-E



FEATURES:

- ✔ 6ppm
- ✔ 300dpi resolution with Microfine toner
- ✔ 512Kb RAM (plus the RAM in your PC)
- ✔ HPIIP, Epson FX-850, IBM ProPrinter XL emulations
- ✔ All Windows fonts
- ✔ High Speed, Bi-Directional Parallel I/F
- ✔ Energy Star Compliant to help save the environment
- ✔ Straight Paper Path for problem free printing
- ✔ 200 A4 sheet input, 100 A4 sheet output
- ✔ 12 months Return-To-Base Warranty
- ✔ Optional On-Site Alternatives

SEE LINE LISTING FOR THE FULL BROTHER GDI RANGE

INKJET

CANON	ITEM NO.	PRICE
BJ-30 Block (CALL FOR LATEST MODELS)	77673-E	†£153
BJ-30 White	77295-E	†£153
BJ-200EX	77234-E	†£172
BJ230	91525-E	†£238
BJ300	71393-E	*£344
BJ330	71394-E	*£389
BJC-70 Black Colour	77674-E	†£227
BJC-70 White Colour	77531-E	†£227
BJC-4000 Colour	76084-E	†£235
BJC600 Colour (NEW)	73863-E	†£328
BJC800 Colour	94805-E	*£1065
EPSON (CALL FOR LATEST MODELS)		
STYLUS 800+	75400-E	†£170
STYLUS 1000 (A3)	73842-E	†£312
STYLUS COLOUR	75397-E	†£328
HEWLETT PACKARD (CALL FOR LATEST MODELS)		
Deskjet 320	76042-E	†£165
DeskJet 320 & Support	76263-E	***£204
Deskjet 320 & CSF	76125-E	†£182
Deskjet 320 &CSF & Support	76264-E	***£215
DeskJet 540 (NEW)	77071-E	†£199
DeskJet 540 & Support	77080-E	***£235
DeskJet 540 & Colour Kit	77325-E	†£228
Deskjet 540 Colour & Support	77333-E	***£259
DeskJet 660C Col (NEW)	77073-E	†£294
DeskJet 660C Col & Support	77082-E	***£352
DeskJet 850C Col (NEW)	77075-E	†£389
DeskJet 850C Col & Support	77084-E	***£CALL
DeskJet 1600C Col	77076-E	†£833
DeskJet 1600CM Col	77077-E	†£1245
PaintJet XL300 Col	71569-E	†£1595
STAR		
Star SJ144	73981-E	†£178

See Warranty Key Below

CBP Mono & Colour Starter Kit

The CBP Printer Starter Kit provides you with everything you need to get up and running and contains:

1 x Parallel connecting cable
1 x Replacement consumable
1 x Ream A4 paper

We carry starter kits for all our top selling printers.

For Example:

Starter Kit for the HP DeskJet 540 is Item No. 72725-E at £26.00 (individual items would cost £33.65. Save £7.65 plus carriage costs).

LASER/THERMAL PRINTERS

Make/Model (NEW)	ITEM NO.	PRICE
Brother HL-630 GDI, 6ppm	76038-E	†£325
Brother HL-630I GDI, 6ppm	76297-E	†£378
Brother HL-660 GDI	76595-E	†£465
Brother HL-1260 GDI	76596-E	†£925
Epson EPL-5200+, 6ppm	77661-E	*£464
Epson EPL-5600, 6ppm	75350-E	*£593
Epson EPL-9000 A3 8ppm	76686-E	£1059
Epson EPL-9000PS A3 8ppm	76687-E	£1359
Fargo Primera & PC PRU (SPECIAL)	75351-E	†£699
Fargo PrimeroPro Col. Therm.	76725-E	†£1099
HP LaserJet 4L, 4ppm	71690-E	†£354
HP LaserJet 4L & Support	73002-E	***£439
HP LaserJet 5P, 6ppm	77078-E	†£579
HP LaserJet 5P & Support	77087-E	***£695
HP LaserJet 5MP, 6ppm	77079-E	†£499
HP LaserJet 5MP & Support	77088-E	***£810
HP LaserJet 4 Plus, 12ppm	75158-E	†£939
HP LaserJet 4 Plus & Support	75159-E	***£1089
HP LaserJet 4M Plus, 12ppm	75106-E	†£1257
HP LaserJet 4M Plus & Support	76463-E	***£1405
HP LaserJet 4V 16ppm,	76029-E	†£1365
HP LaserJet 4V & Support	76131-E	***£1575
HP LaserJet 4MV 16ppm,	76030-E	†£1999
HP LaserJet 4MV & Support	76464-E	***£2175
HP LaserJet 4Si 16ppm	71692-E	*£2085
HP LaserJet 4Si & Support	76113-E	***£2519
HP LaserJet 4Si/MX, 16ppm	71756-E	*£2966
HP LaserJet 4SI/MX & Support	76462-E	***£3385
HP Color LaserJet A3	76698-E	*£4199
HP Color LaserJet A3 & support	77057-E	*£5295
Man Tally T9005, 5ppm	93749-E	*£325
Man Tally T-Win GDI, 4ppm	75455-E	*£245 (LOW)
NEC SuperScript Color 3000GDI Thermal	76775-E	†£654
NEC SuperScript 610+,6ppm	76558-E	*£289
NEC SuperScript 660,6ppm	76565-E	*£405
NEC SuperScript 660i,6ppm	76566-E	*£545
OKI OL400ex, 4ppm (LOW PRICE)	71495-E	*£278
OKI OL410ex, 4ppm	74833-E	*£384
Panasonic KX-P4400, 4ppm	72716-E	†£272
Panasonic KX-P4401, 4ppm	75743-E	†£296
Panasonic KX-P4430, 5ppm	94780-E	*£484
Panasonic KX-P4440, 10ppm	74084-E	**£706
Panasonic KX-P6100, 6ppm GDI	77649-E	*£211
QMS CS210 – Color Thermal	73495-E	*£1895
QMS CS230 – Color Thermal	73496-E	*£5475
QMS Magicolor LX 12MB (NEW)	77486-E	*£4475
QMS Magicolor LX 24MB (NEW)	77487-E	*£5295
Star WinType 4000 GDI 4ppm	75478-E	†£293
Star WinType 800C Thermal	75700-E	†£595

See Warranty Key Below

CBP Starter Kit

The CBP Printer Starter Kit provides you with everything you need to get up and running and contains:

1 x Parallel connecting cable
1 x Replacement consumable
1 x Ream A4 paper

We carry starter kits for all our top selling printers.

For Example:

Starter Kit for the HP LaserJet 4L is Item No. 76128-E at £49.95 (individual items would cost £56.30. Save £6.35 plus carriage costs)

DOT MATRIX PRINTERS

EPSON	ITEM NO.	PRICE
LX-300 9 pin	75451-E	†£90
LX-300 Colour Kit	75452-E	£29
FX-870 9 Pin	71036-E	†£224
FX-1170 9 Pin	71018-E	†£282
LQ300 24 Pin	76651-E	†£142
LQ-570+ 24 Pin	71610-E	†£186
LQ-870 24 Pin	94019-E	†£352
LQ-1070+ 24 Pin	73860-E	†£283
LQ-1170 24 Pin	94020-E	†£402
DFX-5000 9-Pin	71508-E	†£1125
DFX-8000 9-Pin	73463-E	†£1875
DLQ-3000 24 Pin	75959-E	†£672 (NEW LOW PRICE)
NEC		
PinWriter P2Q 24 Pin	72782-E	*£98
PinWriter P3Q 24 Pin	75589-E	*£178
PinWriter P72 24 Pin	71499-E	†£372
OKI		
ML321 9 Pin	71317-E	†£365
ML395B 24 Pin	71795-E	†£635
ML520 9 Pin	71482-E	†£355
ML521 9 Pin	71483-E	†£395
ML591 24 Pin	71020-E	†£499
PANASONIC		
KX-P1150 9 Pin	72974-E	†£89
KX-P3696 9 Pin	76648-E	†£272
KX-P2023 24 Pin	73145-E	†£110
KX-P2135C 24 Pin	76144-E	†£125
KX-P3626 24 Pin	76649-E	†£255
STAR (LOW PRICES)		
LC-90 9-Pin	76351-E	†£79
LC100 9 Pin Col	92667-E	†£89
LC15 9 Pin	71797-E	†£177
LC24-15 Mk II	72783-E	†£233
LC24-20 Mk II	72290-E	†£113
LC-240 24 Pin Mono	76354-E	†£90
LC-240 24 Pin Colour	76355-E	†£103

See Warranty Key Below

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PRINTER MANUFACTURER'S WARRANTY DETAILS

*† = Does not include On-Site Maintenance * = 1 Year On-Site Maintenance*
*** = 2 Year On-Site Maintenance*** = 3 Year On-Site Maintenance*
Please note: Panasonic on-site warranty is limited to the UK Mainland

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KYOCERA

A compact 4ppm personal page printer that offers full system printer capabilities and savings on print costs due to its cartridge-free design.

Kyocera are the company which introduced low-cost printing, the FS-400 is a low cost printer that offers unrivalled potential for small businesss or organisations needing a low-volume centralised printing resource. The only consumable needed is toner, cartridge waste is eliminated by a long life drum for a considerable reduction in page printing costs.

ECOSYS

STANDARD FEATURES:

Output: 4ppm

Emulations: HPLJIII, IBM X24E, Epson LQ-850

RAM: 1MB

Resolution: 300 x 300dpi/ 300 x virtual 1200 IRt

Interfaces: Centronics Parallel plus high speed option I/O port

Fonts: 79 bitmapped, 13 scalable

Small footprint:

Input Trays: 1 x 100 sheet Universal

Output Trays: 1 x 100 sheet face down

Dimensions: 353W x 350D x 173Hmm **Warranty:** 12 months (return to base)

FS-400 £435 Item No. 77063-E

FS-1550 £875 Item No. 76258-E

FS-1600 £1069 Item No. 76259-E

OTHER MEMBERS OF THE ECOSYS COST-CUTTING, PLANET FRIENDLY PRINTER RANGE

Top brand, quality printers designed with your specification in mind and at a price that will be within your budget.

TEXAS INSTRUMENTS

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microLaser PowerPro

High Performance Printing!

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- ✔ Max 12ppm
- ✔ PCL5 emulation
- ✔ PostScript Level 2
- ✔ 6MB RAM (expandable to 22MB)
- ✔ 25MHz RISC processor (16KB Cache)
- ✔ Max 600 x 600 dpi
- ✔ Standard bi-directional parallel and AppleTalk I/Fs
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Power Pro £1099 Item No. 73546-E

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microMarc Color Thermal InkJet Printer

High Quality Colour at an Affordable Price

Features:

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- ✔ Up to 1ppm colour
- ✔ Max 600 x 300dpi (resident fonts)
- ✔ HP DeskJet® compatible with PCL3
- ✔ Parallel and serial I/F
- ✔ 128 KB receiver buffer
- ✔ Auto sheet feeder (120cap)
- ✔ 12 months return-to-base warranty

microMarc Color £265 Item No. 73545-E

TI - INKJET/LASER PRINTERS

DESCRIPTION	Item No.	Price	DESCRIPTION	Item No.	Price	DESCRIPTION	Item No.	Price
microMarc Color, max 5ppm Thermal Inkjet	73545-E	£265	microLaser Pro 600-PS23, max 8ppm Laser	73547-E	£859	microLaser Pro E, max 12ppm Laser	65325-E	£969
microLaser 600, max 5ppm Laser	73550-E	£595	microLaser Pro 600-PS65, max 8ppm Laser	76579-E	£999	microLaser Power Pro, max 12ppm Laser	73546-E	£1099

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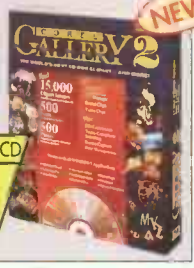

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ITALIAN	WIN	30356-S
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- ✔ Spreadsheets
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- ✔ Windows Write
- ✔ DeskTop Publishing
- ✔ Tailor mode software

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SAGE STERLING +2 Fin. Cont WIN 3½"	33521-E	£354
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AUTOCAD LT WIN	33213-E	£355
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SMARTERM 340 WINDOWS V3.0	33075-E	£159
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COREL VENTURA U/G V4.2 TO V5 CD	33828-E	£65
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LOTUS APPROACH R3.0 WIN CCP UPGRADE	34249-E	£65
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MS ACCESS V2 0 CCP UPGRADE	33365-E	£78
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dBASE 5 WIN UPGRADE CALL FOR COMP. U/G	33573-E	£115
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dBASE 5 DOS UPGRADE	33575-E	£115
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MS FOXPRO V2.6 PRO DOS	33491-E	£271
MS FOXPRO V2.6 STANDARD WIN	33488-E	£70
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PARADOX V5 FOR WINDOWS 3½"	32388-E	£219
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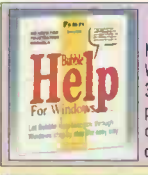
BubbleHelp For Windows



No longer do you need to watch boring videos or search through frustrating manuals. When you have BubbleHelp, the ideal Windows help system for every user of Windows 3.1 and above. BubbleHelp explains Windows from the basics through to the finer points, especially of use to new users. Learn how to use Windows the easy way, with great speed and confidence. All you need do is simply press your right hand mouse button on any area of Windows you do not understand, a bubble will appear instantly explaining what the function is and how to use it.

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COREL DRAW U/G V3 TO V4 CD	33826-E	£95
COREL-DRAW V4.0 3½"	32359-E	£106
COREL-DRAW V4.0 CD	33029-E	£87.50
COREL-DRAW U/G V4 TO V5 3½"	33821-E	£145
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COREL-DRAW V5.0 3½"	33532-E	£365
COREL-DRAW V5.0 CD	33637-E	£279
COREL FLOW 2.0 WIN 3½"	33545-E	£47.50
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HARVARD GRAPHICS V2.0 WIN	31667-E	£92
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VISIO SHAPE – ADV. NETWORK DIAGRAMS	33676-E	£39
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TURBO PASCAL® 7.0	32008-E	£68

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The professional GT-9000 tops the range. It is a fast 30-bit 600x1200dpi colour scanner with output resolutions up to 2400dpi, firmware interpolation and has been specially developed for professional design and advanced business applications.

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GT-6500, Par.	GT-6500, SCSI-2	GT-8500, Par.	GT-8500, SCSI-2	GT-9000, Par.	GT-9000, SCSI-2
£389	£465	£495	£575	£599	£679
Item No.73977-E	Item No. 73771-E	Item No. 77612-E	Item No. 77613-E	Item No. 77993-E	Item No. 75967-E

Model	GT-6500PC Parallel	GT-6500PC SCSI	GT-8500PC Parallel	GT-8500PC SCSI-2	GT9000PC SCSI-2
For use with	ISA 8-bit				
Type	Colour A4 flatbed				
Max. document size	216x297mm				
Optical resolution	300dpi		400dpi		600dpi
Colour recognition	16.7 million				
Grey scales	256				
Scan speed	5.4msec/line		—		
Interface	Bi-direction parallel	SCSI-2 (2x50 pin)	Bi-directional parallel	SCSI-2 (2x50 pin)	Bi-directional - SCSI-2 (2x50 pin)
Software	Adobe Photoshop LE, Caere Omnipage Direct OCR				
Contents	Scanner, I/F card, driver disk, cable, manual				
Dimensions (WxDxH)	333x568x125mm		332x575x132mm		383x595x170mm
Weight	9kg		8kg		12kg
Warranty	12 months return to Epson				

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Welcome to the PerfectOffice!

Standard Trade-up
£165
No. 30115-E

Here's How To Get It!

Trade Up! - From 1st May onwards proof of ownership is required upon registration with Novell. All users of the following competitive products can trade up to PerfectOffice. After this date the trade up will be available to users of the following products.

- Micrasoft Office
- Word
- Excel
- PowerPoint
- Harvard Graphics
- Lotus SmartSuite
- Ami Pro
- Lotus 1-2-3
- Freelance

NOTE: QUALIFICATION NOW NECESSARY

Full first-user version now available

Here's What You Get!

- ✔ **WordPerfect® 6.1** The Perfect Way™ to Create Better Documents
- ✔ **Quattro® Pro 6.0** The Perfect Way™ to Make Your Numbers Count
- ✔ **Presentations 3.0** The Perfect Way™ to Sell Your Ideas
- ✔ **Envoy™ 1.0a** The Perfect Way™ to View any Document
- ✔ **InfoCentral™ 1.1** The Perfect Way™ to Organise People, and Things
- ✔ **GroupWise™ 4.1** The Perfect Way™ to Share Information

Version Upgrade - All users of the following products can upgrade to PerfectOffice Standard.

- WordPerfect (any version)
- Quattro Pro
- WordPerfect Office
- Presentations
- SoftSolutions
- Informs
- PlanPerfect
- Netware
- Borland Office
- GroupWise
- InfoCentral
- Envoy
- DataPerfect
- DrawPerfect

Standard Upgrade
£135
Item No. 30114-E

Note: Any NetWare client will qualify to purchase the upgrade product

Both Upgrade and Trade Up packages contain full disks and documentation.

Publishers Quoted System Requirements
Personal Computer using a 486 25MHz microprocessor (486DX/33 processor recommended). Windows 3.1 or Above Recommended. 8MB RAM VGA Display

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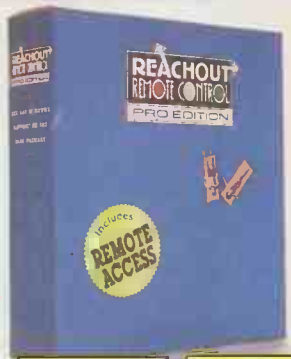

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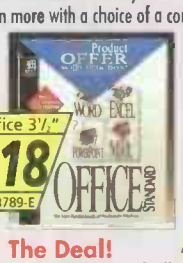

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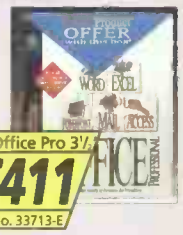

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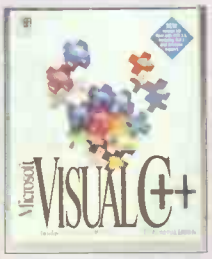

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COMPUTER SHOPPER 1994 Awards Nomination

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PRESENT

A UNIQUE BLEND OF HIGH SPECIFICATION PC SYSTEMS, STATE OF THE ART ON-LINE COMMUNICATIONS SOFTWARE, COMBINED WITH ONE-TO-ONE SERVICES THAT ARE, AS WE WRITE, UNRIVALLED.

WE CALL IT

FOUNTAIN 'ON-LINE'

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Highmead Technologies

FOUNTAIN

• FOUNTAIN PC SYSTEMS • FOUNTAIN ON-LINE PC SYSTEMS • FOUNTAIN MULTI-MEDIA & FULL SCREEN, FULL MOTION VIDEO (MPEG) SYSTEMS • FOUNTAIN BUSINESS & CORPORATE SYSTEMS • FOUNTAIN VIDEO CONFERENCING SYSTEMS

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MEET FOUNTAIN 'ON-LINE'

Let Highmead bring the Internet to you. We are proud to introduce Fountain 'On-Line' PC Systems, Software and Services that will enable you to communicate with the World.

WE CONNECT YOU TO THE INTERNET

FOUNTAIN ON-LINE SYSTEMS

ALL FOUNTAIN PC 'ON-LINE' SYSTEMS INCLUDE IN THE PRICE:

- One of a range of Fountain PC Systems, (with a BABT approved internal Fax Modem) in the configuration that suits you. See following pages.
- Latest PIPEX Dial Communications and On-Line Software, the most professional and easy to operate Internet software in the World, as well as the lowest true cost access to the Internet and its services.
- Delivery, Installation and Configuration at your site and at your convenience by one of our engineers.

ALL FOUNTAIN ON-LINE PC SYSTEMS ARE DELIVERED, INSTALLED AND FULLY CONFIGURED BY ONE OF OUR ENGINEERS, AT YOUR SITE AND AT YOUR CONVENIENCE

PIPEX - UNIPALM is a major 'Back-Bone' Internet Service provider. Many other providers rent lines and services from companies such as PIPEX. PIPEX Dial Communications and Internet Access software is the most professional around and is by far, the easiest to use. **BE WARNED,** certain other Internet software packages are horribly and unnecessarily complicated to install and use.

PIPEX 'BACKBONE' TECHNICAL SPECIFICATION

- **Full Internet access using Windows based software.**
- **Optimised TCP/IP stack from FTP Software Inc.**
- **POP Mailbox within PIPEX.COM domain for sending and receiving mail.**
- **MIME & MAPI-compliant E-Mail reader.**
- **Netscape browser for WorldWide Web & USENET access.**
- **Telnet and Ping utilities for On-Line upgrades.**
- **Secure communications and back-up resilience.**

PIPEX subscription charges are £4.38 per week in the first year, reducing to £3.42 per week in year two and thereafter. This subscription provides customers with unlimited access to Internet services. **THERE ARE NO HIDDEN EXTRAS** and the first month is free, you only pay for call charges. With virtually every other service provider, there are charges, then access charges, some really steep. With PIPEX you only pay for the price of a local call to the local PIPEX Point of Presence (POP). International connections to Worldwide databases etc. are included in the subscription charge.

FOUNTAIN APPROVED 14,400 MODEM SPECIFICATION

- **Full BABT approval - Certificate No. BABT/93/0786.**
- **14,400bps Send & Receive FAX Internal Half Card.**
- **High Speed 16,550 UART.**
- **MNP class 2-4 Microcom error correction.**
- **MNP 5 Microcom Data Compression.**
- **CCITT V.32 bis/V.17 14,400.**
- **Group 3 FAX.**

BABT Approved
APPROVED FOR USE WITH TELECOMMUNICATIONS SYSTEMS RUN BY BRITISH TELECOMMUNICATIONS.

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PIPEX DIAL SOFTWARE INCLUDES:

- Netscape - Internet launcher, the simple to use, icon driven menu is the key to the Internet.
- Mail-It - A comprehensive e-mail program thats not limited to text. You can send entire files, layouts, presentations, even Multi-Media documents around the world.
- Telnet - A Terminal Emulator which allows your system to mimic UNIX, the platform that most Telnet stations run on.
- Ping - A smart utility that allows you to trace sites and e-mail addresses across the Internet.
- WinFax - A Windows based Fax system for sending and receiving Faxes.
- DosFax - A Microsoft DOS based Fax system for sending and receiving Faxes.

HIGHMEAD TECHNOLOGIES - OUR ONE-TO-ONE SERVICE AND MORE

- We are Highmead Technologies, one of the UK's fastest growing Personal Computer Systems and Solutions companies.
- Highmead are the exclusive UK partner of Fountain Technologies Inc., the USA's largest OEM PC manufacturer. Fountian PC Systems are the only systems we sell. We are the Fountain specialists.
- Whether you buy from Highmead, one system or a hundred systems, we promise that you will not become a statistic, not just another sale. Each customer of Highmead is allocated an Account Manager and that Manager will assist you through the order process, keep you informed of delivery, as well as handle and / or oversee any support issues you may have post purchase. Your Account Manager will also keep in touch with you from time to time regarding upgrades, new services etc., our aim is to offer every Highmead customer 'One-to-One' Service.
- If you purchase a Fountain 'On-Line' System we can extend our 'One-to-One' philosophy to Face-to-Face Service, ie one of our engineers will deliver your system to your site, at your convenience, then install it, configure it, launch you onto the Internet and even organise your e-mail address. If you require extra 'One-to-One' training at the time of set-up, we can arrange that too (at an extra cost).
- Our Sales Lines are open from 9.00am to 9.00pm Monday to Friday and from 9.30am to 2.30pm on Saturdays and Bank Holidays. We are closed Sundays. Our Technical Support teams are also available during these hours (but please note our Technical Support lines are not Technical Training lines).
- All Fountain systems come with a one year On-Site warranty, parts and labour, included in the price. Second and Third year On-Site warranties are available at competetive prices (see over page)
- All Fountain Executive (EX) PC Systems (not W - Workstation Systems) are bundled with the latest MS DOS, Windows for Workgroups, as well as Microsoft's Works, Publisher, Entertainment Pack and Productivity Pack, with all disks (FD or CD-ROM) and manuals (where appropriate) provided.
- All Fountain EX PC Systems (excluding W - Workstation Systems) includes as a minimum 8Mb RAM, 540Mb HDD, 1Mb Graphics Card, PCI Plug-and-Play Bus, Quad Speed CD-ROM Drive, 14" 0.28 Dot Pitch Non-Interlaced Monitor, 3.5" FDD, Genesis Reconfiguration File Manager Disk, so please do remember our minimum specifications when comparing prices. Systems can be ordered in either Desktop or Midi-Tower (recommended) at the same price.
- All Fountain Systems and Workstations are available on Finance terms, at very competetive prices (to approved customers). Ask your Account Manager for details. We do not offer 0% Finance, interest charges must come from somewhere and invariably with 0% Finance they are loaded onto the purchase price.
- Delivery times vary from system to system but averagely are less than seven working days, your Account Manager will keep you informed. Delivery charges are £15 + VAT. (UK Mainland only) There is an extra charge for Saturday AM delivery. For Upgrade and 'On-Line' Delivery Charges via our engineers, please consult your Account Manager.

FOUNTAIN PRODUCT CODES
EXC = Executive System with Quad Speed CD-ROM Drive.
EXM = Executive System with Quad Speed CD-ROM Drive, 16-Bit Stereo Sound Card and Amplified Stereo Speakers.

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FOUNTAIN PRODUCT CODES
EXCL = As EXC but includes Internet On-Line Services.
EXML = As EXM but includes Internet On-Line Services.
W = Workstation

VISA AMERICAN EXPRESS Access

For Further Information or to Order Call 01707-27-26-27

Callers by appointment only. Multiple demonstrations only on Saturdays. Highmead Technologies Limited, Jupiter House, Travellers Lane, Welham Green, Herts. AL9 7DA. Fax: 01707-26-74-00.

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Our Superhighway Flyer

Fountain P75 EXCL System 'On-Line'

Its quite amazing really, and its not the speed of change that surprises us at Highmead. Frankly, its what you, our customers are demanding right now. Just 18 months ago, our best selling system was the Fountain 486SX 33 ELM which featured ISA Bus, 210Mb Hard Disk Drive and a single speed CD-ROM Drive with an 8-Bit Sound Card. Times change, don't they. Right now, would you believe, the hot sellers are Fountain P75s with 75MHz Pentium™ processors, 850Mb Hard Disk Drives, Quad Speed CD-ROM Drives, plus Fax / Modem and Internet connection via PIPEX Dial. While thats what you want, thats what you'll get and furthermore we'll deliver it, configure it, install it, even set-up your e-mail address for you. (NB. The delivery service is included in the price of Fountain EXCL and EXML models). With Windows '95 and new, hard disk space hungry, software on the horizon and with Worldwide Internet users currently at 22 million and estimated to rise to 100 million by 1998, it makes no sense to compromise on specification. Therefore, our minimum entry level specification on PC Systems (excluding Workstations) reads Intel DX2 66 processors, 8Mb RAM, 1Mb PCI Bus Graphics, 540Mb Hard Disk Drive, Quad Speed CD-ROM Drive and certainly 'Plug-and-Play', PCI Bus. 'Settle for less at your peril'.

Pentium™ 75MHz Processor with 8Mb RAM
(Single chip upgradeable CPU, RAM expandable to 128Mb, 16k Internal Cache, 256k Ext Cache)

Toshiba Quad Speed IDE CD-ROM Drive
(MPCII standard, Sub 150ms Access Time, 684Kb per sec data transfer rate, 8.33Mb per sec Burst rate)

850Mb *Enhanced IDE HDD*

Approved 14,400 Baud Internal Modem
(BABT approved, 14,400bps Send & Receive FAX, High Speed 16,550 UART, CCITT V.32 bis/V.17 14,400)

3.5" 1.44Mb Floppy Disk Drive

PCI Bus 32-Bit Expansion Slots
(2 Free 32-Bit PCI Bus and 3 Free 16-Bit ISA Slots)

2Mb PCI Bus Accelerator Graphics Card

SuperScreen 14" .28 Dot Pitch, Energy Saver, Non-Interlaced Super VGA Colour Monitor
(Non-Interlaced, Flicker-Free display, 1024 x 768 resolution, up to 90Hz refresh rate)

Desktop or Midi Tower
(Available for the same price)

12 Months On-Site Warranty included in the Price
(See Fountain Aftercare Options for additional Options)

£1449.95 (ex. VAT)

HIGHMEAD FAST-TRACK FINANCE
From Around **£61** Per Month
Finance available over 12, 24 and 36 months at an APR of just 19.5% 10% Deposit

INTERNET via P·I·P·E·X

All the above Fountain 'On-Line' Systems include: Fully Configured Fountain Approved 14,400 Baud Internal Fax / Modem, PIPEX Communication Software, One Months FREE Subscription to the PIPEX Internet 'Backbone', Genesis System Re-Creation File Manager Disk, 10 Metre Telephone Extension Cable (if required) *plus* our Fountain Microsoft Executive Collection (see overleaf) and Full On-Site Installation and Configuration via our Engineers.

Highmead Fountain 'On-Line' Services for Existing PC Owners

IF YOU ALREADY OWN A MODERN IBM COMPATIBLE PC SYSTEM WITHOUT A FAX MODEM, CHOOSE OUR SYSTEM IMPD (INTERNET, MODEM, PIPEX DIAL).

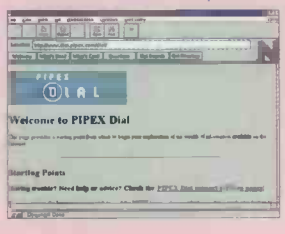
The IMPD package includes:
- Fountain BABT approved internal Modem (14,400 Baud)
- The latest, easy to use PIPEX Dial software
- Telephone extension cable as required
- Delivery and Installation at your site and at your convenience by one of our engineers.

£169.95 (ex. VAT)

Includes one months FREE connection to the Internet, thereafter £4.38 per week subscription in year one and £3.42 per week for subsequent years

IF YOU ALREADY OWN A MODERN IBM COMPATIBLE PC SYSTEM WITH A FAX MODEM (MINIMUM 14,400 BAUD), CHOOSE PIPEX DIAL.

The finest and easiest to use Internet access communications software.



£76.55* (ex. VAT)

Postage and Packing £5.00 (ex. VAT)

Including one months FREE usage of the Internet, thereafter a subscription fee of £3.42 per week (see opposite page)

For existing PC owners, at time of purchase, we offer an 'Upgrade and Check-Up Service'. Our engineers, while connecting you 'On-Line', will check-out your system, as well as upgrade your system's Memory, Hard Disk Drives, Video Cards etc. Ask your Account Manager for details. If engineer installation service is not required, ask your Account Manager for price savings. Turn the page for our latest range of Fountain PCs and services.

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Highmead Technologies

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Scottish Sales Office
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* Does not include installation etc.

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MEET OUR FOUNTAIN DX2 66 SYSTEMS

There are DX2 66s and there are Fountain DX2 66s. Our Fountain DX2 66s use only Intel processors, Fountain manufactured motherboards with PCI Plug-and-Play bus architecture, *plus*, only the finest components to match. Just look at the specification (and software included) below, and compare our prices. Thats all we ask.

Intel DX2™ 66MHz Processor with 8Mb RAM
(Single chip upgradeable CPU, RAM expandable to 128Mb, 8k Internal Cache, 256k Ext Cache)

Latest Toshiba Quad Speed Multi-Session Fast IDE CD-ROM Drive
(MPCII standard, Sub 150ms Access Time, 684Kb per sec data transfer rate, 8.33Mb per sec Burst rate)

540Mb Enhanced IDE HDD

3.5" 1.44Mb Floppy Disk Drive

PCI Bus 32-Bit Expansion Slots
(2 Free 32-Bit PCI Bus and 3 Free 16-Bit ISA Slots)

1Mb Accelerator Graphics Card

SuperScreen 14" .28 Dot Pitch, Energy Saver, Non-Interlaced Super VGA Colour Monitor
(Non-Interlaced, Flicker-Free display, 1024 x 768 resolution, up to 90Hz refresh rate)

Desktop or Midi Tower
(Available for the same price)

12 Months On-Site Warranty Included in the Price
(See Fountain Aftercare Options for additional Service Options)

£999.95 (ex. VAT)

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Ergonomic Mouse
(Two Button, Microsoft Compatible)

HIGHMEAD FAST-TRACK FINANCE
From Around **£42** Per Month
Finance available over 12, 24 and 36 months at an APR of just 19.5% 10% Deposit

THE FOUNTAIN EXECUTIVE COLLECTION INCLUDED IN THE PRICE (ALL MODELS EXCEPT W - WORKSTATION MODELS)

Microsoft Works An Integrated Package with Word Processor, Spreadsheet, Database & Graphics.

Microsoft Publisher The easiest way to create professional Desktop Publishing Documents

Microsoft Productivity Pack An entertaining way to learn how to use your computer

Microsoft Entertainment Pack Light Entertainment with something for everyone.

Microsoft DOS 6.20 Latest version of Microsoft's DOS 6.20

Microsoft Windows 3.11 With Windows for Workgroups.

Fountain DX2 66 EXM (Multi-Media)

- Intel® DX2 66 66Mhz Processor
- 8Mb RAM, 256Kb Cache
- 540Mb Enhanced IDE HDD • 3.5" FDD
- Toshiba Quad Speed CD-ROM Drive
- Fountain 16-Bit Stereo Sound Card
- Amplified Stereo Speakers
- FTN X1 PCI Bus 1Mb Video Card
- 0.28 14" SVGA Colour Monitor
- 2 PCI and 3 ISA Expansion Slots
- Desktop or Midi-Tower Case
- 12 Months On-Site Warranty

Or around £45 per month with Fast-Track Finance

£1069.95 (ex VAT)

Fountain DX2 66 EXCL (CD-ROM 'On-Line')

- Intel® DX2 66 66Mhz Processor
- 8Mb RAM, 256Kb Cache
- 540Mb Enhanced IDE HDD • 3.5" FDD
- Toshiba Quad Speed CD-ROM Drive
- PIPEX DIAL + 14,400 Modem
- FTN X1 PCI Bus 1Mb Video Card
- 0.28 14" SVGA Colour Monitor
- 2 PCI and 3 ISA Expansion Slots
- Desktop or Midi-Tower Case
- 12 Months On-Site Warranty

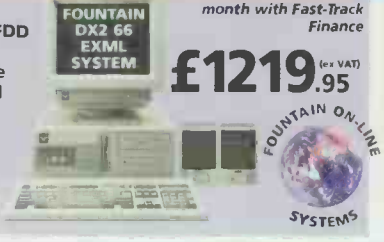
Or around £48 per month with Fast-Track Finance

£1149.95 (ex VAT)

FOUNTAIN ON-LINE SYSTEMS

Fountain DX2 66 EXML (Multi-Media 'On-Line')

- Intel® DX2 66 66Mhz Processor
- 8Mb RAM, 256Kb Cache
- 540Mb Enhanced IDE HDD • 3.5" FDD
- PIPEX DIAL + 14,400 Modem
- Toshiba Quad Speed CD-ROM Drive
- Fountain 16-Bit Stereo Sound Card
- Amplified Stereo Speakers
- FTN X1 PCI Bus 1Mb Video Card
- 0.28 14" SVGA Colour Monitor
- 2 PCI and 3 ISA Expansion Slots
- Desktop or Midi-Tower Case
- 12 Months On-Site Warranty



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FOUNTAIN ON-LINE SYSTEMS

Fountain DX2 66 W (Workstation)

- Intel® DX2 66 66Mhz Processor
- 4Mb RAM, 256Kb Cache
- 540Mb Enhanced IDE HDD • 3.5" FDD
- FTN X1 PCI Bus 1Mb Video Card
- 0.28 14" SVGA Colour Monitor
- 2 PCI and 3 ISA Expansion Slots
- Desktop or Midi-Tower Case
- MS DOS 6.20 & Windows 3.11

(This system does not include Microsoft Works, Publisher, Productivity Pack or Entertainment Pack)

Or around £33 per month with Fast-Track Finance

£799.95 (ex VAT)

Fountain DX2 66 / DX4 100 Specification

• Intel 486DX2 / 4 CPU with PCI Local Bus Addressing • Fast Intel Internal 8Kb Cache • Minimum 4Mb RAM (expandable to 128Mb) • Zif Socket •AMI Bios • Transparent 8042 Emulation for Fast CPU reset and Gate A20 Generation • Shadow RAM for Video and Bios ROM • 3 Free 16Bit Expansion Slots and 2/3 Free PCI Bus Slots • Copy-Back Direct Mapped Cache • 1 x 3.5" and 1 x 5.25" Free Drive Bays (Tower = 4 x 3.5" Free Internal Drive Bays and 3 x 5.25" Free External Drive Bays) • Minimum 540Mb Hard Disk Drive • Average Seek Time = better than 12ms • Cache Buffer = 64Kb with Write Cache • Data Transfer Rate = 6Mb Per Second • 3.5" 1.44Mb High Density Floppy Disk Drive • 2/3 x ISA 16Bit Slots & 3 x PCI Local Bus Slots • 1Mb Graphics Accelerator Card • 14" SVGA Non-Interlaced Colour Monitor • Resolution = 1024 x 768, 800 x 600, 640 x 480, 640 x 350 • Scanning Frequency = Vertical = 47-90Hz, Horizontal = 29KHz to 40KHz • Refresh Rate = up to 90Hz • Distortion <=2.5mm Geometric, <=2.0mm Pincushion • Tilt and Swivel Base • 102 Key UK Enhanced Keyboard • MS-DOS 6.20 • Windows 3.11 with Windows for Workgroups • Mouse • Enhanced IDE interface - support for 4 x E-IDE Hard Disk Drives and 2 x Floppy Disk Drives • Landmark test results (V2.0): 222.72 / 360.00MHz • Power Meter (V1.7): 19.5MIPS • Desktop Case Dimensions: 6" high x 16" wide x 17" deep • Tower Case Dimensions: 18.5" high x 8" wide x 16" deep • Total System Weight including monitor: 31Kg.

Fountain P60 / P75 / P90 / P100 / P120 Specification

• Intel Pentium™ 60-120MHz MicroProcessor options • Internal 16Kb Write-Back Cache split into 8k Code and 8k Data Cache, 256k Direct Mapped, Write Through Second Level Cache • 8Mb RAM (expandable to 128Mb) • Overdrive Processor for Pentium MicroProcessor • Flash AMI Bios • 3 Free 16Bit Expansion Slots and 3 Dedicated PCI Slots, 1 Slot for ISA or PCI • 3 x 3.5" Free Drive Bays and 4 x 5.25" Free External Drive Bays (Tower Case) • Minimum Hard Disk Size - 850Mb • Average Seek Time = better than 11ms • Cache Buffer = 64Kb with Write Cache • Data Transfer Rate = 6Mb Per Second • 3.5" 1.44Mb High Density Floppy Disk Drive • 64-Bit Graphics Engine • 14" SVGA Non-Interlaced Colour Monitor • Resolution = 1024 x 768, 800 x 600, 640 x 480, 640 x 350 • Scanning Frequency = Vertical = 47-90Hz, Horizontal = 29KHz to 48KHz • Refresh Rate = up to 90Hz • Distortion <=2.5mm Geometric, <=2.0mm Pincushion • Tilt and Swivel Base • 102 Key UK Enhanced Keyboard • MS-DOS 6.20 • Windows 3.11 with Windows for Workgroups • Mouse • Enhanced IDE Interface - support for 4 x E-IDE Hard Disk Drives and 2 x Floppy Disk Drives • Desktop Case Dimensions: 6" high x 16" wide x 17" deep • Tower Case Dimensions: 18.5" high x 8" wide x 16" deep • Total System Weight including monitor: 31Kg.

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POWER UP TO OUR FOUNTAIN DX4 100

Lightning performance at a price that's amazing. The DX4 100 is the fastest of Intel's 486 processors and has proved itself to be utterly reliable. If you need that extra speed without too much extra cost, our Fountain DX4 100 systems are for you.

THIS SYSTEM IS DELIVERED AND INSTALLED BY ONE OF OUR ENGINEERS
SEE PAGES 2 AND 3 OF THIS ADVERTISEMENT FOR DETAILS

Intel DX4™ 100MHz Processor with 8Mb RAM
(Single chip upgradeable CPU, RAM expandable to 128Mb, 8k Internal Cache, 256k Ext Cache)

Toshiba Quad Speed IDE CD-ROM Drive
(MPCII standard, Sub 150ms Access Time, 684Kb per sec data transfer rate, 8.33Mb per sec Burst rate)

Fountain F16 16-Bit Stereo Sound Card and Amplified Stereo Speakers

Approved 14,400 Baud Internal Modem
(BABT approval, 14,400bps Send & Receive FAX, High Speed 16,550 UART, CCITT V.32 bis/V.17 14,400)

850Mb Enhanced IDE HDD

3.5" 1.44Mb Floppy Disk Drive

PCI Bus 32-Bit Expansion Slots
(2 Free 32-Bit PCI Bus and 3 Free 16-Bit ISA Slots)

2Mb Accelerator Graphics Card

The Fountain Executive Collection Included in the Price

SuperScreen 14" .28 Dot Pitch, Energy Saver, Non-Interlaced Super VGA Colour Monitor
(Non-Interlaced, Flicker-Free display, 1024 x 768 resolution)

Telephone Extension Cable
(If Required)

Desktop or Midi Tower
(Available for the same price)

PIPEX Dial Software
(Internet Communications Software)

12 Months On-Site Warranty Included in the Price
(See Fountain Aftercare Options for additional Options)

£1419.95 (ex. VAT)

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Fountain DX4 100 EXC (CD-ROM)

- Intel® DX4 100Mhz Processor
- 8Mb RAM, 256Kb Cache
- 850Mb Enhanced IDE HDD • 3.5" FDD
- Toshiba Quad Speed CD-ROM Drive
- FTN X2 PCI Bus 2Mb Video Card
- 0.28 14" SVGA Colour Monitor
- 2 PCI and 3 ISA Expansion Slots
- Desktop or Midi-Tower Case
- 12 Months On-Site Warranty

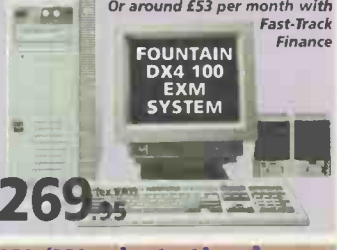
Or around £51 per month with Fast-Track Finance

£1199.95 (ex. VAT)

Fountain DX4 100 EXM (Multi-Media)

- Intel® DX4 100Mhz Processor
- 8Mb RAM, 256Kb Cache
- 850Mb Enhanced IDE HDD • 3.5" FDD
- Toshiba Quad Speed CD-ROM Drive
- Fountain 16-Bit Stereo Sound Card
- Amplified Stereo Speakers
- FTN X2 PCI Bus 2Mb Video Card
- 0.28 14" SVGA Colour Monitor
- 2 PCI and 3 ISA Expansion Slots
- Desktop or Midi-Tower Case
- 12 Months On-Site Warranty

Or around £53 per month with Fast-Track Finance



£1269.95 (ex. VAT)

Fountain DX4 100 EXCL (CD-ROM 'On-Line')

- Intel® DX4 100Mhz Processor
- 8Mb RAM, 256Kb Cache
- 850Mb Enhanced IDE HDD • 3.5" FDD
- PIPEX DIAL + 14,400 Modem
- Toshiba Quad Speed CD-ROM Drive
- FTN X2 PCI Bus 2Mb Video Card
- 0.28 14" SVGA Colour Monitor
- 2 PCI and 3 ISA Expansion Slots
- Desktop or Midi-Tower Case
- 12 Months On-Site Warranty

Or around £57 per month with Fast-Track Finance

£1349.95 (ex. VAT)

FOUNTAIN ON-LINE SYSTEMS

Fountain DX4 100 W (Workstation)

- Intel® DX4 100Mhz Processor
- 4Mb RAM, 256Kb Cache
- 850Mb Enhanced IDE HDD • 3.5" FDD
- FTN X2 PCI Bus 2Mb Video Card
- 0.28 14" SVGA Colour Monitor
- 2 PCI and 3 ISA Expansion Slots
- Desktop or Midi-Tower Case
- 12 Months On-Site Warranty
- MS DOS 6.20 & Windows 3.11

(This system does not include Microsoft Works, Publisher, Productivity Pack or Entertainment Pack)

Or around £42 per month with Fast-Track Finance

£999.95 (ex. VAT)

HIGHMEAD ON-SITE 'AFTERCARE' WARRANTY OPTIONS

*** A 10% DISCOUNT IS AVAILABLE FOR 'ON-LINE' SYSTEMS.**
eg 1.
Fountain DX2 66 EX Years 2 & 3 - System cost £999.95 x 8.5% = £85.00 + VAT
eg 2.
Fountain P5-90 EXLM On-Line Year 2 only - System cost £2149.95 x 5% = £107.49 less 10% = £96.74 + VAT
eg 3.
Fountain P5-100 EXL On-Line Years 2 & 3 - System cost £2299.95 x 8.5% = £195.50 less 10% = £175.95 + VAT

PERIOD	CHARGE	MINIMUM CHARGE
Year One	£ Zero	(Included in System Price)
Year Two	5% of Total System Cost	£50.00
Years Two and Three	8.5% of Total System Cost	£85.00

*** All AfterCare Warranties include Technical Support**

NETWORK SYSTEMS
ON-SITE MAINTENANCE
24 Hour / 4 Hour / 2 Hour
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Highmead Technologies

FOUNTAIN

MAY '95
SALES LINES
OPEN TILL 9.00pm

For Further Information or to Order Call 01707-27-26-27

LINES OPEN: Monday to Friday 9.00am to 9.00pm. Saturdays and Bank Holidays 9.30am to 2.30pm. Closed Sundays.

Callers by appointment only. Multiple demonstrations only on Saturdays. Highmead Technologies Limited, Jupiter House, Travellers Lane, Welham Green, Herts. AL9 7DA. Fax: 01707-26-74-00.

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MEET OUR FOUNTAIN P75 EXC

Awesome Pentium™ Processor Power from Fountain starts with our Fountain P75 models. The P75 comes in CD-ROM, Multi-Media, On-Line, Video Conferencing and Workstation configurations, all feature the very latest PCI Plug-and-Play technology. All our systems with Pentium™ processors will enable you to blaze through the most demanding of graphic intensive and computational heavy applications and run more conventional applications at speeds hitherto unheard of.

Pentium™ 75MHz Processor with 8Mb RAM
(Single chip upgradeable CPU, RAM expandable to 128Mb, 16k Internal Cache, 256k Ext Cache)

Toshiba Quad Speed IDE CD-ROM Drive
(MPCII standard, Sub 150ms Access Time, 684Kb per sec data transfer rate, 8.33Mb per sec Burst rate)

850Mb Enhanced IDE HDD

3.5" 1.44Mb Floppy Disk Drive

PCI Bus 32-Bit Expansion Slots
(2 Free 32-Bit PCI Bus and 3 Free 16-Bit ISA Slots)

2Mb PCI Bus Accelerator Graphics Card

SuperScreen 14" .28 Dot Pitch, Energy Saver, Non-Interlaced Super VGA Colour Monitor
(Non-Interlaced, Flicker-Free display, 1024 x 768 resolution, up to 90Hz refresh rate)

Desktop or Midi Tower
(Available for the same price)

12 Months On-Site Warranty Included in the Price
(See Fountain Aftercare Options for additional Options)

£1299.95 (ex. VAT)

intel inside pentium PROCESSOR

HIGHMEAD FAST-TRACK FINANCE
From Around **£52** Per Month
Finance available over 12, 24 and 36 months at an APR of just 19.5% 10% Deposit

THE FOUNTAIN EXECUTIVE COLLECTION INCLUDED IN THE PRICE (ALL MODELS EXCEPT W - WORKSTATION MODELS)

Microsoft Works An Integrated Package with Word Processor, Spreadsheet, Database & Graphics.

Microsoft Publisher The easiest way to create professional Desktop Publishing Documents

Microsoft Productivity Pack An entertaining way to learn how to use your computer

Microsoft Entertainment Pack Light Entertainment with something for everyone

Microsoft DOS 6.20 Latest version of Microsoft's DOS 6.20

Microsoft Windows 3.11 With Windows for Workgroups.

Fountain P75 EXM (Multi-Media)

- Pentium™ 75Mhz Processor
- 8Mb RAM, 256Kb Cache
- 850Mb Enhanced IDE HDD • 3.5" FDD
- Toshiba Quad Speed CD-ROM Drive
- Fountain 16-Bit Stereo Sound Card
- Amplified Stereo Speakers
- FTN X2 PCI Bus 2Mb Video Card
- 0.28 14" SVGA Colour Monitor
- 2 PCI and 3 ISA Expansion Slots
- Desktop or Midi-Tower Case
- 12 Months On-Site Warranty

Or around £58 per month with Fast-Track Finance

£1369.95 (ex. VAT)

Fountain P75 EXCL (CD-ROM 'On-Line')

- Pentium™ 75Mhz Processor
- 8Mb RAM, 256Kb Cache
- 850Mb Enhanced IDE HDD • 3.5" FDD
- PIPEX DIAL + 14,400 Modem
- Toshiba Quad Speed CD-ROM Drive
- FTN X2 PCI Bus 2Mb Video Card
- 0.28 14" SVGA Colour Monitor
- 2 PCI and 3 ISA Expansion Slots
- Desktop or Midi-Tower Case
- 12 Months On-Site Warranty

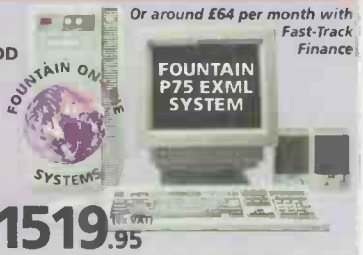
Or around £61 per month with Fast-Track Finance

£1449.95 (ex. VAT)

Fountain P75 EXML (Multi-Media 'On-Line')

- Pentium™ 75Mhz Processor
- 8Mb RAM, 256Kb Cache
- 850Mb Enhanced IDE HDD • 3.5" FDD
- PIPEX DIAL + 14,400 Modem
- Toshiba Quad Speed CD-ROM Drive
- Fountain 16-Bit Stereo Sound Card
- Amplified Stereo Speakers
- FTN X2 PCI Bus 2Mb Video Card
- 0.28 14" SVGA Colour Monitor
- 2 PCI and 3 ISA Expansion Slots
- Desktop or Midi-Tower Case
- 12 Months On-Site Warranty

Or around £64 per month with Fast-Track Finance



£1519.95 (ex. VAT)

Fountain P75 W (Workstation)

- Pentium™ 75Mhz Processor
- 4Mb RAM, 256Kb Cache
- 850Mb Enhanced IDE HDD • 3.5" FDD
- FTN X2 PCI Bus 2Mb Video Card
- 0.28 14" SVGA Colour Monitor
- 2 PCI and 3 ISA Expansion Slots
- Desktop or Midi-Tower Case
- 12 Months On-Site Warranty
(This system does not include Microsoft Works, Publisher, Productivity Pack or Entertainment Pack)

Or around £46 per month with Fast-Track Finance

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PERSONAL VIDEO CONFERENCING FROM HIGHMEAD TECHNOLOGIES

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- 16Mb RAM, 256Kb Cache
- 850Mb Enhanced IDE HDD
- Toshiba Quad Speed CD-ROM Drive
- 3.5" Floppy Disk Drive
- FTN X2 PCI Bus 2Mb Video Card
- 0.28 15" SVGA Colour Monitor
- 2 PCI and 3 ISA Expansion Slots
- High Resolution Intel™ Video Camera
- ISDN Communications Card
- Video Compression / De-compression Card
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- Desktop or Midi-Tower Case
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MEET OUR FOUNTAIN P90 EXC & P100 EXC

Pentium™ 90MHz Processor with 16Mb RAM
(Single chip upgradeable CPU, RAM expandable to 128Mb, 16k Internal Cache, 256k Ext Cache)

Toshiba Quad Speed IDE CD-ROM Drive
(MPCII standard, Sub 150ms Access Time, 684Kb per sec data transfer rate, 8.33Mb per sec Burst rate)

1Gb Enhanced IDE HDD

3.5" 1.44Mb Floppy Disk Drive

PCI Bus 32-Bit Expansion Slots
(2 Free 32-Bit PCI Bus and 3 Free 16-Bit ISA Slots)

Fountain X4 PCI Bus 4Mb Accelerator Graphics Card

SuperScreen 15" .28 Dot Pitch, Energy Saver, Non-Interlaced Super VGA Colour Monitor
(Non-Interlaced, Flicker-Free display, 1280 x 1024 resolution, up to 90Hz refresh rate)

Desktop or Midi Tower
(Available for the same price)

12 Months On-Site Warranty Included in the Price
(See Fountain Aftercare Options for additional Options)

£1849.95 (ex. VAT)

HIGHMEAD FAST-TRACK FINANCE
From Around **£78** Per Month
Finance available over 12, 24 and 36 months at an APR of just 19.5% 10% Deposit

Specification as P90 EXC opposite but with Pentium™ 100MHz Processor and 17" Super VGA Colour Monitor.

£2149.95 (ex. VAT)
Or around £91 per month with Fast-Track Finance

Fountain P90 EXM

- Pentium™ 90Mhz Processor
- 16Mb RAM, 256Kb Cache
- 1Gb Enhanced IDE HDD
- 3.5" Floppy Disk Drive
- Toshiba Quad Speed CD-ROM
- Fountain 16-Bit Sound Card
- Amplified Stereo Speakers
- FTN X4 PCI Bus 4Mb Graphics
- 0.28 15" SVGA Colour Monitor
- 2 PCI and 3 ISA Expansion Slots
- Desktop or Midi-Tower Case
- 12 Months On-Site Warranty

£1919.95 (ex VAT)
Or around £81 per month with Fast-Track Finance

Fountain P90 EXCL

- Pentium™ 90Mhz Processor
- 16Mb RAM, 256Kb Cache
- 1Gb Enhanced IDE HDD
- 3.5" Floppy Disk Drive
- Toshiba Quad Speed CD-ROM
- PIPEX DIAL + 14,400 Modem
- FTN X4 PCI Bus 4Mb Graphics
- 0.28 15" SVGA Colour Monitor
- 2 PCI and 3 ISA Expansion Slots
- Desktop or Midi-Tower Case
- 12 Months On-Site Warranty

£1999.95 (ex VAT)
Or around £80 per month with Fast-Track Finance

Fountain P100 EXM

Specification as P100 EXC above but with:
- Fountain 16-Bit Sound Card
- Amplified Stereo Speakers

£2219.95 (ex VAT)
Or around £94 per month with Fast-Track Finance

Fountain P100 EXCL

Specification as P100 EXC above but with:
- PIPEX DIAL + 14,400 Modem

£2299.95 (ex VAT)
Or around £97 per month with Fast-Track Finance

Fountain P100 EXML

Specification as P100 EXC above but with:
- PIPEX DIAL + 14,400 Modem
- Fountain 16-Bit Sound Card
- Amplified Stereo Speakers

£2369.95 (ex VAT)
Or around £100 per month with Fast-Track Finance

Fountain P90 EXML

- Pentium™ 90Mhz Processor
- 16Mb RAM, 256Kb Cache
- 1Gb Enhanced IDE HDD
- 3.5" Floppy Disk Drive
- PIPEX DIAL + 14,400 Modem
- Toshiba Quad Speed CD-ROM
- Fountain 16-Bit Sound Card
- Amplified Stereo Speakers
- FTN X4 PCI Bus 4Mb Graphics
- 0.28 15" SVGA Colour Monitor
- 2 PCI and 3 ISA Expansion Slots
- Desktop or Midi-Tower Case
- 12 Months On-Site Warranty

£2069.95 (ex VAT)
Or around £87 per month with Fast-Track Finance

Fountain P90 W

- Pentium™ 90Mhz Processor
- 8Mb RAM, 256Kb Cache
- 1Gb Enhanced IDE HDD
- 3.5" Floppy Disk Drive
- FTN X4 PCI Bus 4Mb Graphics
- 0.28 14" SVGA Colour Monitor
- 2 PCI and 3 ISA Expansion Slots
- Desktop or Midi-Tower Case
- 12 Months On-Site Warranty
- MS DOS 6.20 & Windows 3.11

(This system does not include Microsoft Works, Publisher, Productivity Pack or Entertainment Pack)

£1499.95 (ex VAT)
Or around £63 per month with Fast-Track Finance

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Fountain P120 EXML

- Pentium™ 120Mhz Processor
- 16Mb RAM, 256Kb Cache
- 1.28Gb Enhanced IDE HDD
- 3.5" Floppy Disk Drive
- PIPEX DIAL + 14,400 Modem
- Toshiba Quad Speed CD-ROM
- Fountain 16-Bit Sound Card & Amplified Speakers
- FTN X4 PCI Bus 4Mb Graphics
- 0.27 17" SVGA Monitor
- 2 PCI and 3 ISA Expansion Slots
- Desktop or Midi-Tower Case
- 12 Months On-Site Warranty

£2499.95 (ex VAT)

Or around £106 per month with Fast-Track Finance

FOUNTAIN FM1 MOVIE MASTER FULL SCREEN, FULL MOTION VIDEO SYSTEMS

Highmead take Multi-Media to the next dimension and bring you Full Screen, Full Motion Video at 24-Bit resolution and high quality Digitised Stereo Sound using the State of the Art MPEG card manufactured by Ace Coin in the UK. Now as well as standard Multi-Media CD-ROMs, you can learn from and enjoy the latest interactive video CDs. You will be able to freeze frame, draw down and print any frame and even advance the CD frame by frame. The Ace Coin MPEG card complies to ISO 11172 MPEG (white book) standard of video and the latest Phillps video CDs. Fountain MPEG systems start from £1449.95 (ex. VAT), please call for full details.

intel inside pentium PROCESSOR

Highmead Technologies

FOUNTAIN

Scottish Sales Office
Call 01475 744 488
Fax 01475 743 828

For Further Information or to Order Call 01707-27-26-27

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CALL ESL NOW ON 0171 498 7816

ESL

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ESL 486 VLB

- Vesa Local Bus motherboard
- Upgrade with ZIF socket
- Latest AMI WIN BIOS
- 256K cache memory
- 4MB SIMM Memory upgradable to 64MB
- Western Digital Enhance IDE hard drive
- 1.44MB Mitsubishi floppy drive
- VLB ENHANCE IDE controller card
- 2 serial, 1 parallel and 1 game port
- VLB 1MB Cirrus Logic 5429 (New)
- Desktop or Minitower case with 200w PSU Minitower
- 14" Samsung SVGA Syncmaster 3 LR monitor MPRII
- 102 key enhance UK Keyboard

Upgrade options:

Extra 4MB RAM	£99
15" Samsung 15GL monitor	£80
17" Samsung 17GLS monitor	£380
17" Idek Vision Master monitor	£360
Midi Tower case & 230W PSU	£23
Full Tower case & 230W PSU	£46
Cherry soft touch keyboard	£10
Fujitsu ergonomic keyboard click	£15
Microsoft natural keyboard	£49
Dos 6.22 & Windows 3.11 Workgroup	£79
3 button mouse & mat	£10
Logitech Pilot mouse	£19
Microsoft Mouse V2 2 button	£29
Fax modem US Robotics Sportster	£129
Quad speed CD Rom drive	£135

PC today RECOMMENDED

COMPUTER SHOPPER BEST BUDGET BUY

Computer BUYER RECOMMENDED

SYSTEM PRICE	540MB	730MB	850MB	1GB	1.2GB
486SX 33MHZ INTEL	£629	£659	£669	£729	£749
486SX2/50MHZ INTEL	£639	£669	£679	£739	£759
486DX2/66MHZ AMD	£659	£689	£699	£759	£779
486DX2/66MHZ INTEL	£669	£699	£709	£769	£789
486DX2/80MHZ AMD	£669	£699	£709	£769	£789
486DX4/100MHZ AMD	£709	£739	£749	£809	£829
486DX4/100MHZ INTEL	£739	£769	£779	£839	£859

Multimedia Upgrade Options:

1. **Quad Speed Multimedia** **£199**
   Sound Blaster 16 Compatible; Mitsumi FX400 quad speed CD: MS Encarta 95: Speakers.
2. **Sound Blaster Discovery Pack:** **£219**
   Sound Blaster 16 Card; Panasonic double speed CD Drive 563; Stereo speakers with Grolier Multimedia Encyclopedia; Aldus Photostyler and 7 cd titles.
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   Sound Blaster 16 ASP Card; Panasonic double speed CD Drive 563; Headphones; with MS OFFICE PROFESSIONAL V4.3 and MS ENCARTA.

486DX 2/66 PCI
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- 256K Cache memory
- Latest Phoenix BIO
- Upgradeable to P24T ZIF socket
- 8MB Simm memory
- Western Digital IDE
- 1.44MB Floppy drive
- Built in enhance IDE & FDD
- 2 fast serial & parallel port
- IMB Diamond stealth 64D
- Minitower & 200W PSU
- 14" Samsung monitor
- 102 key UK keyboard

MULTIMEDIA PC
PENTIUM 66 PCI
PENTIUM 75 PCI

- 256K Cache memory
- Support flash BIOS
- 8MB Simm memory
- Western Digital IDE enhance
- 1.44MB Floppy drive
- PCI enhance IDE
- 2 serial 1 parallel 1 game
- 2MB Diamond Stealth 64
- Minitower & 200W PSU
- 14" Samsung monitor
- 102 key UK keyboard
- 16 bit Sound Card
- Quad speed CD drive
- Stereo Speakers

MULTIMEDIA PC
PENTIUM 90 PCI
PENTIUM 100 PCI

- Intel Motherboard
- 256K Cache memory
- Support flash BIOS
- 8MB Simm memory
- Western Digital IDE
- 1.44MB Floppy drive
- Built in Enhance IDE controller
- 2 serial 1 parallel 1 game
- 2MB Diamond Stealth 64
- Minitower & 200W PSU
- 15" Samsung monitor
- Cherry soft touch keyboard
- Sound Blaster & Speakers
- Quad speed CD Rom drive

COMPUTER BUYER
RECOM MARCH '95
PENTIUM 90MHz PCI

- Intel motherboard
- 256K Cache memory
- Support flash BIOS
- 8MB Simm RAM
- Western Digital enhance IDE drive
- 1.44MB Floppy drive
- Built in enhance IDE & FDD
- 2 x fast serial & parallel port
- 2MB Diamond stealth 64 VRAM
- Miditower & 200W PSU
- 15" Samsung 15GL monitor
- Cherry soft touch keyboard
- Microsoft mouse v2
- DOS 6.22 & WIN 3.11

540MB £889 / £979	540MB £1149 / £1189	540MB £1499 / £1609	540MB £1499
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Warranty: All ESL systems are covered by 3 year Return to Base warranty; First year includes parts & labour; second and third years free labour. Optional on-site warranty available @ £35. 14 days money back guarantee. Free lifetime telephone support.

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ISA MOTHERBOARDS
386SX 40MHz £49

VESA LOCAL BUS MOTHERBOARD
AMI WIN BIOS with password; UMC/SIS/OPTI CHIPSETS; 3 VESA LOCAL BUS slots + 3x16 bit & 1x8 bit slots; CPU upgradeable; Max. 64MB SIMM on board;
Standard half size 8.6"x9.8" Green function
ZIF Socket; 8 x 30pin or 4 x 30pin + 2 x 72pin Simm Sockets; 3.5V DX4 compatible
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486DX 50MHz 256K Cache INTEL £249
486DX2/66MHz 256K Cache INTEL £149
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486DX4/100MHz 256K Cache AMD £189

PCI MOTHERBOARD
Phoenix BIOS 3 x PCI + 4 x ISA slots; 4 x 72 pin SIMM socket; Built in PCI enhance IDE
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486DX4/100 256K Cache INTEL £239
486DX2/66 256K Cache AMD £159
486DX4/100 256K Cache AMD £209
Options = Built in enhance IDE + FDD controller, Built in fast serial ports and parallel port ..... add £30

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Intel chipset; Intel Motherboard 3 x PCI + 5x16bit slots; built in enhance IDE & FDD controller; 2 x fast serial ; 1 x parallel ports
Pentium 66MHz 256K £329
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Pentium 90MHz 256K £539
Pentium 100Mhz 256K £649

PENTIUM VLB + ISA + PCI MOTHERBOARD
Pentium 66MHz 256K £289
Pentium 75MHz 256K £329
Pentium 90MHz 256K £459

MOTHERBOARDS WITHOUT CPU
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VLB 486DX 256KB Cache 3 Vesa slots; 8x30 & 2x72 pin Simms £79
PCI 486DX 256KB Cache £79
PCI 486DX 256KB Cache with EIDE & FDD, fast serial & parallel £99
EISA 486DX 256 Cache £229

CPU
INTEL SX33 ..... £56
INTEL DX2/50 ..... £69
INTEL DX2/66 ..... £89
INTEL DX50 ..... £179
INTEL DX4/100 ..... £159
AMD DX2/66 ..... £79
AMD DX4/100 ..... £129
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All Caviar series are Enhance IDE Drives
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SCSI Cable 3 Heads £9
SCSI Cable external 50-50 ..... £15
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External Box for 1xSCSI drive £79
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I/O Card with 2 serial, 1 parallel, 1 game port £10
IDE Card control 2 HDD 2 FDD with 2S/1P/1G ports & cables £15
IDE Card with 16550 UART £19
Enhance VLB IDE Card 2FDD 4HDD with 2S91G pot & cables £19
Enhance VLB IDE 2FDD 2.8BMB 2HDD with fast serial 16550 & cables £29
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PCI IDE + FDD Controller with fast serial ports £49
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Adaptec 1542C ISA SCSI HDD & FDD Controller kit with software £169
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Trident 8900 Chip with 256K £25
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VESA LOCAL BUS DISPLAY CARDS
All support 16 million true colours
Cirrus Logic 5429 1MB £59
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Diamond Stealth 64D S3 1MB DRAM £89
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Diamond Stealth 64 Vedio 4MB VRAM £349
MPEG daughter board for Diamond £189
MATROX MGA Ultima Plus 2MB VRAM £289

PCI Graphic Accelerator
Diamond Stealth 64D 1MB DRAM £89
Diamond Stealth 64D 2MB DRAM £129
Diamond Stealth 64 Vedio 2MB VRAM £219
Diamond Stealth 64 Vedio 4MB VRAM £349
Hercules Dynamite Power 2MB VRAM £209
Hercules Graphite Terminator 64 2MB VRAM £279
Hercules Graphite Terminator 64 4MB VRAM £429
MATROX MGA Impression plus 2MB VRAM £259
MATROX MGA Impression plus 4MB VRAM £459
MATROX MGA Impression plus 2MB VRAM DAC £329
Vediologic Graphix Star 500 1MB ..... CALL
Vediologic Graphix Star 500 2MB ..... CALL
Vediologic Graphix Star 700 2MB ..... CALL
Vediologic Graphix Star 700 4MB ..... CALL
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MONITORS

14" Mono VGA monitor £79

Samsung Syncmaster with 1 Year or 2 Year on-site maintenance
Low radiation MPRII; Green function Display Power Management Signalling
14" Syncmaster 3 NI 800 x 600 ..... £169
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15" Vision Master MF8115 0.28mm 30-65Hz 1 year warranty £259
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21" Vision Master MF8221 0.28mm 24.8-85KHz £1249
21" M19121 0.30mm AG 24.8-92KHz £1319
21" Vision Master MF8621 0.26mm 24.8-85KHz £1645
2 year on-site warranty for 17" £45
2 year on-site warranty for 21" £55

Philips with 1 Year on-site warranty
14" 14C 800x600 NI £179
14" 14A 1024x768 NI £219
15" 15A 1024x768 NI with speakers £299
17" 17C 1024x700 NII with speakers £439
17" 17A 1280x1024 NI £689

Sony with 1 Year return to base warranty
15" 155F Trinitron £309
17" 1730S Trinitron £619
17" 17SE 1 Trinitron (New) £819
20" 30SE 1 Trinitron £140

Anti Glare Screen Filter for 14" £22
Monitor extension cable £10
Monitor splitter cable £18

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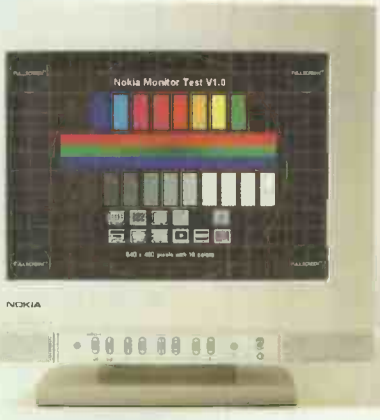

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HP C1533A	4GB	16GB	30MB	45MB	£675
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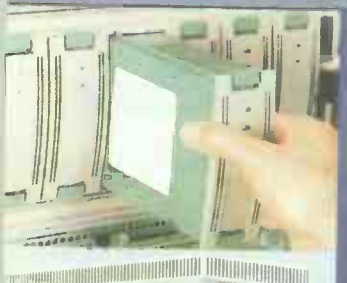

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QUANTUM	1.0GB	IDE	1MB	12MS	£275
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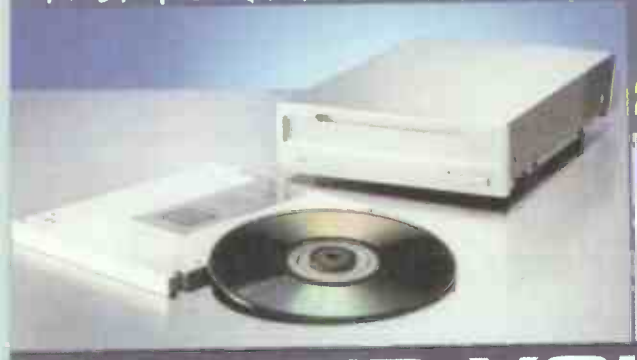
A4 27PPM DOCUMENT SCANNER	£3500
A3 20PPM DOCUMENT SCANNER	£4900
7 ROM DUAL SPEED TOWER	£2200
7 ROM QUAD SPEED TOWER	£2700
14 ROM DUAL SPEED TOWER	£4500
14 ROM QUAD SPEED TOWER	£5200
18 ROM JUKEBOX	£1350
500 ROM JUKEBOX	£12500
CD MANAGEMENT SOFTWARE	POA
DOCUMENT MANAGEMENT SOFTWARE	POA

RE-WRITABLE OPTICAL DRIVES

A SAFER AND EXPANDABLE ALTERNATIVE TO HARD DRIVES



PRICES ARE FOR INTERNAL + £75 FOR EXTERNAL

230MB DRIVES INCLUDE 5 MEDIA AND 1.3GB INCLUDE 1 MEDIA

230MB + 5 DISKS £500 1.3GB + 1 DISK £1200

IBM	230MB	£500	PANASONIC	1.5GB	£1400
FUJITSU	230MB	£500	MAXOPTIX	1.3GB	£1300
SONY	1.3GB	£1200	HITACHI	2.0GB	£1650
SHARP	1.3GB	£1200	HP	1.3GB	£1550
IBM	1.3GB	£1500	JUKEBOX	20GB	£4500

MASTER YOUR OWN CD ROMS

COMPLETE EXTERNAL UNITS
+ MASTERING SOFTWARE
+ 10 CD-R BLANKS
+ CABLES

PINNACLE	DUAL SPEED	£1400
PHILLIPS	DUAL SPEED	£1595
YAHMAHA	QUAD SPEED	£2400

RE-WRITABLE MEDIA

QTY	1	5	10
128MB	£18	£15	£14
230MB	£25	£22	£20
650MB	£55	£50	£45
1.3GB	£65	£60	£55

CD BLANKS

QTY	PRICE
10	£6.50
50	£6.00
100	£5.00

MrPC Systems

MrPC high performance systems are unbeatable In terms of quality, performance and value. We use the highest quality hardware components and deliver to you at the best prices in the UK. We achieve these low prices because of our huge buying power and by letting you choose the software you need rather than bundling software with systems. We guarantee you will not find better prices for the same specification and quality of components. The examples shown here are just some of the configurations available. We can tailor make a system to your requirements using the simple 5 stage procedure opposite.

"I will not be beaten on price"

*see my price guarantee

486 SYSTEMS

Our VESA 486 systems use the highest performance components and are future-proof with chip-change upgradeablity. All systems come with 256K cache, 1Mb video and high quality keyboad and mouse.

MrPC 486DX2-66

- 486DX2-66 processor
- 4Mb RAM expandable by SIMMS
- Pentium technology upgradeable
- 256K external SRAM cache
- 3.5" 1.44Mb floppy drive
- 1Mb VESA bus graphics with Windows accelerator
- IDE hard and floppy controller
- Parallel, 2 serial & keyboard ports
- Expandable desktop case
- 5 drive bays and 7 expansion slots (2 VESA)
- 102 Enhanced keyboard
- Microsoft compatible mouse

MrPC 486DX2-80

- 486DX2-80 processor
- 4Mb RAM expandable by SIMMS
- Pentium technology upgradeable
- 256K external SRAM cache
- 3.5" 1.44Mb floppy drive
- 1Mb VESA bus graphics with Windows accelerator
- IDE hard and floppy controller
- Parallel, 2 serial & keyboard ports
- Expandable desktop case
- 5 drive bays and 7 expansion slots (2 VESA)
- 102 Enhanced keyboard
- Microsoft compatible mouse

MrPC 486DX4-100

- 486DX4-100 processor
- 4Mb RAM expandable by SIMMS
- Pentium technology upgradeable
- 256K external SRAM cache
- 3.5" 1.44Mb floppy drive
- 1Mb VESA bus graphics with Windows accelerator
- IDE hard and floppy controller
- Parallel, 2 serial & keyboard ports
- Expandable desktop case
- 5 drive bays and 7 expansion slots (2 VESA)
- 102 Enhanced keyboard
- Microsoft compatible mouse

4Mb System (as spec)	£359	£379	£409
4Mb 14" Screen, 540Mb	£639	£659	£689
8Mb 15" Screen, 850Mb	£869	£889	£919

"Lowest Prices in the UK"
*see my price guarantee

586 SYSTEMS

Mr PC 586 systems use the latest Intel Pentium™ processors with PCI bus and superfast PCI graphics. These systems offer you the highest performance at the lowest price!

MrPC P60

- Intel Pentium 60 processor
- 8Mb RAM expandable by SIMMS
- 256K external SRAM cache
- 3.5" 1.44Mb floppy drive
- PCI Bus with 4 PCI slots
- 1Mb PCI bus graphics with Windows accelerator
- PCI IDE hard and floppy controller
- Parallel, 2 serial & keyboard ports
- Expandable desktop case
- 5 drive bays and 7 expansion slots (4 PCI)
- 102 Enhanced keyboard
- Microsoft compatible mouse

MrPC P75

- Intel Pentium 75 processor
- 8Mb RAM expandable by SIMMS
- 256K external SRAM cache
- 3.5" 1.44Mb floppy drive
- PCI Bus with 4 PCI slots
- 1Mb PCI bus graphics with 64-bit Windows accelerator
- PCI IDE hard and floppy controller
- Parallel, 2 serial & keyboard ports
- Expandable desktop case
- 5 drive bays and 7 expansion slots (4 PCI)
- 102 Enhanced keyboard
- Microsoft compatible mouse

MrPC P90/P100

- Intel Pentium 90 (or Pentium 100 Processor £60 extra)
- 8Mb RAM expandable by SIMMS
- 256K external SRAM cache
- 3.5" 1.44Mb floppy drive
- PCI Bus with 4 PCI slots
- 1Mb PCI bus graphics with 64-bit Windows accelerator
- PCI IDE hard and floppy controller
- Parallel, 2 serial & keyboard ports
- Expandable desktop case
- 5 drive bays and 7 expansion slots (4 PCI)
- 102 Enhanced keyboard
- Microsoft compatible mouse

8Mb System (as spec)	£719	£779	£999
8Mb 14" Screen, 540Mb	£999	£1059	£1279
8Mb 15" Screen, 850Mb	£1119	£1179	£1399

MrPC Multimedia Systems

Any of our systems can be fitted with our high performance multimedia options to produce powerful multimedia systems.

Each option includes:-

- Quad speed or double speed IDE CD-ROM drive
- 16-bit high quality stereo sound card with Sound software
- Twin high quality stereo speakers

Double Speed Multimedia option **£120**

Quad Speed Multimedia option **£160**

Terms & conditions
All prices are subject to VAT (17.5%) and delivery and may change without notice. Goods are normally delivered within a few days of cleared payment. All orders will be fulfilled within 28 days unless otherwise notified. No surcharges are made to Access, Visa, Amex or Switch. Goods are not supplied on a trial basis. Credit account orders are normally 3% extra. Errors and omissions exempted. Business user prices shown. End user enquiries welcome. All trademarks ackowledged.

AMERICAN EXPRESS Card SWITCH

"LET ME BUILD YOUR SYSTEM"

Simply follow the 5 stage process to specify the system most suited to your requirements.

1. Select the processor base system (See specifications opposite)

☐ 486DX2-66 4Mb	£359
☐ 486DX2-80 4Mb	£379
☐ 486DX4-100 4Mb	£409
☐ Pentium 60 8Mb	£719
☐ Pentium 75 8Mb	£779
☐ Pentium 90 8Mb	£999
☐ Pentium 100 8Mb	£1059

2. Select the IDE hard drive

☐ 540Mb	£120
☐ 850Mb	£170
☐ 1Gb	£250

3. Select the screen. All screens are SVGA non-interlaced with 0.28 or better dot pitch and low radiation.

☐ 14" SVGA	£160
☐ 15" SVGA	£230
☐ 17" SVGA	£440

4. Select the CD/Multimedia options

☐ Double speed CD-ROM drive alone	£70
☐ Double speed CD-ROM plus 16-bit soundcard and speakers	£120
☐ Quad speed CD-ROM drive alone	£110
☐ Quad speed CD-ROM plus 16-bit sound card and speakers	£160

5. Additional options

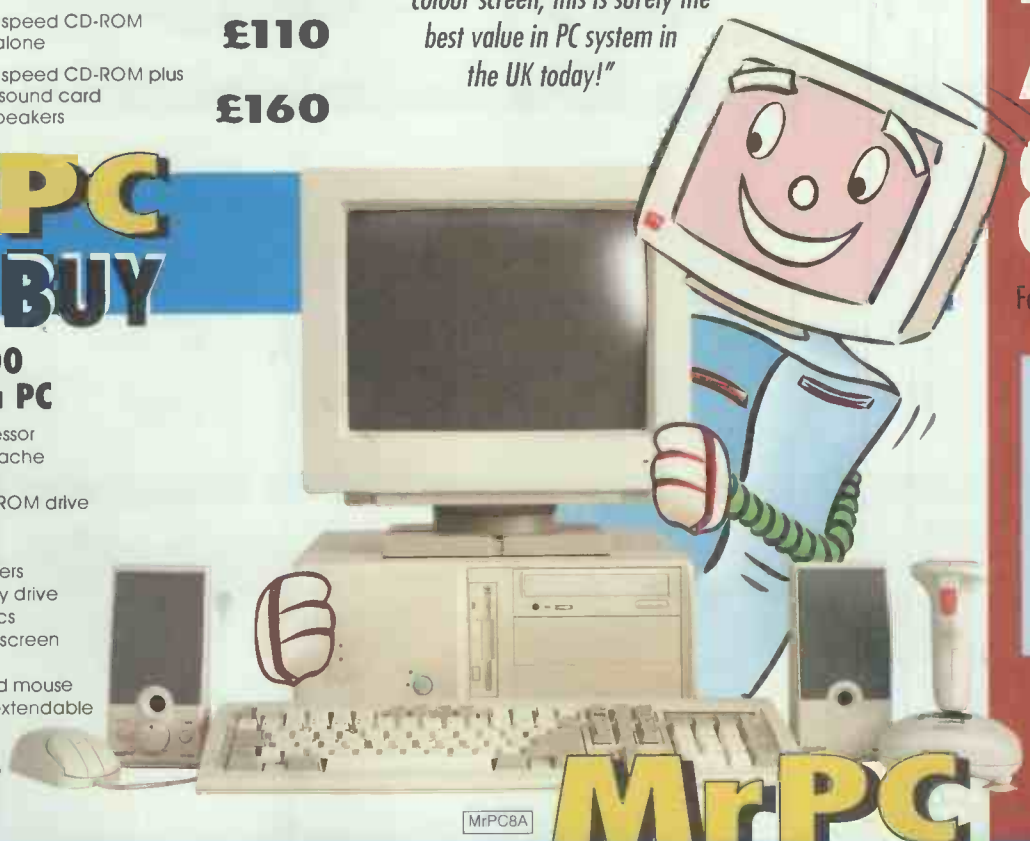
☐ RAM upgrade per 4Mb	£110
☐ 486 video RAM upgrade to 2Mb	£35
☐ Pentium video RAM upgrade to 2Mb	£40
☐ 250Mb Tape streamer	£100
☐ 700Mb Tape streamer	£220
☐ 9624 approved data/fax modem	£35
☐ 14.4 approved data/fax modem	£100
☐ PC joystick	£10
☐ 16-bit sound card	£40
☐ Twin stereo speakers	£10

Pre-loaded Software Options

☐ PC DOS 6.3 and Windows 3.11	£40
☐ MS DOS 6.22 and Windows™ 3.11 for Workgroups	£60

The above options in stages 2 - 5 can only be purchased with a PC system

*"Take a look at my 'Best Buy' 486DX4-100 Multimedia System which comes with an incredible specification for just **£999+VAT**. With fast 850Mb hard drive, 100MHz 486DX4 Processor, quad speed CD Multimedia, 8Mb RAM and a superb crisp sharp SVGA colour screen, this is surely the best value in PC system in the UK today!"*



MrPC BEST BUY

486DX4-100 Multimedia PC

- 486DX4-100 processor
- 8Mb RAM; 256K cache
- 850Mb hard drive
- Quad speed CD-ROM drive
- 16-bit sound card
- PC joystick
- Twin stereo speakers
- 3.5" 1.44Mb floppy drive
- 1Mb VESA graphics
- 14" SVGA 0.28dp screen
- Standard ports
- 102 Keyboard and mouse
- 12mth Warranty extendable to 3 years

£999
SPECIAL PRICE

MrPC8A

MrPC

All prices exclude delivery and VAT

BLACKBURN ROAD, SIMONSTONE, BURNLEY BB12 7GT
TELEPHONE 01282 777 888 FAX 01282 777 209

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8. Comprehensive After-Sales Service
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***MR PC PRICE GUARANTEE**

Due to our huge buying power, our advertised prices are normally the lowest in the UK. If you find a lower advertised price on any current ex. stock product which is confirmed to be genuine, we will beat that price. This guarantee applies to our advertised prices and excludes clearance products sold below cost.

MrPC SYSTEMS

"My Best Selling Printers"

1. HP DeskJet 520 ..... £192
2. Canon BJ10sx £139
3. HP Deskjet 540 ..... £203
4. HP LaserJet 4L ..... £Call
5. Epson Stylus 800+ £167
6. HP LaserJet 4 Plus £935
7. HP DeskJet 320 ..... £163
8. Epson EPL 5600 ..... £579
9. Panasonic KXP2124M . £197
10. OKI 400EX £239
11. Canon BJ200EX £188
12. Star LC24-200C £198
13. NEC P2Q £97
14. Canon BJC600E £360

"you won't find lower prices"

MR PC SYSTEMS

Mr PC 486-50 £749

Mr. PC 486 Systems

- 486DX2-66, 486DX2-80 or 486DX4-100 processor
- 4Mb RAM expandable by SIMMS
- Pentium technology upgradeable
- 256K external SRAM Cache
- 540MB hard drive
- 3.5" 1.44Mb floppy drive
- 1Mb VESA bus graphics with Windows accelerator
- 14" SVGA Colour screen 0.28dp
- IDE Hard and floppy controller
- Parallel, 2 serial & keyboard ports
- Expandable desktop case
- 5 drive bays and 7 expansion slots (2 VESA)
- 102 Enhanced keyboard
- Microsoft compatible mouse

486DX2-66	£639
486DX2-80	£659
486DX4-100	£689

Mr. PC 586 Systems

- Intel Pentium 60, 75, 90, 100 processor
- 8Mb RAM expandable by SIMMS
- 256K external SRAM cache
- 540Mb Enhanced IDE hard drive
- 3.5" 1.44Mb floppy drive
- PCI Bus with 4 PCI slots
- 1Mb PCI bus graphics with windows accelerator
- 14" SVGA Colour screen 0.28dp
- PCI IDE Hard and floppy controller
- Parallel, 2 serial & keyboard ports
- Expandable desktop case
- 5 drive bays and 7 expansion slots
- 102 Enhanced keyboard
- Microsoft compatible mouse

Pentium 60	£999
Pentium 75	£1059
Pentium 90	£1279
Pentium 100	£1339

MR. PC OPTIONS

These options are only available with Mr. PC Systems

850Mb HD instead of 540Mb	£50
1Gb HD instead of 540Mb	£130
15" NI SVGA instead of 14"	£70
17" NI SVGA instead of 14"	£280
RAM Upgrade per 4Mb	£110
486 Video RAM Upg to 2Mb	£35
Pentium Video RAM upg to 2Mb	£40
250Mb Tape streamer	£100
700Mb Tape streamer	£220
9624 Data/fax modem	£35
14.4 Data/fax modem	£100
Double speed CD-ROM drive	£70
Quad speed CD-ROM drive	£110
PC Joystick	£10
16-bit Soundcard	£40
Twin stereo speakers	£10
Preloaded Software Options	
PC DOS 6.3 & Windows 3.11	£40
MSDOS 6.22 & Windows 3.11 for workgroups	£60

IBM APTIVA

IBM Aptiva

- Intel 486SX-25, 486SX-33 or 486DX2-66 processor
- Intel overdrive upgradeable
- 4Mb Ram, max 64Mb/128Mb
- 170Mb, 270Mb or 540Mb Local bus IDE hard drive
- VESA Local bus technology
- 3.5" 1.44Mb floppy drive
- Integrated VESA local bus graphics
- 4 Drive bays & 4 slots
- Parallel, serial and mouse ports
- 14" SVGA colour screen
- MS Compatible mouse & 102 keyboard
- Rapid resume energy saver, password
- PC Dos 6.3, MS Windows 3.1 Microsoft Works v3 & AptivaWare software
- 12 Month warranty extendable to 3 years
- IBM Helpline support

486SX-25 170Mb	£599
486SX-33 270Mb	£699
486DX2-66 540Mb	£899

Mr PC Compaq prices are the best in the UK. Please give us a call for the latest prices

COMPAQ

New Compaq Presario

- 486DX2-66 or 486DX4-90 processor
- 8Mb RAM. Max 64Mb
- 420Mb hard disk
- 3.5" 1.44Mb floppy drive
- Local bus SVGA graphics
- Compact, standard desktop or mini-tower models
- Serial parallel, joystick and mouse ports
- 14" Low radiation NI SVGA colour screen
- 16-bit stereo soundcard, microphone & speakers
- Quad speed multisession CD-ROM drive
- Integrated 9600/2400 fax/data modem with telephone answering
- MSDOS 6.2, Windows 3.1, Tabworks,

Pentium 75 (Model 772)
includes 720Mb hard disk, 256K cache, mini-tower case, PCI bus graphics but no modem. Rest of specification as above.

Software
Microsoft Works v3, MS Money, MS Entertainment pack, Microsoft Encarta CD, The Ultimate Human Body CD

CDS 524 486DX2-66 compact	£Call
CDS 742 486DX4-90 desktop	£Call
CDS 942 486DX4-90 tower	£Call
CDS 772 Pentium 75 tower	£Call

NOTEBOOKS

Toshiba 1910

Toshiba 1910

- Toshiba 1910
- 486SX-33 processor
- 4Mb RAM, max 20Mb
- 200Mb hard drive
- 9.5" STN mono or colour display
- 1.44Mb floppy drive
- MS DOS 6, MS Windows 3.1 & MS ballpaint mouse

Toshiba T1910

486sx-33 200Mb mono	£846
486sx-33 200Mb colour	£1271

Compaq Contura TFT Colour Notebook

- 486DX-25 processor
- 4Mb RAM, max 20Mb
- 120Mb or 209Mb hard drive
- MS DOS 6 & Windows 3.1
- Compaq 3 year warranty
- 8.4" TFT Colour Display

486DX-25 120Mb TFT	£1399
486DX-25 209Mb TFT	£1599

FREE FAX MODEM WITH CONTURA TFT

PRINTERS

HP LaserJet 5P

Canon BJ10SX

Epson Stylus 800 plus

Panasonic KXP4400 Laser

Star LC-100 C

HP LASERJET

HP LaserJet 4L	£Call
HP LaserJet 4ML	£733
HP LaserJet 4 Plus	£935
HP LaserJet 4M Plus	£1257
HP LaserJet 4Si	£2054
HP LaserJet 4V	£1365
HP LaserJet 4MV	£1972
HP LaserJet 5P	£585
HP LaserJet 5MP	£695
HP LaserJet Colour	£4179
HP LaserJet 4SiMX	£2927

Printer options
Remember to order with your printer
- Extra toner
- Extra Ink cartridges
- Extra ribbons
- Extra software fonts
- RAM upgrades etc

CANON

BJ10SX	£139
BJ200EX	£188
BJ230	£237
BJ300	£344
BJ330	£389
BJC4000	£234
BJC600E	£360
BJC800	£1064
BJC820	£1199
LBP4 U	£391
LBP4i	£395

EPSON

LX100	£92
LX300	£87
LX1050	£171
FX870	£220
FX1170	£278
LQ570+	£184
LQ300	£140
Stylus 800 Inkjet plus	£167
Stylus 1000 Inkjet	£309
Stylus Colour	£322
EPL 5200	£460
EPL 5600	£579
EPL 9000	£989
DLQ 3000	£671

PANASONIC

KXP1150	£88
KXP2023	£107
KXP2124M	£197
KXP-Colour Kit	£28
KXP 4400	£269
KXP 4401	£289
KXP 5400 PS	£524
KXP 4430	£478
KXP 4440	£678
KXP 2135	£123
KXP 3626	£255
KXP 6100	£275
KXP 3696	£259

STAR

LC-90	£78
LC-100 C	£88
LC-15	£176
LC24-20 Mk2	£112
LC24-200 C	£198
LC24-300 C	£177
LC24-15 Mk2	£231
LC-240	£90
LC-240c	£102
XB24-200C	£314
XB24-250C	£380
Star SJ48	£148
LS-05 Laser	£364
Wintype 4000	£287
Wintype 800C	£591

HP DESKJET

HP DeskJet 520

HP DeskJet 320	£163
HP DeskJet 520	£192
HP DeskJet 540	£203
HP DeskJet 540C	£236
HP DeskJet 560 colour	£Call
HP DeskJet 660C	£332
HP DeskJet 850C	£389
HP DeskJet 1200 colour	£626
HP DeskJet 1200 PS colour	£945
HP DeskJet 1600C	£835
HP DeskJet 1600CPS	£1245

CITIZEN

Citizen ABC Mono (Col Kit £23)

ABC 24 pin	£102
ABC Colour kit	£23
Swift 90	£113
Swift 90C	£120
Swift 200	£137
Swift200C	£145
Projet Inkjet	£190

NEC

NEC 610 Laser Plus

P2Q	£97
P3Q	£178
P72	£372
P90	£548
S610 Laser Plus	£282
S660 Laser	£415
S660I Laser	£565
S3000 Colour	£638

OKI

OKI 400EX

Okilaser 400EX	£239
Okilaser 410EX	£384
Okilaser 850 PS	£1115
Okilaser 870	£1099

KYOCERA

Kyocera FS-400

FS-400	£469
FS1550	£935
FS-1600	£1145
FS-3400	£1449
FS-3600	£1845
FS3500	£2155

PERIPHERALS

PLOTTERS

DeskJet 650C

HP DesignJet

220 A1 300dpi	£1445
220 A0 300dpi	£1902
600 A1 600dpi	£2716
600 A0 600dpi	£3246
650C A1 Colour	£3711
650C A0 Colour	£4386

HP PaintJet

XL300 A4	£1599
XL300 A3 Value Pack	£1799
XL300 Postscript A4	£2568
XL300 Postscript A3 Value Pack	£2752

SCANNERS

Epson GTX 6500

Logitech

Scanman 32 DOS	£56
Scanman 32 Windows	£56
Scanman 256	£78
Scanman Colour	£165
Scanman Easytouch 256	£109
Scanman Powerpage	£298

HP Scanners

HP ScanJet 3P PC	£338
HP ScanJet IIcx PC	£674

Epson Scanners

GTX6500 Parallel	£435
GTX6500 SCSI	£496
GTX8500 Parallel	£Call
GTC8500 SCSI	£Call
GTX9000 SCSI	£851
SICOS Colour Page Scanner	£225

MONITORS

Taxan 400LR

Taxan Monitors

400LR 14"	£180
410LR 14"	£185
580LR 15"	£262
880LR 17"	£509
885LR 17"	£620
895LR 17"	£829
1080LR 20"	£899
1095LR20"	£1425
2100LR 21"	£1529
Panasonic TX-T1537 15"	£319
Panasonic TX-D1751 17" MPR11	£599
Panasonic TX-D1732 17"	£535
Panasonic TX-D2023 20"	£1125
Panasonic TX-D2131 21"	£1359
NEC 2V 14"	£225
NEC XV15 15"	£279
NEC XE15 15"	£389
NEC XV17 17"	£559
NEC XE17 17"	£686
NEC XP17 17"	£905
NEC XE21 21"	£1329
NEC XP21 21"	£1749

MODEMS

Worldport PCMCIA 14.4

Zoom 14.4 Int	£127
Zoom 14.4 Ext	£127
Zoom 28.8 Int	£198
Zoom 28.8 Ext	£199
Zoom 14.4 Voice	£Call

US Robotics

Sortster 28.8	£189
Sportster 14.4 Int	£121
Sportster 14.4 Ext	£121
Worldport 14.4 PCMCIA	£168
Worldport PCMCIA 2496	£129
Courier Turbo v34	Ext £262
Courier Turbo v34	Int £280

Pace Modems

Pace Mobifax 2496	£Call
Pace Microlin N832+ PCMCIA 14.4	£189
Pace Mobifax 144 14.4	£92
Pace Microlin Fx V32bis Int	£134
Pace Microlin Fx V32bis Ext	£147
Pace Message Desk	£Call

MICE

Logitech

Logitech

Pilot II Serial	£17
Pilot II PS/2	£18
Mouseman RH Bus	£33
Mouseman Cordless RH Serial/PS2	£49
Trackman PC Serial/PS2	£43
Trackman Portable Serial/PS2	£31
Mouseman Sensa	£39

Microsoft

Ballpoint Ps/2	£52
Home mouse	£24
Serial PS/2 Mouse	£35

TAPE DRIVES

Jumbo 250Mb

CMS

Jumbo 250Mb	£93
Jumbo 680Mb	£169
External Kit for Jumbo	£68
Trakker par. port 120Mb	£148
Trakker par. port 250Mb	£188
Trakker 680Mb	£285

HP JetStore External DATs

2000 +ARCsolo + ISA	£948
5000 +ARCserve 4 + ISA	£1527
5000e Windows & Netware ISA	£1869
6000e Windows & Netware ISA	£1951

CHIPS & MEMORY

486DX2-66 Overdrive

RAM Memory

1Mb Standard SIMM	£27
4Mb Standard SIMM	£115
4Mb 72 pin SIMM	£115
8Mb 72 pin SIMM	£225

Intel 486DX2-66 OverDrive £149
Intel 486DX4-100 OverDrive £249
The Intel Overdrive comes complete with chip extraction tool, instructions and lifetime warranty. Doubles or tripies speed and provides maths co-processor. Suitable for all 486sx, and 486DX systems. Simply remove old chip and insert the Overdrive!

GRAPHICS CARDS

Orchid Kelvin 64 VL

Orchid

Kelvin 64 VLB 1Mb	£94
Kelvin 64 VLB 2Mb	£128
Kelvin 64 PCI 1Mb	£97
Kelvin 64 PCI 2Mb	£128

Diamond

Viper VLB 2Mb	£238
Viper PCI 2Mb	£238

Taxan

	ISA	VL	PCI
GTS Ultra + 2Mb	£188	£208	£228
GTS Ultra Pro	£288	£308	£338
GTS Winturbo 2Mb	£336	£337	£338
GTS Winturbo 4Mb	£516	£517	£518

FAX MACHINES

HP Fax 950

HP FAX 900 ..... £529
Plain paper Fax with HP InkJet technology, 30 page document feeder, 100 sheet out tray, copy function, phone/fax switch, auto redial, delayed dialing, broadcasting, one touch keys & menu system.

HP FAX 950 ..... £679
As 950 above but with extra RAM memory (expandable to 128 pages), telephone handset, confidential send & recieve and advanced copy, broadcast, polling and speed dialing functions.

All modems & Fax machines fully BABT APPROVED

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130 Keyboard

Replace your exisiting keyboard with this superb quality 130 keyboard from Mr. PC for only £29.

- Quality responsive action
- Two rows of function keys
- Built in calculator
- Software templates
- Diagonal cursor keys
- Standard DIN interface

PS/2-DIN Adaptor £9

Microsoft Natural Keyboard £57

MULTIMEDIA

CREATIVE LABS

SoundBlaster 16

SoundBlaster Range

SoundBlaster 16 AWE-32	£165
SoundBlaster 16 SCSI-2 AdSP	£132
SoundBlaster 16 SCSI-2	£112
SoundBlaster 16 MCD AdSP	£108
SoundBlaster 16 MCD	£88
SoundBlaster 16 Value	£61
SoundBlaster Pro Value	£40
SoundBlaster v2 Value	£29
WaveBlaster	£124
AdSP Upgrade	£38

Video Capture Cards

VideoBlaster SE	£183
Video Spigot	£144
VideoBlaster FS2000	£239
Intel Smart Video Recorder Pro	£338
Videologic Captivator	£164
Videologic Captivator Plus	£188
Videologic 928 Movie	£248

Multimedia Kits

Discovery CD16 Kit	£222
GameBlaster CD Kit	£249
Digital Edge III Kit	£399

SOUND FX

16 Bit Soundcard

16-BIT SOUNDCARDS

High performance 16-bit stereo soundcard
with standard interfaces and excellent software bundle £49

MRPC CD-ROM KITS

MrPC CD-ROM Double £79
Double Speed IDE CD Kit
- Double Speed Multi-session CD-ROM drive
- IDE ATAPI Interface
- Connects directly to your IDE hard disk cable

MrPC CD-ROM Quad £119
Quad Speed IDE CD Kit
- Latest Quad Speed IDE CD-ROM drive
- IDE ATAPI Interface
- Connects directly to your IDE hard disk cable

CD-ROM DRIVES

IDE CD-ROM

MRPC MULTIMEDIA KITS

Multimedia Kit 1 ..... £139
Double Speed multimedia bundle
- Double Speed IDE CD-ROM drive
- Connects directly to your IDE hard drive cable
- Audio cable included
- 16-bit high performance soundcard
- Multimedia software
- Dual stereo speakers
- PC joystick
- 3 CD titles

Multimedia Kit 2 ..... £179
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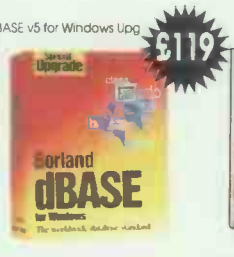

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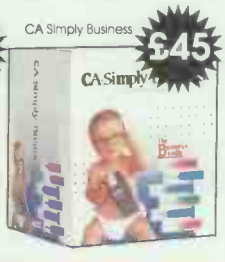

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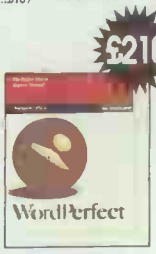

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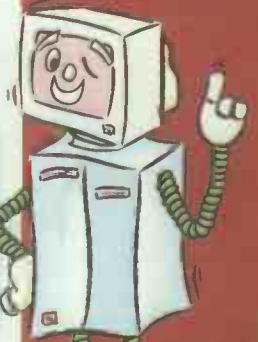

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* MTBF - 70,000hr
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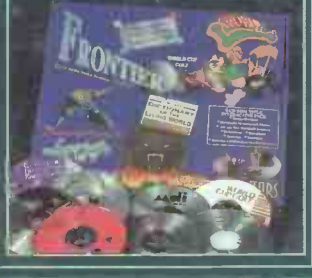

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* MTBF - 70,000hr
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- MS Windows Sound System
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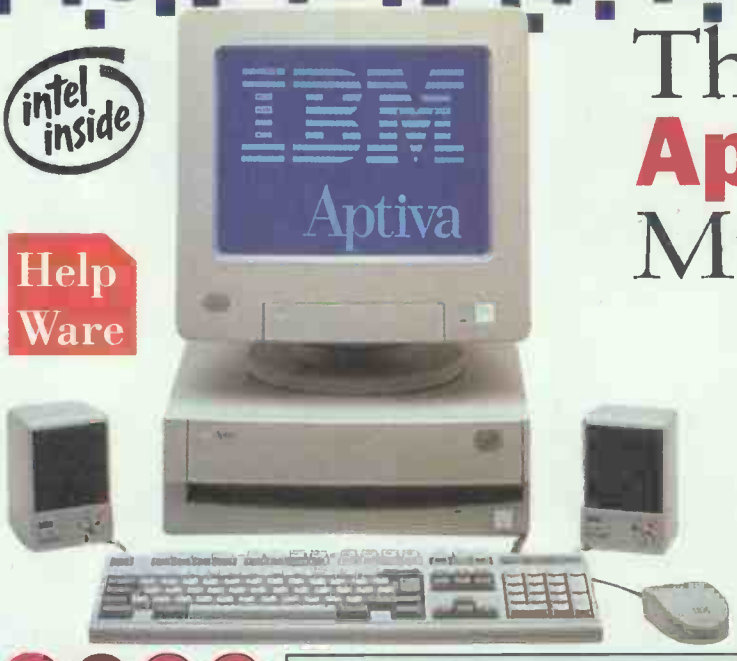

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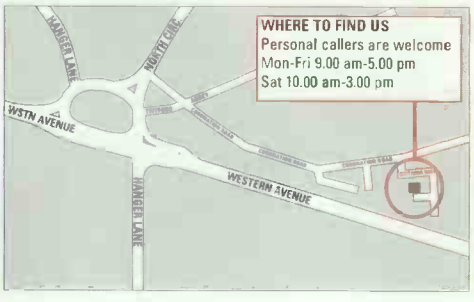

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Power Premium 3/33; 4/33; 4/33s; 4/50d, 4/66d; Premium Server SE 4/33					
Advantage Pro 486DX/33; 486SX/25;		115	220	400	800
Bravo 4/25s; 4/33; 4/33s; 4/50d; 4/66d;					
Bravo LC 4/25s; 4/33; 4/33s; 4/50d; 4/66d; Bravo LP 4/25s; 4/33; 4/66d,					
Bravo MT 4/33; 4/66d					
ADV.+ 486DX/33; 486DX2-50; 486DX2-66		115	220		
Bravo 286's, 386sx/16; 386sx/20,386sx/25	70		210		
Bravo 3/25s; 3/33s	54		210		
Premmia 4/33; 4/33s; 4/50d; 4/66d		140	240	460	800
Premium 386; Premium 386C		120			
Premium 386/25; 385/33; 386SX/16; 386/33T; Premium II 386SX/20, 386SX/25; Premium Server SE 4/50; SE 4/66; Cupid Expension Board		140			
Manhattan SMP				320	

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COMPAQ					
Deskpro 286N; 386N, 386s/20; 386s/20N; 3/25i, 3/33i; 4/25iS; 4/33i; 4/66i, 386/25M, 386/33M; 486/33M; 486s/16M; 486s/25M; 486DX2/50M; 486DX2/66M; Deskpro XE-433s; 450; 466; Enhanced Prolinea;	70	120	230	400	860
Prolinea 4/25s; 4/33; 4/50; 4/66; 4/33s; CDS, Not 1/25e; 1/25s; 1/25tr, Prolinea-MT 4/33s; MT 4/50; MT 4/66; Prosario-400/ 600/ 800 Series; Prosignia PC-Server 486/33, 486DX2/66; Prosignia VS; Systempro/ LT 386/25; 386/33, 486SX/25; 486/33; 486DX2/50, ProLiant 1000-486DX2/66					
Deskpro 386/33; 486/25; 386/33L; 486/33L; 486/50L; Systempro 386/33; 486/33, 486/33-1020e; 486/33-1e; 486/33-2040e, 486/33-680e	80		320		975
Deskpro 5/60M; 5/66M; XE 560;			280	480	920
ProLiant 1000 5/60; ProLiant 2000-486/50; 5/66; ProLiant 4000 486/50; 5/66, Prosignia PC Server 5/60					
Prolinea 3/25s; 3/25zs	54		210		
Systempro /XL 486/50, Pentium				480	880

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Deskpro 385/16	67	160	314	470

	4Mb	Mod	4Mb	Brd
Deskpro 386s	154		207	
Deskpro 386/20; 386/20e; 386/25; 386/25e	154		187	

	2Mb	4Mb	8Mb	16M	32M
DELL					
System 316SX; 320SX(Rev.1); 325SX	70				
System 320SX(Rev.2); 325D; 325P; 333D; 333P; 433P		120			
Power Desktop 486D/16; 486D/20; 486D/25; 486D/33, 486D/50; 486D/66; Low Profile Desktop 486P/16; 486P/20; 486P/25; 486P/33, Low Profile Power-Desktop 486P/50; 486P/66; Precision-486 Series		120		400	
Performance 425s/L; 425s/M; 433/L, 433/M; 433/T; 433s/L, 433s/M; 450/L, 450/M; 450/T; 466/L; 466/M; 466/T		115		400	
Performance 425s/ME; 433/ME, 433s/ME; 450/ME; 466/ME; 4000/XE Series 486/33; 486/50, 486/66			230		800
System 425TE; 433TE; PowerLine-Workstations 420DE; 425DE; 433DE; 450DE, 450DE/2, 466DE; 420SE; 425SE; 433SE; 450SE; 450SE/2; 466SE	80	140	240	480	800

	2Mb	4Mb	8Mb	16M	32M
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Vectra QS/16S; QS/20; RS/20; RS/20C; RS/25; RS/25C	70	140			
Vectra 386/25 PC; 486/25VL; 486/33VL; 486/66VL; 486/25N; 486/33N; 486/50N; 486/66N; 486/25M; 486/25MI; 486/25NI; 486/33M; 486/33MI; 486/33NI; 486s/33M; 486s/33MI; 486s/33NI; 486 PC; 486s/20; 486/25T; 486/33T PC; 486/25U PC; 486/33U PC; 486/50U PC, 486/66U PC; 486/33ST; 486/66ST; 486/330M; 486/50XM; 486/66XM; 486s/33XM; NetServer LE Series 486DX/33; 486DX2/66; 486SX/33, NetServer LM-Series 4/33 LM, 4d/66 LM; 5/60 LM	70	120	230	400	800
Vectra 386/16N PC; 386/20N PC; 386/25N PC; 386/33N; 386/33NI	70		280		

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IBM					
PS/1 286 (2011); PS/1 386SX (2121)		75	140		
PS/1 PRO 386SX (2123); (2133- 72PIN); (2155 72PIN); (2168- 72PIN); PS/ValuePoint (6381); (6382); (6384--72PIN); (6387)	36	62	120	230	400
PS/1 (2133- 30PIN); (2155- 30PIN); PS/ValuePoint (6384- 30PIN)			110		420
PS/2 25/286; 30/286		83			
PS/2 35LS; 35SX, 40SX; 50Z; 55LS; 55SX; 56SLC; 56SLC LS; 56SX; 56LS; 57SLC; 57SX; 65SX; 70; 80; 90 XP 486; 95 XP 486 (8595); E (9533), Server 85; Premier PS/2 56; 57; 76; 77; Ultimedia-M57; M77	40	70	120	230	
PS/2 95 XP 486 (9595); Server 95 (9595); Server 95 Array (9595)			140	260	460
PS/2 Series 16/ 32 Bit MCA Exp. Board (6450609 & 34F3077)		194	240	345	600

	2Mb	4Mb	8Mb	16M	32M
ZENITH					
Z-386SX; Z-386SX/20; Z-325/SX	70		210		
Z-386/20, Z-386/25; Z-386/33, Z-386/33E; Z-486/25E		120			
Z-486/33ET		140		460	
Z 420/SX; Z-425/SX, Z-433/DX; Z-433/SX; Z-Station 325Sh; 325Sn, 420Sh, 420Sn, 425Sh; 433Dh; 420SEh, 420SEn, 433DEh, 450XEn; Z-400+ Series		120		400	
Z-Server 425SE; 433DE; 450DE; EX 433DE; EX 450DE; EX P66E; LT 433DE; LT 486XE; LT P60E		140	240	460	800

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HP Apollo 9000 Series 375; 380; 400dt; 400s; 400t; 425s; 425t; 433s	140	240	460	880	
HP Apollo 9000 Series 382; 425e	140	240	460		
HP Apollo 9000 Series 700/RX 16Ca; 16Ci; 19Ca; 19Mi	120	230			
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HP Apollo 9000 Series 745i; 747i; 715/33; 715/50; 725/50		300	580	1100	2300
HP Apollo 9000 Series 720; 730; 735			580	1100	2300
HP Apollo 9000 Series 750; 755			580	1100	2300

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IBM					
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RS/6000 POWERstation/ POWERserver-220 Series	120	230			
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SUN MICROSYSTEMS					
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SPARCstation ELC (4/25); IPX (4/50)			480		
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SPARCstation SLC (4/20)	120				
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SPARCstation Classic LC (4/15); LX (4/30)		240		900	
SPARCserver /station/ engine 10-/Model 30; Model 41; Model 52/54			520		1950
SPARCserver 630MP; 670MP; 690MP					1920

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PREMIUM EXECUTIVE 286/12; 386SX/20; 386SX/25; 386SX/25C	62		135		
POWER EXECUTIVE 3/25SL; 3/25SL-C; 4/25SL (SE); 4/33SL, Colour; Colour +; EL		97	150	345	655
POWER EXECUTIVE 4/25SL; Colour; Colour Plus			156		575

	2Mb	4Mb	8Mb
CANON			
NoteJet 486/25 (BN-22)	85	130	273
NoteJet 486/33 (BN-22); 486C (BN-100C)		180	320
NoteJet II 486C (BN-32P)	85	145	280

	2Mb	4Mb
COMMODORE		
C286-LT; C386SX-LT (16 Mhz)	75	
C386SX-LT (20 Mhz)		170

	1Mb	2Mb	4Mb	8Mb	16M
COMPAQ					
CONCERTO 4/25; 4/33; LTE ELITE				136	273 513
CONTURA 3/20; 3/25; 3/25C		43	144	269	
CONTURA 4/25; 4/25C; 4/25CX; 4/25EX			246	325	535
CONTURA AERO			150	250	
LTE 286	38	69	100		
LTE 386s/ 20	77		157		
LTE LITE/ 20; LITE/ 25; LITE/ 25C; LITE/ 25E			60	140	300 500
LTE LITE 4/25; 4/25C; 4/25E; 4/33C				143	290 513
PORTABLE 486/66, 486C/66	47	74	120	230	
SLT 286	69		208		
SLT 386s/ 20	57	79	163		

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DELL		
212N; 320N, 320N+	75	
316LT; 320LT; 320LX	70	
320SLi; 325SLi	82	279
325N; 325NC	75	
NL20; NL25	84	

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EVEREX	
TEMPO CARRIER	82
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IBM				157	306
PS/2 CL57 SX; THINKPAD 700; 700C; 720; 720C					
PS/2 L40 SX; N33 SX, PS/NOTE 182		77	156	284	
PS/2 N51 SLC; N51 SX		83	147	275	
PS/2 P70 031; 061; 121; P75	40	74	130	250	
PS/Note 2618 C45; E35; M40; Thinkpad 350 /C			156	275	444
PS/NOTE N45 SL		Call			
THINKPAD 300			80		287
THINKPAD 500				170	330
THINKPAD 710T			87	160	315
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	4Mb
MITAC	
3026E	170

	1Mb	2Mb	4Mb	8Mb	16M
PANASONIC					
CF- 170; 270; 370	48				
CF- 380; 480C		103	181	225	
CF- 580			156		634
CF- 1000			158		
CF- V21P (CD-NOTE)			168		595

	2Mb	4Mb
PHILIPS		
PCL 300; 304	82	163

	2Mb
SANYO	
17/NB; 18/NB; NB/6	75

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SHARP				
PC 6200; 6220; 6240	63			
PC 6440		140		
PC 6600; 6621; 6641; 6661		80		
PC 6700; 6741; 6781; 6785; 6800; 6841; 6881; 6891		78	130	
PC 7700; 7750; 8150; 8650			138	500
PC 8501 COLOURSTAR		92		

	2Mb	8Mb
TANDON		
NB 386SX; 486SLC	55	210

	1Mb	2Mb	4Mb	16M
TEXAS INSTRUMENTS TRAV. MATE'S				
2000	63			
3000; 3000 WinSX; WinSLC/25		80		
4000 Win Series & 4000E Win Series			150	900

	2Mb	3Mb	4Mb	8Mb	16M
TOSHIBA			176		
DYNAPAD T100X					
T1000LE; 1000SE; 1000XE; 1800; 1850; 1850C; 2000; 2000SX; 2000SXe; 2200SX	64		144	300	
T1200XE	44				
T1600	50				
T1900; 1900C; 1950; 1950CS; 1950CT; 4500; 4500C; 4600; 4600C; 4700; 4700CS; 4700CT; T4800; DYNAPAD T200			142	278	594
T2400; 3400, 3600			157	330	613
T3100	99				
T3100E	90				
T3100SX	65		138		
T3200		84			
T3200SX; 3200SXC	60		160		
T3300SL	66		163	Call	Call
T4400C DX; 4400SX; 4400C SX; 4400SXC; 6400DX; 6400DXC; 6400SX, 6400SXC; 6600C; 6600C/CD; 6600C/CDV	47		147	304	598
T5100	59				
T5200; 5200/100; 5200/200; 5200C; 8500	75			325	

	1Mb	2Mb	4Mb	8Mb
ZENITH				
SUMSPORT 286; SUPERSPORT 286; 286e	72	113	144	
SUPERSPORT SX		100		
MASTERSPORT 386SL; 386SLa; II;		75		
ZDS-600nt; 620nt; 625nt; Z-STAR 433VL				
MASTERSPORT 386SX		78		
Z-SPORT 325S		90	160	
Z-SPORT 420S; 425S			Call	
Z-NOTE 320L; 320Lb; 325L; 325Lc; 325Lp		74		241
Z-NOTE 200; 425Ln, 425Lnc, 425Lnp; 425Ln+; 425Lnc+; 425Lnp+; 433Lnc+; 433Lnp+			132	475
Z-LITE 320L		Call	Cal	

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LASERWRITER II NTX & NTX-J	Call		127		
LASERWRITER PRO 600 & PRO 630			120		520
LASERWRITER PRO 810			175	350	
LASERWRITER SELECT 300	30		114		
LASERWRITER SELECT 310	40		120		
LASERWRITER SELECT 360					520
PERSONAL LASERWRITER NT				228	
PERSONAL LASERWRITER NTR		Call			

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BROTHER					
HL- 4; 4PS; 4V; 4Ve	77	107	167		
HL- 8D; 8e; 8V	74	104			
HL- 6V		103	165		
HL- 10DPS; 10DV; 10PS; 10V		107	170		
HL- 10h	40	91	120	244	

	1Mb	2Mb	3Mb	4Mb	8Mb
CANON					
LBP- 4; 4 LITE; 4 PLUS	90	120			
LBP- 4SX	71	110			
LBP- 430	43	135			
LBP- 8II; 8IIR; 8IIT	72	95		160	
LBP- 8III; 8III PLUS	104	134	164		
LBP- 8IV; 4U	40			130	250
LBP- 8SX	75	110			
LBP- 860	44	77		135	264

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COMPAQ				
PAGEMARQ 15 & 20	80	148	246	488

	512	1Mb	2Mb	3Mb	4Mb
EPSON					
ACTIONLASER 1000; 1500; 5000; 5200	24		77		
ACTIONLASER II; EPL- 4000; 4100; 4300, 8000; 8100		52	91	125	
ACTIONLASER PLUS & EPL- 6000			108		192
EPL- 7000	24		Call	Call	
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EPL- 7500			Call		Call

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DESIGNJET 200; 600; 650C, PLOTTER		40	70	130	250
DESKJET 500; 500C; 510; 520; 550C, 560; PLUS	39				
DESKJET 1200; 1200C; 1200C/PS			40	74	130 250
LASERJET II; IID			72	95	160
LASERJET IIP; IIP PLUS; III, IIID; IIIP; FAX			52	82	130
LASERJET IIISi			33		120 240
LASERJET 4; 4 PLUS; 4M; 4MP; 4M PLUS; 4P, 4 Si, 4 SiMX;			40	74	130 250
LASERJET 4L			48		
PAINTJET XL300			96		186 306

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IBM / LEXMARK					
LaserPrinter (4019-001); E(4019-E01); Pennant System (4028)	63	93	138		
LaserPrinter 5E (4029-010); 6 (4029-020); 6A (4029-021); 10 (4029-030); 10A (4029-041); 10L (4029-040); (4037-5E)	49	69		150	
LaserPrinter 4039 10R; 10R DUPLEX; 12L; 12R; 16L, Colour JetPrinter PS 4079					130 250

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KYOCERA			
F- 800; 800A; 800T	70	100	160
F- 820; 1200S (Post 92); 1500 /A; 1800 (Post 92); 1800A; 2000A; 3000A; 3300 (Post 92); 5000	63		
F- 1200S (Pre.92); 2000A; 3000A; 3300 (Pre.92)	76	160	219
FS- 1500 & 1500A	60	106	245

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MANNESMAN TALLY			
MT- 904; 904 PLUS	57		
MT- 905		115	193
MT - 908	45	80	

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OLIVETTI		
PG- 108; 208	110	187
PG- 308	115	193

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OKI			
OL 400	55	83	
OL 400e; 400ex; 410ex	72	102	162
OL 410; 810	77	107	Call
OL 800; 820	62	92	152
OL 830; 840; 850		117	

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PANASONIC				
KXP- 1124i	15			
KXP- 4410; 4430		63	93	153
KXP- 4420; 4450i, 4451		62	92	152
KXP- 4400; 5400		62	93	173
KXP- 4440; 5410		74	104	178
KXP- 4450		73		
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SHARP					
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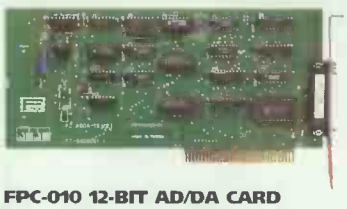

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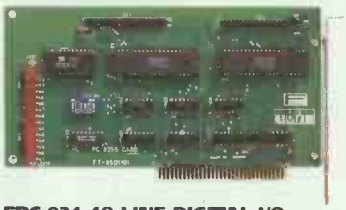

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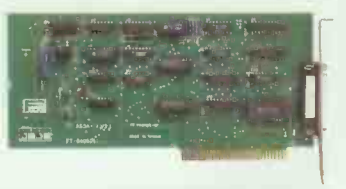

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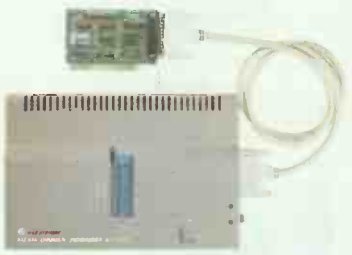

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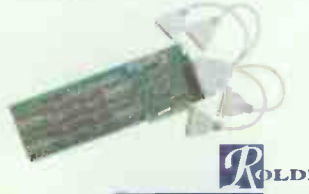

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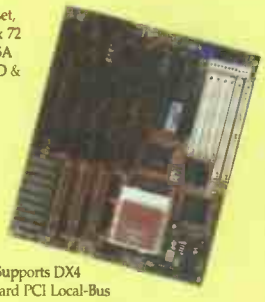

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TP1 4/5 Baby AT size board with 256K cache, OPTI chipset, AMI Win BIOS. Memory 4x 72 Pin SIMM slots supports up to 128MB. 3x PCI 32 Bit, 2xVESA, 5x ISA 16 Bit expansion slots. Supports DX4 Intel, AMD, Cyrix CPU. On-board PCI Local-Bus Enhanced IDE & Floppy controller. 2x RS232 (16550), 1x Parallel (ECP, EPP) ports.

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   504 Dudley Road, Wolverhampton, WV2 3AA.

If you need more information, advice or a copy of our latest price list, please feel free to contact us.

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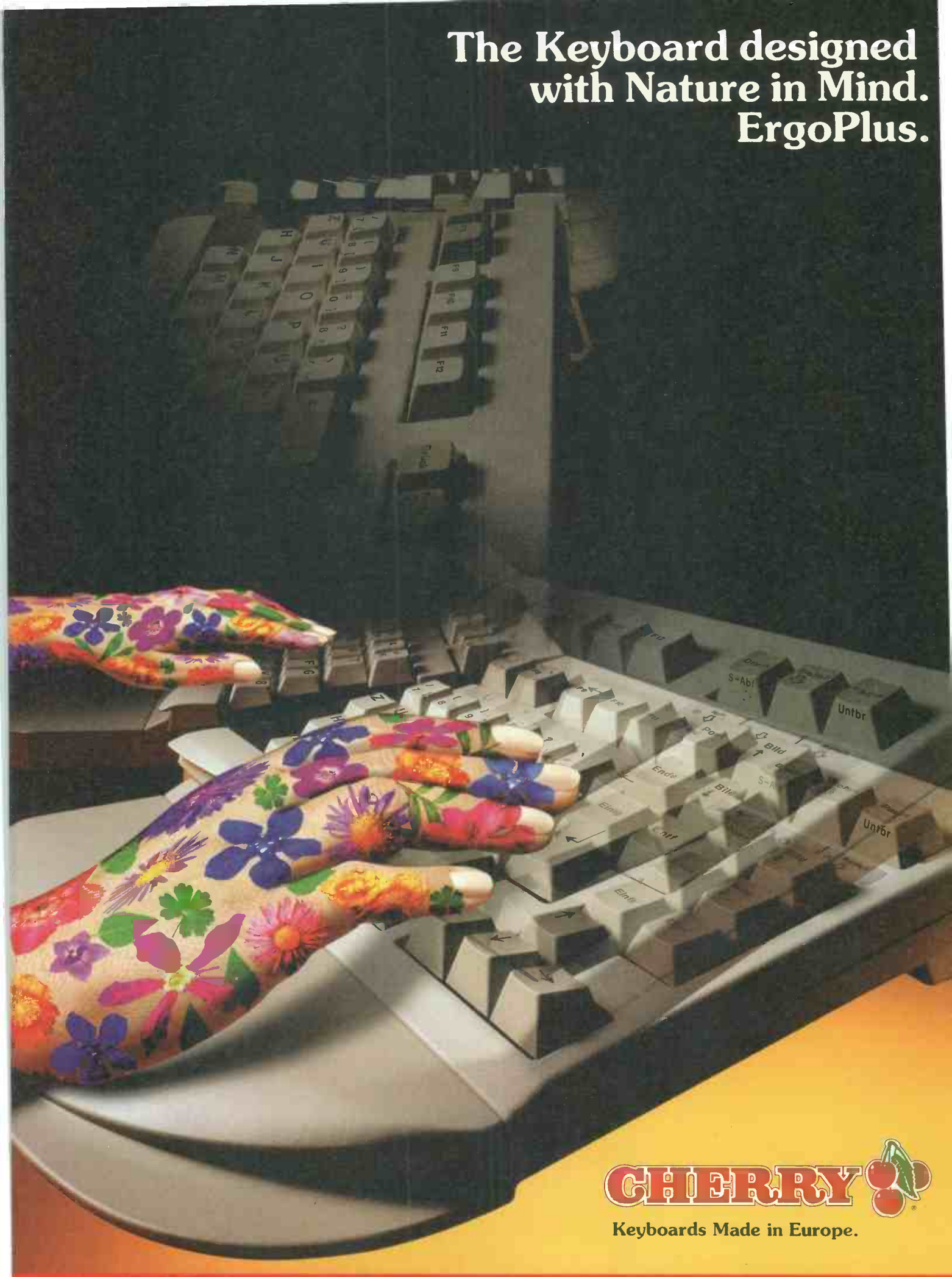
The Keyboard designed with Nature in Mind. ErgoPlus.



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Cherry Electrical Products Ltd., Coldharbour Lane, Harpenden, Herts., UK - AL5 4UN; Phone: (01582) 763 100, Telefax (01582) 76 88 83
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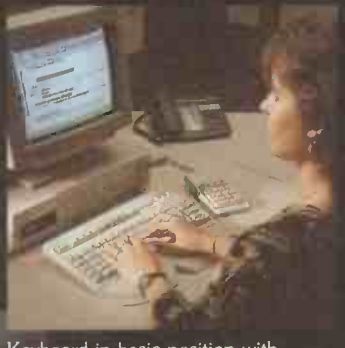
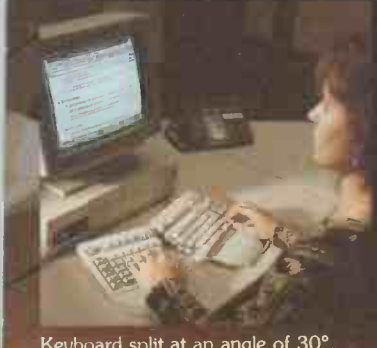
Cherry Sàrl, 1 Avenue des Violettes, Z.A. des Petits Carreaux, F - 94 384 Bonneuil/M. cedex, Tél.: 1-43 77 29 51, Télex: 262 657 cher f, Téléfax: 1-43 77 20 84

For years avid computer users have been searching for a keyboard that will adjust to their individual postures, thus helping to prevent cramp and tension in their wrists, arms and shoulders.
Cherry's new ErgoPlus is the answer to these pleas. It is highly ergonomic and adapts to the needs of every user as it can be set to any of a total of 24 different positions on 3 axes. At last a keyboard that Mother Nature can really enjoy. Free of CFCs. 90% recyclable. 100% tested. Because Cherry keyboards are quality products manufactured in our ISO 9001 certified company.
Test our competence.
Send today for further technical details!

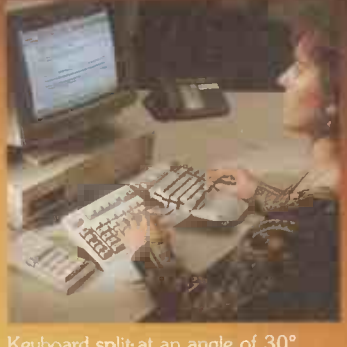
3 of 24 different positions:



Keyboard in basic position with optional numeric pad on the right.



Keyboard split at an angle of 30°.



Keyboard split at an angle of 30° with steep roof inclination and optional numeric pad on the left.

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80286 16MHz Plug-in CPU + Multi I/O	129
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80486DX-33 MHz (256 K Cache)+Multi I/O	515
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80486DX2-66 MHz (256 K Cache)+Multi I/O	565

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16 Ch Data Acq. & control Card (12 bit)*	219
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Isolated RS422/485 Interface Card	99
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*12 Bit resolution
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*PC 512K Disk Card
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MJN and Lotus offer you an unbeatable Pentium® processor based solution

Intel Pentium processor based business systems from MJN provide the latest technology and performance with renowned MJN quality at incredible prices. All systems feature the latest PCI motherboards, fast 64 Bit PCI graphics, 850Mb or 1Gb PCI enhanced IDE hard disks, Quad speed CD-ROM drives, a minimum of 8Mb RAM and superb 15" SVGA non-interlaced screens. In addition, all systems are pre-loaded with 9 leading Lotus applications that individually cost over £1000.

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- 9 Lotus applications

Lotus Software

The entire suite of high end Lotus applications, including Lotus Smartsuite 3.1 is *pre-installed on all systems together with full on-line documentation making the applications easy to use and easy to learn!

- Lotus 1-2-3 v5
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- Lotus Approach v3
- Lotus Improv v2.01
- Lotus Organizer v2
- Lotus SmartPics
- Lotus ScreenCam
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MJN14E

Buyers Guide

TIME Computer Systems Ltd. - THE COMPANY

Long established as a standard-setter in the computer market, Time Computers has always been the first choice of customers who demand quality products at competitive prices with reliable service and back-up.

As well as achieving soaring sales and rapid growth to become the UK's leading direct PC supplier, we have also established an excellent reputation for our professional approach to supplying quality computer solutions to small businesses and home users. We have the resources, know how, and financial strength to keep us ahead with all the latest advances in computer technology and to respond quickly to market trends and the needs of our customers.

We were the first company to offer complete bundled solutions at affordable prices, the first to offer interest free credit in the direct PC market and the first to successfully develop the direct retail showroom concept.

To ensure the quality of our products and to provide you with the latest technology, we have forged strong working relation-ships with the giants of the industry. Our direct relationships with the world's leading hardware and software manufacturers coupled with the strength of our volume buying and our efficient centralised operation with its low overheads also means that we are able to offer the keenest prices on the very latest products,

We have invested heavily in our personnel and operations, to ensure our customers receive the best service available from every department in the company. Staff are trained to be efficient and helpful, and we always endeavour to achieve complete customer satisfaction.

Our company was one of the first and still one of few who have implemented BS5750 quality standard. It is a testament to our commitment to quality, value and service that the majority of our sales are the result of repeat purchases or personal recommendations.

THE CHANNEL GROUP

COMPUTER SHOPPER
1994 Awards Winner
Fair Trading Award
(Software Dealers)

REGISTERED FIRM
BS5750

Time computers 'invented' the bundled PC solution for the mass market

Time Computers HQ site is situated in the Ribble Valley near the M65 & M66. Over 99.2% of systems despatched arrive with customers the following day.

Your representatives within Time Computers - Some members of the Customer Service Team.

BGBA

TIME SERVICES

We believe Time Computers' success story is a direct result of our commitment to listening to our customers needs, and most important of all, delivering those needs promptly. In our book the customer comes first.

Sales staff are friendly, knowledgeable and will be able to answer all the questions you have about buying a PC solution.

It is our overall commitment to exceptional customer support programmes and high quality solutions that has put us where we are today - in a unique position of being able to offer the keenest priced solutions with the best service in the industry.

PRE-SALES ADVICE

Our knowledgeable sales staff are fully trained with what is available in the PC industry and are happy to give you free advice on the most suitable make and model for your requirements. Please feel free to give them a call any time to discuss the features and benefits of any computer solution.

The sales team are fully trained and will guide you through the selection process.

CONFIGURATION & TESTING

Remember when you buy from Time Computers you are not limited to the standard configurations. Any options such as additional RAM, Multimedia products, Fax modems and extra drives that you may require will be installed in your PC system to make a solution tailored to your needs. The system will then be fully tested so that you can start using it immediately.

SOFTWARE PRE-INSTALLATION

In most cases any bundled software will be pre-installed by our engineers and optimised for your system. This will save you many hours of time and will enable you to start using your system immediately. Many of you who are new to computers, experience most difficulties when installing software. Our service removes this hurdle and allows you to start learning and being productive with your software from the moment you recieve your system. On most systems documentation and on-line help are also pre-loaded making it easier to learn these applications. On-Line help is context-sensitive, providing relevant help when you are stuck. Traditional pre-printed manuals and backup disks are also available as options if required.

Installing software is the most difficult task for new users.

HARDWARE TECHNICAL SUPPORT

One of the main advantages of dealing directly with Time Computers is the facility to seek help from trained PC experts. Our technical support staff will provide free hotline support should your system ever malfunction, or if you wish to upgrade.

Technical help is always only a phone call away

CUSTOMER SERVICE

Customer Services Staff liaise closely with your sales contact, and will act as your representatives within the company, and ensure that your queries are speedily resolved.

WARRANTY

All goods carry 12 month's return-to-base warranty except where otherwise indicated. In addition, Time Cover offers a valuable extended 3 or 5 year warranty on PC Systems, covering all parts, labour and carriage costs to ensure long term trouble-free-use. Please ask for details when placing your order.

COMPREHENSIVE REPAIR/UPGRADE FACILITIES

We have in-house fully equipped facilities to repair the vast majority of products we sell. This means that you have very fast turn around should your system ever go faulty. Our upgrade service will enable you to keep your system future-proof by installing new processors, RAM and larger storage devices.

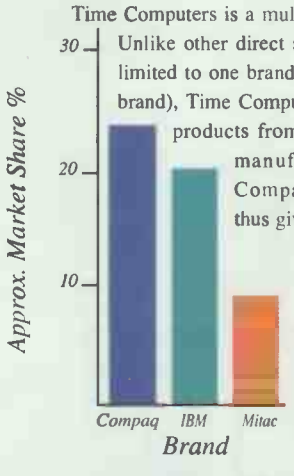
Upgrade service enables you to keep your system future-proof

BUYING FROM TIME - DIRECT IS BEST

There is no doubt that the customer gets better value in terms of price, specification and support when they buy PC systems Direct. When you buy from Time Computers you not only have all the advantages of buying Direct but also advantages of having a wider range to choose from and retail showroom facilities.

WIDER RANGE

Time Computers is a multi-vendor direct company. Unlike other direct suppliers who are usually limited to one brand of PC (usually their own brand), Time Computers offers the best value products from the world's leading PC manufacturers (such as IBM, Compaq, Toshiba and Mitac) thus giving you more choice.



TIME SHOWROOM FACILITIES

Our showroom facilities enables us to provide the most popular systems for display throughout the UK. This enables you to see and use the system before you decide to buy at the same time as having full access to all of our range of direct services provided by our specialist staff.

Retail Showrooms are available in the following sites. Please call for details.

Time Computers have a showroom presence throughout the UK.

- GREAT PORTLAND ST
- STRAND
- TOTTENHAM COURT RD
- KNIGHTSBRIDGE
- VICTORIA
- KENSINGTON
- WATFORD
- AYLESBURY
- MANCHESTER
- DARLINGTON
- IPSWICH
- BIRMINGHAM
- CLIFTON (BRISTOL)

HOW TO ORDER

Look through the offers and decide on the solutions which interest you most. Then call our sales team on (01282) 777 111. They can provide further advice and clarify any points. You can place your order directly with your sales contact over the phone and give details of the system you require. Payment can be made using Access, Visa, Switch or American Express. You can also send your order by fax, or post, if more convenient, including a cheque for the full amount made payable to Time Computer Systems Ltd (please allow 5 working days for cheques to clear).

CREDIT

Interest Free Credit (APR 0%) is also available on some solutions and options (subject to status). All solutions advertised with Interest Free Credit can also be paid for in full by credit card or cheque. If you wish to take out interest Free Credit, please let your sales contact know when placing your order. Systems which are not available on Interest Free Credit may be purchased on credit at a competitive APR (Annual Percentage Rate) of 19.8% over a 24 month period, subject to status. Please ask for further details.

DELIVERY

After your order is placed and payment cleared (or credit agreement approved), your system will be tested and despatched by courier to your preferred address. If you are not in to receive the system, the courier will leave a message for you to contact the local depot and re-arrange delivery.

Goods are normally despatched within 7 to 10 days from cleared payment. All orders will be fulfilled within 28 days unless otherwise specified. Mainland insured courier delivery rates are listed as follows.

£ 19 plus VAT (£ 22.33) for PC Systems
£ 15 plus VAT (£ 17.63) for Printers and Peripherals
£ 10 plus VAT (£ 11.75) for smaller items purchased separately

PRICES

System prices are shown without VAT (17.5%) and Delivery. All Interest Free Credit prices include Delivery & VAT. Please note that prices are subject to change and that these offers in this current advert are limited whilst current stocks last. Please order early to avoid disappointment. All trademarks are acknowledged. Prices, specifications and offers are subject to change, availability and subject to our conditions of sale copies of which are available on request. Please contact our sales staff for the latest up to date details. E&OE.

Finance Department, where the most popular customer request is for Interest Free Credit.

INTEREST FREE EXAMPLE

The following example shows a typical purchase.
All these interest free prices include delivery & VAT

Cash purchase		Credit Purchase	Deposit	24 Monthly Payments	Total
Time Machine E	£1196.15	Time Machine E	£120.95	£44.80	£1196.15
Laser Pack	£509.95	Laser Pack	£53.95	£19	£509.95
Total (Inc. Del & VAT)	£1706.10	Totals	£174.90	£63.80	£1706.10

TOTAL CASH PRICE = TOTAL CREDIT PRICE

Interest Free Credit is available subject to status. Written quotations are available on request. Be sure you can afford the payments before entering into a credit agreement.

The deposit may be paid by credit card or cheque. Most customers also purchase other options (e.g. floppy discs, 3 year extended warranty, Multimedia kit etc). Most of these are also available on Interest Free Credit whilst others can be paid for by increasing the deposit. Please call for details.

IBM Aptiva PowerStation

SYSTEM SPECIFICATION

- 486DX2-66 or 486DX4-100 processor
- 4Mb RAM or 8Mb RAM
- 540Mb IDE hard drive
- 3.5" 1.44Mb floppy drive
- Integrated VESA local bus graphics
- 4 drive bays and 4 slots
- Parallel, serial and mouse ports
- 14" SVGA 0.28dp low rad colour screen
- MS compatible mouse and 102 keyboard
- PC DOS 6.3 and MS Windows™ 3.1
- Microsoft Works v3 and AptivaWare software
- 12 month warranty extendable to 3 years
- IBM Helpline support

Multimedia (MM) Models
Also include 16-bit soundcard, stereo speakers, fitted CD-ROM drive, PC joystick and a superb range of Educational and leisure CD Multimedia titles

PRE-LOADED SOFTWARE

Please see pages 12 onwards for details

- Lotus 1-2-3 v5 spreadsheet
- Lotus Ami Pro v3.1 wordprocessor
- Lotus Approach v3 database
- Lotus Organizer v2
- Lotus SmartPics graphics
- Lotus Training for 1-2-3, Ami Pro and Approach
- New Quicken v4 personal finance pack
- GST PressWorks 2 desktop publishing pack
- GST DesignWorks 2 art and graphics pack
- Pacioli 2000 business accounts

The new high performance IBM Aptiva PowerStation is the perfect solution for the home or business user. Only models from Time Computers come with the additional software including the Lotus software suite, GST DTP & graphics suite, new Quicken v4 personal finance pack and some excellent Multimedia CD titles (with MM models only).
These models are not available on Interest Free Credit

TIME Almanac CD

EZ Language CD

Play & Learn CD

BodyWorks 3 CD

UFO for Windows CD

Dinosaur Museum CD

Aptiva PS 1	Aptiva PS 2	Aptiva MM PS 3	Aptiva MM PS 4
486DX2-66 4Mb	486DX4-100 8Mb	486DX2-66 4Mb Multimedia Model	486DX4-100 8Mb Multimedia Model
£999 Plus VAT	£1249 Plus VAT	£1199 Plus VAT	£1399 Plus VAT

BUY NOW ....

Pay only £120.95 deposit with nothing more to pay for 6 months

PAY LATER ....

After 6 months pay just £44.80 per month for 24 months on interest free credit. APR 0% . (Time Machine E)

These amazing high performance 486 systems come complete with a powerful suite of the best business, educational and leisure programs and provide the ideal solution for the home and business user. They are available on a truly incredible interest Free Credit Offer.

PC SPECIFICATION

- 486DX2-66, 486DX2-80 or 486DX4-100 processor
- 540MB or 850MB fast IDE hard disks
- 4MB or 8MB RAM expandable to 96MB
- Fitted CD Drive shown is £100+VAT extra
- 1.44Mb Floppy drive. 256K external cache
- Pentium technology upgradeable
- VESA SVGA graphics controller with 1MB
- 14" or 15" SVGA non-interlaced low radiation colour screen with 0.28dp
- Desktop case with 5 drive bays and 7 slots
- 102 Keyboard and Microsoft compatible Mouse
- PC DOS 6.3 and Windows 3.11
- Manufactured by Mitac in the UK
- 12m Warranty extendable to 5 Years

PRE-LOADED SOFTWARE

Please see pages 12 onwards for details

Business Software
- Lotus Software suite including Lotus 1-2-3, Ami Pro, Approach, Organizer 2, SmartPics and Lotus Training
- GST PressWorks 2 and DesignWorks 2
- TurboCAD for Windows
- Organize Your Way
- CV & Job Search Pro
- Pacioli 2000 Accounts
- Masterclips SE and Picture This!

Educational Software
- Windows Training and Windelete
- Fun School 4, Fun School Maths and Typing Tutor ComputerWorks, BodyWorks and AutoWorks EZ Language French, German and Spanish

Leisure Software
- PC Paintbrush
- Arts & Letters Draw and Wired for Sound lite
- Doom, Blake Stone, Pinball and Raptor Games

Time Machine E	Time Machine F	Time Machine G
486DX2-66, 540MB, 4MB RAM, 14" Screen	486DX2-80, 540MB, 8MB RAM, 14" Screen	486DX4-100, 850MB, 8MB RAM, 15" Screen
£44.80	£53.00	£62.00
£120.95 deposit, nothing more to pay for 6 months and then 24 monthly payments of £44.80. Total price £999 +VAT = £1196.15 Inc Delivery & VAT. APR 0%	£159.15 deposit, nothing more to pay for 6 months and then 24 monthly payments of £53. Total price £1199 +VAT = £1413.15 Inc Delivery & VAT. APR 0%	£178.15 deposit, nothing more to pay for 6 months and then 24 monthly payments of £62. Total price £1399 +VAT = £1666.15 Inc Delivery & VAT. APR 0%

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Sales Lines Open
Mon-Fri 8.30am-7pm
Sat. 9am-5pm

01282 777 111

Multimedia Time Machines

SYSTEM SPECIFICATION

486 Models

- 486DX2-66, 486DX2-80 or 486DX4-100 processor
- 540Mb or 850Mb fast IDE hard disks
- 4Mb or 8Mb RAM expandable to 64Mb
- 1.44Mb floppy drive. 256K external cache
- Pentium technology upgradeable
- VESA SVGA graphics controller with 1Mb
- 14" or 15" SVGA non-interlaced low radiation colour screen with 0.28dp
- Desktop case (new design) with 5 drive bays and 7 slots
- 102 keyboard and mouse
- PC DOS 6.3 and Windows™ 3.11
- Manufactured by Mitac in the UK
- 12mths warranty extendable to 5 years

Pentium Models

- Intel Pentium® 60, 75, 90 or 100MHz based processors
- 8Mb RAM expandable to 128Mb
- PCI Pentium board with PCI graphics and PCI IDE hard disks

Rest of specification as 486 Models

Multimedia HardWare

- Double or Quad speed IDE CD-ROM drive
- 16-bit high quality soundcard
- Twin stereo speaker system
- PC joystick

Fax & Internet Pack 1

- Pace MobiFax BABT approved data and fax modem
- Delrina WinFax Lite Fax software
- Communications software
- Introductory subscription to CompuServe with Internet Mailbox

Quiken v4 | Encarta 95 CD | Microsoft Works CD | Golf CD | Beethoven CD | Dangerous Creatures CD

PRE-LOADED SOFTWARE

Please see pages 12 onwards for details

Business Software

- Lotus Software suite Including Lotus 1-2-3, Ami Pro, Approach, Organizer 2, SmartPics and Lotus Training
- GST PressWorks 2 and DesignWorks 2
- TurboCAD for Windows
- Organize Your Way
- CV & Job Search Pro
- Pacioli 2000 Business Accounts
- Masterclips SE and Picture This!
- Quicken v4 Personal Finance

Educational Software

- Windows Training and Windelete
- Fun School 4, Fun School Maths and Typing Tutor
- ComputerWorks, BodyWorks, EZ Language French, German and Spanish

Leisure Software

- PC Paintbrush
- Arts & Letters Draw and Wired for Sound Lite
- Doom, Blake Stone, Pinball and Raptor Games

Microsoft® Multimedia Software

- Microsoft Encarta '95 Encyclopaedia CD
- Microsoft Works CD
- Microsoft Golf CD
- Microsoft Beethoven CD
- Microsoft Dangerous Creatures CD

The Multimedia Time Machines are powerful, high specification 486 and Pentium systems that provide the complete solution for the home and small business environment. They all come with excellent business software from Lotus and other leading manufacturers plus a range of educational and leisure software. All are fully multimedia ready with fitted CD-ROM drives, 16-bit soundcards and a superb range of CD Multimedia titles from Microsoft.
Also included is the Fax and Internet Pack from Pace allowing these systems to function as a powerful fax machine and allowing you to get on-line to services such as CompuServe and the Internet.
At these amazing prices with Interest Free Credit available for a limited period, these systems are without doubt the best computer solutions for the home and small business user. Add a quality Printer Pack or Scanner Pack (available on Interest Free Credit) for a complete solution.

APR **0%**

INTEREST FREE CREDIT

Interest Free Credit is available subject to status. Written quotations are available on request. Be sure you can afford the payments before entering into a credit agreement. See page 3 for Interest Free example. Software is pre-loaded. Pack shots shown for illustration only. See page 12 onwards for software details.

Multimedia Time Machine 1
486DX2-66/DX2-80/DX4100

486DX2-66 with 540Mb hard drive, 4Mb RAM and 14" screen

£39

£159.15 deposit and 24 monthly payments of £53.00 OR
£495.15 deposit and 24 monthly payments of £39.00
Total price £1199.00+VAT = £1431.15
Inc delivery & VAT. APR 0%

Model 1B 486 DX2-80 ..... £50 Extra
Model 1C 486DX4-100 ..... £100 Extra
RAM Upgrade to 8Mb ..... £Call

Multimedia Time Machine 2
486DX4-100

486DX4-100 with 850Mb hard drive, 8Mb RAM and 15" screen

£49

£199.65 deposit and 24 monthly payments of £66.00 OR
£607.65 deposit and 24 monthly payments of £49.00
Total price £1499.00+VAT = £1783.65
Inc delivery & VAT. APR 0%

Multimedia Time Machine 3
Pentium 60

Pentium 60 with 540Mb hard drive, 8Mb RAM and 14" screen

£59

£186.40 deposit and 24 monthly payments of £69.00 OR
£426.40 deposit and 24 monthly payments of £59.00
Total price £1549.00+VAT = £1842.40
Inc Delivery & VAT. APR 0%

Multimedia Time Machine 4
Pentium 75, 90, 100

Pentium 75 with 850Mb hard drive, 8Mb RAM and 15" screen

£69

£229.40 deposit and 24 monthly payments of £77.00 OR
£421.40 deposit and 24 monthly payments of £69.00
Total price £1749.00 +VAT = £2077.40
Inc delivery & VAT. APR 0%

Pentium 90 Upgrade £200
Pentium 100 Upgrade £300

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Granville House, Blackburn Road, Simonstone, Burnley, BB12 7GT

CALL NOW! Sales Lines Open Mon-Fri 8.30am-7pm Sat. 9am-5pm

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5AB

IBM Aptiva Solution

SYSTEM SPECIFICATION

486 Models

- 486DX2-66 or 486DX4-100 Processor
- 4Mb or 8Mb RAM
- 540Mb IDE hard disk
- 3.5" 1.44Mb floppy drive
- Integrated VESA local bus graphics
- 4 drive bays & 4 slots
- Parallel, serial and mouse ports
- 14" SVGA 0.28dp low rad colour screen
- MS compatible mouse & 102 keyboard
- PC Dos 6.3 & MS Windows™ 3.1
- Microsoft Works v3 & AptivaWare software
- 12 month warranty extendable to 3 years
- IBM helpline support

Fax & Internet Pack:
Pace MobiFax BABT approved Data and fax modem with fax & comms software and CompuServe introduction with Internet Mailbox

Multimedia (MM) Models:
Also include 16-bit sound card, stereo speakers, fitted CD-ROM drive, PC joystick and a superb range of educational and leisure CD multimedia titles

PRE-LOADED SOFTWARE

Please see pages 12 onwards for details

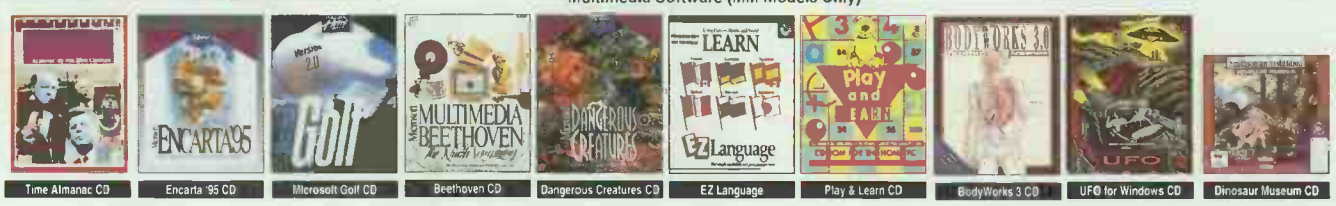
Business Software

- Lotus software suite including Lotus 1-2-3, Ami Pro, Approach, Organizer 2, SmartPics and Lotus Training
- GST PressWorks v2 and DesignWorks v2
- TurboCAD for Windows
- Pacioli 2000 Accounts

Educational Software
Windows Training and Windelete
Fun School 4 and Fun School Maths
ComputerWorks, BodyWorks and AutoWorks
EZ Language German

Leisure Software
PC Paintbrush
Doom and other games

Multimedia Software (MM Models only)



Time Almanac CD | Encarta '95 CD | Microsoft Golf CD | Beethoven CD | Dangerous Creatures CD | EZ Language | Play & Learn CD | BodyWorks 3 CD | UFO for Windows CD | Dinosaur Museum CD

IBM Aptiva Time Machine solutions are amongst the highest performance systems in this superb new IBM range. They all come with excellent business software from Lotus and other leading manufacturers plus a range of educational and leisure programs not included with our other Aptiva systems. Multimedia Models (MM) are fully multimedia ready with fitted CD ROM drives, 16-bit sound cards and a superb range of CD multimedia titles from Microsoft and others. Also included is the Fax and Internet Pack from Pace allowing these systems to function as a powerful fax machine and allowing you to get on-line to services such as CompuServe and the Internet.

Only systems from Time are available with the additional software and modem at these amazing prices. Interest Free Credit is available for a limited period and also applies to Printer Packs or Scanner Packs which can be added for a complete IBM Aptiva Solution.

APR **0%**

INTEREST FREE CREDIT

Interest Free Credit is available subject to status. Written quotations are available on request. Be sure you can afford the payments before entering into a credit agreement. See page 3 for Interest Free example. Software is pre-loaded. Pack shots shown for illustration only. See page 12 onwards for software details.

Aptiva Solution 1
486DX2-66
486DX2-66 with 540Mb hard drive, 4Mb RAM and Modem

£39

£169.90 deposit and 24 monthly payments of £55.00 OR
£553.90 deposit and 24 monthly payments of £39.00
Total price £1249.00+VAT = £1489.90
Inc delivery & VAT. APR 0%

Aptiva Solution 2
486DX4-100
486DX4-100 with 540Mb hard drive, 8Mb RAM and Modem

£49

£199.65 deposit and 24 monthly payments of £66.00 OR
£607.65 deposit and 24 monthly payments of £49.00
Total price £1499.00+VAT = £1783.65
Inc delivery & VAT. APR 0%

Aptiva MM Solution 3
486DX2-66
Multimedia Model
486DX2-66 with 540Mb hard drive, 4Mb RAM and Modem

£59

£199.65 deposit and 24 monthly payments of £66.00 OR
£367.65 deposit and 24 monthly payments of £59.00
Total price £1499.00+VAT = £1783.65
Inc Delivery & VAT. APR 0%

Aptiva MM Solution 4
486DX2-100
Multimedia Model
486DX2-66 with 540Mb hard drive, 8Mb RAM and Modem

£69

£218.65 deposit and 24 monthly payments of £75.00 OR
£362.65 deposit and 24 monthly payments of £69.00
Total price £1699.00 +VAT = £2018.65
Inc delivery & VAT. APR 0%

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Sat. 9am-5pm

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6BA Tel: 01282 777 111 Fax: 01282 770 701. All prices exclude delivery and VAT (17.5%). *All software applications are pre-loaded. Pack shots are shown for illustration only. Printed manuals and backup disks are available as options. E&OE

Compaq Presario
Multimedia Powerstations

SYSTEM SPECIFICATION

- 486DX2-66 or 486DX4-90 processor
- 8Mb RAM expandable to 64Mb
- 420Mb hard disk
- 3.5" 1.44Mb floppy drive
- Local Bus SVGA graphics
- Compact 3 bay case with 2 expansion slots shown (Standard Desktop model with 3 bays & 3 slots and Mini-Tower Models with 5 bays & 5 slots also available)
- Serial, parallel, joystick, MIDI and mouse ports
- 14" Low radiation NI SVGA colour screen
- 16-bit stereo soundcard, microphone & speakers
- Quad Speed Multisession CD-ROM drive
- Integrated 9600/2400 Fax/Data Modem with telephone answering & CompuServe.
- MS DOS 6.2, Windows 3.1, Tabworks, Welcome Centre, Control Centre and Learning Centre

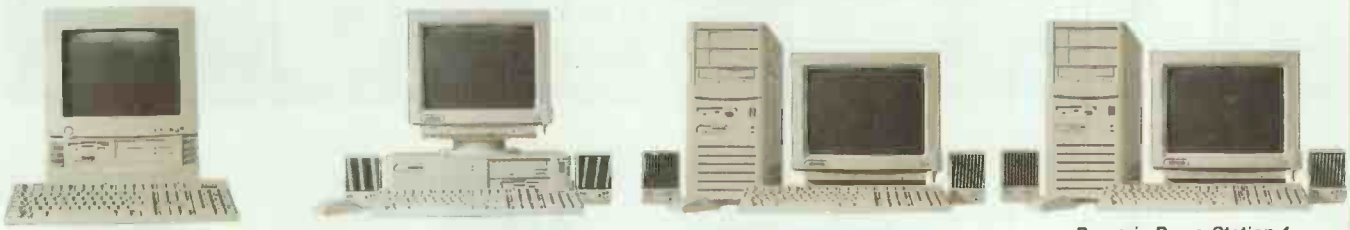
Compaq Presario PowerStation 4:
Pentium 75 Model includes 720Mb hard drive, 256K Cache, Mini-Tower case, PCI Bus graphics but no modem. Rest of specification as above.

SOFTWARE

Pre-loaded or on CD

- Lotus 1-2-3 v5 Spreadsheet
- Lotus Ami Pro v3.1 Wordprocessor
- Lotus Approach v3 Database
- Lotus Organizer v2
- Lotus SmartPics Graphics
- Lotus Training for 1-2-3, Ami Pro and Approach
- New Intuit Quicken v4 Personal Finance Pack
- GST PressWorks 2 Desktop Publishing Pack
- GST DesignWorks 2 Art & Graphics Pack
- Pacioli 2000 Business Accounts
- Microsoft Works v3 all-in-one package
- MS Money finance pack
- MS Entertainment pack
- Microsoft Encarta Encyclopaedia
- EZ Language French, German, Spanish & more
- The Ultimate Human Body

Compaq Presario Multimedia Powerstations provide you with famous brand, high quality solutions for home and business use. Only systems from Time come with additional software including the Lotus Business Suite, GST Graphics & DTP packages and New Quicken v4 personal finance pack. Also included are some excellent CD titles including Microsoft Encarta, EZ Language and The Ultimate Human Body.
All systems feature high quality Quad Speed Multimedia and 486 system also include fax & data modem with answerphone facilities.



Presario PowerStation 1
486DX2-66
Compact Model
£1299+VAT

Presario PowerStation 2
486DX4-90
Standard Desktop Model
£1399+VAT

Presario PowerStation 3
486DX4-90
Mini-Tower Model
£1449+VAT

Presario PowerStation 4
Pentium 75
Mini-Tower Model
£1799+VAT

Winstations

High performance tower systems with Lotus software suite from just £549 +VAT!

PC Specification

- 486sx-25, 486-50 or 486DX2-66 processor
- 4Mb RAM expandable to 32Mb (8Mb models at extra cost)
- 3.5" 1.44Mb floppy drive
- 127Mb, 250Mb or 340Mb IDE hard disks
- 32-bit local bus graphics with windows accelerator
- 14" 0.28dp Non-interlaced SVGA MPRII low radiation colour screen
- Colossus Mini-tower case with 6 drive bays and 8 16-bit free slots
- Parallel, mouse and 2 serial ports
- 102 keyboard and mouse
- PC DOS 6.3 and Windows 3.1

WinStation 1 486SX-25 127Mb.....£549
WinStation 5 486-50 250Mb.....£599
WinStation 6 486-50 340Mb with 256K cache and Maths coprocessor £699
WinStation 7 486DX2-66 340Mb, 8 Mb ..£899

VESA Winstation previousley offered on credit. This offer ended 18th March.

Software

(see page 12 onwards for details)
The following software applications are pre-loaded. Lotus backup disks and printed manuals are available as options.

- Lotus 1-2-3 v5 Spreadsheet
- Lotus Ami Pro v3.1 Wordprocessor
- Lotus Approach v3 Database System
- Lotus SmartPics Graphics
- Lotus Organizer v1
- AutoRoute Express v3 for Windows
- Pacioli 2000 Accounts

340Mb models come with extra software including:-

- Individual Training for Lotus 1-2-3, Ami Pro and Approach
- Lotus Smart-text On-line documentation
- GST PressWorks v1 for Windows
- GST DesignWorks for Windows v2
- BodyWorks, AutoWorks, ComputerWorks and much more

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7AB

Compaq Multimedia Time Machines

SYSTEM SPECIFICATION

- 486DX2-66 or 486DX4-90 processor
- 8Mb RAM expandable to 64Mb
- 420Mb hard disk
- 3.5" 1.44Mb floppy drive
- Local bus SVGA graphics
- Standard desktop case with 3 bays and 3 expansion slots shown (Compact and Mini-Tower models also available)
- Serial, parallel, joystick, MIDI and mouse ports
- 14" Low radiation NI SVGA colour screen
- 16-bit stereo sound card, microphone & speakers
- Quad speed multisession CD-ROM drive
- Integrated 9600/2400 fax/data modem with telephone answering & CompuServe
- MS DOS 6.2, Windows™ 3.1, TabWorks, Welcome Centre, Control Centre and Learning Centre
- PC joystick is included

Compaq Time Machine 4:
Pentium 75 model includes 720Mb hard drive, 256K cache, Mini-Tower case, PCI bus graphics but no modem. Rest of specification as above.

SOFTWARE

Pre-loaded or on CD
Please see pages 12 onwards for details

Business Software
- Lotus Software suite including Lotus 1-2-3, Ami Pro, Approach, Organizer 2, SmartPics and Lotus Training
- GST PressWorks 2 and DesignWorks 2
- TurboCAD for Windows
- Organize Your Way
- CV & Job Search Pro
- Quicken v4 Personal Finance Pack
- Pacioli 2000 Business Accounts
- Masterclips SE and Picture This!

Educational Software
- Windows Training and Windelete
- ComputerWorks and AutoWorks
- Fun School 4, Fun School Maths and Typing Tutor

Leisure Software
- PC Paintbrush
- Arts & Letters Draw and Wired for Sound lite
- Doom, Blake Stone, Pinball and Raptor Shareware Games

Microsoft Software
- Microsoft Works v3 all-in-one package
- Microsoft Money finance pack
- Microsoft Encarta, '95 Encyclopeaedia CD
- Microsoft Entertainment pack
- Microsoft Golf CD
- Microsoft Beethoven CD
- Microsoft Dangerous Creatures CD

Additional Multimedia Software
- Time Almanac CD
- BodyWorks 3 CD
- EZ Language CD
- Play & Learn CD
- UFO for Windows CD
- Dinosaur Museum CD
- The Ultimate Human Body CD

Microsoft & Additional Multimedia Software

Time Almanac CD | Encarta '95 CD | Microsoft Golf CD | Beethoven CD | Dangerous Creatures CD | EZ Language | Play & Learn CD | BodyWorks 3 CD | UFO for Windows CD | Dinosaur Museum CD

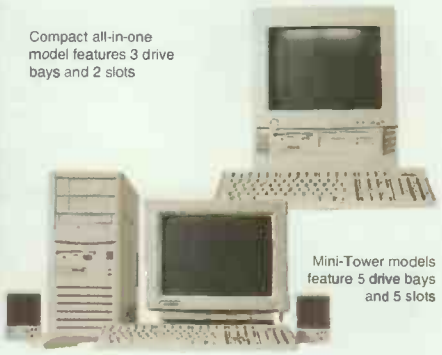
Compaq Multimedia Time Machines are powerful multimedia systems that come with all the software you are ever likely to need. These systems include extra business, educational and CD multimedia titles not included with some of our other systems.
All systems are exclusive to Time Computer

Systems and feature high quality quad speed multimedia with a PC joystick as standard. 486 system also include a fax & data modem with answerphone facilities. These systems are also available on Interest Free Credit and monthly payment examples are shown below.

APR **0%**

INTEREST FREE CREDIT

Interest Free Credit is available subject to status. Written quotations are available on request. Be sure you can afford the payments before entering into a credit agreement. See page 3 for Interest Free example. Software is pre-loaded or on CD. Pack shots shown for illustration only. See page 12 onwards for software details.



Compact all-in-one model features 3 drive bays and 2 slots

Mini-Tower models feature 5 drive bays and 5 slots

Compaq Time Machine 1
486DX2-66
Compact Model
420Mb , 8Mb RAM and Modem

£49

£186.40 deposit and 24 monthly payments of £69.00 OR
£666.40 deposit and 24 monthly payments of £49.00
Total price £1549.00+VAT = £1842.40
Inc delivery & VAT. APR 0%

Compaq Time Machine 2
486DX4-90
Standard Desktop Model
420Mb, 8Mb RAM and Modem

£59

£207.90 deposit and 24 monthly payments of £73.00 OR
£543.90 deposit and 24 monthly payments of £59.00
Total price £1649.00+VAT = £1959.90
Inc delivery & VAT. APR 0%

Compaq Time Machine 3
(Mini Tower Model) is £50 + VAT extra

Compaq Time Machine 4
Pentium 75
Mini Tower Model
720Mb, 8Mb RAM

£79

£245.90 deposit and 24 monthly payments of £91.00 OR
£533.90 deposit and 24 monthly payments of £79.00
Total price £2049.00+VAT = £2429.90
Inc Delivery & VAT. APR 0%

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8BA

Multimedia POWER PC

PC SPECIFICATION 486 Models

- 486DX2-66, 486DX2-80 or 486DX4-100 processor
- 540Mb or 850Mb fast IDE hard disks
- 4Mb or 8Mb RAM
- 1.44Mb floppy drive
- 256K external cache
- Pentium technology upgradeable
- VESA SVGA graphics with 1Mb
- 14" or 15" SVGA NI low radiation colour screen with 0.28dp
- Desktop case (new design) with 5 bays and 7 slots
- 102 keyboard and mouse
- DOS 6.3 and Windows 3.11
- Manufactured for Time by Mitac in the UK
- Multimedia hardware and Fax and Internet Pack included as standard (see below)

PRE-LOADED SOFTWARE

Please see pages 12 onwards for details

- Lotus 1-2-3 v5 Spreadsheet
- Lotus Ami Pro v3.1 Wordprocessor
- Lotus Approach v3 Database
- Lotus Organizer v2
- Lotus SmartPics Graphics
- Lotus Training for 1-2-3, Ami Pro and Approach
- GST PressWorks 2 Desktop Publishing Pack
- GST DesignWorks 2 Art & Graphics Pack
- Pacioli 2000 Business Accounts
- Quicken v4 Personal Finance Package

Multimedia Software

- EZ Language Multimedia CD Learn French, German, Spanish and more
- World Atlas CD
- Play & Learn Educational CD
- Shareware CD with many excellent games

If you are looking for a powerful complete multimedia solution, the Multimedia Power PC represents the best value. These 486 and Pentium systems have a high specification which includes large hard drives, fast controllers and plenty of expansion potential.

All are fully multimedia ready with fitted CD-ROM drives, 16-bit soundcards, an excellent range of CD titles and come with the Pace Fax and Internet Pack, allowing these systems to function as a powerful fax machine and allowing you to get on-line to services such as CompuServe and the Internet.

Also included is a range of excellent business software from Lotus and GST which will handle all your requirements for wordprocessing, filing, number crunching, organizing, graphics, accounts and desktop publishing. At these special introductory prices, these systems are a great buy.

ALL MODELS INCLUDE:

Pentium® Models

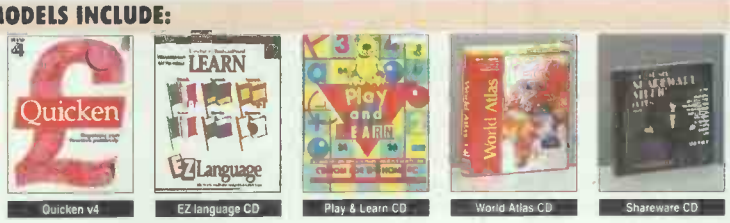
- Intel Pentium 60, 75, 90 or 100 processors
- 8Mb RAM expandable to 128Mb
- PCI Pentium board with PCI graphics and PCI IDE hard disks
- Rest of specification as 486 models

Multimedia HardWare

- Double speed or Quad speed IDE CD-ROM drive
- 16-bit high quality soundcard
- Twin stereo speaker system
- PC Joystick

Fax & Internet Pack 1

- Pace MobiFax BABT approved Data and Fax Modem
- Delrina Winfax Lite Fax software
- Communications & On-Line software



Quicken v4 | EZ language CD | Play & Learn CD | World Atlas CD | Shareware CD

Multimedia POWER PC 1

486DX2-66

486DX2-66 with 540Mb hard drive, 4Mb RAM and 14" screen

£899

Model 1B 486DX2-80 ..... £949
Model 1C 486DX4-100 ..... £999
RAM Upgrade to 8Mb ..... £Call

Multimedia POWER PC 2

486DX4-100

486DX4-100 with 850Mb hard drive, 8Mb RAM and 15" screen

£1199

Multimedia POWER PC 3

Pentium 60

Pentium 60 with 540Mb hard drive, 8Mb RAM and 14" screen

£1249

Multimedia POWER PC 4

Pentium 75, 90, 100

Pentium 75 with 850Mb hard drive, 8Mb RAM and 15" screen

£1449

Pentium 90 Upgrade £200
Pentium 100 Upgrade £300

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CALL NOW! Sales Lines Open Mon-Fri 8.30am-7pm Sat. 9am-5pm

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Tel: 01282 777 111 Fax: 01282 770 701. All prices exclude delivery and VAT (17.5%). See page 3 for ordering instructions. *All software applications are preloaded. Pack shots are shown for illustration only. Printed manuals and backup disks are available as options. E&OE 9BA

Mitac 486 Powerstation

System Specification

- 486DX2-66, 486DX2-80 or 486DX4-100 processor
- 540Mb or 850Mb fast IDE hard disks
- 4Mb or 8Mb RAM
- CD-ROM drive (shown) is £100 extra
- 1.44Mb FD. 256K external cache
- Pentium technology upgradeable
- VESA SVGA graphics with 1Mb
- 14" or 15" SVGA NI low rad colour screen with 0.28dp
- Desktop case (new design) with 5 bays and 7 slots
- 102 Keyboard and Mouse
- DOS 6.3 and Windows 3.11
- Manufactured for Time by Mitac in the UK

Mitac 586 Powerstation

System Specification

- Intel Pentium® 60, 75, 90 or 100 based processor
- 540Mb or 850Mb fast IDE hard disks
- 8Mb RAM (max 128Mb)
- CD-ROM drive (shown) is £100 extra
- 1.44Mb FD. 256K external cache
- PCI SVGA graphics with 1Mb or 2Mb (at extra cost)
- 14" or 15" SVGA NI low rad colour screen with 0.28dp
- Desktop case (new design) with 5 bays and 7 slots
- 102 Keyboard and Mouse
- DOS 6.3 and Windows 3.11
- Manufactured for Time by Mitac in the UK

Mitac 486

The 486 Mitac PowerStation is an incredible high performance PC system ideal for the business user and professional. It features fast 486DX2-66 or 486DX4-100 processors with a choice of high performance hard disks, and superb gaphics.

These systems are very expandable and can be tailored to your requirements with additional CD and multimedia options, extra RAM, high performance modems and Scanners.

The excellent business software from Lotus, GST and Intuit is all you will need to keep you fully productive. At a price of just £749, the Mitac PowerStation Is the best value PC in the UK today.

Pre-loaded Software

Included with all systems.
See page 12 onwards for details.

- Lotus 1-2-3 v5 Spreadsheet
- Lotus Ami Pro v3.1 Wordprocessor
- Lotus Approach v3 Database
- Lotus Organizer v2
- Lotus SmartPics Graphics
- Lotus Tralning for 1-2-3, Aml Pro and Approach
- Pacioli 2000 Business Accounts
- GST PressWorks 2 Desktop Publishing Pack
- GST DesignWorks 2 Art & Graphics Pack
- New Quicken v4 for Windows Personal Finance Package

Mitac 586

The 586 Mitac PowerStation is the ultimate system for the power user. It features the very latest technology from Intel and has an incredible, specification which can be tailored to your requirements. The Pentium 75 Model is our best buy and can be upgraded to Pentium 90 or Pentium 100 in the future.

All systems include the excellent business software from Lotus, GST and Intuit.

Mitac PowerStation 1A
486DX2-66
486DX2-66 with 540Mb hard drive, 4Mb RAM and 14" screen
£749
Model 1B 486DX2-80 .....£799
Model 1C 486DX4-100 .....£849
RAM Upgrade to 8Mb .....£call

Mitac PowerStation 2
486DX4-100
486DX4-100 with 850Mb hard drive, 8Mb RAM and 15" Screen
£1049

Mitac PowerStation 3
Pentium 60
Intel Pentium 60 CPU with 540Mb hard drive, 8Mb RAM and 14" screen
£1099

Mitac PowerStation 4
Pentium 75, 90, 100
Intel Pentium 75 CPU with 850Mb hard drive, 8Mb RAM and 15" Screen
£1299
Pentium 90 Model £200 Extra
Pentium 100 Model £300 Extra

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Sat. 9am-5pm
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Tel: 01282 777 111 Fax: 01282 770 701. All prices exclude delivery and VAT (17.5%). *All software applications are pre-loaded. Pack shots are shown for illustration only. Printed manuals and backup disks are available as options.E&OE

10AB

Mobile Comms Office

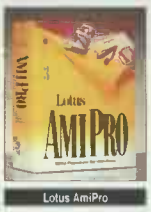
Time announce an incredible range of high performance notebook solutions from Toshiba, Compaq and Texas Instruments that come ready to use with excellent business software from Lotus and Intuit.
All these systems also come with a complete Fax and Internet Pack including a BABT approved Intel PCMCIA or Pace MoblFax portable modem with appropriate fax and comms software. Fax your documents to anyone and connect to your PC to your base and many other on-line services with ease.
At prices of just £49 per month on Interest Free Credit, these mobile comms office solutions are going fast. Hurry place your order today!

APPROVED for connection to telecommunication systems specified in its instructions for use subject to the conditions set out in them

APR **0%** INTEREST FREE CREDIT

Interest Free Credit is available subject to status. Written quotations are available on request. Be sure you can afford the payments before entering into a credit agreement. See page 3 for Interest Free example. Software is pre-loaded. Pack shots shown for illustration only. See page 12 onwards for software details.

Lotus 1-2-3



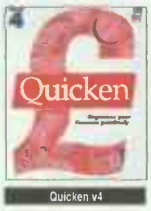
Lotus AmiPro

Lotus Approach

Lotus Organizer v2

Lotus SmartPics

AutoRoute Express



Quicken v4

TOSHIBA

The ideal entry level business solution with T1910 Mono and Colour models, Intel Modem and Software preloaded

- Intel 486SX-33 processor
- 4Mb or 8Mb RAM
- 200Mb IDE hard disk
- VGA Mono or Dual Scan colour screen
- Trackball mouse
- 1.44Mb floppy drive
- PCMCIA type II or III slots and standard ports
- MS DOS 6.2 and Windows™ 3.1
- Intel PCMCIA Fax & Data Modem with software
- Business software suite (Shown above)

COMPAQ

The superb Compaq Contura TFT Colour models with Pace portable modem and business software suite. Simply the best buy in TFT colour notebooks

- Intel 486DX-25 processor
- 4Mb or 8Mb RAM
- 120Mb or 209Mb IDE hard disk
- Superb VGA TFT colour screen
- Built-in trackball mouse
- 1.44Mb floppy drive
- All standard ports
- MS DOS 6.2 and Windows™ 3.1
- Pace Portable Fax & Data Modem with Software
- Business Software Suite (Shown above)
- Compaq 3 year Warranty

TEXAS INSTRUMENTS

Texas Instruments latest 4000M models with built-in Multimedia, Intel Modem and Preloaded Software. The CD-ROM portable dock is also available as an option on Interest Free Credit

- Intel 486DX2-50 processor
- 4Mb or 8Mb RAM
- 340Mb or 455Mb IDE hard disk
- VGA Dual Scan or TFT colour screen
- 1Mb VESA Video
- Built-in 16-bit soundcard, microphone and speakers
- Built-in point mouse
- Adaptec Fast SCSI-II Port
- Optional CD-ROM drive
- 1.44Mb floppy drive
- PCMCIA II/III and all standard ports
- MS DOS 6.2 and Windows 3.1
- Intel PCMCIA Fax & Data Modem with software
- Business software suite (shown above)

Toshiba Comms Office 1
486SX-33 200Mb 4Mb Mono

£49

£255.15 deposit and 24 monthly payments of £49.00 Total price £1199.00 +VAT = £1431.15 inc. Delivery & VAT. APR 0%

Toshiba Comms Office 2
486SX-33 200Mb 4Mb Colour

£725.15 deposit and 24 monthly payments of £49.00 Total price £1599.00 +VAT = £1901.15 inc. Delivery & VAT. APR 0%

RAM Upgrade 4Mb to 8Mb £160

Compaq Comms Office 1
486DX-25 120Mb 4Mb TFT Colour

£69

£245.15 deposit and 24 monthly payments of £69.00 Total price £1599.00 +VAT = £1901.15 inc. Delivery & VAT. APR 0%

Compaq Comms Office 2
486DX-25 209Mb 4Mb TFT Colour

£480.15 deposit and 24 monthly payments of £69.00 Total price £1799.00 +VAT = £2136.15 inc. Delivery & VAT. APR 0%

RAM Upgrade 4Mb to 8Mb £155

TI Comms Office 1
486DX2-50 340Mb 4Mb Dual Scan Colour

£89

£352.65 deposit and 24 monthly payments of £89.00 Total price £2099.00 + VAT = £2488.65 inc. Delivery & VAT. APR 0% RAM Upgrade 4MB to 8MB £185

TI Comms Office 2A
486DX2-50 455Mb 8Mb TFT Colour

£316.15 deposit and 24 monthly payments of £115.00 Total price £2599.00 + VAT = £3076.15 inc. Delivery & VAT. APR 0%

Portable CD-ROM Dock

£79.82 deposit and 24 monthly payments of £28.00 Total price £599.00 +VAT = £503.83 inc delivery & VAT. APR 0%

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Granville House, Blackburn Road, Simonstone, Burnley, BB12 7GT

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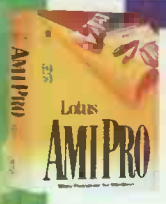
Tel: 01282 777 111 Fax: 01282 770 701. All prices exclude delivery and VAT (17.5%). See page 3 for ordering instructions. *All software applications are pre-loaded. Pack shots are shown for illustration only. Printed manuals and backup disks are available as options.E&OE

11AB

Lotus General Business Applications

The following pages describe the software applications which may be included with your PC system. Please refer to the individual system offer to see which applications are included. In most cases software is pre-loaded with on-line help with an easy to use menu system enabling you to be productive instantly.

When it comes to general business applications, Lotus leads the world in high quality state of the art software products. Innovative preloaded Lotus Doc-on-line provides the complete set of Lotus manuals in electronic format to enable you to learn these applications quickly. The latest releases of these award winning applications incorporate all the advanced features to enable you to get the most out of your PC system. We firmly believe that the Lotus Suite of products is the best you can buy at ANY price and we recommend this range for your general business applications.



Lotus Ami Pro for Windows

Lotus Ami v3.1 for Windows is the latest version of this superb easy to use wordprocessing package that lets you write letters, produce documents and even write books. It includes advanced features such as different headers and footers on alternate page, outlining, and generation of a table of contents plus much more.

- **POWERFUL WORD PROCESSING**
  SmartMerge provides a step-by-step guide to mail merge. Proof-read your work with the Spell Checker, Thesaurus and Grammar Checker. Produce an outline, table of contents and index in seconds.
- **GIVE YOUR DOCUMENT THE PERSONAL TOUCH**
  With over 55 professionally designed style sheets that you can customise to suit your needs, it's easy to produce professional looking documents; everytime.
- **COMPATIBILITY WITH OTHER APPLICATIONS**
  Read documents from a wide variety of sources, including WordPerfect, Microsoft Word and more. Do not worry if your company uses another brand, the built-in Switch Kit makes the transition to Lotus Ami Pro simple. You can also read a variety of spreadsheet, database and graphic files.
- **Drawing, Charting & Page Layout**
  Create frames in your document for flexible placement of editable text and graphics, or create your own graphics with the built-in freehand drawing tools and over 25 different chart types.

Lotus 1-2-3 for Windows

Lotus 1-2-3 Release 5 for Windows (RRP £ 365 +VAT) spreadsheet is one of the most flexible applications available and will enable you to do virtually anything with numerical information.

It includes database functions as well as a wide range of scientific and financial ones. WYSIWYG will let you see the typefaces that you have included in your sheet on the actual sheet. Its' macro language will enable you to automate operations when performing complicated calculations and it can generate charts or graphs automatically, simply by highlighting an area of data on the sheet.

- **INCREASED PRODUCTIVITY**
  SmartMaster templates give you a head start producing forecasts, financial statements and more. Lotus Maps displays your spreadsheet data on a colour-coded map. One-Step Charting creates a chart with a single click of the mouse.
- **THE LATEST IN SPREADSHEET PUBLISHING**
  Multi-Page Print Preview displays up to 9 spreadsheet pages before printing. Fast Format copies formatting information from one range to another. Designer Frames give charts and tables a professional look.
- **DATABASE POWER AT YOUR FINGERTIPS**
  Unique integration with Lotus Approach's data management capabilities lets you easily build forms and customised reports or rearrange views using Dynamic Crosstabs. You can now open dBase and Paradox files directly into your spreadsheet.
- **OLE2 SUPPORT**
  Drag and drop. Move or copy your data between Lotus 1-2-3 files with visual mouse cues to assist you. No other spreadsheet can do this.
- **WORKGROUP READY NOW**
  Version Manager allows multiple sets of data to be saved in the same cell, along with the "who, what, when and why" of each version. New Range Routing lets you mail a range to colleagues for input, then roll everyones' ideas back into your file.

Lotus Approach for Windows

New Lotus Approach v3 for Windows is basically a computerised filing cabinet but with very advanced features which allows you to handle any information with ease.

- **GETS YOU STARTED QUICKLY**
  No other database will help you get started faster. You don't have to be a programmer to use Lotus Approach. Lotus Approach includes SmartMaster, templates for popular database applications and Assistants to quickly build your reports, mailing labels, forms, crosstabs and charts.
- **KEEPS YOU PRODUCTIVE**
  With features such as NoteTab interface, Query by From and SmartSummary calculations, Lotus Approach's built in usability keeps you productive as your requirements grow and change.
- **POWERCLICK REPORTING**
  Generate professional reports with unprecedented ease. Customise reports with a WYSIWYG report writer that lets you see the changes as you make them.
- **UNRIVALLED INTEGRATION**
  Lotus Approach offers transparent access to popular PC databases such as dBase, Paradox, FoxPro, Oracle, Access, and SQL Servers. Unrivalled integration enables you to report and analyse live Lotus 1-2-3 data.
- **POWER AND SPEED**
  Full relational power. X10 speed technology, automatic record locking, crosstabs, charting and advanced macro capabilities ensure the ability to build powerful, customised applications.

Lotus Organizer for Windows

Lotus Organizer for Windows is a full-feature Personal Information Manager that allows you to manage your time & work. It is effectively your own personal secretary with some very advanced features.

- **PERSONAL ORGANIZER**
  On-screen book appearance with section tabs and pages that turn to make you feel at home from the start.

The Calendar lets you arrange appointments and confirm meetings

The To Do List helps you keep track of every last detail.

The Planner gives the broader picture, making it easier to plan and monitor long term projects.

The Address book can store up to 65,000 names, addresses and telephone numbers - all available in an instant.

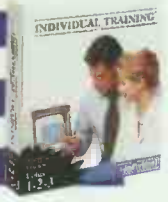
The Notepad lets you jot down free-form ideas.

- **EASY LINKING**
  Link entries from different sections for easy cross-referencing, then move freely and instantly among linked entries.
- **FLEXIBLE PRINTING**
  Print in any page in formats designed to fit your manual planner. Create mailing labels sorted by specific criteria.

Lotus SmartPics for Windows

Lotus SmartPics Graphics consist of the finest Clipart, i.e. high quality images that can cover a wide range of topics and which can be easily incorporated into documents created by a wordprocessor, Spreadsheet, Desktop Publishing or Drawing Package.

Use these amazing colourful and versatile images when you need to add that extra sparkle to business presentations, or enhance memos, reports, overheads and handouts. Thirty general business categories include: realistic people, business symbols, international icons, computers, military, medical illustration, backgrounds and memorable cartoons - just to name a few.



Lotus Training for 1-2-3

Lotus Training for Ami Pro

Lotus Training for Approach

Individual Training Packages are provided for Lotus 1-2-3, Lotus Approach and Lotus AmiPro. The packages cover upto the previous version of each of the Lotus products. Lotus On-Line help covers the latest information on the new Lotus releases.

These packages help you master your PC and software in less time than any other method. They include high quality graphics and sharp screen displays and a glossary of key terms. Individual Training offers you complete step-by-step training to teach you everything you need to know, from the basics to the most advanced topics. These programs provide you with a quick and easy method to master new skills and to advance in the software applications.

Individual Training offers extensive topic coverage and helps you understand basic to advanced skills, concepts, menus and on-screen messages. Guided Lessons allow you to advance at your own pace and provide practice sessions with useful examples, illustrations and helpful hints to make learning easy. Quiz sections at the end reinforce learning.

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Other Business Software Applications

In addition to the main-line business application (such as Word-processing, Spreadsheet, Database etc.) there are other programs which are very useful for business and professional use. We have selected the best products to be included with some of our systems.

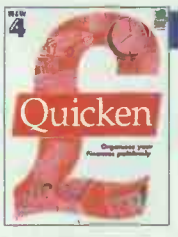
GST DesignWorks v2 for Windows

GST Designworks v2 for Windows (RRP £ 149 +VAT) is a powerful drawing package like CorelDRAW that allows you to create logos and other business graphics. Drawings created can also be used in other applications such as a Desktop Publisher or a Wordprocessor.

DesignWorks is the ideal design tool for adding flair and impact to your work. Whether you want to create a logo for your newsletter, add professional graphics to presentations and reports, or create a colourful poster or eye-catching invitation. DesignWorks gives you the power to do all of this quickly and easily.

GST PressWorks v2 for Windows

PressWorks v2 (RRP £ 149) is a full-feature Desktop Publishing Program (DTP) with a wealth of powerful features and lets you produce full colour reports, memos, presentations, advertisements, brochures and catalogues. In fact, just about any printed page where good presentation is important. PressWorks supports OLE2, text, graphics, colour, word processing, spell check with thesaurus, paragraph styles, powertext, typefaces, templates, language support, clip art, text run-around, typography, photo CD and screen snapshots.

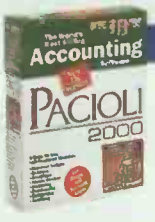


New ! Quicken Uk 4.0 for windows

Quicken is the fastest, easiest way to organise your home and small business finances. It manages bank and credit card accounts, mortgages, loans and investments, in any currency. It calculates VAT automatically and provides detailed analysis with its customisable reports and graphs. Quicken is easy to use and quick to update. Standing orders are entered automatically and your transactions are memorised, ensuring you never have to type an entry twice. From the records you enter, Quicken gives you the 'big picture' view of your finances, using the indicators of your choice. And with this information at your fingertips, planning your financial future is easy!

Autoroute Express UK v3 for Windows

Autoroute Express for Windows (RRP £ 99 +VAT) is a colourful, computerised road atlas, with simple-to-read maps and easy-to-follow directions. Forget fumbling with fold out maps or messing with mileage charts. Autoroute takes all the trouble out of travel. Just tell Autoroute when and where you're starting and where you're heading. Just set your driving style and speed. Autoroute takes it from there, showing the quickest routes, fastest routes, country routes, most economical routes - in fact, which ever route is right for you. So before you hit the road on business or head off on holiday, check the route with Autoroute.

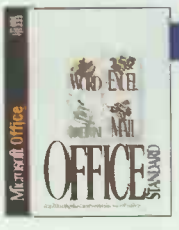


Pacioli 2000 Accounts

Pacioli 2000 is a full featured accounting software package that combines ease-of-use with the power and features required by most businesses. Help is given so that people who are not fully fledged accountants, can use this program. Pacioli features eight fully featured modules including Nominal Ledger, Stock Control, Invoicing and Budgeting. This package outperforms many accounting systems costing over £500.

IMSI TurboCAD v2 for Windows

TurboCAD v2 for Windows (RRP £99 +VAT) is a full-featured desktop drawing and drafting (CAD) software that will have you creating professional drafting, plans and drawing with ease and with incredible speed. It is very advanced and powerful yet very easy to use. Now everyone can do Home Designs (Kitchens, Bathrooms) Business Floorplans, Landscapes and much more. Optional extra libraries of drawings are available for specialist use. Unlike other CAD programs, a maths co-processor is NOT required to run this excellent CAD program.



Microsoft Office CD Bundle

Microsoft Office CD Bundle consists of 9 excellent Microsoft applications on CD and is available with any system fitted with a CD drive for a small extra charge. Applications include Microsoft Excel, Microsoft Word, Microsoft Powerpoint, Microsoft cc:Mail Licence, Microsoft Works, Microsoft Encarta 95, Microsoft Dangerous Creatures, Microsoft Multimedia Beethoven and Microsoft Golf.

IMSI Masterclips SE

IMasterclips SE Intro is not an application but a collection of drawings. It includes some of the highest quality and creative clip art available. This can be used to highlight and enhance presentations, reports, proposals newsletters and other materials. Images are provided for use with most graphics software applications. The images are full colour and vector art files which allows the graphics to be recoloured, rotated, manipulated, and resized without jagged lines.

IMSI Windows Training

IMSI Wind Ease allows you learn Windows in less than One Hour. Wind Ease is perfect for beginners, allows you to start with the basic lessons and move to advanced Windows features at your own pace. There are dozens of tips and techniques that even the experienced Windows user can learn from. You will find loads of information on features you may never have used before. You are shown how to install and use other applications, how to set up printers and fonts, how to create time saving macros, and how to set up and run a DOS application under Windows.

Arts & Letters Draw

Arts & Letters Draw for Windows is another drawing package that is remarkable easy to use and which has a complete set of drawing tools, allows curve editing, 300 clipart images, 8 True Type fonts, and symbol libraries. WinDelete

WinDelete

WinDelete is the safe and simple Windows Uninstaller. When windows applications are installed, files may be placed in several directories. WinDelete tracks and logs all the files placed on your hard disk and allows you to uninstall these programs easily thereby making room for new programs and speeding up Windows performance. Incorporates easy point and click options with context-sensitive help.

Picture This! for Windows

Picture This! is the complete professional image manager and editor for anyone working with any type of images. It is the fastest, easiest way to organize and enhance your images. This one package helps you keep track of your image files; organize them into albums; convert graphics files between popular formats (E.g. BMP, GIF, JPEG, PCX, TIFF and more); capture screen images on your computer; even do professional photo retouching (overlay, edge, sculpt, emboss and adjust colour and sharpness) and special effects. It supports Photo CDs and TWAIN scanners.

Organise your Way

Things to Do! Places to Go! & People to See!
Organize your Way v4 for Windows bridges the gap between personal information managers (e.g. Sidekick) and complex contact managers by combining both of these functions to produce an easy, yet powerful information and contact manger. It includes a database, calendar, to-do-list, and a contact manger that offers unmatched ease-of-use and flexibility.

PFS: CV & Job Search Pro

CV & Job Search Pro for Windows enables you to tackle those job interviews with confidence. Create impressive CVs and cover letters that stand out. It incorporates a flexible CV Builder, a Job Search Manager as well as comprehensive wordprocessing features.
CV Builder automatically formats entire CV and includes templates for Business, Academics, Recent Graduates and more. Job Search Manager includes prospects database and allows scheduling of interviews and follow-ups.

PC Paintbrush for Windows

PC Paintbrush for Windows is the latest version of this classic professional painting package that includes very advanced features. This superb package is the ultimate in creativity and lets you create, edit, manipulate, colourize, texturize and Paint anything you can imagine! It ranks as No.6 on the IDC list of best selling software of all time. Other painting programs only give you a small taste of how much fun painting can be. PC Paintbrush is the ultimate and the art form of the future. Includes 87 painting tools; 14 kinds of paintbrushes, 5 kinds of air brushes, 4 spraycans, 6 pens, 4 markers, 4 crayons and much more

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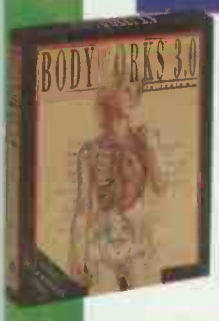
Educational & Leisure Software

The PC is quickly becoming the ideal vehicle for education. The latest educational programs provide all the information needed by children and make learning fun.
The latest multimedia PC games have overtaken the games consoles in quality and features. Some of the best educational programs and games are included with certain PC systems from Time Computers.

BodyWorks

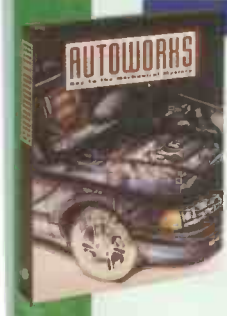


BodyWorks v3 for Windows is the best selling interactive science adventure that lets you explore the human body. For all the fascinating "inside" information - how the eye sees, the inner workings of the heart, the different stages of pregnancy, experience Bodyworks and discover the miracle of the human machine.
-Colourful, photoquality graphics and vast database lets you study different internal systems (skeletal, muscular, respiratory, reproductive etc)
-Magnified views and cutaways reveal even the most elaborate cell structure and detailed animations bring the intricate functions of the body to life.
-Phonetic "Smart search" directs you to any part of the body and advanced "speech back" lets you hear the correct pronunciation
-Complete Health Section includes information on first aid, fitness, sports injuries, common illness, nutrition and more.
-Lesson plans and quizzes to enhance knowledge of the human anatomy
-Easy exporting of text and graphics to a wide range of printers for creation of customized reports for school and college.

ComputerWorks

Computers have revolutionised the way we work, learn and play. Now you can explore the universe of microchips and megabytes on your own computer. From hard disks to software, ComputerWorks is your high-tech tour guide.
-Colourful animated graphics and comprehensive information highlight each component of the computer system, including the inner workings of monitor, drives, printers, CD-ROM, mice and other peripherals.
-In-depth history of the computer covers the evolution of computers from 500BC to the present day.
-Special "related topics" section explores key subjects including artificial intelligence, virtual reality, multimedia viruses, hacking, computer viruses and much more.
-Detailed lesson plans and challenging quiz sections provide helpful instruction, teaching you all about computers.
-Advanced interface lets you export text and graphics to create your own customized reports and print documents.
Whether you are new to computers or just wanting to know more about how a CD-ROM works, how a CPU "thinks" and interacts with the main circuitry, ComputerWorks is your High-Tech Tour Guide.

AutoWorks



If you've ever looked under the hood at an engine and wondered what makes a car go... Autoworks is your key to the mechanical mystery. Explore the world of spark plugs and pistons, fan belts and brakes, all without getting your hands greasy.
-Three-dimensional animated graphics bring to life the systems, structures and functions of your car with full-view displays, including top and side angles, show entire systems and how their parts interact.
-Detailed sections cover Engine (pistons, timing chain, camshaft, engine block) Drive train (Automatic transmission, Manual transmission, clutch, differential); Steering/Suspension (Ride joints, stabiliser bars, control arms, ball joints, shock absorbers); Exhaust/Emissions control (catalytic converter, alternative fuels, muffler/tailpipe); Fuel system (injection system, Turbocharger/supercharger); Cooling system (Thermostat, Radiator, water pump); Climate control (heating, air conditioning); brakes (disc/drum, anti-lock brakes, master cylinder); Electrical (starter , ignition, alternator, battery, spark plug); Safety system (air bags, seat belts)
-Fun car quiz tests your automotive knowledge and special trivia sections explore fascinating topics and print-out graphics and text for customized reports, and all graphics are exportable to PC files.

Fun School for Windows

Fun School 4 for children aged 7 to 11, contains six of the best selling Fun School series which will delight, entertain and, most importantly, educate your children in a wide variety of skills. Each of these programs has been designed by a team of educationalists following guide-lines laid down by the National Curriculum. Fun School 4 is a unique learning package. It uses a variety of colourful and stimulating graphics along with numerous sounds which will encourage children's progress. There are three areas covered by this pack, Mathematics, Geography and History.

Fun School Merlin Maths

Fun School Maths (Merlin's Maths) has been carefully designed to help children aged 7 and over with simple mathematical concepts and calculations whilst at the same time, having fun playing the six games. Each of the games has three difficulty levels and within each level the questions get harder the longer the child plays.

EZ Language

The simple vocabulary and pronunciation tutor
EZ Language is the fun and easy vocabulary and pronunciation tutor. In just minutes you'll be learning over 400 new words and phrases. It's like having your own personal language instructor available at your command. See pictures with the words and listen to native speakers' voices. This interactive program makes learning fun, fast and easy. Perfect for travellers, students, and others wishing to communicate in a new language.

EZ Language French
EZ Language German
EZ Language Spanish

-A picture is worth a thousand words
Colourful, descriptive graphics make learning fun and easy. Words and phrases appear in both English and the foreign language to help you learn.
-Hear the correct pronunciation and record your own voice
Your PC speaker or soundcard lets you hear native language speaker say the word or phrase properly. Then you can practice speaking by recording your own voice with a microphone and sound card.
-Measure your success
Multiple choice tests at the end of each section let you gauge your success. Review any areas where you need more practice or move on to the next lesson. You'll soon be speaking a new language.

Flying Fingers Typing Tutor

Flying Fingers is an interactive typing course which operates within Windows. It is designed to improve your keyboard skills with the minimum of effort. It's built in family of tutors will give advice, encouragement so that you can develop your word processing skills. You will learn how to create immaculate layouts for letters and other documents. Also lessons can be planned in advance with its built in timeplan.

DOOM

Knee-Deep in the Dead
Doom is the ultimate 3D adventure, bringing virtual reality action to your PC. This version includes 9 levels of 3D action and superb graphics. DOOM is the world's best selling graphics game! (Warning: This program may not be suitable for young children as it contains frightening monsters and violence! Delete DOOM facility is included for you to delete this game.)

Blake Stone

The Star Institute
Terror reigns in this 3D action adventure. Set in a space station, you are British military agent Blake Stone, put into deadly combat with a mad scientist and his mutant army. Blake Stone uses the award winning technology from Wolfenstein 3D, plus added strategy and new graphical effects.

Raptor

Bravo Sector
ca (The Raptor is a warship, and you have been chosen to pilot it into enemy territory. With each ship and ground target you destroy, you will earn the cash to buy new technology for the next wave. Raptor offers 256-colour VGA smooth scrolling graphics.

Epic Pinball

Epic Pinball allows you to play pinball right on your PC. Smooth scrolling, lights, beacons and digital sound effect this game the best in its class. Epic Pinball bring ramps, sink holes, kickbacks, drop targets and multiple-ball play.

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Multimedia Software & Hardware

CD ROM Multimedia Software

BodyWorks 3 for Windows CD
Explore the system, structures and functions of the body in fascinating detail. (see BodyWorks opposite). This CD Multimedia version includes 3-D rotating views with detailed animation and video clips and all the features of the Disk version.

UFO for Windows CD
UFO is the most complete guide to close encounters with over 1200 fully documented UFO sightings with actual photographs of the UFO sightings. Display, copy and print text and images through the Windows clipboard. A great tool for amateur or the expert sky watchers.

IMSI EZ Language (6 Pack) Multimedia CD
Using pictures, words, and sound you can learn French, German, Spanish, Italian, Russian and Japanese. EZ Language is a simple vocabulary and pronunciation tutor on CD. You actually hear the correct pronunciation of word using this multimedia language product. Perfect for travellers, students and others wishing to communicate in a new language. Simple tests at the end of each section let you gauge your success.

Zool 2 Multimedia CD
The latest CD version of this excellent platform game is better than ever. Zool 2 features the Ninja of the Nth dimension, a karate expert living on planet Loox, and his female partner Zooz. Their mission is to defeat the evil Krool who wants to conquer the known universe.

World Atlas CD
This excellent educational encyclopaedia of the World allows you to access over 3000 topics including Geography, people, education, health, Government, crime, economy, agriculture, communication, travel and international organisations. Includes detailed maps, flags, anthems and much more.

ShareWare CD
The Shareware CD is packed with almost 100 of the best Shareware programs and games covering every topic. Simply install the programs you need onto your hard disk. These games are simply excellent and will provide years of entertainment. Amazing value for money.

Play & Learn Multimedia CD
Play and learn has been developed for children between the ages of four to ten. It contains many excellent programs including ten colourful animated games and a series of learning modules covering spelling and maths.

Software Toolworks Multimedia Encyclopaedia CD
The amazing power of multimedia CD-ROM technology has never been more evident than the Software Toolworks Grollier Multimedia Encyclopaedia. Forget printed encyclopaedias and get the best and most comprehensive multimedia encyclopaedia available. Based on the contents of a 21 volume encyclopaedia with over 33,000 articles. Five search and browse facilities enable you to source information quickly and easily.

Dinosaur Museum CD
Transform your computer into a Time Machine with vivid sound, lavish colours and interactive games. Visit the Museum Room and learn detailed facts about dinosaurs including size, classification, behaviour and more. The Conservatory features exhibits on the biology of the Mesozoic era, and the Game Room tests your dinosaur IQ in two educational games for 1 or more players. Includes hundreds of photos plus movie clips.

TIME Almanac of the 20th Century
Experience history as it happened with this unique multimedia CD reference title. Travel through the 20th century with full-motion video covering issues and events that shaped our time. Quickly retrieve maps and search through an archive of 4000 articles. Includes Newsquest quiz, every Time 'man of the year' story, 70 full-motion videos, 12 narrated essays and over 450 photographs.

Microsoft Encarta 1995 CD
Microsoft Encarta 95' is another superb multimedia encyclopaedia based on the contents of a 28 volume encyclopaedia. It includes over interactive charts & tables, stunning animation, videos, maps, charts, sounds and pictures.

Microsoft Works CD
Microsoft Works 3 for Windows integrates easy to use word-processor, spreadsheet, database, drawing module and comms in one application on CD.

Microsoft Golf CD
Microsoft Golf for Windows allows you to tee off with upto eight golfing partners and move from driving range to practice green. It features unmatched photo-realistic scenery and stunning graphics, true golf ball flight, and easy accurate swing control.

Microsoft Dangerous Creatures CD
Microsoft Dangerous Creatures is a superb multimedia title featuring some of the most exciting living things. Complete with high quality graphics, motion video and superb stereo sound, it provides education and enjoyment for everyone.

Microsoft Multimedia Beethoven
This magnificent orchestral performance of masterworks by Beethoven lets you look closer into the composition in new ways highlighting the principal instruments, relates the piece to other works, and viewing the work in its social context.

Mega CD Bundles
This superb bundle includes all of the programs covered on pages 12, 13 and 14 (except Microsoft Office CD bundle and AutoRoute) plus many more programs and comes loaded on CD-ROM. This CD bundle is only available bundled in with your PC system. As many of our systems already come with some of this software preloaded, prices of the Mega bundle vary depending on the system with which it is purchased. As well as providing extra software programs, the CD also serves as a backup of your pre-installed software should you need to re-install any applications. Please call for details.

Multimedia Hardware

Multimedia systems come with some of the following hardware, all fitted and ready to use with a range of CD titles. These hardware items may also be added to other systems to build a system to your requirements.

- Double Speed CD-ROM drive
- Quad Speed CD-ROM drive
- 16-bit high quality soundcard with sound software
- Standard speakers
- Large Speakers
- PC joystick & microphone
- TV card with Teletext
- MPEG Video player card

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Granville House, Blackburn Road, Simonstone, Burnley, BB12 7GT

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Fax & Internet Packs

Printer Packs APR 0%

Our Fax and Internet Packs will be very useful to all PC users and we strongly recommend this option to enable you to get the most out of your PC. We offer a choice of 3 packs. All are also available on Interest Free Credit (With IF Systems only).All packs contain:-

1. A FAX AND DATA MODEM

Pack 1: Includes a Pace V.22 bis MobiFax Data and Fax modem. This is an external unit which comes complete with cable to attach to your PC. It comes complete with powerful Fax and Comms software and provides all the facilities you need.

Pack 2: Includes a 14.4 V.32bis Internal Fax and Data Modem . This is faster and more suited to prolonged data communications.

Pack 3: Includes a 14.4 V.32bis Fax and Data Modem with Voice Facilities. In addition to the Fax and Comms software, this also comes with SuperVoice voice software with automatic switching between Data, Fax and Voice. Your PC can function as a powerful answering machine with multiple mailboxes, a mini-bulletin board as well as a Fax machine and Comms station.

2. FAX SOFTWARE

Powerful fax software included with each modem will convert your PC into a full-feature advanced Fax machine. You can receive faxes from other modems and standard Fax machines. These faxes are saved as a file on your hard disk and the software informs you automatically which faxes have arrived. These can then be looked at, inserted into other documents, printed or deleted. You can also send faxes created on your PC to other modems and fax machines directly without printing out anything.

3. COMMUNICATIONS SOFTWARE

Comms software will allow you to communicate and exchange information and software with other modem users. It will also enable you to link to other computers with access to many on-line services such as CompuServe and also link to the Internet. The Internet is the name give to the Information Super-Highway which consists of many computers all over the world linked together via standard telephone lines. The Internet is essentially a public electronic mailing system but also includes other services. Worldwide communications over the Internet an be very cost effective as you only pay local telephone rates.

4. MEMBERSHIP OF COMPUSERVE ON-LINE SERVICES WITH INTERNET MAILBOX

a. CompuServe Introductory Membership for the first month
b. Usage credit of £10 to explore the chargeable services available
c. WinCIM Windows Software that allows linking to CompuServe and enables you to use the services easily.
d. CompuServe user booklet (Membership Guide for Windows)

CompuServe is the leading commercial provider of on-line information for PC users and has more than 2 million users worldwide who can access a huge range of global & local services and electronic mail usually by a local phone call. The range of services is wide and as well as CompuServe commercial and support services, members can also access the InterNet (the world wide electronic mail system with mainly public domain services). Here are just some examples of the CompuServe services available:-

- Electronic Mail, Communications and Bulletin Board facilities
- Links to Internet with Internet mailbox
- CompuServe Support Forums with free support & updates provided by major software and hardware companies such as Lotus, Microsoft, IBM and Novell.
- News, Weather and Sports Services which is updated continually and access to Newspapers such as The Daily Telegraph, Guardian, Times etc.
- Travel services with updated information on Airline schedules and fares with flight booking option. Information also provided on world-wide hotel rates, Car hire, AA information on accommodation in UK, and advice on Visas, Immigration etc.
- Electronic shopping allows you to buy virtually anything
- Money matters, Markets and Information Services with data on stocks, commodities and Money Markets. CompuServe's on-line brokerage facility allows you to buy and sell
- Entertainment and Games with access to many programs and multiplayer games
- Research, Reference and Health with access to over 900 databases including services such as MEDLINE, and the complete Grolier's Academic Encyclopaedia.

Pack 1	Pack 2	Pack 3
£4.29	**£6.50**	**£8.75**
£13.36 deposit and 24 monthly payments of £4.29 Total price £99 + VAT = £116.33 APR 0%	£19.07 deposit and 24 monthly payments of £6.50 Total price £149 + VAT = £175.08 APR 0%	£23.83 deposit and 24 monthly payments of £8.75 Total price £199 + VAT = £233.83 APR 0%

APPROVED for connection to telecommunication systems specified in the instructions for use subject to the conditions set out in them

Scanners

A scanner allows you to input printed graphics and text into your applications. Logitech hand held scanners provide a convenient way to scan images as graphics files and text into wordprocessors via OCR software (Optical Character Recognition Software).

Scanman 256 Pack	Scanman Colour Pack
£5.50/Mth	**£13.00/Mth**
The Scanman 256 features 256 grey scales (mono) and Phototouch Windows software £19.58 deposit and 24 monthly payments of £5.50 Total £151.58 + VAT with Interest Free systems only	Scanman Colour offers 24-bit true colour scanning as well as 256 grey scales, Phototouch Colour and AutoStitch software £39.33 deposit and 24 monthly payments of £13.00 Total £351.33 + VAT

Tel: 01282 777 111. Fax No: 01282 770 701. All prices exclude delivery and VAT (17.5%). Interest Free Prices include delivery & VAT. Mainland Courier Delivery is £19 + VAT for systems and £15 +VAT for printers. Visa / Access / American Express / Switch, Government, Educational and Corporate orders welcome. Prices, specifications and offers are subject to change, availability, and subject to our conditions of sale copies of which are available on request. Mail order only. Goods are normally despatched within 7 to 10 days. All orders will be fulfilled within 28 days unless otherwise specified. All trademarks acknowledged. On bundled systems software applications are preloaded. Pack shots are shown for illustration only. Printed manuals and backup disks are available for a small extra charge. *Interest Free Credit available subject to status. Written details are available on request. Be sure you can afford the payments before entering into a credit agreement. Interest free example shown on page 3. E&OE.

Printer packs include leading InkJet and laser printers and come ready to use complete with PC printer cable and 3 excellent software packages. These packs are available on interest free credit from as little as £13.50 per month*

Sim City for Windows
The world's best windows game. As the Mayor and City Planner, you control the fate of countless cities where Sims move in and build hospitals, homes, stores & factories, or move out in search for something better. This great city simulator puts you in control and features superb animation and colour graphics.

100 Fonts for Windows
Expert 100 fonts for windows contains a selection of 100 Serif, Sans Serif and Display fonts that are fully scaleable and will work with all your Windows applications that support fonts and will enhance the output from these printers.

Labels for Windows
Labels, envelopes and bar codes - all in one simple package that runs under windows and supports these Windows printers. Choose from over 120 label formats or create your own in any size. A program that will be useful for all users.

HP DeskJet 540 Pack — £13.50 MTH INTEREST FREE CREDIT

£44.95 deposit and 24 monthly payments of £13.50.
Total price £299.00 + VAT = £368.95 inc. Delivery & VAT. APR 0%*

The new HP DeskJet 540 600 x 300 dpi InkJet printer with flexibilty of the option of upgrading to colour later on. Our Pack includes DeskJet 540 Printer with autosheet feeder, 3 year HP warranty, a shielded printer cable and the above software.

HP DeskJet 540 Colour Pack

As above but with Colour kit included. £50.08 **deposit and 24 monthly payments of £15.00**
Total price £334.00 + VAT = £410.08
inc Delivery & VAT. APR 0%.

HP DeskJet 560C Pack — £23.00 MTH INTEREST FREE CREDIT

£69 deposit and 24 monthly payments of £23.
Total price £513.51 + VAT = £621 Inc Delivery & VAT. APR 0%*

The high quality Colour DeskJet with resident black and colour cartridges for convenience.

New HP DeskJet 660C Pack.....£Call

Epson Stylus Colour Pack — £25.00 MTH INTEREST FREE CREDIT

£69.00 deposit and 24 monthly payments of £25.00 Total price £ 554.36 + VAT = £ 669 inc Delivery & VAT. APR 0%.

The Epson Stylus Colour is the only colour InkJet to offer an amazing true 720 x 720 dpi resolution. This colour printer is simply superb, producing crisp text in solid black or colour. If you are looking for the best quality from your printer, this is the printer for you. Our includes Printer with autosheet feeder, 3 year Epson warranty, a shielded printer cable and the above software.

NEC Laser Pack — £19.00 MTH INTEREST FREE CREDIT

£53.95 deposit and 24 monthly payments of £19.00 Total price £419.00 + VAT = £509.95 inc. Delivery & VAT. APR 0%*

The NEC SuperScript the first personal laser printer designed specifically for Windows. Incorporating leading technology in a simple, compact design, these are the first laser printers that are driven by your PC's processor rather than their own. They offer ultra fast printing, with the first page printed faster than any conventional printer because of the PC-based GDI (Graphical Device Interface - which is Windows native language). Using resolution enhancement technology, these printers produce outstanding printer quality at a virtual 600dpi with solid blacks and fine half tones. Our packs include laser printer, a shielded printer cable, and the above software.

TIME Computer Systems Ltd.
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When you use a Brother PC you are drawing on the wealth of production experience that has kept Brother at the forefront of business machine technology for sixty years.

Quality
Reliability
Support
& Value

Today's range of Brother high performance personal computers and notebooks continues that fine tradition. The maximum performance and power at great prices. No one offers you more. Workstations, Servers, Multimedia Systems, Notebooks of all sizes, systems with added-value software, Brother has the answer to all your computing needs. And we support you all the way.

Brother's superior service includes one year on-site warranty, a 30-day money back guarantee and a lifetime technical hotline.

As a member of the International Brother Group, you can depend on Kyodai to offer exceptional service. Call our salespeople today for great products, great service and peace of mind.

In business, education, government and the home, Brother quality makes the difference.

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The Brother MAX

Boxes shown for illustration only.

- 486DX2 66MHz Processor
- 540Mb Hard Disk
- 128K Cache
- 8Mb RAM exp. to 128Mb
- 14" SVGA Low Radiation MPRII, Non-interlaced Colour Monitor (0.28 dp), EPA EnergyStar
- 1Mb VESA Local Bus Graphics Accelerator
- 3.5" 1.44Mb Floppy Disk
- 2 VESA Local Bus slots
- 2 serial, 1 Parallel Ports
- 1 x 8-bit, 6 x 16-bit (2VL) slots
- Dual speed CD-ROM
- SoundBlaster 16-bit Stereo Soundcard
- Games Pro Joystick
- Deluxe Stereo Speakers
- PC GemFax Internal Fax/Modem with communications software
- Microsoft compatible mouse
- 102 key enhanced Keyboard
- The MAX Software Package (see panel for details)
- Windows for Workgroups 3.11 and MS-DOS 6.2
- Desktop Case
- 12 months on-site warranty

Amazing power. Fantastic features. And a stunning array of software. The Brother MAX gives you everything you need to enjoy the multimedia experience - and much, much more besides.

The MAX is designed for uncompromising performance - 486DX2 66MHz processor, 8Mb of RAM, large 540Mb storage, a double-speed CD-ROM, 16-bit stereo soundcard and high-speed VESA local bus graphics.

When it comes to getting the most from your system the MAX is exceptional - all your Business, Education, Entertainment and Communications needs are catered for - we even include a modem and software to get you into the exciting world of the information superhighway

The MAX is a system you deserve. Built with attention to detail, quality engineered and designed to keep you up and running, year after year.

AMAZING VALUE

£1249

Add £130 to upgrade to Modem with Voice Facility

The Max Software Package:

Business:
Lotus Smartsuite v3 inc:
- *Lotus 123 v5 Spreadsheet*
- *Lotus AmiPro 3.1 Word Processor*
- *Lotus Approach 3.0 Database*
- *Lotus Freelance Graphics*
- *Lotus Organiser 1.1*

Entertainment: *(Top 10 Games)*
- *Dragon Lore*
- *MegaRace*
- *Theme Park*
- *FIFA International Football*

Education:
- *Grolier's MultiMedia Encyclopaedia*
- *MultiMedia Typing Tutor*

Communications:
- *Connection to Compuserve and Internet (Free for Limited period)*
- *Supervoice (requires Modem with Voice available for extra £130)*

Utilities:
- *Pilot MultiMedia Graphical Interface*
- *Training for Lotus Smartsuite*
- *Interlude and Get Organised*
- *Professor MultiMedia*
- *Professor Windows*

(On-line documentation included)

New The Brother SUPERMAX

as The Brother Max plus:
- 486DX2 80MHz Processor
- Microsoft Family CD Pack

AMAZING VALUE

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Add £130 to upgrade to Modem with Voice Facility

Worth over £400 (RRP)

Microsoft Family CD Pack
- MS Encarta 1995 CD *Encyclopaedia*
- MS Works for Windows CD *Integrated Package*
- MS Dangerous Creatures CD *Wildlife*
- MS Money CD *Home Finances*
- MS MultiMedia Golf CD *Entertainment*
- MS Scenes (3.5" disks) *Backgrounds*

Documentation included on CD. Works and Money supplied on 1 CD

Some recent Brother press quotes

"Very good price for a system of this quality (Brother Pentium P60)"
COMPUTER SHOPPER

"For the best home bargain the Brother MultiMedia Master pipped the XXX on raw price performance"
WINDOWS USER

"This is a mother of a Brother especially at the price...Overall performance proved handsome"
COMPUTER BUYER

"Brother has produced a well-specified PC at a very competitive price. The package includes everything you need"
PC DIRECT

"PCMCIA flexibility and an impressive battery life make this a good choice...the Brother Litebook should certainly be on your shopping list"
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DELIVERY: Add £20+VAT per system for delivery in UK Mainland. Delivery will normally be effected on the next working day. Please allow 5 days for cheque clearance. Carriage will be charged for items returned within the 30 day guarantee period

ALL PRICES EXCLUDE VAT

Kyodai A BROTHER COMPANY

The Brother MultiMedia Series

Model shown: Graduate MultiMedia.
Boxes shown for illustration purposes only.
Speakers supplied will be superior Deluxe Stereo Speakers

NEW UPGRADED PROCESSORS

Enter a whole new dimension in creative computing with a Multi Media PC. Integrate text, graphics, sound and live action on your PC to bring education, leisure and business software to life. With the new Microsoft Family CD Pack the Brother range offers excellent value for the beginner through to the professional. And all hardware and software is installed, tested and ready to run straight from the box.

Tutor Multimedia

- 486DX 40MHz processor
- 128K Cache
- 270Mb Hard Disk
- 4Mb RAM exp. to 128Mb
- 14" SVGA Colour Monitor
- 1Mb VESA Graphics Accelerator
- Dual Speed CD-ROM
- SoundBlaster 16-bit Stereo Soundcard
- Stereo Speakers
- Microsoft Family CD Pack
- 12 months on-site warranty

£899

Graduate Multimedia

- 486DX2 66MHz processor
- 128K Cache
- 540Mb Hard Disk
- 4Mb RAM exp. to 128Mb
- 14" SVGA Low Radiation Non-Interlaced Colour Monitor (0.28)
- 1Mb VESA Graphics Accelerator
- Dual Speed CD-ROM
- SoundBlaster 16-bit Stereo Soundcard
- Deluxe Stereo Speakers
- Microsoft Family CD Pack
- 12 months on-site warranty

£999

Professor Multimedia

- 486DX2 80MHz processor
- 128K Cache
- 540Mb Hard Disk
- 4Mb RAM exp. to 128Mb
- 14" SVGA Low Radiation Non-Interlaced Colour Monitor (0.28)
- 1Mb VESA Graphics Accelerator
- Dual Speed CD-ROM
- SoundBlaster 16-bit Stereo Soundcard
- Deluxe Stereo Speakers
- Microsoft Family CD Pack
- 12 months on-site warranty

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P75 Multimedia

- Intel Pentium 75MHz processor
- PCI 64-bit Graphics Accelerator
- 256K Cache
- 540Mb Hard Disk
- 8Mb RAM exp. to 128Mb
- 14" SVGA Low Radiation Non-Interlaced Colour Monitor (0.28)
- Dual Speed CD-ROM
- SoundBlaster 16-bit Stereo Soundcard
- Deluxe Stereo Speakers
- Microsoft Family CD Pack
- 12 months on-site warranty

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All Systems include:

- 3.5" 1.44Mb Floppy Disk
- 2 VESA Local Bus Slots (except Pentium)
- 2 Serial, 1 Parallel, 1 Games Port
- 1 x 8-bit, 6 x 16-bit (2VL) slots (Pentium: 4 x PCI/4 x ISA)
- 200 Watt PSU
- 102 key enhanced Keyboard
- Windows for Workgroups 3.11, MS-DOS 6.2 and Mouse

Brother 486 and Pentium Systems are EnergyStar compliant with advanced Power Saving facilities

Microsoft Family CD Pack
FREE with these Brother MultiMedia Systems

Worth over £400 (RRP)

- MS Encarta 1995 CD Encyclopaedia
- MS Works for Windows CD Integrated Package
- MS Dangerous Creatures CD Wildlife
- MS Money CD Home Finances
- MS MultiMedia Golf CD Entertainment
- MS Scenes (3.5" disks) Backgrounds

Documentation included on CD. Works and Money supplied on 1 CD

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14" SVGA to 14" SVGA LR 0.28	£40
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14" SVGA LR to 17"SVGA LR	£390
Joystick	£12
PC Gem Fax Modem (IM74)	£49
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Upgrade Case to 5000 Series Mini Tower Case	£20
Upgrade Case to 8000 Series Full Tower Case	£50

ALL PRICES EXCLUDE VAT To the best of our knowledge the specifications and prices shown are correct at the time of press. Subject to change without notice. E.&.O.E.

brother

The Brother Tutor Series

Tutor 386

- 386SX, 40MHz processor
- 170Mb hard disk
- 4Mb RAM exp. to 128Mb
- 14" SVGA colour monitor
- 512K video memory
- 3.5" 1.44Mb floppy disk
- 200 Watt PSU
- 2 serial, 1 parallel ports
- 6 x 16 bit expansion slots
- Keyboard and mouse
- Microsoft Works v3 *for Windows*
- MS-DOS 6.2, Windows for Workgroups 3.11
- 12 months on-site warranty

£549

Tutor 486SX

- 486SX, 25MHz processor
- 170Mb hard disk
- 4Mb RAM exp. to 128Mb
- 14" SVGA colour monitor
- 1Mb VESA local bus graphics accelerator
- 3.5" 1.44Mb floppy disk
- 200 Watt PSU
- 2 serial, 1 parallel ports
- 2 VESA local bus slots
- 6 x 16 bit, 1 x 8 bit expansion slots
- Keyboard and mouse
- Microsoft Works v3 *for Windows*
- MS-DOS 6.2, Windows for Workgroups 3.11
- 12 months on-site warranty

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With 486SX 33MHz processor £679

Tutor 486DX

- 486DX, 40MHz processor
- 210Mb hard disk
- 4Mb RAM exp. to 128Mb
- 14" SVGA colour monitor
- 1Mb VESA local bus graphics accelerator
- 3.5" 1.44Mb floppy disk
- 200 Watt PSU
- 2 serial, 1 parallel ports
- 2 VESA local bus slots
- 6 x 16 bit, 1 x 8 bit expansion slots
- Keyboard and mouse
- Microsoft Works v3 *for Windows*
- MS-DOS 6.2, Windows for Workgroups 3.11
- 12 months on-site warranty

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Lotus Tutor

- 486DX, 40MHz processor
- 210Mb hard disk
- 4Mb RAM exp. to 128Mb
- 14" SVGA colour monitor
- 1Mb VESA local bus graphics accelerator
- 3.5" 1.44Mb floppy disk
- 200 Watt PSU
- 2 serial, 1 parallel ports
- 2 VESA local bus slots
- 6 x 16 bit, 1 x 8 bit expansion slots
- Keyboard and mouse
- Lotus Bundle 1 Package
- MS-DOS 6.2, Windows for Workgroups 3.11
- 12 months on-site warranty

£729

Lotus Bundle 1 inc:
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- *Lotus Ami Pro 3.1 Word Processor*
- *Lotus Organiser1.1*
- *Lotus SmartCam*
- *Lotus SmartPics 1.0 Clipart*

(disks & manuals available at extra cost)

NEW *UPGRADED* PROCESSORS

The Brother Graduate Series

Graduate

- 486DX2 66MHz processor
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- 128K Cache
- 8Mb RAM exp. to 128Mb
- 14" SVGA low radiation MPRII non-interlaced colour monitor (0.28 dot pitch)
- 1Mb VESA local bus graphics accelerator
- 3.5" 1.44Mb floppy disk
- 2 VESA local bus slots
- 2 serial, 1 parallel ports
- 1 x 8-bit, 6 x 16-bit (2 VL) expansion slots
- Keyboard and mouse
- Microsoft Works v3 *for Windows*
- Windows for Workgroups 3.11 and MS-DOS 6.2
- 12 months on-site warranty

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Brother Office Graduate

Microsoft Office v.4.2 inc: *MS Office Manager, • MS Word v6 for Windows • MS Excel v5 for Windows • MS PowerPoint v4 for Windows • MS Mail Licence*

(Disks & Manuals included. Boxes shown for illustration only)

Office Graduate

- 486DX2 66MHz processor
- 540Mb hard disk
- 128K Cache
- 8Mb RAM exp. to 128Mb
- 14" SVGA low radiation MPRII non-interlaced colour monitor (0.28 dot pitch)
- 1Mb VESA local bus graphics accelerator
- 3.5" 1.44Mb floppy disk
- 2 VESA local bus slots
- 2 serial, 1 parallel ports
- 1 x 8-bit, 6 x 16-bit (2 VL) expansion slots
- Keyboard and mouse
- Microsoft Office 4.2 for Windows
- Windows for Workgroups 3.11 and MS-DOS 6.2
- 12 months on-site warranty

£1129

The Brother Professor Series

The Professor

- 486DX2 80MHz processor
- 540Mb hard disk
- 128K Cache exp. to 1Mb
- 8Mb RAM exp. to 128Mb
- 14" SVGA low radiation MPRII, non-interlaced colour monitor (0.28 dp), EPA EnergyStar
- 1Mb VESA local bus graphics accelerator
- 3.5" 1.44Mb floppy disk
- 2 VESA local bus slots
- 2 Serial, 1 parallel ports
- 1 x 8-bit, 6 x 16-bit (2VL) slots
- Microsoft Works v3 *for Windows*
- Windows for Workgroups 3.11 and MS-DOS 6.2
- Microsoft compatible mouse
- Desktop case and keyboard
- 12 months on-site warranty

£989

Lotus Professor

Lotus Smartsuite v3 inc:
Lotus 123 v5,
Lotus Ami Pro 3.1,
Lotus Approach 3.0,
Lotus Freelance Graphics
Lotus Organiser1.1,
(includes on-line documentation. Disks & manuals available at extra cost. Box shown for illustration)

- 486DX2 80MHz processor
- 540Mb hard disk
- 128K Cache exp. to 1Mb
- 8Mb RAM exp. to 128Mb
- 14" SVGA low radiation MPRII, non-interlaced colour monitor (0.28 dp), EPA EnergyStar
- 1Mb VESA graphics accelerator
- 3.5" 1.44Mb floppy disk
- 2 VESA local bus slots
- 2 Serial, 1 parallel ports
- 1 x 8-bit, 6 x 16-bit (2VL) slots
- Lotus Smartsuite v.3
- Windows for Workgroups 3.11 and MS-DOS 6.2
- Microsoft compatible mouse
- Desktop case and keyboard
- 12 months on-site warranty

£1049

Office Professor

- 486DX2 80MHz processor
- 540Mb hard disk
- 128K Cache exp. to 1Mb
- 8Mb RAM exp. to 128Mb
- 14" SVGA low radiation MPRII, non-interlaced colour monitor (0.28 dp), EPA EnergyStar
- 1Mb VESA graphics accelerator
- 3.5" 1.44Mb floppy disk
- 2 VESA local bus slots
- 2 Serial, 1 parallel ports
- 1 x 8-bit, 6 x 16-bit (2VL) slots
- Microsoft Office Pro 4.3 CD
- Dual Speed CD-ROM drive
- Windows for Workgroups 3.11 and MS-DOS 6.2
- Microsoft compatible mouse
- Desktop case and keyboard
- 12 months on-site warranty

Microsoft Office v4.3 CD:
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MS Word v6 for Windows
MS Excel v5 for Windows
MS PowerPoint v4 for Windows
MS Access v2 for Windows
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(no documentation on CD. Box shown for illustration only)

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as the Office Professor except:
- 486DX4 100MHz Processor

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"For the best home bargain the Brother MultiMedia Master pipped the XXX on raw price performance"
WINDOWS USER

"This is a mother of a Brother especially at the price...Overall performance proved handsome"
COMPUTER BUYER

"Brother has produced a well-specified PC at a very competitive price. The package includes everything you need"
PC DIRECT

"PCMCIA flexibility and an impressive battery life make this a good choice...the Brother Litebook should certainly be on your shopping list"
PC DIRECT

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Sat 9am-2.30pm

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ALL PRICES EXCLUDE VAT

Kyodai A BROTHER COMPANY

Brother P-Series *with* Pentium® Processors

System shown includes Microsoft Office 4.3. Boxes shown for illustration purposes only

If you're looking for the fastest PC's around, the New Brother P-Series with Pentium® Processors has been designed for you. They're powerful, fast, highly specified and ready to run all your toughest applications at record-breaking speed.

Take a leap into the future with Pentium® Processor-based systems, featuring Intel's long awaited 64-bit Pentium technology. Up to 5 times faster than the 32-bit 486 processor, the Pentium is the way forward for ultra-high performance. And to get the most from the Pentium processor, the new motherboard incorporates the latest PCI local bus architecture. The PCI bus can move 32-bits of data around at an astonishing 120Mb per second! Just think what it could do for your graphic-intensive Windows™ applications.

Brother P-Series with Pentium® Processor

P75 with 75MHz Pentium® Processor	£1199
P90 with 90MHz Pentium® Processor	£1399
P100 with 100MHz Pentium® Processor	£1499

intel inside pentium® PROCESSOR

Brother P-Series *with* Microsoft Office Professional 4.3

P75 CD Office	£1559
P90 CD Office	£1759
P100 CD Office	£1859

CD OFFICE SYSTEMS INCLUDE:

- Dual Speed CD-ROM
- Microsoft Office 4.3 CD:
  - *MS Office Manager,*
  - *MS Word v6 for Windows*
  - *MS Excel v5 for Windows*
  - *MS PowerPoint v4 for Windows*
  - *MS Access v2 for Windows*
  - *MS Mail Licence*

(inc documentation on CD. Box shown for illustration only)

Brother Pentium gives the Best Performance for Desktop Publishing
Reviewed in September 1994 Computer Shopper

Brother P-Series Systems include:

- Intel Pentium processor for lightning fast 64-bit power
- PCI bus optimises data speed
- 540Mb hard disk
- 256K Cache exp. to 1Mb
- 8Mb RAM exp. to 128Mb
- 14" SVGA low radiation MPRII, non-interlaced colour monitor (0.28 dp), EPA EnergyStar
- PCI 64-bit graphics accelerator
- 3.5" 1.44Mb floppy disk
- 2 serial/1parallel/1games ports
- 4 x PCI, 4 x ISA (1shared) slots
- Windows for Workgroups 3.11 and MS-DOS 6.2
- Microsoft compatible mouse
- Desktop case and keyboard
- 12 months on-site warranty

Options & Upgrades

Monitor Upgrades	
14" SVGA LR to 15"SVGA Low Radiation	£90
14" SVGA LR to 17"SVGA Low Radiation	£390
PC Gem Fax Modem (IM74)	£49
8Mb RAM to 16Mb	£232

Upgrade Case to 5000 Series Minl Tower Case £20

Upgrade Case to 8000 Series Full Tower Case £50

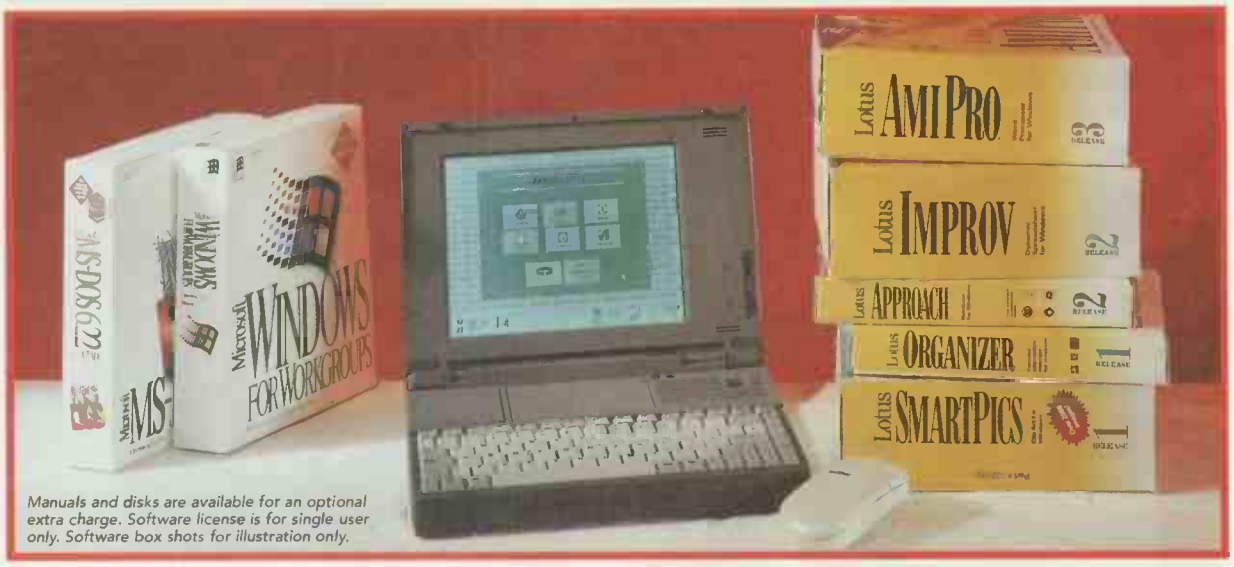
(Picture shows 17" monitor option)

Pentium is a trademark of Intel Corporation

ALL PRICES EXCLUDE VAT To the best of our knowledge the specifications and prices shown are correct at the time of press. Subject to change without notice. E.&O.E.

brother

The Brother & Lotus Notebook



Manuals and disks are available for an optional extra charge. Software license is for single user only. Software box shots for illustration only.

Brother brings you an exclusive notebook solution that represents truly amazing value. The powerful Brother BCP431V notebook with its fast 486DX 33MHz processor and large 250Mb hard disk, together with a complete suite of Lotus Windows software (now upgraded to include Lotus 123 v5) pre-installed and ready to run for your convenience. This solution provides the answer to all your needs - word processing, spreadsheet, personal organising plus clipart graphics - and all Lotus documentation is pre-loaded to provide on-line help as you need it.

LOTUS SOFTWARE

All this software is Pre-installed and ready to run

- Lotus 123 v5
- Lotus Ami Pro 3.1
- Lotus Smart Pics
- Lotus Organiser 1.0
- Lotus ScreenCam

Disks and manuals extra. Does not include Microsoft Works

Brother BCP431V

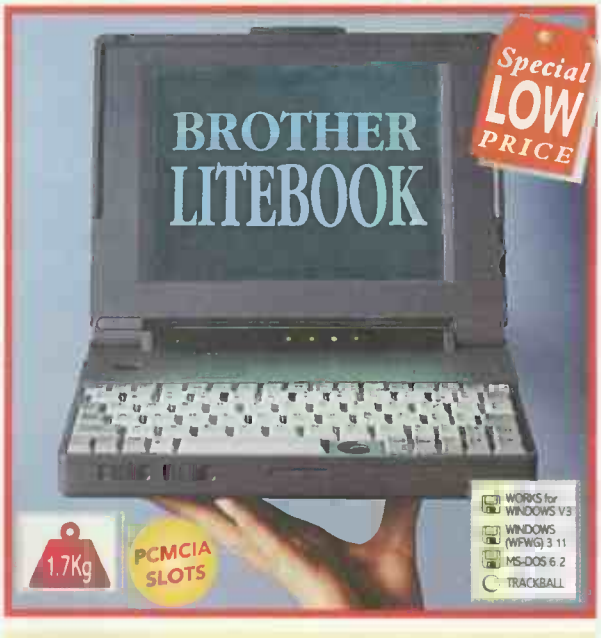
- 486DX 33MHz Processor
- Maths Co-processor
- Internal cache memory
- 250Mb Hard Disk
- 4Mb RAM expandable to 8Mb
- Power saving conservation feature on Hard Disk and LCD
- Easy to read back-lit 10" VGA Mono LCD with 64 greyscales
- 3.5" 1.44Mb floppy disk drive
- 2 x Serial, 1 x Parallel, SVGA monitor and keyboard ports
- 2-4 hours average charge time
- Password protection
- Microsoft compatible Mouse
- Lotus Software Bundle
- Windows for Workgroups 3.11, MS-DOS 6.2
- 292(w) x 217(d) x 46(h) mm
- Weighs only 3Kg
- 12 Month on-site warranty
- Wide range of options: carry case, car adaptor, trackerball, extra battery, LAN Ethernet D link, keyboard adaptor.

£899

The Brother Litebook

No other Notebook is this lightweight, this powerful, this flexible or this affordable **£699**

For ultimate portability without sacrificing usability or performance, the Brother LiteBook sub-notebook is what you've been waiting for. Never has so much computing power been packed into such a compact unit. PCMCIA slots give you access to optional plug-in cards that can provide fax/modem, extra memory and much more. The Sleep and Suspend feature extends usage time and the Nickel Metal Hydride battery provides up to 4 hours of power. To complete the package Microsoft Works v3.0 is pre-loaded to provide a complete suite of applications the moment you power up.



- 486SLC 25MHz processor
- Built-in co-processor
- 4Mb RAM exp. to 20Mb
- 80Mb Hard Disk
- PCMCIA slots: 2 x type II, 1 x type III
- External 3.5" 1.44Mb FDD
- 8.5" VGA LCD 64 Greyscales
- External colour (1024 x 768) port
- Ports: 1 serial, 1 parallel, 1 SVGA + External keyboard, 1 External Floppy Disk Drive
- Built-in Micro Trackball with left/right buttons
- Microsoft Works 3.0 package includes Word Processing, Spreadsheet, Database and Communications
- Microsoft Windows 3.11, MS-DOS 6.2
- Removable Long-Life NiHi battery
- 252mm x 192mm x 39mm
- Weight 1.7kg with battery
- 12 months on-site warranty

The Brother Traveller

The Brother Litebook with GemFax PCMCIA Fax/Modem and Communications Software

- PCMCIA card slots straight into Litebook
- Gain access to the InterNet and Information Superhighway with FREE subscription + £25 on-line time
- Free Communication Software (Windows & DOS)
- Group III Send and Receive Fax
- 2400 bits per second Modem
- Dataflex 5 Year Guarantee

£799

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Full 12 months on-site warranty

30 day no-quibble money back guarantee

MS-DOS, Windows and mouse pre-installed with original documentation

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Kyodai
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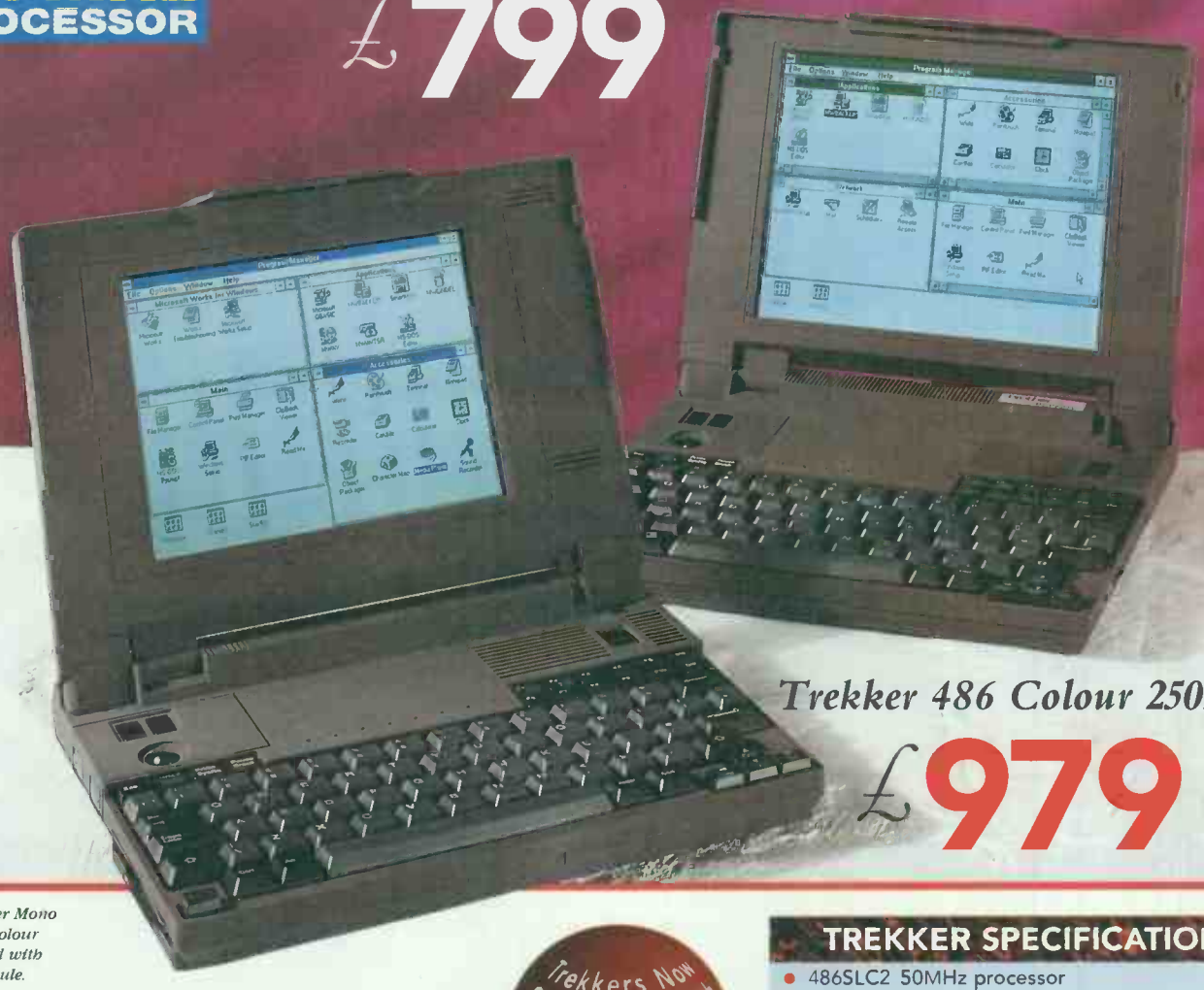
New Brother Trekker Notebooks

SUPERFAST 50MHz PROCESSOR

Trekker 486 Mono 250Mb

£799



Trekker 486 Colour 250Mb

£979

Brother Trekker Mono and Trekker Colour come standard with Trackball Module.

Trekkers Now Standard with 250Mb Hard Disk

The Brother Trekker is the perfect business travelling partner. It is one of the world's smallest and most lightweight portable computers yet packs the power of the Superfast 486SLC2 50MHz processor and is equipped with a formidable array of features you would expect to find on your desktop PC. Giving you the power to run your applications while visiting customers on-site, while on the move or to bring work home.

Designed for flexibility, the Brother Trekker features Personality Modules - exchangeable cartridges enabling you to tailor the Trekker for your own use. The Trekker comes with a Trackball device as standard, optional modules include a Pocket Fax/Modem, Lan Ethernet Adaptor and a second RS232 port.

Weighing a mere 2.3Kg and approximately the size of an A4 sheet, the Brother Trekker combines the most advanced technology with superb portability enabling it to readily perform as your primary computer, as well as being your perfect portable companion.

TREKKER SPECIFICATIONS

- 486SLC2 50MHz processor
- 4Mb RAM expandable to 8Mb
- 250Mb hard disk
- Built-in 3.5" 1.44Mb floppy disk drive
- Mono: 9.5" VGA LCD 64 greyscales
- Colour: 8.25" passive matrix colour LCD
- External colour (800 x 600) SVGA port
- Micro Trackball module with left/right buttons
- 80-key keyboard with embedded numeric keypad
- Suspend/Resume feature
- Ports: 1 serial, 1 parallel, 1 SVGA + external keyboard
- 2-4 hour fast charge NiCd battery
- Microsoft Works v3.0 integrated package includes Word Processing, Spreadsheet, Database, Communications
- Microsoft Windows for Workgroups 3.11, MS-DOS 6.2
- 279mm x 210mm x 40mm
- Weight 2.3kg
- 12 Months on-site warranty

TREKKER OPTIONS

Brother Trekker with 250Mb Hard Disk and Lotus Bundle 1*
(Lotus 123 v5, Lotus Ami Pro 3.1, Lotus Organiser 1.0, Lotus Smart Pics, Lotus ScreenCam)
Mono: **£818**
Colour: **£999**

Brother Trekker with 250Mb Hard Disk and Lotus Smartsuite 3.0*
(Lotus 123 v5, Lotus Ami Pro 3.1, Lotus Organiser 1.0, Lotus Approach 3.0, Lotus Freelance Graphics)
Mono: **£879**
Colour: **£1059**

Additional 4Mb RAM	£150	Car Adaptor	£49
RS232 Module	£13	Executive Carry Case	£49

* Includes on-line documentation. Disks and manuals available at extra cost. Does not include Microsoft Works. Boxes shown for illustration.

Software worth over £200

- Microsoft® Works for Windows V3 integrated package inc. Word Processing, Spreadsheet, Database, Communications
- MS-DOS 6.2 • Microsoft Windows for Workgroups 3.11

Documentation and disks included. Software boxes shown for illustration only.

ALL PRICES EXCLUDE VAT

To the best of our knowledge the specifications and prices shown are correct at the time of press. Subject to change without notice. E.&O.E.

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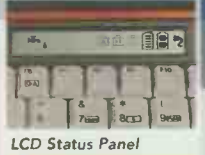
New Brother Pro'Book

PCMCIA Card Slots Type II and Type III

Removable long-life battery with 5-level charge indicator

Removable Hard Disk for Infinite Storage and Security



LCD Status Panel

Sleek design and ergonomic palmrests

The revolutionary new GlidePoint® makes pointing and clicking simpler than ever

Now with
- **Built-in Sound**
- **340Mb Standard Hard Disk**

" A well designed portable. Of all the 256 Colour screens reviewed here, the Brother had the nicest TFT"
Personal Computer World, March 1995
40 Notebook Group Test

The New Brother Pro'Book 700 Series represents the next generation in portable computing. Now you can have more power in your notebook than you have on your desktop. Choose from DX/33, DX2/50 and the lightning-fast IntelDX4™ processor running at 75MHz or 100MHz.

Designed for the most sophisticated users the Pro'Books are equipped with the ultimate in features and facilities, while providing sleek aesthetics and comfortable usability.

New to the 700 Series is built-in 16-bit stereo sound, the revolutionary GlidePoint® trackpad that makes pointing and clicking a dream, plus a larger 340Mb standard hard disk.

Convenient upgradability has arrived with the modular design Pro'Book: the hard disk is removable allowing infinite storage and security; the LCD displays are exchangeable, easy access to the motherboard allows simple upgrades of memory, even the processor chip is even upgradable.

In addition the 3.3V technology design enhances the efficiency of the removable battery which features a 5-level remaining capacity display.

To enhance the Pro'Book, PCMCIA slots give access to versatile applications including Fax/Modem, networking, SCSI devices and hard disks.

Along with your Brother Pro'Book you get excellent support, 12 months on-site warranty and a 30-day money-back guarantee. Superb ergonomics, an extensive list of features, outstanding performance and superb pricing - the Pro'Book is the professionals choice.

Pro'Book BCP700 Series

All prices are for standard 340Mb Hard Disk.

Model	Processor	9.5" Mono	9.5" Dual Scan	9.5" TFT Colour
BCP 731	486DX-33	£1119	£1419	£2019
BCP 741	486DX2-50	£1159	£1459	£2059
BCP 751	486DX4-75	£1249	£1549	£2149
BCP 761	486DX4-100	£1319	£1619	£2219

Pro'Book Options

Upgrade from 4Mb to 8Mb RAM	£159
Upgrade from 8Mb to 16Mb RAM	£299
Upgrade from 16Mb to 32Mb RAM	£599
Internal Battery Pack	£49
Docking Station	£399
Additional NiMH Battery Pack	£73
Car Adaptor	£49
Executive Carry Case	£49
Extra Hard Disk Kits:	£CALL

Brother Pro'Book 486DX33 Mono/340Mb and Lotus Bundle 1* inc: Lotus 123 v5, Lotus Ami Pro 3.1, Lotus Organiser 1.0, Lotus SmartPics, Lotus ScreenCam **£1129**

Brother Pro'Book 486DX33 Mono/340Mb Hard Disk and Lotus Smartsuite 3.0* **£1189**

*Disks and manuals extra. Does not include Microsoft Works.

Pro'Book Specifications

- *Choice of Display:*
  Mono 9.5" VGA LCD 64 greyscales
  Dual Scan Colour 9.5"
  Colour Active Matrix TFT 9.5"
- *Choice of Processor:*
  486DX 33MHz, 486DX2 50MHz,
  486DX4 75MHz, 486DX4 100MHz
- 4Mb RAM exp. to 8Mb, 16Mb or 32Mb
- Removable 340Mb hard disk (520Mb option)
- Built-in 16-bit SoundBlaster compatible stereo sound system
- Built-in 3.5" 1.44Mb floppy disk drive
- 1Mb VESA Local Bus graphics accelerator
- PCMCIA slots: 2 x Type II and 1 x Type III
- Docking Station Connector
- Ergonomic Palmrests
- Full feature power management with doze, sleep, suspend and suspend to disk mode
- LCD Status Indicator
- Removable battery pack with 5 level LED display of remaining capacity
- External colour (1024 x 768) SVGA port
- GlidePoint® trackpad with dual buttons
- 84-key keyboard with embedded keypad
- Ports: 1 serial, 1 enhanced bi-directional parallel, 1 SVGA + external keyboard
- 2 hour fast battery charge
- Microsoft Works v3.0 integrated package includes Word Processing, Spreadsheet, Database, Communications
- Microsoft Windows for Workgroups 3.11, MS-DOS 6.2
- 286mm x 220mm x 45mm
- Weight 2.6kg
- 12 Months on-site warranty

PCMCIA Fax/Modems

With Delrina WinFax Lite Software

14,400bps **£129** 28,800bps **£199**

brother

Make Brother your *First* Choice

Express Delivery from Vast Stocks

Full 12 months on-site warranty

30 day no-quibble money back guarantee

MS-DOS, Windows and mouse pre-installed with original documentation

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Kyodai
A BROTHER COMPANY

New Brother Printers

All Brother Printers inc 1 Year On-site Warranty

BROTHER HL-630 Laser Printer

- Superfast first page out
- Six pages per minute
- GDI mode for windows
- Built-in emulations for DOS printing
- Low cost per copy
- Network connectivity
- Microfine toner
- Straight paper path
- Auto emulation switching
- Economy print mode

only £349

BROTHER HL-660 Laser Printer

All the features of the HL-630 plus

- 600dpi resolution
- 2Mb RAM expandable to 8Mb
- HP LaserJet™ 4, Epson FX-850 and IBM Proprinter XL emulations

only £499

The new HL-630 Superfast All-Rounder. Ordinary Windows-only printers don't look so clever now.

The amazing new HL-630 is a completely different kind of laser printer. It's the first superfast all-rounder on the market.

SUPERFAST FOR WINDOWS™

It offers outstanding performance within Windows. Its GDI technology means first page out is virtually instant, and printing is continuous, with no pause between pages.

SUPER-VERSATILE TOO

But unlike the cheap & cheerful GDI-only printers currently available, the HL-630 is also at home outside Windows, because Brother have put the technology into this new printer that others have left out of theirs. Conventional GDI printers rely directly on your PC and can't think for themselves. That means they're only as good as your existing hardware. What's more GDI printers only work effectively within Windows, so they are useless if you need to print directly form DOS or connect to a network. The HL-630 is completely different. It has PCL level 4 and multi-emulations, which mean it can print directly from DOS - and it's fully networkable too. So you get all the benefits of GDI without the limitations.

OUTSTANDINGLY HIGH QUALITY

Print quality is excellent too, with possibly the lowest cost per copy on the market. And you only have to try the HL-630 once to realise that it's built like every other Brother laser, with no compromise on quality.

OUTSTANDINGLY LOW PRICE

You'd expect a significant price premium for such a major advance in versatility and technology. But you'd be wrong - no laser printer has ever offered so much for so little. The new HL-630 superfast all-rounder. It makes competitors look less than clever

Brother HJ-400 Low Cost InkJet Printer

- Optimised for Windows
- Apple Mac and PC compatible
- Built-in 100 sheet feeder
- 2ppm
- Small footprint

only £169

- Genuine 600dpi with 1200dpi achieved with high resolution control & photoscale technology
- True 12ppm print speed
- 2Mb memory upgradeable to 26Mb
- BR-Script level 2 (PostScript®) and PCL5e emulations
- Duplex and Network options available
- 75 Scalable Fonts
- 500 sheet paper cassette plus 150 sheet multi tray
- Microfine Toner
- PCMCIA card slot and Font cartridge slot

only £949

The new HL-1260 Ultimate Workgroup Laser Printer

New

Full Range of Printers from Brother, Canon, Epson and Hewlett-Packard available

brother

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To the best of our knowledge the specifications and prices shown are correct at the time of press. Subject to change without notice. E.& O.E.

COMPAQ PRESARIO

PRESARIO MODEL CDS 522

- 486SX2-66 processor
- 4Mb RAM expandable to 64Mb
- 270Mb hard disk
- 3.5" 1.44Mb floppy drive
- Local bus SVGA graphics
- Compact 3 bay case with 2 expansion slots serial parallel, joystick, MIDI and mouse ports
- 14" Integral low radiation NI SVGA colour screen
- 16-bit stereo sound card, microphone & speakers
- Quad speed multisession CD-ROM drive
- MS DOS 6.2, Windows 3.1, TabWorks, Welcome Centre, Control Centre and Learningn Centre
- Microsoft Works v3, MS Money and MS Entertainment pack
- Microsoft Encarta '95 CD & The Ultimate Human Body
- 3 Year Compaq Warranty

RRP £1099
OUR PRICE CALL

PRESARIO MODEL CDS 524

- 486DX2-66 processor
- 8Mb RAM expandable to 64Mb
- 420Mb hard disk
- 3.5" 1.44Mb floppy drive
- Local bus SVGA graphics
- Compact 3 bay case with 2 expansion slots
- Serial parallel, joystick, MIDI and mouse ports
- 14" Integral low radiation NI SVGA colour screen
- 16-bit stereo sound card, microphone & speakers
- Quad speed multisession CD-ROM drive
- Integrated 9600/2400 fax/data modem with telephone answering & CompuServe
- MSDOS 6.2, Windows 3.1, Tabworks, Welcome Centre, Control Centre and Learning Centre
- Microsoft Works v3, MS Money and MS Entertainment Pack
- Microsoft Encarta '95 CD & The Ultimate Human Body CD
- 3 Year Compaq warranty

RRP £1279
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Presario Model CDS 528 as above with TV £CALL

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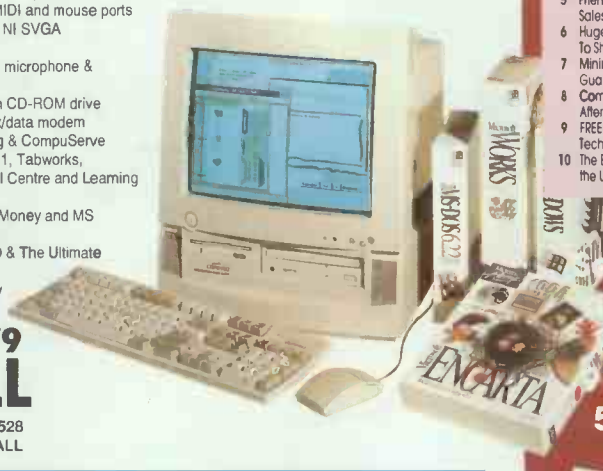

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10. The Best Value in the UK

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*See my price guarantee

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am until
5:30 pm

Order Hotline

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FAX 01282 777209

PRESARIO MODEL CDS 742

- 486DX4-90 processor
- 8Mb RAM expandable to 64Mb
- 420Mb hard disk
- 3.5" 1.44Mb floppy drive
- Enhanced local bus SVGA graphics with 1Mb RAM
- Desktop case with 3 drive bays and 3 expansion slots
- Serial parallel, joystick, MIDI and mouse ports
- 14" Low radiation NI SVGA colour screen
- 16-bit stereo sound card, microphone & speakers
- Quad speed multisession CD-ROM drive
- Integrated 9600/2400 fax/data modem with telephone answering & CompuServe
- MS DOS 6.2, Windows 3.1, TabWorks, Welcome Centre, Control Centre and Learning Centre
- Microsoft Works v3, MS Money and MS Entertainment Pack
- Microsoft Encarta '95 CD & The Ultimate Human Body CD
- 3 Year Compaq warranty

RRP £1399
OUR PRICE CALL

PRESARIO MODEL CDS 772

- Pentium 75 processor with 256K Cache
- 8Mb RAM expandable to 64Mb
- 535Mb hard disk
- 3.5" 1.44Mb floppy drive
- PCI bus SVGA graphics with 1Mb RAM
- Large desktop case with 4 drive bays and 4 slots
- Serial parallel, joystick, MIDI and mouse ports
- 14" Low radiation NI SVGA colour screen
- 16-bit stereo sound card, microphone & speakers
- Quad speed multisession CD-ROM drive
- MS DOS 6.2, Windows 3.1, TabWorks, Welcome Centre, Control Centre and Learning Centre
- Microsoft Works v3, MS Money and MS Entertainment Pack
- Microsoft Encarta '95 CD & The Ultimate Human Body CD
- 3 Year Compaq warranty

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- Fast 486 & Pentium processors
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- High Quality 16-bit sound
- Quad speed CD-ROM
- Full-Feature fax machine
- Automatic answering machine
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- Links To CompuServe
- Excellent Microsoft software
- Wide range to choose from
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AMERICAN EXPRESS Card Welcome · SWITCH · VISA

PRESARIO MODEL CDS 942

- 486DX4-90 processor
- 8Mb RAM expandable to 64Mb
- 420Mb hard disk
- 3.5" 1.44Mb floppy drive
- Enhanced local bus SVGA graphics with 1Mb RAM
- Mini-Tower case with 5 drive bays and 5 expansion slots
- Serial parallel, joystick, MIDI and mouse ports
- 14" Low radiation NI SVGA colour screen
- 16-bit stereo soundcard, microphone & speakers
- Quad speed multisession CD-ROM drive
- Integrated 9600/2400 fax/data modem with telephone answering & CompuServe
- MS DOS 6.2, Windows 3.1, TabWorks, Welcome Centre, Control Centre and Learning Centre
- Microsoft Works v3, MS Money and MS Entertainment Pack
- Microsoft Encarta '95 CD & The Ultimate Human Body CD
- 3 Year Compaq warranty

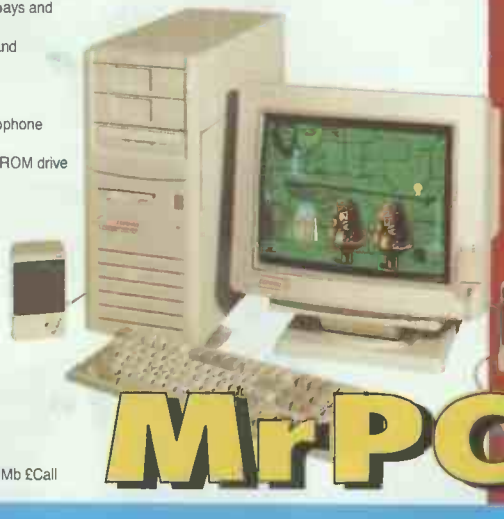
RRP £1449
OUR PRICE CALL

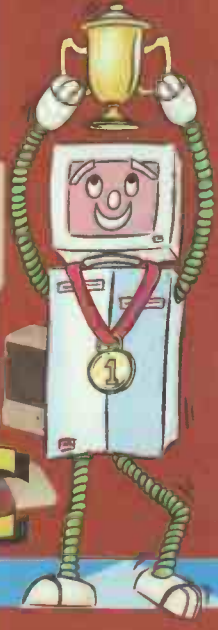
***MR PC PRICE GUARANTEE**
Due to our huge buying power, our advertised prices are normally the lowest in the UK. If you find a lower advertised price on any current ex. stock product which is confirmed to be genuine, we will beat that price. This guarantee applies to our advertised prices and excludes clearance products sold below cost.

PRESARIO MODEL CDS 962

- Pentium 60 processor
- 8Mb RAM expandable to 64Mb
- 535Mb hard disk; 256K Cache
- 3.5" 1.44Mb floppy drive
- PCI local bus SVGA graphics with 1Mb RAM
- Mini-Tower case with 5 drive bays and 5 expansion slots
- Serial parallel, joystick, MIDI and mouse ports
- 14" Low radiation NI SVGA colour screen
- 16-bit stereo soundcard, microphone & speakers
- Quad speed multisession CD-ROM drive
- MSDOS 6.2, Windows 3.1, TabWorks, Welcome Centre, Control Centre and Learning Centre
- Microsoft Encarta '95 CD & The Ultimate Human Body CD
- 3 Year Compaq warranty

RRP £1579
OUR PRICE CALL
Presario Model 972
As above with Pentium 75 & 720Mb £Call





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MICROSOFT HOME MOUSE BUNDLE

This month, Microsoft and Peripheral Warehouse point to the future!

In an exciting new bundle from Microsoft, get the acclaimed Microsoft Home Mouse, The best of the Microsoft Windows Entertainment Pack and Microsoft Arcade for Windows all for just...

HURRY! Offer closes 31st July!!

£29.95

3 Great products for the price of one!!

This offer is packaged in one box and features the following products:

The Best of Microsoft Windows Entertainment Pack

Includes the games - Pipedream, Taipei, Tut's tomb, Rodent's Revenge, Golf, SkiFree, JazzBall, Dr. Black Jack , Tetravex and the classic hit Tetris.

Microsoft Arcade for Windows

Relive all the classic arcade games with this best-selling collection from Microsoft. remember Missile Command? or the ever popular Asteroids? What about Centipede , Tempest and the tank simulation BattleZone?

They are all here and more fun ever. You can even customise the games. It's unrelenting, unrestrained arcade action!

Microsoft Home Mouse

Ergonomically designed for accurate work in even the toughest home environment. The Microsoft Home Mouse offers excellent value for money, and now with these additional packages, there has never been a better time to upgrade.

Microsoft

NEW!! THE MICROSOFT MOUSE 2.0 NEW!!

MICROSOFT MOUSE 2.0

Microsoft bring you the benefits of breakthrough ergonomic research!

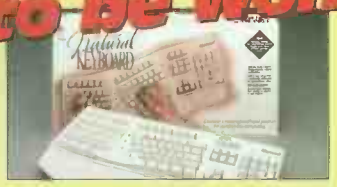
NEW PRODUCT

The New Microsoft Mouse 2.0 brings you the latest ergonomic Mouse design and new IntelliPoint software. Supremely comfortable, accurate and versatile, the Microsoft Mouse 2.0 is simply the best mouse you can buy.

New Microsoft IntelliPoint software means you can save time and hand movements by assigning your most commonly used tasks to mouse functions. There is an 'AutoScroll' function that allows diagonal scrolling through spreadsheets, a 'Both Buttons' feature that allows you to get an additional button by pressing both buttons simultaneously. A 'SmartSpeed' feature slows the cursor for added control and accuracy, 'LineLock' locks the cursor in horizontal or vertical mode while with the 'Special Effects' option you can choose from five sets of cursor animations from sailboat to bowling pins!

Microsoft

100 MS keyboards to be won!



Simply answer 3 questions and explain why you would like a Natural keyboard. Then return the entry form included in every Microsoft Mouse 2.0 box - GOOD LUCK!

- Unique contoured design encourages a balanced, more natural hand and wrist position.
- 104 key design - extra function keys
- IntelliPoint software - customisable for improved Windows - based computing performance

Microsoft® Natural Keyboard.....**£69**

PRICE PLEDGE
If you find it cheaper - CALL US!
We aim to beat ANY advertised price.
(Subject to terms on last page of advert.)

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MODEMS

Sportster 28.800bps

This new V.34 modem provides speeds of up to 28,800bps.

The Sportster 28.800 fax provides connection speeds of up to 28.800bps, and with the use of data compression, a throughput of up to 115,200bps can be achieved. Features include fax speeds from 300bps to 14.000bps, Class I and II, Group 3 fax compatibility, DOS and Windows datafax software is provided.
As with all US Robotics modems, you will receive a five year warranty and free lifetime technical support with this BABT-approved modem.

USR012 US Robotics Sportster 28.8 External £199
USR014 US Robotics Sportster 28.8 Internal £199

US Robotics
The Intelligent Choice in Data Communications

The Ultimate Internet, Fax & Modem Bundle!

The best-priced 14,400 portable BABT modem on the market - with free Internet Starter Kit for a limited period.

Now you can get the top-selling, BABT-approved portable modem from Andest, the Road Runner Rocket and the ultimate Internet Access package, worth £50, for only £119.

Rocket Modem Features:
- Small, light and rugged design for total portability
- FREE serial cable, 9V battery & power supply unit
- High-speed v32Bis modem
- 14,000 Data, with throughput up to 57,600bps
- V42, V42Bis MNP1-5
- Group III (Class 2) Fax to 9600bps

AND008 Roadrunner Rocket £119

Limited Offer Internet Kit (worth £50)
- FREE copy of Internet magazine, PLUS 50% subscription discount offer
- FREE worldwide access to the Internet for up to 80 hours via CityScape (probably the largest Internet provider in the UK)
- FREE access to CompuServe
- FREE serial cable & software to access the Internet & Compuserve

AND011 Andest High Speed Modem Serial Card £49
DAT014 Dataflex - SuperGem Pocket 14.4 WSL £109
DAT003 Dataflex - Modem Pocket WSL £69
DAT007 Dataflex - Fax Modem Pocket WSL £59
DAT006 Dataflex - GemFAX 2400 Internal WSL £59
PAC010 Pace - Microlin FX Int. £111
PAC008 Pace - Microlin FX32 Int. £165

USR001 US Robotics - Sportster Fax 14.4 Ext. £129
USR002 US Robotics - Sportster Fax 14.4 Int. £135
CAB001 US Robotics - Sportster Cable 25-to-9 pin £9
CAB002 US Robotics - Sportster Cable 25-to-25 pin £9
USR006 US Rob. - Worldport 2496 Pocket NEW! £159
WOR047 US Rob. - Worldport Dual Std. Pocket £175
USR007 US Rob. - Courier VFast 8.8 Ext. NEW! £399

SCANNERS

UMAX Vista T630 Colour Scanner

Triple-pass colour scanner from the world's largest manufacturer.

An outstanding specification at an Incredible price! The UMAX T630 gives you 600x300dpi optical scan resolution for up to 4800dpi output. Comes with Photoshop LE software, SCSI interface and all cables.

VIS050 UMAX Vista T630 ..... £449

Also available from Peripheral Warehouse

VIS051 UMAX Vista S6 ..... £529
Single pass, 600x300dpi, upto 4800dpi with interpolation. Includes Photoshop LE.
PC Pro Recommend this unique scanner.

VIS052 UMAX Vista S8 ..... £699
800x400dpi. Max resolution with interpolation 6400dpi. Includes Photoshop LE.

LOG006 Logitech Scanman 256 ..... £85
LOG013 Logitech Scanman EasyTouch £109
LOG007 Logitech Scanman Colour £175
LOG016 Logitech Scanman PowerPage £305

MICE

PET002 IMSI Pet Mouse Serial £15
LOG003 Logitech Cordless Mouse £52
LOG027 Logitech Mouseman Sensa Wood £39
LOG028 Logitech Mouseman Sensa Leopard £39
LOG029 Logitech Mouseman Sensa Pearl £39
LOG030 Logitech Mouseman Sensa Black £39
MIC031 Microsoft Mouse PS/2 & Serial £39
LOG020 Logitech Pilot Mouse Beige £17
LOG033 Logitech Pilot Chroma Blue £19
LOG031 Logitech Pilot Chroma Green £19
LOG015 Logitech Pilot Trackball £26
STY002 IMSI Stylus Serial £29
STY001 IMSI PC Stylus PS/2 ..... £29
MOU005 IMSI Mini Thumball £24
LOG010 Logitech Trackman II £45
LOG011 Logitech Trackman Portable £35

JOYSTICKS

CHF001 CH Flightstick £28
CHF002 CH Flightstick Pro £49
JOY005 CH Virtual Pilot Yoke £63
JOY003 Suncom FX 2000 ..... £16
JOY004 Suncom G Force £33
JOY002 Quickshot Warrior 5 ..... £9
QUI019 Quickshot Super Warrior 5 ..... £13
GRA010 Gravis Gamepad £19
GRA011 Gravis Analogue Pro £32
LOG025 Logitech Wingman £29
LOG026 Logitech Wingman Extreme £39

SPEAKERS

SBE001 Screenbeat SB203 ..... £12
LAB000 LabTec Power Speakers £19
SPK002 ZYFI Pro Speakers £39
PRO008 Pro Digital £29
SPK003 Micro Speaker CS-150 ..... £16

GRAPHICS CARDS

Miro Video 12 PD

An incredibly low-cost graphics accelerator and AVI movie board!

The Miro Video 12 PD is a unique graphics card and the only one of its kind on the market today. With full-screen AVI and MPEG playback, it can display up to 32-bit resolution and 16.7 million colours making it the ideal graphics card for CD-ROM users. It comes bundled with U-Lead Video Studio software and is available as a 1MB or 2MB card. This is a plug-and-play card - there are no jumpers or dip switches to set - and it comes with a two year warranty. Compatible with VL and PCI buses, it's the only all-in-one graphics and multimedia accelerator.

MIR002 Miro Video 12 PD 1MB £119
MIR007 Miro Video 12 PD 2MB £189

Miro Video DC1

The ultimate desktop video editing system for Windows!

The ideal video solution for real-time capture and play-back of video sequences comes with Adobe Premiere or VideoStudio software.
Capture digital VHS video to your hard disk and add transitions, titles and special effects, then print to tape in full-size NTSC or PAL, with SVHS and VHS quality, and up to 16.7m colours. Comes complete with MJPEG hardware compression. There are no jumpers or dip switches to set and you get a two-year warranty. It's compatible with the ISA bus and requires a full length, 16-bit slot.

Personal Computer World Highly Commended, May 1995

MIR005 Video DC1 + VideoStudio £449
MIR004 Video DC1 + Adobe Premiere £589

GrafixStar from VideoLogic

A new generation of leading price/ performance 64-bit Windows accelerators.

GrafixStar 300
Entry level, 64-bit S3 Trio64 graphics card. 85+ million Winmarks. Displays up to 1280x1024 resolution. Expandable with GrafixStar VMC multimedia options.

GRA014 GrafixStar 300 ..... £99

GrafixStar 500
Best all-round 64-bit, S3 Vision868 graphics card. 95+ million Winmarks. Displays up to 1280x1024 resolution. Expandable with GrafixStar VMC multimedia options. Built-in AVI with advanced DCI drivers. Free Xing sWare.

GRA015 GrafixStar 500 ..... £129

GrafixStar 700
Fastest performance 64-bit, S3 Vision968 graphics card. 110+ million Winmarks. Displays up to 1600x1200 res. Expandable with GrafixStar VMC multimedia options. Built-in AVI with advanced DCI drivers. Free Xing sWare.

GRA016 GrafixStar 700 ..... £249

GRA014 GrafixStar 300 VLB/PCI 1MB £99
GRA015 GrafixStar 500 VLB/PCI 1MB £129
GRA016 GrafixStar 700 VLB/PCI 1MB £249
GRA017 GrafixStar 300/500 1MB Upgrade £49
GRA018 GrafixStar 300/500/700 VMC Controller £39
GRA019 GrafixStar 700 2MB Upgrade & VMC Controller £149
MPE001 MPEG Player £229
CAP001 Captivator Pro £179
CAP002 Captivator Pro TV £229

DIA001 Diamond Speedstar Pro ISA £93
DIA002 Diamond Speedstar 64 2MB ISA £195
DIA003 Diamond Stealth 24 ISA £127
DIA004 Diamond Stealth Pro 1MB ISA £196
DIA005 Diamond Stealth Pro 2MB ISA £269
DIA006 Diamond Stealth 32 2MB ISA £169

ORC008 Orchid Fahrenheit 1MB £99
ORC009 Orchid Fahrenheit VA 1MB £129
ORC010 Orchid Fahrenheit VLB 1MB £122
ORC011 Orchid Fahrenheit VLB 2MB £156
ORC033 Orchid Fahrenheit 64 VLB 1MB £149
ORC034 Orchid Fahrenheit 64 VLB 2MB £189

ORC035 Orchid Fahrenheit Pro 64 VLB 2MB £299
ORC036 Orchid Fahrenheit Pro 64 VLB 4MB £399
ORK026 Orchid Kelvin 64 ISA 1MB £119
ORK027 Orchid Kelvin 64 ISA 2MB £159
ORC016 Orchid Kelvin 64 PCI 1MB £119
HAP001 Hauppage Celebrity FREE OS/2 WARP £269

928004 928Movie ISA £195
928001 928Movie VLB £195
928002 928Movie and sound card ISA £245
928009 928Movie and sound card VLB £245
928003 928Movie 1Mb RAM upgrade £75
PCI001 928Movie PCI 2Mb (16x faster SVGA) £349

PC TELEVISION CARDS

Hauppage Win/TV Prisma

TV and Teletext for your PC.

The new Win/TV Prisma is a 16-bit multimedia card with built-in TV and Teletext features. Watch real-time TV/video and Teletext in any resizable Window while running other Windows applications. This product offers the lowest cost Multimedia video solution, allowing you to connect a video camera and grab images in 16.7m colours. You can also freeze and save images in BPM, TIFF and GIF formats and retouch them in Corel Draw, etc. Never buy another TV Guide again - just download the teletext pages to your PC and then print them out to your printer! You can also grab stocks and shares information straight from Teletext and import them into your spreadsheet.

HAP002 Win/TV Prisma ... £149

Miro Video 20 TD Live

Integrated graphics accelerator, video overlay and TV reception - all on one board!

Watch any TV or cable channel on your PC and then capture, store and edit any TV clip or edit video from any external sources. Play back AVI movies or TV images in full-screen size and at full speed. The 20 TD Live comes with 2MB of DRAM and is supplied with U-Lead video studio - the leading video editing software.
This card is also one of the fastest graphics accelerators available - it's the only graphics card that you'll need. There are no jumpers or dip switches to set and you get a two-year warranty. It's compatible with the VL and PCI buses and delivers 16.7m true colours.

Personal Computer World Highly Commended, May 1995

MIR003 Video 20 TD Live ... £339

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SOUND CARDS AND KITS

This month we feature new products from Creative Labs!

This month Creative Labs introduce five new sound cards and kits.

CREATIVE LABS

All SoundBlaster cards feature a built-in CD-ROM interface, mIdi Interface, enhanced stereo synthesiser and speech synthesis software. Plus Creative DOS Utilities: Creative Record, Mix & Play Utilities, Creative Mixer, Creative Quick CD, Creative FM Intelligent Organ. Includes microphone port, line-in & line-out jacks, speaker connectors, microphone and MIDI / Joystick ports.

Not only the cheapest prices on Creative - but choose a FREE CD below!

SOU013 SoundBlaster V2 Value £33
SOU014 SoundBlaster Pro Value £51
SOU015 SoundBlaster 16 Value New IDE Interface! £67
SOU007 SoundBlaster 16 Pro New IDE Interface! £90
SOU101 SoundBlaster 16 Pro AdSP New IDE Interface! £113
SOU009 SoundBlaster Pro16 SCSI-2 ..... £116
SOU017 SoundBlaster Pro16 SCSI-2 AdSP £137
SOU102 SoundBlaster AWE 32 Value New Card! £155
SOU018 SoundBlaster AWE 32 AdSP £168
MIC196 Microsoft Office Multimedia Kit £399

SoundBlaster Multimedia Home CD Kit

This month Creative Labs also introduce what we believe to be the first ever complete Multimedia kit. This high quality kit was designed specifically for your home and office, and it allows you to work, learn and play. The kit includes a Quad Speed CD-ROM drive, 16-bit sound card with AdSP, stereo speakers and a complete range of 11 Microsoft and 4 leisure titles that make this kit both versatile and invaluable. It is perfect for the home, as well as an excellent choice for games and educational applications for all the family.

SoundBlaster Multimedia Home CD Kit Includes:
Hardware: Quad Speed CD-ROM drive, SoundBlaster 16 AdSP and Stereo speakers.
Productivity software: MS Works, MS Publisher and MS Design Pack.
Education software: MS Encarta 95, MS Bookshelf 94, MS Ancient Lands, MS Dangerous Creatures, MS Musical Instruments, MS Cinemania 95 and MS Scenes.
Entertainment software: MS Golf, Syndicate, Pagan Ultima, Strike Commander & Wing Commander.

SOU100 Multimedia Home CD Kit £294.95

PRIMAX FEATURE

Primax - now available in the UK!

Primax are the largest mouse and scanner supplier that you've probably never heard of.

PRIMAX

Primax have chosen Peripheral Warehouse as its first business partner to market the Primax range in the UK. This month we feature the revolutionary range of Primax scanners and the unique Primax DataPen.
Primax are also one of the world's leading manufacturers in mice, game pads, sound cards, speakers, flatbed scanners, cables, printer-share devices, and communications hardware. All Primax products are supplied with a two-year warranty and are backed by years of intensive research and development. Peripheral Warehouse will be stocking the leading products from the Primax range in both our retail outlets and through our mail-order operation.

Primax Scanners

This exciting new range of Primax scanners are ALL supplied with Finishing Touch photo-styling software and ReadIRIS text recognition software (OCR). ALL are TWAIN compatible and come with UK support and warranty.

Primax Greyscale Hand Scanners

The Primax greyscale scanners scan at 100/200/300 and 400 dpi and have a wider than normal scan width of 105mm. The 32 greyscale scanner will actually scan up to 256 using software emulation. The 256 greyscale scanner scans at true 256 greyscales via its hardware.

PRI101 Primax 32 Greyscale £44.95
PRI102 Primax 256 Greyscale £54.95

Primax Colour Hand Scanners

The Primax Colour Hand Scanners scan at up to 400dpi resolution. They are able to scan black and white, greyscales and 24-bit true colour (16.8 million colours). They come with a high-speed , 16-bit interface card.

PRI103 Primax Colour £99.95

Primax Colour Mobile Scanners

The mobile version includes all the features as above, but also includes motorised rollers. This unique feature allows a hand scanner to perform at the same accuracy as a flatbed scanner. You simply place the scanner on the image to be scanned and press the start button on-screen, and the scanner automatically moves itself across the original image. It determines the speed of scanning with reference to computer speed and image complexity. This is absolutely essential for a perfect scan of colour or greyscale images. It also connects to your parallel port, making it ideal for use with portables or in offices where more than one person needs to scan images and documents.

PRI104 Primax Colour Mobile £149.95

Primax DataPen

The Primax DataPen is simply the fastest way of entering text and is, on average, 20-30 times faster than using the keyboard. You simply run the DataPen over text. It will input text where the cursor lies. The OmniFont OCR software runs in the background and allows it to recognise any font between 8 and 22pt text size. It can be used in all applications software running under MS Windows. There is even a spell checking facility in eleven languages.
The DataPen is easy to install and connects to the standard parallel port.

PRI105 Primax DataPen (Win) £199.99
PRI106 Primax DataPen (Mac) £249.99

CD-ROM DRIVES

GoldStar CD-ROM Drive

Lightning fast CD-ROM drives from the leaders in home entertainment!

GoldStar have recently launched a dual speed CD-ROM drive and this month are launching their new quad speed CD-ROM drive. Both have motorised loading trays and are enhanced IDE drives that will connect to your standard IDE controller as fitted in most PCs. (If you already have two hard drives, or a non-enhanced IDE controller, then Software Warehouse sell an enhanced IDE for just £29.) Both drives offer full PhotoCD compatibility, MPC Level 2 support, multisession support, CD-i, Video CD, CD-DA, CD-ROM/XZ. Both are compatible with Windows 3.1 and the forthcoming Windows 95, making them probably the most compatible drives for both today's and tomorrow's standards.

Dual Speed RS20B

Features include: 300Kb/sec. data transfer rate; 250ms access time; 256Kb buffer; Windows, NT, OS/2 support

GOL002 Dual Speed E-IDE £86.95

Quad Speed RS40B

Features include: 600Kb/sec. data transfer rate; 220ms access time; 256Kb buffer; Windows, NT, OS/2 support; quick audio play buttons inc. Play, Skip and Stop

GOL003 Quad Speed E-IDE £128.95

Creative Bundle

Includes Creative CDR563 dual speed CD-ROM drive, Grolier's Multimedia Encyclopedia and Photostyler SE. As it's from Creative Labs, you can be sure that it's compatible with SoundBlaster cards.

SOU026 Creative Bundle £99

NEC Quad Speed

NEC, the best name in CD-ROM drives, have this month launched their Enhanced IDE drive at an unbelievable price.

NEC040 NEC E-IDE Quad Speed £139
NEC041 NEC E-IDE & Encarta 95 ..... £159

SOU026 Creative Labs Dual Speed £99
MIT017 Mitsumi Triple Speed £149
MIT019 Mitsumi IDE Interface Triple Speed £149
MIT006 Mitsumi Enhanced Interface Card £15
CDR005 NEC 2Xi SCSI Internal Dual Speed £132
CDR007 NEC 3Xi SCSI Internal Triple Speed £244
CDR008 NEC 3Xp SCSI Portable Triple Speed £255
CDR004 NEC 3Xe SCSI External Triple Speed £339
CDR009 NEC 4X Pro External Quad Speed £579
NEC040 NEC 4X Enhanced IDE Quad Speed £139
NEC041 NEC 4X Enhanced IDE 4X & Encarta 95 ..... £159
PAN001 Panasonic CR562 Dual £95
PAN060 Panasonic CR517B IDE Interface Dual £110
PAN006 Panasonic Interface Card £15
CDR002 Sony CD33A Internal Dual £98
CDR006 Sony CD730S External Dual £275
CDR017 Toshiba Internal Quad Drive £249

CD952 2X PCMCIA CD-ROM Drive

The easiest solution for multimedia on your notebook!

The CD952 runs off your notebook's motherboard via the PCMCIA interface card you don't need an external power supply. Plus, because it runs off the PCMCIA interface, you enjoy faster access times and greater data transfer rates than with parallel port CD-ROM drives. The CD952 features everything you need in one package: CD-ROM drive, PCMCIA card and cable.
Features include: Compliant with PCMCIA 2.1 standard; Easy to install device driver software; No external power supply required; Weight: 1.3Kg; Double speed data transfer rate: 307.2KB/sec; Average access time: 350 ms (1/3 stroke); 64KB memory buffer

PCM011 IC CDS92 ..... £259.95

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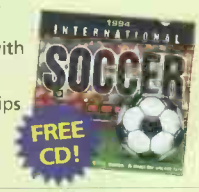
World Cup 1994

Brings the World Cup to your PC with over 1600 full colour images, fantastic video clips and action shots from each game.



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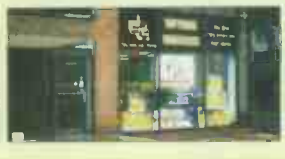
Manchester, Deansgate 0161 831 7779
Leeds, Eastgate 0113 244 8540



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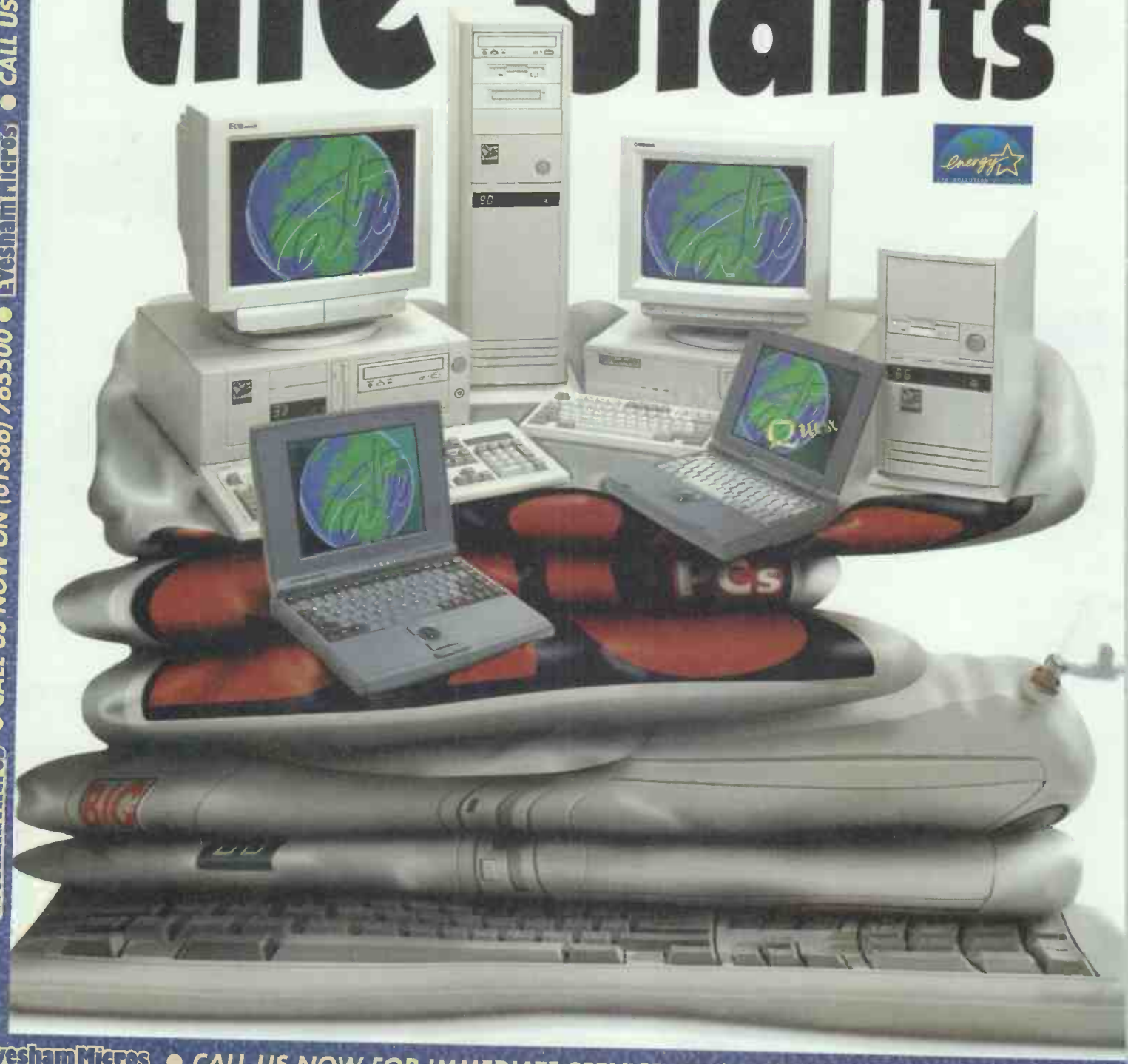
Deflating the Giants



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The case is clear – buying from big name manufacturers does not guarantee better performance or better service.

What the PRESS say:

March 1995
Vale Premier

February 1995
Vale Platinum

February 1995
Vale Prestige

January 1995
Vale Platinum

January 1995
Vale Platinum

May 1995
Vale Platinum

January 1995
Vale Voyager

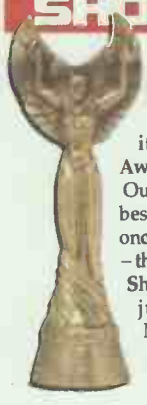
January 1995
Vale Premier

Dealer or Direct?

PC Plus, in their January 1995 edition, pitted a Vale Premier against 'equivalent' machines from Compaq, Elonex and Hewlett Packard, to find which offered the best value for money. The Vale turned in the best performance at the lowest price! When discussing the price difference between the Vale and the Hewlett Packard, they asked "Is any company's reputation worth over £1000 per unit purchased?" And in summing up: "Without hesitation we recommend the Vale Premier from this group."

What our CUSTOMERS say:

COMPUTER SHOPPER



For the last 2 years Evesham Micros have swept the board when it comes to Service Awards.

Our efforts to provide the best possible service have once again been rewarded – the readers of "Computer Shopper" magazine have just voted Evesham Micros "Best Customer Liaison" for 1994.

In the 1993 PC Direct 'HITS AWARDS' we won both "Customer Service Excellence" and "Service and Support Excellence" categories as voted by their readers. In 1994 we did it again winning the prestigious "Service Excellence" award. We are especially proud of all these accolades as they were nominated by readers who have actually dealt with our company.

The PC Direct readers also voted us their favourite supplier of these products:

SCANNERS

OPTICAL /CD-ROM DRIVES

UPGRADE CARDS

What we OFFER:

READY TO RUN

All systems are fully formatted and pre-installed with DOS and Windows. Comprehensive documentation is of course supplied, including all software disks and manuals, as is a mouse. Any peripherals and upgrades you buy with your PC will, wherever possible, be fully configured and tested.

DYNAMIC BURN-IN

A rigorous burn-in procedure repeatedly tests all key components. Only after passing this and a final QC inspection do we ship the goods.

NO CHARGE UNTIL SHIPMENT

If you pay by credit card, payment is not processed until the goods are shipped. Beware of suppliers who charge your credit card weeks before they ship your order!

ON-SITE MAINTENANCE

All UK mainland based PCs (except the *Quest* and *Voyager* notebooks) have the benefit of on-site maintenance for the first year, covering both parts and labour. The length of cover can be extended to 2 or 3 years if desired (see the "Options" section of each page for price details).

LIFETIME WARRANTY

We also offer a lifetime warranty on labour, so if a problem arises at anytime in the future you will only pay for the parts necessary to repair it.

LIFETIME TECHNICAL SUPPORT

As an owner, you will be privileged with access to an exclusive VALE HOTLINE support number, staffed by friendly knowledgeable people with a full record of your system. Lines open 9am until 5-30pm Monday to Friday, and 10am until 4pm Saturday.

30 DAY MONEY BACK GUARANTEE

We are so confident that you will be delighted with your Vale PC that should you, *for any reason at all*, be unhappy with your purchase, we will COLLECT it and refund your money in full. You will NOT pay any carriage or restocking charges. (UK mainland only).

ESTABLISHED 11 YEARS

Evesham Micros has been established over 11 years and now has four operating locations with a total annual turnover exceeding £34 million. It has risen to a position of strength in the computer market, with sustained growth and a secure financial status.

READY TO SHIP

We endeavour to build and despatch all orders as quickly as possible. To this end, we try to maintain a buffer stock of popular configurations which can be either shipped immediately or purchased from one of our showrooms. These models are highlighted with a "Ready to ship" logo in the pricing information.

Custom and other configurations are built to customer order and take a little longer, but we aim to despatch in days not weeks. If you contact us we will give you a realistic estimate of the current delivery situation.

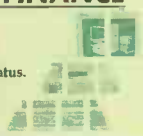
PCDMA

We are a founder member of the Personal Computer Direct Marketers Association; a collaboration of manufacturers who adhere to a professional code of practice. This assures you of our pledge to provide a high standard of service. Additionally, the new Payment Protection Plan provides peace of mind if you pay by cheque.

NO DEPOSIT PERSONAL FINANCE

APR 18.5%

Available with all purchases over £1000, subject to status. Please see the examples on the following pages. Written quotations are available on request. Interest rate correct at time of going to press but may vary.



BUSINESS FINANCE

We also offer lease agreements to limited companies, government and educational establishments. Please see the example prices on the following pages. Full written details are available on request.

Corporate Sales

Evesham Micros has a proven track record of supplying some of the country's leading organisations – a wide spectrum of businesses, government bodies and educational establishments. Each of our branches has an established corporate sales team with a wealth of experience and enthusiasm, and the backing of the leading suppliers to the industry. Whether your needs are large or small, they are ready to discuss your requirements and advise on the ideal solution.

The RANGE:

'486 PCs

We offer a range of '486 desktop PCs from the modestly priced *Popular* models to the top of the range *Premier*.

PENTIUM MODELS

In the *Platinum* range we offer a computer optimised specifically to provide state of the art performance from the Pentium processor.

NOTEBOOKS

The *Voyager* offers the ultimate in performance mobile computing, in a very modern stylish design.

FILESERVERS AND NETWORK INSTALLATION

In addition to stand-alone PCs we specialise in the installation and support of a wide variety of network installations. Please see the "Network Solutions" section on page 7 of the advert.

Vale Popular PCI

DX2-66 as standard
Don't settle for less!!

At last PCI becomes a popular standard.

The new *Vale Popular PCI* makes the latest technology available in a highly upgradeable package at a budget conscious price.

Quite simply most PCs in this price range do not compete with the performance and features offered with the *Popular PCI*. The motherboard is a bang up to date integrated design that incorporates a fast PCI hard disk controller, a ZIF socket for processor upgrades and 256kb cache RAM coupled with the latest energy saving technology. The 1Mb *Diamond Stealth SE* PCI video card bestows the *Vale Popular* with astonishingly fast video performance for such a moderately priced computer (see the graph on the *Premier* page).

486DX2-66, 528Mb £799+VAT
Ready to Ship

Popular Media '95 £999+VAT
486DX2-66/528Mb with Media '95 kit (double speed CD-ROM).
Ready to Ship

- Integrated motherboard with Flash BIOS
- On-board fast PCI hard disk controller
- Type 3 ZIF socket for processor upgrades, including Pentium OverDrive®
- 4Mb RAM (expandable to 128Mb)
- 256kb external processor cache
- 2xPCI, 1xPCI/16-bit & 4x16-bit expansion slots
- 1 EPP parallel port and 2 serial ports with 16550 UART
- 1Mb *Diamond Stealth SE* PCI video card
- 14" SVGA monitor (non-interlaced up to 800x600)
- 3.5" 1.44Mb Floppy Disk Drive
- TÜV approved Power Supply with low noise fan
- EPA Energy Star compliant
- Low profile desktop case
- 102-key keyboard
- MS-DOS 6.22, Windows for Workgroups 3.11 *and* Mouse
- 30 day moneyback guarantee
- 1 year On-Site Maintenance for parts and labour
- Lifetime technical support hotline
- Lifetime labour warranty

DIAMOND MULTIMEDIA Stealth SE 1Mb video card
See the Premier page for details

new ZyFi2

NO DEPOSIT PERSONAL FINANCE
Example: *Popular Media '95 PC*
(Cash price £1173.83 inc VAT).
£41.95 inc VAT per month. No deposit.
36 monthly payments.
APR 18.5%. Total payable £1510.20 inc VAT.

TATUNG ON TOP displaying Advantage

A Vale Popular Media '95 PC

POPULAR OPTIONS

8Mb RAM option instead of standard 4Mb	£120.00 +VAT
16Mb RAM option instead of standard 4Mb	£360.00 +VAT
1Gb IDE hard disk instead of standard 528Mb	£130.00 +VAT
Fully non-Interlaced monitor (as *Vale Prestige*)	£50.00 +VAT
Fully non-Interlaced 15" monitor (as *Vale Premier*)	£100.00 +VAT
Internal High Density 5.25" 1.2Mb Drive	£49.00 +VAT
Second year on-site maintenance	£69.00 +VAT
Second and third year on-site maintenance	£149.00 +VAT

SEE THE *PLATINUM* PAGE FOR VALE ACCESSORIES

Pentium and OverDrive are registered trademarks of Intel Corporation

Microsoft Works Golf Media '95

MS Encarta '95
MS Works
MS Golf
PhotoCD software
MS Scenes
MS Money
MS Dangerous Creatures

Superb multimedia kit available with any Vale model:

- Choice of double speed or quad speed CD-ROM drive;
- ZyFi2 amplified stereo speaker system;
- Genuine Creative Labs SoundBlaster 16 sound card;
- Media '95 software bundle.

With double speed CD-ROM drive **£200+VAT**

With quad speed CD-ROM drive **£230+VAT**

We offer a full range of multimedia packs and products, any of which can be specified with your *Vale* PC, see page 9 of our advert for full details. Please note that bundled software does not feature full retail packaging. When ordering double speed CD-ROM installations in Vale computers the Panasonic CR-571 enhanced IDE drive is used.

Vale Prestige PCI

A "Best Buy" in the PCI stakes.

A 2Mb video card, non-interlaced monitor and quality keyboard help the *Vale Prestige PCI* earn its laurels.

Prestige models use a top quality dark screen, low emission 14" SVGA colour monitor which is non-interlaced in all modes including 1024x768. An important point is its ability to display SVGA mode (800x600) at 72Hz refresh rate which is flicker free, making it comfortable to use and restful on the eyes. It also meets the stringent MPR II safety requirements as well as surpassing the EPA Energy Star power saving standard.
The keyboard with the *Prestige*, *Premier & Platinum* ranges is a full 102-key unit with proper tactile switches and a sturdy metal base. It has consistently impressed reviewers: "...almost traditional in its weight and touch. A deeply desirable device." Computer Buyer, June 1994.

- Integrated motherboard with Flash BIOS
- On-board fast PCI hard disk controller
- Type 3 ZIF socket for processor upgrades, including Pentium OverDrive®
- 4Mb RAM (expandable to 128Mb)
- 256kb external processor cache
- 2xPCI, 1xPCI/16-bit & 4x16-bit expansion slots
- 1 EPP parallel port and 2 serial ports with 16550 UART
- 2Mb *Diamond Stealth SE* PCI video card
- Fully non-interlaced 14" MPR II monitor
- 3.5" 1.44Mb Floppy Disk Drive
- TÜV approved Power Supply with low noise fan
- EPA Energy Star compliant
- Choice of desktop or mini-tower case
- Full-tower case available at extra cost
- 102-key tactile keyboard
- MS-DOS 6.22, Windows for Workgroups 3.11 *and* Logitech Mouse
- 30 day moneyback guarantee
- 1 year On-Site Maintenance for parts and labour
- Lifetime technical support hotline
- Lifetime labour warranty

DIAMOND MULTIMEDIA Stealth SE 2Mb video card
See the Premier page for details

486DX2-66		486DX4-100	
528MB	£929+VAT	528MB	£999+VAT
1GB	£1059+VAT	1GB	£1129+VAT

PRESTIGE OPTIONS

8Mb RAM instead of standard 4Mb	£120.00 +VAT
16Mb RAM instead of standard 4Mb	£360.00 +VAT
Tekram PCI caching HD controller with 2Mb installed (for IDE hard disks)	£167.00 +VAT
1Gb SCSI hard disk instead of 1Gb IDE	£199.00 +VAT
2Gb SCSI hard disk instead of 1Gb IDE	£450.00 +VAT
Double speed CD-ROM drive	£89.00 +VAT
Quad speed CD-ROM drive	£119.00 +VAT
Internal high density 5.25" 1.2Mb drive	£49.00 +VAT
Full-Tower case	£50.00 +VAT
Second year on-site maintenance	£69.00 +VAT
Second and third year on-site maintenance	£149.00 +VAT

SEE THE *PLATINUM* PAGE FOR VALE ACCESSORIES

Pentium and OverDrive are registered trademarks of Intel Corporation

"Best Buy" February 1995,
in a group test including PCs from Gateway, IBM, Compuadd & Acer.

"Overall, this is a well-specified, well-constructed computer with good expansion potential, plenty of bells and whistles and sharp performance. A hard combination to beat."
Vale Prestige

BEST BUY · BEST BUY · BEST BUY · WHAT PC?

Prestige Media '95

486DX2-66/528Mb with Media '95 kit (Quad speed CD-ROM).
Ready to Ship **£1159+VAT**

Prestige Lotus Multimedia Office

486DX2-66/528Mb with Lotus Multimedia kit (Quad speed CD-ROM).
Ready to Ship **£1209+VAT**

MONITOR UPGRADES

Vale EcoScan 15 SVGA colour monitor (as *Premier* range)	£50.00 +VAT
17" Idek Iiayma Vision Master SVGA colour monitor (see *Platinum Editors' Edition* page) PC Magazine "Editors' Choice" April 1995	£449.00 +VAT
17" Panasonic TX-D1732 SVGA colour monitor, illustrated on *Platinum* page, (up to 64kHz scan, on-screen control display, EPA Energy Star power saving functions)	£399.00 +VAT
17" Tatung CM-17MCR SVGA colour monitor (up to 65kHz scan, 1280x1024 max. res. non-interlaced) "...leads the field in PC Labs' performance tests" (CM-17MBD) – PC Magazine, June 1993	£299.00 +VAT
17" Tatung CM-17MKR SVGA colour monitor (up to 82kHz scan, 1600x1200 max. resolution non-interlaced)	£479.00 +VAT
20" Tatung SVGA Low Emission colour monitor (1280x1024 non-interlaced)	£699.00 +VAT

A Vale Prestige Media '95 PC

Lotus MULTIMEDIA Office

Sound Blaster 16

Superb multimedia kit available with any Vale model:

- Choice of double speed or quad speed CD-ROM drive;
- ZyFi2 amplified stereo speaker system;
- Genuine Creative Labs SoundBlaster 16 sound card;
- Lotus Multimedia software bundle.

- *Lotus 1-2-3, Lotus AmiPro, Lotus Approach, Lotus Screencam, Lotus Smartpics*
- *Software Toolworks Grolier Encyclopaedia for 1995 - version 7*
- *FIFA International Football, Supervoice, Dragon Lore, MegaRace, Theme Park*
- *Professor Windows, Professor Training Suite, Professor Multimedia, Typing Tutor*
- *Pilot Multimedia including 'Interlude' and 'Get Organized'*

With double speed CD-ROM drive **£250+VAT**

With quad speed CD-ROM drive **£280+VAT**

We offer a full range of multimedia packs and products, any of which can be specified with your *Vale* PC, see page 9 of our advert for full details. Please note that bundled software does not feature full retail packaging. When ordering double speed CD-ROM installations in Vale computers the Panasonic CR-571 enhanced IDE drive is used.

Premier PCI

"Recommended" January 1995
In a group test with PCs from Compaq, Elonex & Hewlett Packard.
"Without hesitation we recommend the Vale Premier from this group."
Vale Premier Media '95 PC

The "Recommended" option for serious performance.

If you are looking for a top specification 486 the *Vale Premier PCI* has class beating credentials.

"Recommended" March 1995
"When you take into consideration the price and the one year on-site warranty, the Vale offers excellent value for money."
Vale Premier

The *Premier PCI* range boasts the following enhancements to the *Prestige PCI* range.

- 8Mb RAM
- 2Mb *Diamond Stealth 64 DRAM* 64-bit PCI video card
- Microprocessor controlled 15" non-interlaced 0.28mm dot pitch monitor

Now fitted with STEALTH 64 DRAM as STANDARD

486DX2-66		486DX4-100	
528MB	£1069+VAT	528MB	£1139+VAT
1GB	£1199+VAT	1GB	£1269+VAT

PREMIER OPTIONS

16Mb RAM instead of standard 8Mb	£240.00 +VAT
Tekram PCI caching HD controller with 2Mb installed (for IDE hard disks)	£167.00 +VAT
1Gb SCSI hard disk instead of 1Gb IDE	£199.00 +VAT
2Gb SCSI hard disk instead of 1Gb IDE	£450.00 +VAT
Diamond Stealth 64Video *VRAM* card (2Mb)	£130.00 +VAT
Diamond Stealth 64Video *VRAM* upgrade to 4Mb	£130.00 +VAT
Double speed CD-ROM drive	£89.00 +VAT
Quad speed CD-ROM drive	£119.00 +VAT
Internal high density 5.25" 1.2Mb Drive	£49.00 +VAT
Full-Tower case	£50.00 +VAT
Second year on-site maintenance	£69.00 +VAT
Second and third year on-site maintenance	£149.00 +VAT

Premier Media '95

486DX2-66/528Mb with Media '95 kit (Quad speed CD-ROM).
Ready to Ship **£1299+VAT**

Premier Lotus Multimedia Office

486DX2-66/528Mb with Lotus Multimedia kit (Quad speed CD-ROM).
Ready to Ship **£1349+VAT**

NO DEPOSIT PERSONAL FINANCE

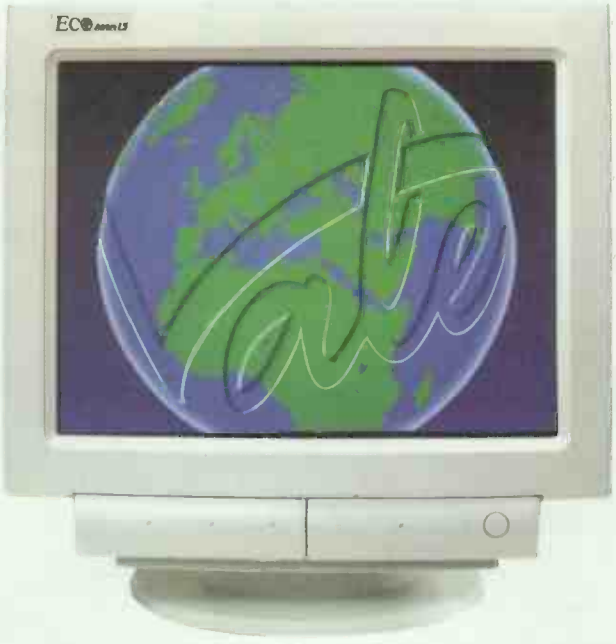
Example: Buy the *Premier Lotus Multimedia Office PC* (Cash price £1585.08 inc VAT).
£56.65 inc VAT per month.
No deposit. 36 monthly payments. APR 18.5%.
Total payable £2039.40 inc VAT.

BUSINESS FINANCE

Example: Lease the *Premier Lotus Multimedia Office PC* for
£47.75+VAT per month.
3 year term, payable quarterly.

15" MONITOR The *Vale EcoScan 15* that is supplied with the *Premier* and *Platinum* ranges is a superb quality micro-processor controlled 15" monitor. A dark non-glare FST screen with 'Edge-to-Edge' display gives as much as 30% greater picture area than 14" models. Complete control over all display adjustments is obtained via a simple digital push button system, with on–screen representation of the settings. As it complies with the stringent Swedish MPR II safety standards and can display 1024x768 at 72Hz refresh rate it is especially kind to your eyes.
If you prefer the luxury of a larger monitor with your PC we offer a choice of 17" and 20" models. Please see the "Monitor upgrades" section below.

The on-screen display shows the current selected video mode and, with the simple push buttons, facilitates easy adjustment of display settings.



The Vale 15" microprocessor controlled digital Monitor

MONITOR UPGRADES

17" Idek Iiayma Vision Master SVGA colour monitor (see *Platinum Editors' Edition* page) PC Magazine "Editors' Choice" April 1995	£399.00 +VAT
17" Panasonic TX-D1732 SVGA colour monitor, illustrated on *Platinum* page, (up to 64kHz scan, on-screen control display, EPA Energy Star power saving functions)	£349.00 +VAT
17" Tatung CM-17MCR SVGA colour monitor (up to 65kHz scan, 1280x1024 max. res. non-interlaced) "...leads the field in PC Labs' performance tests" (CM-17MBD) – PC Magazine, June 1993	£249.00 +VAT
17" Tatung CM-17MKR SVGA colour monitor (up to 82kHz scan, 1600x1200 max. res. non-interlaced)	£429.00 +VAT
20" Tatung SVGA Low Emission colour monitor (1280x1024 non-interlaced)	£649.00 +VAT

Why Diamond Video Cards ?

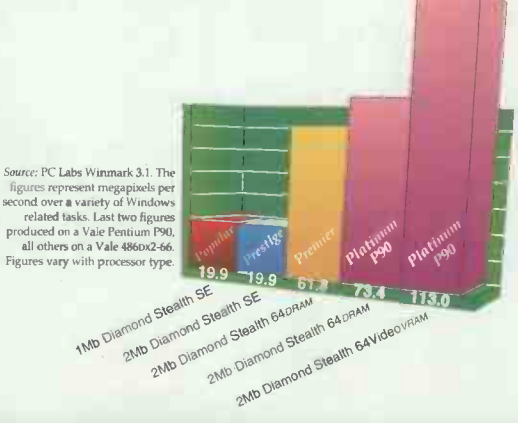
DIAMOND MULTIMEDIA

The highly acclaimed Stealth range has won many press accolades including the coveted PC Magazine "Editors Choice". Now a new range of stealth cards is available, giving a wide choice of graphics performance. They are all based around S3 chipsets for superb Windows acceleration as well as class leading DOS performance, and come with the renowned *InControl Tools* utility for setting up the Windows environment. Remember that Diamond are continually striving to optimise the performance and compatibility of their video cards; and you therefore have the assurance that driver support is ongoing.

STEALTH SE The latest addition to the range continues the tradition of delivering the best price/performance available. It displays 24-bit True Colour at 640x480 with 1Mb DRAM *(Vale Popular)* or at 800x600 with 2Mb DRAM *(Vale Prestige)*.

STEALTH 64 *DRAM* *(Vale Premier and Platinum)*. The Stealth 64*DRAM* is the world's fastest DRAM accelerator, its S3 Vision864 controller setting a new standard in affordable 64-bit graphics performance. Supplied with full AutoCAD drivers.

STEALTH 64Video *VRAM* *(Option)*. The new Stealth 64Video*VRAM* is the ultimate graphics and video accelerator. It is supplied with full AutoCAD drivers and its 2Mb high speed VRAM can be expanded to 4Mb, giving 24-bit colour at 1280x1024!
It has driver support for all popular video formats, including MPEG – you can scale video playback up to full screen, or view video clips in full-motion (30 fps). The optional Motion Video Player accessory provides hardware MPEG decoding, allowing full-screen full-motion video, as well as accepting video input from camcorder, VCR, laserdisk etc.



Source: PC Labs Winmark 3.1. The figures represent megapixels per second over a variety of Windows related tasks. Last two figures produced on a Vale Pentium P90, all others on a Vale 486DX2-66. Figures vary with processor type.

Vale Platinum

Vale Platinum... the Editors' Choice – twice!

Four 1995 magazine accolades already – stunning success for a stunning performer.

- Pentium® processor, upgradeable with P54CT via Intel socket 5
- Integrated motherboard with 2x PCI, 1xPCI/16-bit & 4x16-bit expansion slots
- 256kb external CPU write-back cache
- 8Mb RAM (expandable to 192Mb)
- Fast PCI IDE hard disk controller (528Mb and 1Gb IDE models)
- Flash BIOS
- EPP and ECP capable printer port
- Two 16550 compatible UART driven high speed serial ports
- *Diamond Stealth 64DRAM* 2Mb 64-bit video card
- Microprocessor controlled 15" non-interlaced monitor (as *Premier* range, see previous page)
- Full *Microsoft Windows 95* 'plug and play' support
- 3.5" 1.44Mb Floppy Disk Drive
- TÜV approved Power Supply with low noise fan
- CPU cooling fan
- EPA Energy Star compliant
- 102-key tactile keyboard (as *Prestige/Premier* range)
- *MS-DOS 6.22, Windows for Workgroups 3.11* and *Logitech Mouse*
- Choice of desktop or mini-tower case
- Full-tower case available at extra cost
- 30 day moneyback guarantee
- 1 year On-Site Maintenance (next working day response) for parts and labour
- Lifetime technical support hotline
- Lifetime labour warranty

Now fitted with STEALTH 64 DRAM as STANDARD

PC MAGAZINE UK EDITORS' CHOICE

- Vale Platinum P90 with:
- Diamond Stealth 64VRAM video upgrade
- Panasonic CM-17MCR monitor upgrade
- Toshiba XM-5302B quad speed CD-ROM
- Creative Labs SoundBlaster AWE32 sound card and ZyFi 2 speaker system

"The combination of an excellent multimedia platform and high all-round DOS and Windows performance, at a good price, makes the Vale Pentium an excellent multimedia PC, and a worthy Editors' Choice" ***May 1995***

PC P90 — ***January 1995*** Vale Platinum Media '95 PC

WHAT PERSONAL COMPUTER BEST BUY IN-DEPTH LABS TESTS

"The Platinum took the top spot in our performance tests. The Diamond Stealth video system had a chance to show its true colours...Not only is the Platinum a top class machine, it's also good value for money." ***February 1995*** Vale Platinum P90

PC MAGAZINE UK EDITORS' CHOICE

- Vale Platinum P90 with:
- 16Mb RAM upgrade
- Diamond Stealth 64VRAM video upgrade
- Panasonic TX-D1732 monitor upgrade
- Media '95 multimedia kit

"the Evesham Vale Platinum delivers excellent performance, a good feature set and an affordable price–a combination which is the hallmark of a *PC Magazine* Editors' Choice.
In a market where compromise is all too common, the Evesham Vale Platinum is a winner." ***January 1995***

EDITOR'S EDITION No. Vale PLATINUM

VALE PLATINUM EDITORS' EDITION

Please see the following page for details of this high spec limited edition PC based on the Editors' Choice winners.

Platinum Media '95
528Mb model with Media '95 kit (Quad speed CD-ROM).
P75..£1479+VAT P90..£1579+VAT

Platinum Lotus SmartSuite Office
528Mb model with Lotus Multimedia kit (Quad speed CD-ROM).
P75..£1529+VAT P90..£1629+VAT

P75	
528MB	£1249+VAT
1GB	£1379+VAT
2GB	£1829+VAT

P90	
528MB	£1349+VAT
1GB	£1479+VAT
2GB	£1929+VAT

P120	
528MB	£1849+VAT
1GB	£1979+VAT
2GB	£2429+VAT

PLATINUM OPTIONS

16Mb RAM instead of standard 8Mb	£240.00 +VAT
Tekram PCI caching HD controller with 2Mb installed (for IDE hard disks)	£167.00 +VAT
1Gb SCSI hard disk instead of 1Gb IDE	£199.00 +VAT
Diamond Stealth 64VideoVRAM card (2Mb)	£130.00 +VAT
Diamond Stealth 64VideoVRAM upgrade to 4Mb	£130.00 +VAT
Double speed CD-ROM drive	£89.00 +VAT
Quad speed CD-ROM drive	£119.00 +VAT
Internal high density 5.25" 1.2Mb Drive	£49.00 +VAT
Full-Tower case	£50.00 +VAT
Second year on-site maintenance	£69.00 +VAT
Second and third year on-site maintenance	£149.00 +VAT

MONITOR UPGRADES

PLEASE SEE THE *PREMIER* SECTION FOR MONITOR UPGRADES

NO DEPOSIT PERSONAL FINANCE

Example: Buy the *Platinum P90 Lotus Multimedia Office PC*
(Cash price £1914.08 inc VAT).

£68.40 inc VAT per month.
No deposit. 36 monthly payments. APR 18.5%.
Total payable £2462.40 inc VAT.

BUSINESS FINANCE

Example: Lease the *Platinum P90 Lotus Multimedia Office PC* for

£57.67 +VAT per month.
3 year term, payable quarterly.

A Vale Platinum P90 PC with the optional Panasonic 17" monitor and Panasonic CD-ROM drive

Vale PC Accessories

TAPE STREAMER BACKUP UNITS

Regular backups are essential to ensure the safety of your data; why not take the advantage of having a tape streamer fitted into your *Vale*? It is more economical than using multiple floppy disks, as well as being faster and far more convenient. Quoted capacities are with compression software (supplied). All units are supplied with full backup software.

IOMEGA 250Mb UNIT....£99.00 +VAT
DC2120 Tapes for above.....£15.00 + VAT

IOMEGA 700Mb UNIT..£249.00 +VAT
Tapes for above.....£16.00 + VAT

TEAC 1Gb UNIT .....£399.00 +VAT
QIC-143 Tapes for above.....£25.00 + VAT

NEW! LOTUS SMARTSUITE 3

A complete software suite providing the latest versions of leading Windows applications.

- Ami Pro 3.1
- 1.2.3. 5.0
- Organiser 1.1
- Approach 3.0
- Freelance 2.1

£199.00+VAT
Via voucher redemption

Evesham Micros ● ▲▲▲▲ (01386) 765500 ▲▲▲▲ ● Evesham Micros ● ▲▲▲▲ (01386) 765500 ▲▲▲▲ ● Evesham Micros

Platinum Editors' Edition

A **Vale Platinum P90 Multimedia PC** has just received a *2nd* PC Magazine "Editors' Choice". We are so proud of our winning PC that we have decided to commemorate its success by producing a limited edition of 500 machines, individually numbered, built around the winning specification. Not content with two Editors' Choice awards we have added the Idek Iiyama Vision Master 17" monitor, itself the proud owner of an "Editors' Choice" award. With an unprecedented Ed-count of three, and a saving of over £100 we are sure this is a classic in the making!

Please see the previous page for general features of the Platinum range.

The Platinum Editors' Edition features the following upgrades:

- 90Mhz Pentium® processor
- 1Gb IDE hard disk ✦ 16Mb RAM
- *Diamond Stealth 64 Video* PCI video card (2Mb VRAM)
- *Idek Iiyama Vision Master 17"* microprocessor controlled non-interlaced monitor
- *Toshiba XM5302-B* Quad Speed CD-ROM drive
- *Zy-Fi2 PRO* amplified stereo speaker system
- Genuine *Creative Labs SoundBlaster* AWE32 sound card
- *Media '95* software bundle

OPTIONS

Tekram PCI caching HD controller with 2Mb installed (for IDE hard disks)	£167.00 +VAT
1Gb SCSI hard disk instead of 1Gb IDE	£199.00 +VAT
2Gb SCSI hard disk instead of 1Gb IDE	£450.00 +VAT
Video card upgrade to 4Mb VRAM	£130.00 +VAT
Internal high density 5.25" 1.2Mb Drive	£49.00 +VAT
Full-Tower case	£50.00 +VAT
Second year on-site maintenance	£69.00 +VAT
Second and third year on-site maintenance	£149.00 +VAT

"performance, features, and an affordable PRICE..."

£2495+VAT

A Vale Platinum P90 Editors' Edition PC with Idek 17" monitor, Toshiba CD-ROM drive and Zy-Fi 2 PRO speakers.

"Evesham's Vale Platinum delivers excellent performance, a good feature set and an affordable price–a combination which is the hallmark of a *PC Magazine* Editor's Choice. In a market where compromise is all too common, the Evesham Vale Platinum is a winner." ***January 1995***

"...includes excellent multimedia hardware and software. The combination of an excellent multimedia platform and high all-round DOS and Windows performance, at a good price, makes the Vale Pentium an excellent multimedia PC, and a worthy Editors' Choice." ***May 1995***

"At 86 kHz , the Vision Master 17's rated maximum horizontal scanning frequency was the highest of all 21 monitors we reviewed. This means that for any given screen resolution it should be able to support a higher refresh rate than the competition. Image quality is excellent up to 1,024 x 768, with a bright and sharp display showing consistent colour registration, good power supply regulation and minimal ghosting or streaking." ***April 1995***

Network Solutions

Novell CNE

Novell Authorised Reseller

Whatever your networking requirement, we can provide the complete solution. From a simple two user peer to peer system to a Wide Area Network, *we will install and support the entire installation* – from initial concept to user training. All our installations are supervised by a Novell Certified Netware Engineer, thus assuring our clients of the very best in networking expertise. Why not contact our Corporate Sales staff at your nearest Evesham Micros branch to discuss your requirements.

The Vale Fileserver

This is just an example of the type of fileserver we can supply. We will be happy to quote for your individual requirements.

- 90MHz Pentium® processor
- 1Gb SCSI hard disk with PCI controller
- 8Mb RAM ✦ 256kb cache
- 1Mb PCI video
- 14" SVGA monitor
- 32-bit PCI ethernet card
- Full-tower case

£1899+VAT

BUSINESS FINANCE

Example: Lease the *Vale Fileserver* for

£67.22+VAT per month.

3 year term, payable quarterly.

The Vale RAID 5 system

RAID 5 System

Example specification:

- 5Gb array (5x1Gb drives giving 4.25Gb formatted space) and 10Gb array (5x2Gb drives giving 8.25Gb)
- Cache controller with 16Mb installed (max 128Mb)
- Average DTR 6Mb/sec (with 16Mb cache)
- Hot swap of failed drive with automatic restore

5Gb..£6999+VAT 10Gb..£8999+VAT

This is a very flexible system – please call us to discuss your specific requirements.

Pentium is a registered trademark of Intel Corporation

Vale Voyager

PC today BEST BUY
January 1995

"it's toughness, excellent performance and good display make it a machine that we must honour with the *PC today* best buy award."
Vale Voyager 486DX2•66 Dual Scan Colour

The Vale Voyager, with its flexibility, Windows performance and sound capabilities, is one of the most powerful and stylish notebooks on the market. Its completely modular construction enables it to be tailored to the user's exact needs, now and in the future.

'Dual Scan' Colour display Offers near TFT quality at sensible cost.

Multimedia Ready

DISPLAY
A choice of display types is offered – LCD mono, Dual Scan colour and TFT colour. All are 9.5" VGA with 64 greyscales (mono model) or 256 colours (colour models). The display driver is 1Mb 32-bit VESA local bus with Windows acceleration. A port is provided for connection to an external monitor, with up to 1024 x 768 resolution.

BUILT-IN AUDIO
The *Voyager* has a built-in microphone and speaker, with digitized audio recording/playback capability. A Yamaha music chipset (SoundBlaster and Windows Sound System compatible) allows for sound generation. There are sockets for external speakers and microphone. With this audio performance, the addition of a CD-ROM drive makes the *Voyager* truly 'Multimedia ready'.

PCMCIA
PCMCIA ports allow for the use of two type II cards or one type III card.

EXPANSION PORTS
Rear panel connectors include serial port; EPP parallel port; SVGA monitor; and PS/2 mouse, keyboard or keypad. A160-pin port enables fast connection to a docking station (see below for details).

3.5" FLOPPY DRIVE
Can be easily removed and replaced.

HARD DISK
The hard disk is removable, offering the ultimate in upgradeability and data security.

STYLISH HIGH QUALITY DESIGN
Slim and attractive, the Voyager measures 286 x 224 x 34mm and weighs just 2.4kg (mono model). The quality of fit and finish is amongst the best we have ever seen.

KEYBOARD
The *Voyager* uses a full function 86-key keyboard. Unlike many notebooks, it has a good solid feel.

TRACKBALL
A 19mm ergonomically designed trackball is built-in. The surrounding surface makes for a comfortable hand rest whilst typing.

WARRANTY
The Voyager features 12 months 'return to base' warranty covering parts, with a lifetime warranty on labour.

BATTERY
The primary battery is a long life NiMH unit, giving up to 3-4 hours use with the 486DX2-66 mono model, and can be recharged in just 1.5 hours. It can be easily removed and replaced by a second unit. Extensive power management features include doze, sleep and 'suspend to disk' modes. The latter quickly saves your working environment to disk when the lid is closed, allowing you to re-load it later.

CPU & RAM
Low power consumption CPUs are used to maximize battery life. The motherboard is CPU upgradeable, supporting any '486 up to the DX4-100. 4Mb RAM is fitted as standard, and can be upgraded to 20Mb.

DOS & WINDOWS
The Voyager is supplied with MS-DOS 6.22 and Windows 3.11 installed and ready to run.

A Vale Voyager with the supplied carrying pouch

Monochrome

	250MB	340MB	520MB
486DX2•66	£1049•VAT	£1149•VAT	£1249•VAT
486DX4•100	£1149•VAT	£1249•VAT	£1349•VAT

Dual Scan Colour

	250MB	340MB	520MB
486DX2•66	£1349•VAT	£1449•VAT	£1549•VAT
486DX4•100	£1449•VAT	£1549•VAT	£1649•VAT

TFT Colour

	250MB	340MB	520MB
486DX2•66	£1949•VAT	£2049•VAT	£2149•VAT
486DX4•100	£2049•VAT	£2149•VAT	£2249•VAT

VOYAGER OPTIONS

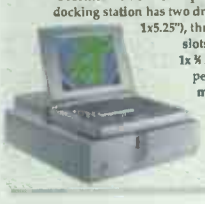
Additional primary NiMH battery	£89•VAT
Upgrade from 4Mb to 8Mb RAM	£169•VAT
Upgrade from 4Mb to 12Mb RAM	£299•VAT
Upgrade from 4Mb to 20Mb RAM	£699•VAT
PCMCIA FAX/Modem	£135•VAT
PCMCIA V32 bis FAX/Modem	£222•VAT
3com PCMCIA Ethernet card	£179•VAT
Carrying case	£30•VAT
Please see page 11 for other carry cases	
Docking station	£349•VAT
Cigar lighter adaptor	£49•VAT
Additional PSU	£49•VAT
External keyboard	£29•VAT
Soundplus speakers/microphone /earphones system	£19•VAT
ZyFi2 amplified speakers	£29•VAT
Total care warranty	£see panel below

PCMCIA MODEMS

A FAX/modem is the gateway to a world of communications, whether sending and receiving faxes or connecting to the internet information superhighway.

DOCKING STATION

With a docking station on your desk the *Voyager* becomes a true "desktop replacement". The docking station has two drive bays (1x3.5" & 1x5.25"), three ISA expansion slots (2x full length & 1x ¾ length), as well as permanent ports for monitor, keyboard, PS/2 mouse, serial, parallel, speaker, microphone and audio line-



RAM UPGRADES

Make the most of the power of your *Voyager* by specifying extra RAM – giving a total of either 8Mb, 12Mb or 20Mb.

TOTAL CARE WARRANTY

Our optional "Total Care" package replaces the existing warranty with 2 year care. If your *Voyager* should need attention during this period we will collect it and return it to you when repaired. Typical turn-around is 3 working days. This cover is just 12.5% of the cost of the notebook (without accessories) – for example, £131.13•VAT for the 486DX2-66/250Mb mono model.

CARRYING CASE

A versatile, padded case with carrying handle and detachable shoulder strap. Ideal for protecting your *Voyager* "out in the field".

Evesham Micros ● ▲▲▲▲ (01386) 765500 ▲▲▲▲ ● Evesham Micros ● ▲▲▲▲ (01386) 765500 ▲▲▲▲ ● Evesham Micros

TWO GREAT MULTIMEDIA BUNDLES

OFFERED WITH A VARIETY OF PACKS

Microsoft Media '95

Microsoft Encarta '95 The complete multimedia encyclopaedia, harnessing the power of your computer to take you on a journey of discovery and learning.

Microsoft Works *The* integrated productivity suite: Word Processor, Spreadsheet, Database, Graphics, Communications.

Microsoft Golf Experience the true-to-life challenges of the game of golf.

Microsoft Scenes Superb screen saver.

Microsoft Money All you need to take control of your finances.

Microsoft Dangerous Creatures See extraordinary creatures come to life in more than 100 exciting narrated videos.

PhotoCD software.

Lotus MULTIMEDIA Office

Superb Lotus Suite:

Lotus 1-2-3
Lotus AmiPro
Lotus Approach
Lotus Screencam
Lotus Smartpics

Top Games Titles:

Supervoice, Dragon Lore, MegaRace, Theme Park, FIFA International Soccer

Grolier Encyclopaedia:

Software Toolworks Grolier Encyclopaedia for 1995 - version 7

Plus:

Professor Windows, Professor Training Suite, Professor Multimedia, Typing Tutor
Pilot Multimedia including 'Interlude' and 'Get Organized'

See the CD-ROM drives (below and right) for details of the complete packs. When ordering please quote pack number. We recommend a minimum 486sx33 system for these packs. Please note that bundled versions of software and sound cards are not full retail packs, and the software features on-line documentation.

PANASONIC CD-ROM DRIVE

CR-562 Double Speed, multi-session drive for only £84.99+VAT

February 1994 — April 1994

Includes cables and driver software

- Double speed 300kb/sec data transfer rate
- Multi-session mechanism - compatible with Kodak Photo CD Standard
- Motorised loading tray – no need for a caddy
- High speed 320ms access
- White book (CDi) compatible for video CDs
- MPC compatible
- Mounts in 5.25" drive bay
- Output from audio CDs via headphone socket
- Requires SoundBlaster or compatible card with Panasonic CD interface

1B £144.99 +VAT — CR-562 bundled with SoundBlaster 16 card

1C £164.99 +VAT — CR-562 with SoundBlaster 16 ASP card

1E £98.99 +VAT — CR-562 with AT-bus driver card

SPECIAL OFFER! – **"Aldus PhotoStyler"** PhotoCD compatible image manipulation software and **"Software Toolworks Grolier Encyclopaedia for 1994 - Version 6"** with any of the above packs for only £20+VAT.

COMPLETE MULTIMEDIA PACKS

Complete multimedia packs featuring the Panasonic CR-562 with a genuine SoundBlaster 16 sound card, ZyFi 2 active speakers, and either of our two software bundles. The speakers can be upgraded to ZyFi 2 PROs for a surcharge of £20+VAT.

Microsoft Media '95 — Lotus MULTIMEDIA Office

7A £200.00 +VAT — CR-562 with Media '95 pack, ZyFi 2 speakers and SoundBlaster 16 card

7B £220.00 +VAT — CR-562 with Media '95 pack, ZyFi 2 speakers and SoundBlaster 16 ASP

9A £249.99 +VAT — CR-562 with Lotus Multimedia Office, ZyFi 2 speakers and SoundBlaster 16 card

9B £269.99 +VAT — CR-562 with Lotus Multimedia Office, ZyFi 2 speakers and SoundBlaster 16 ASP

CREATIVE LABS, INC.

SoundBlaster 2 Deluxe card – includes "Lemmings" and "Indianapolis 500" games	£37.50+VAT
SoundBlaster PRO Value pack	£62.00+VAT
SoundBlaster 16 Value pack – with Panasonic only CD-ROM interface	£67.00+VAT
SoundBlaster 16 MCD card	£99.00+VAT
SoundBlaster 16 ASP MCD card	£119.00+VAT
MCD (Multi-CD) cards have a triple CD-ROM interface for Panasonic/Sony/Mitsumi drives	
SoundBlaster AWE32 card – integrated design combines *SB16 ASP MCD* with *WaveBlaster*	£179.00+VAT
WaveBlaster	£115.00+VAT
VideoBlaster SE The ultimate in video versatility for multimedia computing for only	£189.00+VAT
TV Coder VGA to Video encoder. Transfer your PC creations and manipulations back to video	£119.00+VAT

CD-ROM SOFTWARE

7th Guest	£34.00+VAT	Microsoft Art Gallery	£35.00+VAT
Alone in the Dark 2	£30.00+VAT	Microsoft Bookshelf	£69.00+VAT
Beneath a Steel Sky	£30.00+VAT	Mozart Multimedia	£35.00+VAT
Cinemania '94	£36.00+VAT	Musical Instruments	£35.00+VAT
Corel Photo CD Access	£15.00+VAT	Quantum Gate	£29.50+VAT
Critical Path	£29.50+VAT	Rebel Assault	£31.50+VAT
Day of the Tentacle	£31.50+VAT	Return to Zork	£31.50+VAT
MS Dinosaurs	£36.00+VAT	Sam & Max	£31.50+VAT
Encarta 1995	£69.00+VAT	Sherlock Holmes 3	£31.50+VAT
Golf	£29.50+VAT	Sim City	£31.50+VAT
Guinness Book of Records	£37.50+VAT	Star Trek 2	£31.50+VAT
JFK Assassination	£29.50+VAT	MS Stravinsky	£35.00+VAT
Mavis Beacon MPC version	£32.00+VAT	T.F.X.	£29.50+VAT
Mega Rock, Rap & Roll	£49.00+VAT	The Animals	£35.00+VAT

Special Offer! – The following titles are available with any purchase of a CD-ROM drive, Sound card or our special bundles (see right). Please note that they are not full retail packs.

7th Guest	£25.00+VAT	Groller PreHistoria	£19.00+VAT
Animals of San Diego Zoo	£15.00+VAT	Secrets of Luftwaffe	£15.00+VAT
World Atlas	£15.00+VAT	Sherlock Holmes	£15.00+VAT
Chessmaster 3000	£15.00+VAT	Microsoft Works 3	£39.00+VAT
Software Toolworks Grolier Encyclopaedia for 1994, Version 6	£39.00+VAT	PhotoStyler LE	£29.00+VAT
Guinness Book of Records	£19.00+VAT	'Challenge Pack' 9 Games	£19.00+VAT
Corel Photo CD Access	£15.00+VAT	Microprose 6 Game Pack – 3D Pool, Gunship, Pick Dangerous, Savage, Midwinter & World Class Soccer	£15.00+VAT

QUAD SPEED IDE CD-ROM DRIVE

TOSHIBA XM-5302B ENHANCED IDE DRIVE

4x Quad speed -IDE-

With 4x speed and the latest enhanced IDE interface this drive has the performance to cope with the most demanding multimedia applications.

- Enhanced IDE ATAPI interface
- Quad speed 600kb/sec sustained data transfer rate
- Super fast 190ms access
- Output from audio CDs via headphone socket
- Multi-session drive - compatible with Kodak Photo CD
- MPC and White Book (CDi) compatible

This drive requires a sound card with an enhanced IDE interface, and therefore we sell it only in the packs below – not separately.

4A £170.00 +VAT XM-5302B with genuine SoundBlaster 16 card

4B £235.00 +VAT XM-5302B with genuine SoundBlaster AWE32 lite

4C £270.00 +VAT XM-5302B with genuine SoundBlaster AWE32

Complete multimedia packs featuring the Toshiba XM-5302B with ZyFi 2 active speakers and either of our two software bundles. The speakers can be upgraded to ZyFi 2 PROs for a surcharge of £20+VAT.

Microsoft Media '95 · Sound Blaster 16 · Lotus Multimedia Office

5A £230.00 +VAT XM-5302B with Media '95 pack, ZyFi 2 speakers and SoundBlaster 16 card

5B £295.00 +VAT XM-5302B with Media '95 pack, ZyFi 2s and SoundBlaster AWE32 lite

5C £330.00 +VAT XM-5302B with Media '95 pack, ZyFi 2s and SoundBlaster AWE32

6A £280.00 +VAT XM-5302B with Lotus Multimedia Office, ZyFi 2s and SoundBlaster 16

6B £345.00 +VAT XM-5302B with Lotus Multimedia Office, ZyFi 2s and SB AWE32 lite

6C £380.00 +VAT XM-5302B with Lotus Multimedia Office, ZyFi 2s and SB AWE32

TEAC CD-55A *Super Quad* CD-ROM drive

Only £169.99+VAT *Including cables and driver software.*
Requires sound card with Panasonic CD-ROM interface or AT-Bus driver card.

8A £179.99 +VAT CD-55A with AT-bus driver card

8B £229.99 +VAT CD-55A with genuine SoundBlaster 16 card

8C £249.99 +VAT CD-55A with genuine SoundBlaster 16 ASP card

PC SOUND SOLUTIONS

SOUNDPLUS 16 CARD *Incredible value...* £49.99+VAT

A 16-bit stereo sound card, compatible with the SoundBlaster and SoundBlaster Pro, as well as the Windows Sound Sytem, MPU-401 and AdLib standards. It provides CD-ROM interfaces for Panasonic, Sony, Mitsumi and IDE CD-ROM drives, has a MIDI interface/joystick port, and also interfaces for microphone, speakers, audio in/out, and wave table synthesizer. The high specification includes 48kHz stereo sampling rate, a 20 voice FM music synthesizer, and a 4 Watt per channel stereo power amplifier.

3G £64.99 +VAT Soundplus 16 sound card with QS-123 joystick and Soundplus speakers

3H £74.99 +VAT Soundplus 16 sound card with QS-123 joystick, ZyFi 2 active speakers and Monkey Island 2

3D £89.00 +VAT Pack 3H with genuine SoundBlaster 16 card

3F £109.00 +VAT Pack 3H with genuine SoundBlaster 16 ASP card

"Monkey Island 2 Le Chuck's Revenge" is a registered trademark of Lucasfilm Games

Packs which feature the ZyFi 2 speaker system can be upgraded to ZyFi 2 PROs for a supplement of £20+VAT.

ZYFI 2 SPEAKERS

6 Watts RMS per channel

THE NEW ZYFI 2 ACTIVE POWER AMPLIFIED STEREO SPEAKERS OFFER THE VERY BEST IN SOUND REPRODUCTION – IDEAL FOR ALL SOUND CARDS AND MULTIMEDIA SYSTEMS!

Feature built-in power amplifier with separate L/R volume controls and tone control. Magnetically shielded.

RECOMMENDED PC ANSWERS *March 1995*

"Sound quality is splendid and a great improvement over the originals – stereo comes across well and the sound is crisp. You can get a fair amount of bass too... ZyFi 2s are definitely a sound investment."

Only £29.00 +VAT

ZYFI 2 PRO SPEAKERS

18 Watts RMS per channel

The latest addition to the serious multi-media system must be our ZYFI 2 PRO Active speaker system.

With a PMPO of 60 Watts per channel and an amplifier with a true 18 Watts RMS per channel rating, the PROs deliver a rich dynamic sound. They feature separate volume, bass and treble controls, and are magnetically shielded. Speaker size 14x23x15cm.

RECOMMENDED PC ANSWERS *March 1995*

"If you've invested in a decent sound card, then you've got to get some serious amplification to do it justice, and these are the boys to add a bit of oomph to your PC, especially if you plan to play some audio CDs or are serious about games."

Only £49.00 +VAT

FX2000 Joystick £18.00+VAT

This recent addition to the highly acclaimed range of Suncom joysticks brings further advances in comfort and control. The pistol grip can be easily rotated to give perfect orientation for left or right handed use, while the unique "V" designed top fire button allows lightning fast response. Switchable autofire, throttle control and suction feet complete the package. Requires game port.

FlightMAX £25.00+VAT

Suncom's analogue joysticks always set new standards in quality and performance. The new *FlightMAX* Advanced Flight Control Console features Suncom's unique "SATURN-RING" Direct Drive Technology. This feature equalises control stick tension in all directions, for constant 'G' tracking. *FlightMAX* also has dual fire buttons, throttle and rudder controls – right at your fingertips. Requires game port.

COMMAND CONTROL £17.00+VAT

TWO-HANDED HIGH DEFINITION CURSOR CONTROL – IDEAL FOR ALL GAMES!

New from Suncom Technologies is this exclusive Command Control. Giving full two handed cursor control it adds a new dimension to playing action games. Two fire buttons *and* autofire buttons at your fingertips maximize your scoring. Requires game port.

FLIGHTSTICK £30.00+VAT

THE FLIGHTSTICK IS CONSISTENTLY REVIEWED AS THE BEST QUALITY JOYSTICK IN ITS CLASS

Test fly a Flightstick with your favourite simulator and you will know the meaning of *control*. Whether you're a novice or experienced combat pilot, flying skills will be improved and enemy kill rate will increase. Excellent construction - looks and feels like the real thing! Includes throttle control and 7ft long connection cable. Requires game port.

FLIGHTSTICK PRO £55.00+VAT

THE ULTIMATE COMBAT STICK FOR COMPUTER PILOTS!

The new Flightstick PRO from CH Products offers the ultimate in fingertip control. It has four fire buttons, and a four-way switch which allows you to control weapons, radar and viewing functions on more advanced software – all without taking your hand from the stick! With its top quality sturdy construction it is designed to last for years. Includes driver software and long connection cable. Requires game port.

FLIGHT YOKE £39.00+VAT

Introducing G-FORCE from Suncom, designed for realistic control of all simulation software.

The G-FORCE functions as a full size aviation yoke with pitch and roll control, and twin fire buttons at your thumb-tips. For driving games, simply engage the column lock and G-FORCE functions as a stable steering wheel. The base plate has large suction feet and table edge clamps. Requires game port.

VIRTUAL PILOT £68.00+VAT

THE MOST REALISTIC FLIGHT YOKE AVAILABLE FOR THE PC

Enjoy the ultimate realism in all flight simulation games with the Virtual Pilot, made in the USA by CH Products. Looking just like a real airplane yoke, it is designed for the ultimate precision, giving you superb control. Also ideal for driving games. Clamps to table top. Requires game port.

VIRTUAL PILOT PRO £79.00+VAT

The VIRTUAL PILOT PRO has all the best features of the award winning VIRTUAL PILOT. It adds four extra fire buttons and two four-way switches for unrivaled control in all combat and simulation games. Requires game port.

PRO PEDALS £89.00+VAT

Featuring dual operating modes for forward and back rudder motion, as well as pivot movement for driving games, the CH Products PRO PEDALS provide gamers with the most realistic flying and driving experience. They also include aircraft style toe-brakes, and independant accelerator and brake controll. They are designed to work with all CH Products joysticks and yokes, and are built with rugged components to withstand the toughest competitor. Require game port.

GAME PORT 2000 £12.50+VAT

Game port card for any of these joysticks and yokes. Works with any clock speed. Particularly recommended for 486dx2-66 and Pentium systems.

UPGRADES & ACCESSORIES

PROCESSORS

486DX2-66 ..... £99.00+VAT
Heatsink and fan recommended

486DX4-100 ..... £179.00+VAT
Heatsink and fan recommended. Motherboard support for 3.3V required.

Pentium P60 ..... £229.00+VAT
Heatsink and fan recommended.

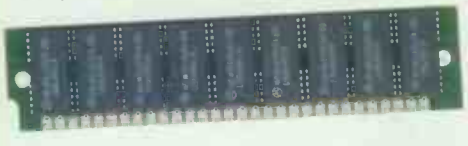
Pentium P75 ..... £249.00+VAT
Heatsink and fan recommended.

Pentium P90 ..... £349.00+VAT
Heatsink and fan recommended.

CPU Heatsink ..... £3.00+VAT
486 fan & heatsink ..... £10.00+VAT
Pentium fan & h/sink ..... £12.50+VAT

MEMORY UPGRADES

1Mb 30-pin SIMM (3 chip) 70ns ..... £34.00+VAT
4Mb 30-pin SIMM (3 chip) 70ns ..... £120.00+VAT
4Mb 72-pin SIMM 70ns 32-bit ..... £120.00+VAT
8Mb 72-pin SIMM 70ns 32-bit ..... £240.00+VAT



MOTHERBOARDS

SPECIAL PRICES

Our bulk purchase of motherboards allows us to offer you these special prices.

486 UP TO DX2•66 (TYPE 2) ..... £69.00+VAT

● 3xVESA local bus/ISA slots ● 3xISA slots ● 256kb Cache ● ZIF socket ● P24T upgradeable ● Will accept most 486 CPUs up to DX2-66 ● Accepts 30-pin and 72-pin SIMMs.

SPECIAL OFFER!
Type 2 board with 486DX2•66 processor....£163.00+VAT

486 UP TO DX2•66 (TYPE 4) ..... £85.00+VAT

● 3xPCI local bus slots ● 4xISA slots ● ZIF socket ● P24T upgradeable ● 256kb Cache ● Will accept most 486 CPUs up to DX2-66 ● Accepts 72-pin SIMMs.

SPECIAL OFFER!
Type 4 board with 486DX2•66 processor....£179.00+VAT

486 UP TO DX4•100 (TYPE 7) ..... £99.00+VAT

● 3xPCI local bus slots ● 4xISA slots ● ZIF socket ● P24T upgradeable ● 256kb Cache ● On-board PCI IDE hard disk controller ● 2x 16550 compatible UART driven high speed serial ports ● EPP and ECP compatible parallel port ● Will accept most 486 CPUs up to DX4-100 ● Accepts 72-pin SIMMs.

SPECIAL OFFERS!
Type 7 board with 486DX2•66 processor....£193.00+VAT
Type 7 board with 486DX4•100 processor..£273.00+VAT

PENTIUM P75/P90 (TYPE 6) ..... £169.00+VAT

DESIGNED FOR PENTIUM P75 OR P90 PROCESSOR ● 2xPCI local bus slots ● 1xPCI/ISA bus slot ● 4xISA slots ● ZIF socket ● 256kb Cache ● On-board PCI IDE hard disk controller ● 2x 16550 compatible UART driven high speed serial ports ● EPP and ECP compatible parallel port ● Accepts 72-pin SIMMs.

SPECIAL OFFERS!
Type 6 board with Pentium P75 processor..£408.00+VAT
Type 6 board with Pentium P90 processor..£508.00+VAT

VIDEO CARDS

Why Diamond Video Cards ? DIAMOND MULTIMEDIA

The highly acclaimed Stealth range has won many press accolades including the coveted PC Magazine "Editors Choice", and the new Stealth SE and Stealth 64 Video continue the tradition of delivering the best price/performance available. They are all based around S3 chipsets for superb Windows acceleration as well as class leading DOS performance, and come with the renowned *InControl Tools* utility for setting up the Windows environment.

Diamond Stealth 24 VL Bus (1Mb) ..... £79.00+VAT
Diamond Stealth 64DRAM VL Bus (2Mb) ..... £129.00+VAT
Diamond Stealth 64DRAM PCI Bus (2Mb) ..... £130.00+VAT
Diamond Stealth 64 Video VL Bus (2Mb) ..... £249.00+VAT
Diamond Stealth 64 Video PCI Bus (2Mb) ..... £250.00+VAT
Diamond Stealth SE PCI Bus (1Mb) ..... £78.00+VAT
Diamond Stealth SE VL Bus (1Mb) ..... £79.00+VAT

MONITORS

Due to our bulk purchasing power for our own Vale PCs, we are able to offer the following high specification monitors at very competitive prices.

Vale EcoScan15

- On screen micro-processor controlled digital adjustments
- Fully non-interlaced
- 72Hz Flicker-Free at 1024x768
- Low radiation (MPR II)
- 1280 x 1024 max. res.
- Energy Star power saving

ONLY £249.00+VAT

Tatung 14" SVGA Monochrome ..... £99.00+VAT

Vale Eco14 SVGA Colour ..... £149.00+VAT
0.39mm dot pitch (as *Vale Popular*)

Vale EcoScan14 SVGA Colour ..... £199.00+VAT
0.28mm dot pitch (as *Vale Prestige*)

Panasonic TX-D1732 17" SVGA Colour..£599.00+VAT
On-screen control display • EPA power saving functions • Up to 64KHz horiz. scan

Tatung CM-17MCR 17" SVGA Colour .....£479.00+VAT
1280x1024 max. res. (non-interlaced) • 0.28mm dot pitch • Up to 65KHz horiz. scan

Tatung CM-17MKR 17" SVGA Colour .....£649.00+VAT
1600x1200 max. res. (non-interlaced) • 0.28mm dot pitch • Up to 82KHz horiz. scan "...leads the field in PC Labs' performance tests" (CM-17MBD) – PC Magazine, June 1993

Tatung 20" SVGA Colour ..... £899.00+VAT
1280x1024 max. res (non-interlaced) • 0.31mm dot pitch • Auto 29-65KHz horiz. scan

NOTEBOOK CARRY CASES

SOLIDEX PERFORMANCE — Combining modern design with classic styling

TECHNOLOGY CASE £39.00+VAT

- Computer compartment (15.5" x 10.5" x 3.5")
- Printer/FAX compartment (12.75" x 9" x 2")
- Cellular 'phone and power supply pockets
- Diskette and file pockets, pen and buniness card holders

EXECUTIVE CASE £59.00+VAT

- Computer compartment (16.5" x 10.5" x 2.5")
- Cellular 'phone and power supply pockets
- Diskette and file pockets, pen and buniness card holders

HARD DISKS

COST EFFECTIVE MASS STORAGE

Drive mechanism only:

Optional installation kit (5.25" mounting bracket kit plus cables) ..... £10.00+VAT
Seagate ST3290A (IDE) 250Mb ..... £112.00+VAT
Seagate ST3660A (IDE) 528Mb ..... £135.00+VAT
Seagate ST31220A (IDE) 1Gb ..... £249.00+VAT
Seagate ST31200N (SCSI) 1Gb ..... £399.00+VAT

HD CONTROLLER CARDS

VL bus IDE controller with 2x hard disk/floppy disk ports, 2x serial ports, 1x parallel port ..... £19.00+VAT
Tekram (PCI bus) c/w 0Mb RAM (upgradeable to 16Mb) ..... £99.00+VAT
Tekram (PCI bus) c/w 2Mb RAM (upgradeable to 16Mb) ..... £167.00+VAT

PROMISE TECHNOLOGY INC.

PROMISE CACHING HARD DISK CONTROLLERS

DC99M (ISA bus) c/w 512kb RAM (upgradeable to 8.5Mb) ..... £59.00+VAT
DC4030 (VL bus) c/w 0kb RAM (upgradeable to 16Mb) ..... £89.00+VAT
DC4030 (VL bus) c/w 2Mb RAM (upgradeable to 16Mb) ..... £149.00+VAT

UPSONIC UPSs

Protect your installation from mains power faults with an Upsonic uninterruptible power supply.

UPSONIC *Station 28* 280VA rating ..... £95+VAT
UPSONIC *Station 40* 400VA rating ..... £155+VAT
UPSONIC *Station 60* 600VA rating ..... £209+VAT
UPSONIC *Station 90* 900VA rating ..... £309+VAT
UPSONIC *Station 140* 1400VA rating ..... £419+VAT
UPSONIC *Station 200* 2000VA rating ..... £649+VAT

SYSTEM SERIES ON-LINE UPSs

- True on-line protection ● True Sine wave output
- Fully automatic operation with LED status idicators
- Communications interface for use with automatic shutdown software
- System 300 has comprehensive LCD display of operating, monitoring and diagnostic information

UPSONIC *System 60* 600VA rating ..... £499+VAT
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UPSONIC *System 300* 3000VA rating ..... £1399+VAT

AMSTRAD ACCESSORIES

3.5" 720kb internal floppy drive for PC1512/1640. Suits any single drive machine. Complete kit with full instructions ..... £51.06+VAT
PC1512 RAM upgrade to 640k with full instructions ..... £25.49+VAT

NETWORK PRODUCTS

Reliability is the key to network installations – you cannot afford to make compromises. Kingston offer top quality branded products at an affordable price.

Kingston TECHNOLOGY CORPORATION

Novell compatible 16-bit network card.

Fully Novell authorised and tested.

- 10BaseT and 10Base2 I/O ports
- Faster than and compatible with NE2000 cards
- NETBIOS compatible
- 10Mbps

Novell Labs Tested & Approved

£45.00 +VAT

Kingston card with Novell Netware Lite...£65.00+VAT

Network hubs.

9 port stackable hub...£169.00+VAT

16 port hub.....£299.00+VAT

Pocket LAN adaptor

Pocket LAN adaptor (connects to parallel port) 10Base2 & 10BaseT ....£110.00+VAT

We are NOVELL Authorised Resellers Please contact us regarding your specific networking requirements.

Novell Authorised Reseller

Cabling.

BNC connectors:	'T' Connector	£3.20+VAT
	Through Connector	£1.80+VAT
	Cable plug	£1.75+VAT
Ethernet Cable:	Loose, per metre	£0.75+VAT
	5m length with BNC plugs at each end	£8.50+VAT
	10m length with BNC plugs at each end	£14.00+VAT
	20m length with BNC plugs at each end	£20.00+VAT

PACE FAX/MODEMS

APPROVED for connection to telecommunication systems specified in the instructions for use subject to the conditions set out in them.

PACE Authorised Dealer

MICROLIN fax modems

Personal Computer World Editor's Choice

V22bis units (2400 bps Modem. 9600bps FAX)

MICROLIN *fx* portable external unit.....£97+VAT

MICROLIN *fx* internal unit.....£85+VAT

MICROLIN NB 24 PCMCIA type II unit.....£135+VAT

Computer Shopper Recommended BEST BUY

V32bis units (14400 bps Modem and FAX)

MICROLIN *fx* 32Plus portable external unit.....£172+VAT

MICROLIN *fx* 32Plus internal unit.....£154+VAT

MICROLIN NB 32Plus PCMCIA type II unit.....£222+VAT

Personal Computer Reviewers Choice February 1993

MobiFax

The MobiFax personal fax modem is the affordable way to enhance your PC with communications ability. Send and receive faxes, and access online information services and the Internet. All you need is MobiFax, your PC, and a phone socket.

- Includes free registration and online time for the Compuserve information service and the Almac bulletin board system

MobiFax 24 package.....£79+VAT
V22bis (2400 bps) Modem. 9600bps FAX

MobiFax 144 package.....£119+VAT
V32bis (14400 bps) Modem. 14400bps FAX

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Made for us by Mitsumi, this is the 102-key keyboard used in our Vale Popular range of PCs. A very neat and attractive design, it is superb value for money.

£25.00+VAT

A top quality 102-key keyboard as used in our Vale Prestige, Premier and Platinum ranges of PCs. It features proper tactile keys and a sturdy metal base. This unit has consistently impressed reviewers: "...almost traditional in its weight and touch. A deeply desirable device." Computer Buyer, June 1994

ERGONOMIC KEYBOARD

£39.00+VAT

Take the strain out of typing. This specially designd keyboard allows your hands and wrists to work naturally for maximum comfort and maximum speed. Recommended by professional typists, and ideal for learners.

TRUEMOUSE £19.00+VAT

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NEW

Maximum comfort and optimum usability for all home PC users. With the Home Edition of Intellipoint Software

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MITSUMI MOUSE £9.99+VAT

A very stylish, comfortable and good quality mouse at a budget price. As used in our Vale Popular range of PCs.

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Competitive upgrade

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- MS Excel
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Top quality tape streamer available as either an internal or a stand alone unit. The stand alone version simply connects to the PC's parallel port, with a through port for printer operation.

- Internal unit and external 'parallel port' version available
- Industry standard QIC-80 recording format
- The only drive to read QIC tapes and Irwin tapes
- Internal unit includes DOS backup software
- Parallel port unit includes Central Point backup software (for DOS)
- 2 year warranty

PC today "A superb combination of tape drive and software." PC Today, December 1993 Iomega Tape250 Parallel Port Unit

RUNNER-UP HITS TAPE BACKUP SYSTEMS Evesham Micros Ltd Iomega Tape 250 Internal

250Mb Version

INTERNAL UNIT	PARALLEL PORT UNIT
£99.00+VAT	£199.00+VAT

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ALL SCANNERS ARE TWAIN COMPLIANT

True 256 GREYSCALE HANDY SCANNER with all the right features, including O.C.R. and extensive graphics editing facilities.

True 24-bit Colour Version

Providing powerful colour scanning tools, this package enables high quality colour images to be generated for use in professional graphics presentations.

- Genuine 256 greyscale performance (not interpolated from 32 greyscales) giving photo-realistic quality monochrome scans, with actual shades and shadows, at up to 400dpi
- Halftone and Line-art scanning at genuine 800dpi resolution
- Full 105mm wide scanning head
- Eight selectable scanning resolutions between 100 and 800dpi
- Variable brightness control
- Built-in scan speed indicator
- Includes "iPhoto Plus" top professional *Windows* based image scanning and photograph re-touching software, and "Perceive Personal" OCR software

Requires '386 CPU or above with Colour Monitor, at least 4Mb RAM, Windows 3.1 or higher, Hard Drive and Mouse.

WHAT PC? BEST BUY

"Superb quality results time after time. The ease of use is commendable and the bundled software offers brilliant value for money... We therefore recommend the Mustek without hesitation."
What PC?, August 1993

with internal interface card **£59.00+VAT**

or with 'parallel port' interface (see bottom left) **£125.00+VAT**

COLOUR SCANNER FEATURES:

- *Colour* mode gives genuine 16 million colour, 400dpi hardware scanning (not software interpolated)
- *Greyscale* mode with true 256 greyscales at up to 400dpi
- *Halftone* and *Line-art* modes at up to 400dpi

Scanners from Mustek

PACKAGE INCLUDES:

- HAND-HELD COLOUR SCANNER & INTERFACE CARD
- 'iPhoto Plus' top professional *Windows* based Image Scanning and Photograph re-touching software
- 'PERCEIVE PERSONAL' powerful OCR *Windows* software, giving simple, efficient operation with highly effective results

Requires '386 or higher, Windows 3.1 or higher, at least 4Mb RAM, Mouse, Hard Drive and 256 colour SVGA graphics or higher,

Personal Computer World "...I have found the quality of photographic and line-art scans to be good, and with Picture Publisher thrown in, this is extremely good value for money."
Personal Computer World, September 1994

£129.00+VAT
Clearly excellent value !

Produced by the 24-bit hand scanner at 300dpi.

TRY BEFORE YOU BUY

SCAN SERVICE

To help with your choice of scanner we have prepared a sample disk pack for each of the three units featured on this page.

Each sample pack contains several images (including the Car and Child) scanned in various modes to provide an exact representation of each unit's capabilities – before you buy.

A fact sheet is also included containing loading instructions, scanning info., and printed originals produced by the scanner of your choice for comparison.

Please state which scanner you are interested in (greyscale, colour or flatbed). Supplied on 3½" disks.

Cost Per Pack
£5.00+VAT
Including delivery – refundable on purchase of a scanner.

External SCANNER INTERFACE

Connect your scanner to your printer port!

This compact In-line interface box does away with the need to install an expansion card for your scanner by simply plugging into the *Parallel* port. It is ideal for anyone who wants to transfer their scanner quickly between computers, as well as notebook owners and those who have simply run out of expansion ports. Compatible with the Mustek Black & White, Greyscale, & 24-bit Colour hand-held scanners.

only **£69.00+VAT**

FLATBED A4 COLOUR SCANNERS

- 600dpi unit, giving 1200dpi via interpolation, or:
- Very fast 800dpi *single-pass* unit, giving 1600dpi via interpolation
- Line art, 8-bit grey and 24-bit colour modes
- 12 built-in halftoning patterns
- 216mm x 356mm scan area
- SCSI expansion card interface supplied
- Both units include powerful OCR software and 'iPhoto Plus' Image Scanning and Photograph re-touching software

new fast single pass model

600/1200dpi	£299.00 +VAT
single pass 800/1600dpi	£499.00 +VAT
Transparency adaptor	£299+VAT
Sheet feeder	£299+VAT

"Excellent value for money. The works for only £700." PERSONAL COMPUTER December 1993

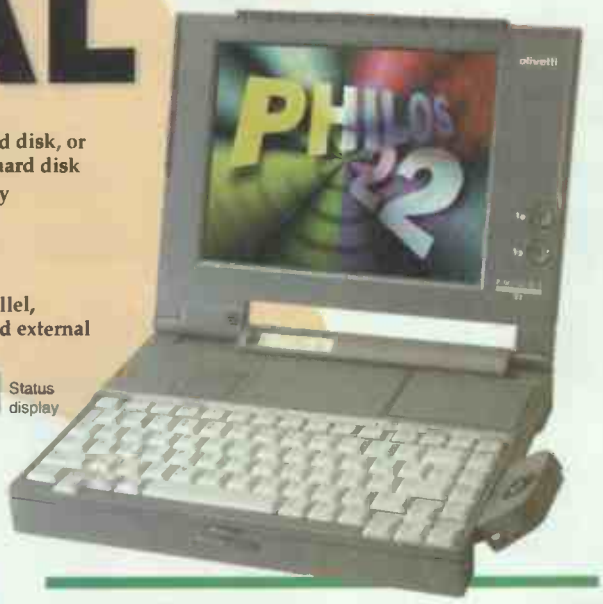
Personal Computer World April 1993 "The MFS6000C is a quality piece of hardware... Superb results."

"The Mustek MFS-1200CX provides a good set of features at the lowest price in the test group. ...if you need an inexpensive high-resolution scanner, then the Mustek MFS-1200CX should be on your shortlist." PC MAGAZINE October 1994

Requirements: 386 or higher, Windows 3.1 or higher, Mouse, Hard Drive and 256 colour SVGA graphics or higher. 600dpi unit needs at least 4Mb RAM, 1200dpi unit needs at least 8Mb RAM.

IT'S A STEAL

AN OLIVETTI '486 FOR £599 ?



- Intel 25MHz 486SL processor
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- 10" mono or 9.4" colour VGA display
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- 3.5" 1.44Mb floppy disk drive
- Expansion ports include serial, parallel, external PS2 keyboard or mouse, and external VGA monitor (via adaptor cable)
- Comprehensive Status display

Status display

- Weight: Mono 4.4lbs / Colour 5.5lbs
- Dimensions: 279 x 216 x 44mm (mono) or 49mm (colour)
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Carrying case .....£30.00+VAT
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Side view

Go on Twist our arm!

mono £599.00 +VAT

colour £899.00 +VAT

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Personal Computer Products

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Epson LX300	£100.00+VAT
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TI microWriter PS65	£699.00+VAT
TI microLaser Pro600 PS23	£999.00+VAT
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Cut Sheet feeders are available for most printers. Please call for price / availability

This product can seriously SAVE you money...

INK REFILLS

For HP DeskJet/500/ Plus/DeskWriter printers

The best and easiest to use inkjet refills we have found. Comprehensive and simple to follow instructions are supplied. Each pack will refill a standard cartridge four times, or a long life cartridge twice.

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Categories: 1. As new
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2. - £399+VAT 3. - £349+VAT

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NEC P6+ 24-pin	£139.00+VAT
Citizen Projet 24-pin	£139.00+VAT
Epson LQ860, Pro quality 24-pin	£269.00+VAT
Cut Sheet Feeder for Star FR10 /XB24-10/XB24-200	£19.00+VAT

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Citizen Projet	£119.00+VAT
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Olivetti JP150	£99.00+VAT
Olivetti JP350S	£139.00+VAT
Epson Stylus 800	£169.00+VAT

LASER

TI microWriter	£199.00+VAT
TI microWriter (new)	£219.00+VAT
TI microWriter PS23 (PostScript)	£369.00+VAT
TI microWriter PS65 (PostScript) -new	£569.00+VAT

OTHERS

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Triumph Adler notebook, 486sx25, 120Mb HD, mono screen	£649.00+VAT
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250Mb tape streamer (external)	£199.00+VAT
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Colour handscanner	£89.00+VAT
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Pace linnet 32 (internal) (new) high specification V32 modem (9600bps)	£129.00+VAT
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More clearance bargains are held at our other branches – please call them if you do not see what you require.

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OR any other software user. **£169.95**

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PerfectOffice 3.0 integrates software like no other suite available today. A new PerfectFit™ technology takes you beyond common look-and-feel integration to a suite that offers complete inter-connection between programs. With a common user interface, all your programs share consistent toolbars, pull-down menus and key dialogue boxes. Each program looks and feels alike - making it easy for you to master each application quickly and with the minimum of fuss.

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What You Mean Is What You Get

Perfect Office features new PerfectSense™; a number of intelligent word and grammar correction features far superior to anything currently available in other suites. The intelligent find and replace feature actually understands the meaning of words and their different forms. For example you can search for all forms of 'go' (go, goes, went, gone, going) and replace them with corresponding forms of 'fly' (fly, flies, flew, flown, flying) automatically!

PerfectSense will also help you write better English by automatically rewriting entire sentences for your consideration, correcting both spelling and grammatical errors. Complete sentences can be corrected in just one click of a button - proof reading your business letters just got a whole lot easier!

Perfect Office Professional

Perfect Office is now also available with Paradox Version 5, the powerful database that it easy to use and includes its own programming language, and Visual App Builder 1, a fifth generation visual programming tool.

Perfect Office Pro Upgrade CD.....**£199**
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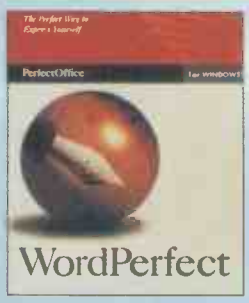

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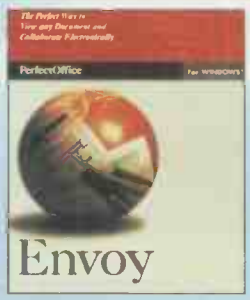

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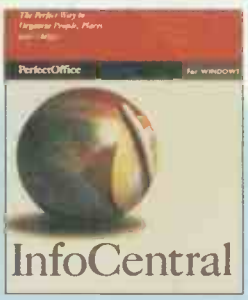

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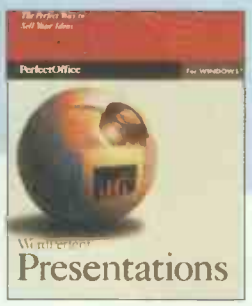

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NOVELL

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Call us with your order before 3pm and we will deliver it the following day.

We offer a next-day delivery service on ALL our stock items. Whether you are ordering for yourself or a company and whether you want delivery to a private or commercial address we can offer you next-day delivery for just £6.95 per order.

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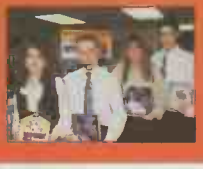

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EPS007 Epsilon Accounts **£359**
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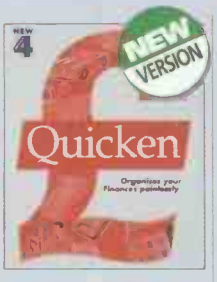
Quicken 4.0 for Windows

Quicken is the fastest, easiest way to organise all your personal and small business finances.



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Quickbooks 3.0 now includes full stock control - it's the no-hassle accounting package.

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QUI016 QuickBooks 3.0. (WIN) **£95.95**

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PEG001 Pegasus Solo (DOS) **£67.20**

Pegasus Solo Payroll

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THR003 3D Designer ... **£88.95**

Get both for £109!

Floorplan Plus 3D

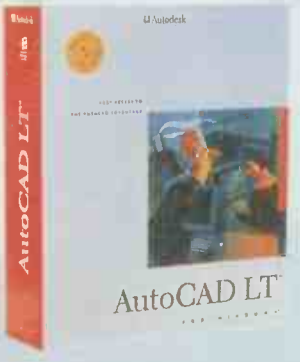
Now you can design and plan your home , office or garden quickly and easily.

Everything you need is here: large libraries of furniture, fixtures, fittings, landscaping and so on, definable wall types that break when windows and doors are Inserted, floor coverings, wiring, plumbing - the lot. You can even produce a bill of materials list which can be exported in 'Estimator Plus' for a detailed costing. With this 3D version, you can now see your design in 3D, walking around in 'virtual reality' style!

THR002 FloorPlan Plus 3D **£63.90**

AutoCAD LT for Windows

Ideal for architects, engineers, designers and contractors.



AutoCAD LT for Windows is the ideal CAD software for those architects, engineers, designers and contractors who don't need the power and sophistication of AutoCAD. Extensive 2D drawings and editing features and the familiar Windows interface offer a great value alternative.
You can extrude 2D drawings into 3D, perform shade and hide operations, and edit 3D drawing from AutoCAD. All drawings can then be used in AutoCAD.

AUT025 AutoCAD LT **£368**

AutoSketch 2 for Windows

AutoSketch for Windows combines CAD precision, drawing flexibility and Windows simplicity in one value-packed program.

Produce concept sketches, technical diagrams, architectural layouts, electrical drawings, patterns, illustrations, presentations, and information graphics. Freehand curve tools and line options give you the versatility to meet any need.

Easy view features let you choose drawings, symbols and fonts with simple icons, allowing you to create professional illustrations quickly. Other features include: over 600 symbols, TrueType fonts support, DWG Write 4 upward compatibility with AutoCAD and DFX import/export.

AutoSketch Libraries

AutoDesk have introduced two specific libraries for AutoSketch for Windows to aid designers, architects and electrical engineers to produce high quality drawings and diagrams as quickly and accurately as possible. Both libraries contain industry standard drawings and symbols.

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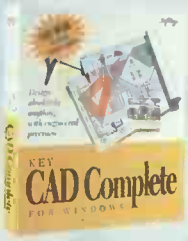
DRA004 Drafix CAD **£49**

KeyCAD for Windows

High performance CAD at your fingertips.



You can produce drawings, plans and layouts to perfect scale and accuracy.

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TUR018 TurboCAD V2..... **£55.95**

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The best-selling fax software.

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WIN039 WinFax Pro **£52.95**

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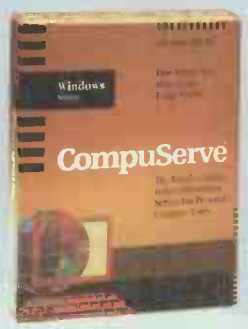

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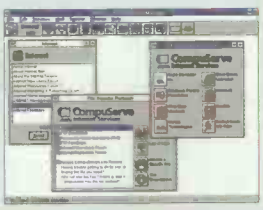

COM003 CompuServe Starter Pack **£14.99**

ReachOut Remote Control Pro Edition

In recent head-to-head reviews ReachOut has become the No.1 remote access software.

Modem Version

A communications software program that allows one PC to control another PC. Via a modem with ReachOut, you can use your keyboard and mouse to operate the distant PC, whether that it's a few miles away or 3000 miles away. With ReachOut, you can do anything that you could do seated in front of the distant PC.

With ReachOut Remote Control you can support users running Windows or DOS applications and eliminate the time and expense of on-site service calls, you can even conduct product demonstrations remotely. You can access and operate your desktop PC from home or while travelling - edit word processing documents and spreadsheets, search through databases, or even send and reply to e-mail.

With ReachOut you can dial into network workstations and use LAN resources, or use ReachOut Network for accessing other workstations on the LAN gateway. ReachOut's built-in terminal emulator lets you dial into on-line services such as CompuServe, America Online and any popular BBS. With ReachOut's file transfer commands, you can simply drag-and-drop files from any source, and you're even protected from virus infected files by this advanced software.

REA002 ReachOut Remote Control Pro Modem Version **£88.95**

Network Version

This Network Version allows one PC on a LAN to control and view another PC on the LAN. First, you connect to another PC on the network using ReachOut, then use your keyboard and mouse to operate the distant PC., whether that PC is across the hall, downstairs, or in another part of the organisation.

You can give support to any other user running DOS or Windows on the network. View and edit their Windows and System files, or diagnose workstation problems. No more time-consuming journeys to other offices! You can use ReachOut's built-in gateway to provide worldwide access to your LAN, providing a cost-effective modem sharing option.

With ReachOut Remote Control you can work on the same project as another LAN user, share data or monitor the progress of another user. ReachOut has a full set of file transfer commands, while retaining drag-and-drop ease of use, and you can quickly copy and distribute software around your network.

REA005 ReachOut Remote Control 4-User LAN **£133.85**

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The easy way to the Internet.

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EZI001 EZ Internet for Win **£29.99**

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NOR024	WIN	Norton PC Anywhere Remote v2	£59
NOR026	DOS	Norton PC Anywhere v5	£94
PCA001	DOS	Norton PC Anywhere v5 Remote	£89
PRO004	DOS	Procomm Plus EC v2.10	£54
PRO015	DOS	Procomm Plus 5-User LAN	£269
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REA003	WIN	ReachOut Host	£69
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DATABASES

FileMaker Pro

The complete database that includes six ready-to-run applications

FileMaker Pro is established as one of the easiest-to-use relational Windows databases. In this new version, Claris have added many hot new features and six full-blown pre-designed applications for you to use or modify in just about any database application.
Order before June 30th and get a FREE Claris T-shirt and a 100 template CD on registering your copy.

CLA002 FileMaker Pro **£86.90**

Alpha 5

Alpha 5 is a fully-featured Windows database.

Alpha 5 goes much further than other Windows databases because it comes with common database functions already pre-built! With Alpha 5 you can create powerful database applications without the need for any programming or take advantage of XBasic™, Alpha 5's proprietary database language. Create forms, reports, mail labels and even stunning WYSIWYG letters with the ease of Drag & Drop.

ALP004 Alpha 5 for Win **£69.85**

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DBA007	WIN	DBase IV v5 for Windows CU	£89
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MIC148	WIN	MS Access v2	£222
MIC144	WIN	MS Access v2 MLP	£199
MIC174	WIN	MS Access v2 CCP Upgrade	£85
PAR010	DOS	Paradox 4.5	£333
PAR019	WIN	Paradox	£129
PAR007	WIN	Paradox Engine	£99
PAR014	DOS	Paradox Runtime	£139
Q&A002	WIN	Q & A by Symantec	£129
Q&A004	WIN	Q & A by Symantec 3-User	£239
Q&A001	DOS	Q & A by Symantec	£174

DEVELOPMENT & LANGUAGES

BOR017	CD	Borland C++ v4.5 C/U	£129
BOR014	CD	Borland C++ v4.5 U/G	£95
BOR101	CD	C++ v4.5 + Database. Tools C/U	£199
BOR099	CD	C++ v4.5 + Database. Tools V/U	£159
DEL006	WIN	Borland Delphi	£158
DEL007	WIN	Borland Delphi Client/Server	£749
TUR013	WIN	Borland Turbo C++ Visual Ed. v3.1	£65
TUR005	DOS	Borland Turbo C++ v3	£48
TUR003	WIN	Borland Turbo Pascal v1.5	£78
TUR008	DOS	Borland Turbo Pascal v7	£68
MIC146	DOS	MS Macro Assembler v6.11	£89
COB001	DOS	MS Cobol PDS v5	£389
VIS002	WIN	MS Visual Basic v3 Std.	£78
VIS004	WIN	MS Visual Basic v3 Prof.	£193
MIC071	DOS	MS Visual Basic v1 Std.	£79
VIS003	DOS	MS Visual Basic v1 Prof.	£196
VIS009	WIN	MS Visual C++ Std.	£57
MIC222	CD	MS Visual C++ Prof v2 NEW!	£259
VIS031	WIN	MS Visual C++ 32-Bit	£259
PAR019	WIN	Paradox	£129
PAR007	WIN	Paradox Engine	£99
PAR014	DOS	Paradox Runtime	£139
SYM004	WIN	Symantec C++ Std.	£79
SYM005	WIN	Symantec C++ Prof.	£212

DESKTOP PUBLISHING

PagePlus 3.0

The World's Best Value in Windows Desktop Publishing!

If you are looking for a really powerful Desktop Publisher look no further. PagePlus 3.0 has won hundreds of international awards and accolades for its high functionality, low price and ease of use. It has all the features of DTP packages costing over ten times the price.

Right out of the box you'll be designing and producing professional, graphics-packed newsletters, ads, catalogues, brochures, greeting cards and a thousand other designer publications. Print in colour or black and white to ANY Windows printer or get hi-res colour separations, ready for commercial printing.

WITH PAGEPLUS 3.0 YOU CAN:

- Create impressive flyers, newsletters, reports, invitations, business stationery and more
- Get started in minutes
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- Layout publications quickly and easily
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PAG019 PagePlus 3.0..... **£52.95**

LIMITED OFFER - Get PagePlus 3.0 and a Logitech scanner for ONLY £99

THE PUBLISHING SUITE INCLUDES

TablePlus - create tables, spreadsheets and equations
TypePlus - create special text effects
PhotoPlus - is Serif's award-winning imaging software
DrawPlus - allows you to create vector drawings

PAG027	WIN	PagePlus Suite CD	£79
PAG021	WIN	PagePlus 3.0 Suite	£79
PAG024	WIN	PagePlus Type Plus v3	£29
PAG026	WIN	PagePlus Art Pack v2	£29
PAG023	WIN	PagePlus Photo Plus	£29
PAG013	WIN	PagePlus 10-User Pack	£199

Serif Monster CD

Monster-sized DTP starter kit on CD!

The Serif Monster CD includes PagePlus Intro DTP, DrawPlus Intro, 1000 Colour Clip Art images, 100 TrueType fonts. In fact, everything you need to get started in DTP!

PAG029 Serif Monster CD..... **£12.99**

Corel Ventura Version 5

Power publishing for Windows.

Corel Ventura 5 extends the boundaries of DTP with an intuitive new interface and powerful architecture that supports both structured and free-form documents.
Included are over 650 fonts, 17,000 clip-art images, 100 photos and 75 style sheets and templates.

COR044 Corel Ventura CD..... **£59.85**

ALD002	WIN	Aldus Persuasion	£189
PAG003	WIN	Aldus PageMaker v5	£429
PAG018	WIN	Aldus PageMaker Classic	£58
COR009	WIN	Corel Ventura v4.2	£115
COR044	WIN	Corel Ventura v5 Comp. Upgrade CD	£60
COR045	WIN	Corel Ventura v5 Comp. Upgrade	£115
DES006	WIN	GST DeskPress	£189
PRE001	WIN	GST PressWorks	£65
GST001	WIN	GST Publishing Partners	£79
MIC073	WIN	MS Publisher v2	£62
MIC159	WIN	MS Publisher MLP	£57
MIC147	WIN	MS Publisher 20-MLP	£699
PFS005	WIN	PFS Publisher v2	£29
QUA014	WIN	Quark XPress v3.3	£565
TIM005	DOS	TimeWorks Lite	£27

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Language Assistant

The most powerful Windows software for translating English to and from French, German, Italian and Spanish.

Language assistant gives you fast, understandable translations to or from English. It is the proven way to translate documents, and you get a full suite of powerful reference tools to help you write or study a foreign language - French, German, Italian or Spanish.
Language Assistant is so easy you'll be translating documents as soon as you open the box. It's easy to install, easy to use and it can be easily customised to your particular needs. Language Assistant uses rule-based, expert system technology to help you produce understandable translations. It will translate entire documents with a single keystroke or you can use it interactively to achieve even greater levels of accuracy.
When translating documents you can even preserve a variety of file formats, including WordPerfect, Word for Windows, AmiPro, Microsoft Write, RTF and text files.
Alternatively, you can create and edit documents in Language Assistant's integrated text editor. You can also access grammar help on a wide variety of topics, complete conjugations for over 3,000 verbs, and on-line bilingual dictionaries that provide instant translations of English or foreign words.

Each language..... **£48.95**

GLO019	DOS	Globalink Chinese	£99
GLO013	WIN	Globalink Pro French	£289
GLO014	WIN	Globalink Pro German	£289
GLO012	DOS	Globalink Pro Russian	£249
LAN001	WIN	Langauge Assistant French	£49
LAN003	WIN	Langauge Assistant German	£49
LAN004	WIN	Langauge Assistant Italian	£49
LAN002	WIN	Langauge Assistant Spanish	£49

FOREIGN TUITION

EZ Language

A simple vocabulary and pronunciation tutor in Spanish, French, German, Italian, Russian and Japanese.

This CD is the fun and easy vocabulary and pronunciation tutor. In just minutes, you'll be learning new words and phrases in six foreign languages. See pictures with the words and listen to native speakers' voices. It's like having your own personal language instructor available at your command. This full multimedia approach makes learning fun, fast and it's perfect for travellers, students and anyone else who wants to communicate in a new language.

Words and phrases appear in both English and the foreign language to help you learn quickly. You can even search for a specific word to find its translation. If you have a sound card you'll be able to hear a foreign speaker pronounce the words properly and if you have a microphone, you will even be able to record your own voice to monitor your improvements.

EZL001 EZ Language..... **£33.95**

EZ Language was recently featured on BBC TV technology program and received glowing reviews.

The following product examples are available in various European languages and Japanese - call for details

LEA008	WIN	Learn to Speak Spanish v5	£89
LEA005	CD	Learn to Speak Spanish v3	£49
THI001	CD	Think & Talk German	£89
EZL002	WIN	EZ Language French	£29
LIN016	WIN	Lingua Welsh A-Level	£19
LIN009	WIN	Lingua Welsh GCSE Level	£19
LIN006	WIN	Lingua Italian GCSE Level	£19
LIN002	WIN	Lingua Match European	£19

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FORMS SOFTWARE

Formtool Gold for Windows 2.0

The easiest way to create, fill and print all the forms your business needs.

Formtool Gold is the easiest way to create, fill and print all the forms you need to run a successful business. Its powerful design and editing features allow you to create professional looking forms in minutes, not hours. You can insert headings, lines, check boxes and pictures with the click of a button. easily enter calculations, automatically generate databases and fill all your forms on screen.

FormTool will generate reports to help you keep track of your business information. Pressed for time? Just modify one of the pre-designed form templates which come free with FormTool. You will improve your business image, Increase your productivity and save money!

FOR018 FormTool Gold Win **£49.95**

Toplevel Forms

Powerful forms design and filling with contact database.

Keep accurate records and save time by "auto-filling" your forms from the built-in, 4 billion record contact database. It lets you reduce form-filling errors by using standard phrases, autoincrement numbers, pull down choice lists, comb entry fields and enhanced maths. Whether you're in accounts, personnel, sales, servicing or 855750, TopLevel Forms can help!

TOP003 Toplevel Forms **£68.95**

Toplevel Fastforms

Make your business look bigger!

ONLY £24.99

Get started fast with 50 professionally designed forms, or use boxes, shading, text and imported graphics to make your own, great-looking forms. Then simply fill-in and print them as you need, saving time and money. This British-developed package has sold 200,000 copies in America.

TOP004 Toplevel Forms **£24.99**

Delrina Perform for Windows

Professional forms in just seconds.

Perform for Windows takes all the guesswork out of designing forms with the DelrinaExpert™, a comprehensive help tool that designs forms to your specifications automatically.

Perform helps you to produce forms by answering a few simple questions from the DelrinaExpert, selecting from dozens of predesigned form templates, and it even lets you customise the predesigned forms with drag-and-drop simplicity or design your own forms from scratch.

PER021 Delrina Perform **£44.95**

GRAPHICS

Simply 3D

ONLY £29 WHEN YOU BUY COREL DRAW

A complete set of multimedia 3D graphic tools - let your imagination go wild with this powerful new package from Visual Software

This simple to use 3D graphics package enhances Corel Draw and other 2D draw and paint applications, quickly add 3D effects to your 2D work. It's all you'll ever need to create stunning presentations and amazing graphics. Comes with 70 seamless textures, over 100 3D objects, 3 animation players and a comprehensive step-by-step tutorial.

SIM008 Simply 3D 1.0 ..... **£59.50**

Corel Draw!

COREL DRAW 3 £49.99

CorelDRAW offers ease-of-use, incredible value and outstanding features

CorelDRAW 3: The perfect entry-level graphics package Inc. Corel PhotoPaint, Corel Chart, Corel Show, Corel Trace. 250 fonts and 14,000 clipart images.

CorelDRAW 4: All the above with the addition of new Corel Move (for animation) and OCR. Also 750 fonts and 18,000 clipart. CorelDRAW 5: All the above plus a fully integrated copy of the DTP package Corel Ventura 5. 825 fonts and 22,000 clipart.

COR038 Corel Draw 3 CD..... **£49.99**

J.I.T. Corel Training

NEW PRODUCT

An exciting new approach to learning CorelDraw!

All of JIT's products are designed to run in a parallel window to CorelDraw or Corel PhotoPaint. In that way the learner is able to work right along with the instructions, using either the graphics provided on the CD, or directly within their own application. A complete set of 'VCR-type' controls to pause, repeat and skip forward or backward within the relevant training make this the easiest way to learn Corel Draw.

JIT CorelDraw 3,4 or 5..... **£29.95**

Graphics: Labels & Forms

CAL002	WIN	Calendar Creator	£29
LAB001	DOS	Labels Unlimited	£29
FOR004	DOS	Form Tool Gold	£29
PER003	WIN	Form Flow Designer	£119
PER004	WIN	Form Flow Filler	£75
PER005	WIN	Form Flow Filler 10Pk	£499
HAR016	WIN	Harvard Chart XL	£89

Graphics: Design

FIR004	WIN	1st Design	£29
ADO008	WIN	Adobe Illustrator	£389
ALD004	WIN	Aldus Freehand	£190
ALD003	WIN	Aldus IntelliDraw	£99
ANI001	WIN	Animation Works	£88
ART001	WIN	Arts & Letters Apprentice	£49
COR002	WIN	CorelDraw 3	£87
COR038	CD	CorelDraw 3	£49
COR003	WIN	CorelDraw 4	£119
COR012	CD	CorelDraw 4	£109
COR018	WIN	CorelDraw 5	£399
COR030	CD	CorelDraw 5	£349
COR019	WIN	CorelDraw 3 to 5 Upgrade	£269
COR019	CD	CorelDraw 3 to 5 Upgrade	£229
COR032	WIN	CorelDraw 4 to 5 Upgrade	£159
COR033	CD	CorelDraw 4 to 5 Upgrade	£129
DES009	WIN	Designworks v2	£69

PhotoFinish V3

Produce and edit photographic quality images.

Scan, crop, straighten and enhance images all in one easy step. It also features automatic retouching filters (adjust brightness, contrast, hue and saturation, remove spots and moire patterns). Automatic effects let you emboss, detect edges, diffuse, twist, pixellate, crystallise, add motion blur, etc. Includes PhotoLibrary Vol. 1 and ImageViewer.

PHO001 PhotoFinish **£33.95**

Corel PhotoPaint 5

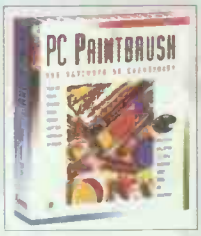
The best in photo-editing and bitmap creation

Corel PhotoPaint 5 Plus includes all the tools you will need to paint, edit and retouch your images. Features dynamic special effects, such as mesh, warp, swirl, pinch and 3D perspectives and the ability to import or scan photos. As with all Corel products it includes a whole host of goodies including: 1000 photographs, 10,000 clip art images, 100 TrueType and Type1 fonts, 50 image enhancement features, 300 seamless tiles, 50 custom brushes, 40 canvases and 40 artist brush styles.

COR054 Corel PhotoPaint 5 Plus CD..... **£59.60**

PC Paintbrush

The popular drawing and painting package that allows you to simulate natural painting techniques



PC Paintbrush is a fully featured drawing program that lets you export your artwork to most popular Windows programs. It also allows users to simulate natural painting techniques without being a professional artist, and lets users become instantly productive via its easy-to-use interface.

PAI002 PC Paintbrush..... **£26.95**

Designer Powerpack

Includes Picture Publisher 5.0 and Designer V4.1TE.

This powerful value-added pack includes 15,000 clip art, 300 stock photos and 250 fonts, as well as the best publishing and design packages on the market. Now MicroGrafix offer the ultimate package for graphics power! Combining the precision illustration capability of Designer with the "sky's the limit" image editing power of Picture Publisher, you can create anything you can imagine! Then you can enhance it to a level of realism that few graphics packages can match.

DES012 Designer Power Pack **£168.70**

Graphics: Clip Art & Fonts

125001	WIN	1250 Fonts on CD	£19
ART001	WIN	Arts and Letters Apprentice	£49
CLI008	WIN	Click Art Studio Animals & Nature	£14
CLI009	WIN	Click Art Studio Artistry & Borders	£14
CLI010	WIN	Click Art Studio Business Art	£14
CLI011	WIN	Click Art Studio Illustrations	£14
CLI012	WIN	Click Art Studio Sport & Games	£14
CLI018	WIN	Click Art Studio All 5 Titles	£39
CLI013	WIN	Click Art Cartoons Beastly Funnies	£14
CLI014	WIN	Click Art Cartoons Bulletins & Newsletters	£14
CLI015	WIN	Click Art Cartoons Company & Business	£14
CLI016	WIN	Click Art Cartoons Parties & Events	£14
CLI017	WIN	Click Art Cartoons On The Job	£14
HAR008	WIN	Harvard Clip Art Collection CD	£29
HAR009	WIN	Harvard Clip Art Cartoons	£19
HAR017	WIN	Harvard Clip Art Christmas	£10
HAR010	WIN	Harvard Clip Art Business	£19
LOT000	WIN	Lotus SmartPics for Freelance	£79
MAS001	WIN	MasterClips 3.5"	£119
MAS001	WIN	MasterClips CD	£49
MON003	WIN	50 PostScript MonoType Fonts	£14

Graphics: Images / Editing

ADO006	WIN	Adobe Photoshop	£469
COR011	CD	Corel ArtShow v3 CD & Book	£24
COR041	CD	Corel ArtShow v5 CD & Book	£24
COR035	CD	Corel Photos People	£19
COR022	CD	Corel Photos Food	£19
COR027	CD	Corel Photos Auto Racing	£19
COR029	CD	Corel Photos Wild Animals	£19
MIC023	WIN	Micrographix PhotoMagic	£69
MIT005	CD	Kodak Photo CD	£15
MOR004	WIN	Morph	£89

Graphics: Presentations

AST001	WIN	Astound	£85
ALP003	WIN	Alpha Bravo Presentations	£45
ASY001	WIN	Asymedia	£93
HAR013	WIN	Harvard Graphics v3 C/U	£129
HAR000	WIN	Harvard Presenters' Pack	£189
HAR012	WIN	Harvard Spotlight	£49
LOT034	WIN	Lotus Freelance U/G	£95
POW002	WIN	MS PowerPoint v4	£225
MIC155	WIN	MS PowerPoint MLP	£199
MIC156	WIN	MS PowerPoint U/G CCP	£90

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Astound V2

The number one multimedia presentation package.

Astound V2 lets you create dynamic overheads, slides, and more in minutes. Just choose from one of Astound's 70 pre-designed templates and then add text, graphics, sound, video and more.

AST002 Astound V2 ..... **£157.95**

Get 5 Top-Rated CDs for only £45

This amazing bundle includes PhotoFinish, KeyCAD, WordStar, PhotoLibrary, and ClipArt Library. Purchased individually, these SoftKey packages would cost over £125 from Software Warehouse.

SOF016 5 Top CDs..... **£44.95**

3D GRAPHICS SOFTWARE

Visual Reality

The complete set of professional tools for 3D graphics and multimedia

Visual Reality includes 'Renderize Live', an award-winning rendering and camera animation tool. Create three dimensional wire frame models in an easy and intuitive environment. Also includes 'Visual Image', a powerful object-based image editing and processing tool, over 500 3D clip art images and the ability to playback animations in FLI, FLC or AVI formats.

VIS037 Visual Reality..... **£239.50**

3D F/X

Create high quality professionally rendered 3D images and animations with Asymetrix 3D F/X

Build dynamic 3D scenes quickly with a catalogue of models, surfaces, animation paths and more! Create and modify scenes easily using Windows standard 'drag-and-drop'. With full Microsoft Office and OLE 2.0 compatibility you can embed 3D F/X graphics into existing Windows applications. Export via AVI, BMP and TGA file formats. Spin and fly logos and models in and out of scenes using pre-set or custom animation paths.

3DF001 3D F/X..... **£99.45**

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Only Software Warehouse could offer you so many great products for less than the price of one!

Includes MasterClips 3000 (3000 clips, RRP £79), Corel ArtShow 3 (1000s of images, RRP £39), KeyFonts Plus (1250 fonts, RRP £42) and SoftKey Photos (2100 photos, RRP £39). In promotional packaging.

BUN001 Image Bundle..... **£29.99**

Corel Gallery

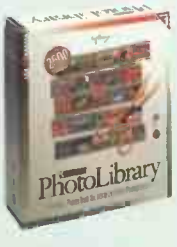
An easy-to-use, visual clipart manager, featuring 10,000 clipart images, on CD-ROM.

CorelGALLERY allows users to drag and drop images into any OLE-2-enabled application or export images to several industry-standard file formats. It includes over 10,000 professionally designed clipart images (including more than 6000 in colour), plus a full-colour reference guide.

COR017 CorelGallery..... **£26.95**
COR Corel Gallery v2 ..... **£46.95**

Photo Library

An outstanding double CD collection of 2500 images.



A wide range of photo images in both TIFF and BMP formats. All images are royalty free, 24-bit colour photos.
It also includes Power Library, a powerful picture organiser which builds up an album of all pictures, allowing the user to easily view and browse images before using them. It's an unbeatable resource for anyone who works with PhotoShop, PhotoFinish and CorelDraw.

PHO003 Photo Library..... **£28.95**

PC Clip Art Library

The ultimate colour clipart collection.

Introducing PC Paintbrush Clip Art Library - the ultimate collection of 12000 hand drawn colour clipart masterpieces. These stunning royalty-free images are ready-to-use in any Windows application. PowerAlbum is bundled absolutely free to help you organise and work with any existing clipart/images you may already have.

SOF018 ClipArt Library (Floppy Disk - 3003 images)..... **£14.99**
CLI007 ClipArt Library (CD - 12000 images) **£24.99**

GRAPHICS, CHARTING AND LABELS

CorelFLOW

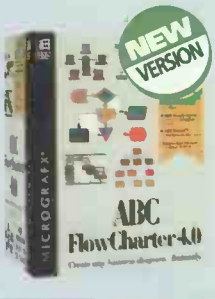
Create flowcharts, diagrams, schematics, charts & more.

CorelFLOW can create quick and powerful diagrams, flow charts, organisational charts, and even your own clipart with the ease of drag and drop. Choose symbols from over 90 pre-defined symbols libraries. Incredible value with over 2000 symbols, 1000 clip art, 1000 photos (on CD), 100 TrueType fonts. CorelFLOW has all the features you need!

COR034 Corel Flow **£47.10**

ABC FlowCharter V4

Crisp, clear and concise flow charts.



ABC FlowCharter enables you to see structures and processes in your company as they really are. It includes four modules that allow you to successfully plan and analyse ALL your business processes - from personnel organisation to complete Total Process Management.
FlowCharter generates process diagrams and flow charts to make existing structures and processes brilliantly clear. With ABC Data Analyser's extensive diagram and chart functions you can check their efficiency. You can then present this information with ABC's Snap Graphics or send them as a file to other Windows programs.

ABC002 ABC FlowCharter V4.....from **£98.95**

Labels Unlimited

The easiest way to label anything. Create great labels - any size, any style.

Whether you're creating labels for addresses, file folders, audio/visual, or inventory stickers, Labels Unlimited has the label format that you need. Choose from over 80 A4 size labels for Avery, TENZA, Stampiton and others. Alternatively, you can custom design any format of your own. With convenient thumbnail previews to help you to select the right label, no other program makes it easier.

LAB003 Labels Unlimited **£26.95**

Visio Version 3

If you can move a mouse, you can draw with Visio. Just drag and connect pre-drawn stencils - Visio does the rest.

Visio is the drag and drop drawing tool for people who can't draw. The 22 job-specific stencils and 750 SmartShapes™ that come with Visio allow you to create a multitude of diagram types, from flowcharts and organisation charts to electrical diagrams, maps and office floor plans.

In addition to the SmartShapes™ included in Visio, you can select one or more of 15 Add-On SmartShape products for your own particular diagramming tasks or projects. Visio SmartShapes™ are more than static clip art or symbol libraries, because they anticipate how you'll use them and then behave in a useful way. SmartShapes™ resize without distorting, connecting lines stay glued and reroute automatically, and text goes where it should in a format that makes sense. There are more than 3,000 shapes to choose from. Simply add the shapes you need, when you need them!

VIS033 Visio 3..... **£87.95**

Extra Visio Shapes & Ideas

Advanced Flowcharts **£39**
More than 260 shapes for flowcharting
Network Diagrams **£39**
Design and model detailed data networks
Electrical Engineering **£39**
Create electrical and electronic diagrams
Marketing **£39**
Illustrate business, sales and marketing concepts
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Produce data flows, processes & logic structures
Space Planning **£39**
240 shapes for planning office layouts
Chemistry **£39**
Draw complex chemical structures & functions
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Petroleum Engineering **£39**
Covers all phases of petroleum based activities
Insurance/Law **£39**
Graphics for insurance claims & legal briefs
Home Planning **£39**
Plan your dream home or your next remodel
Kids **£39**
A wealth of fun illustrations & shapes for kids
Landscape Planning **£39**
Landscape your garden & create planting charts
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A breakthrough in early learning!

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DOR002 First Incredible Dictionary CD **£29.99**

History of the World

Travel through 12 different time periods to uncover fascinating facts and stories.

Watch a medieval archer loading and firing his longbow, hear the passion in the actual spoken words of Martin Luther King, and share in the joy of German crowds as they tear down the Berlin Wall. The Eyewitness History of the World allows you to investigate historical stories, facts and artefacts from around the world with a simple mouse click.

DOR007 Eyewitness History of the World CD **£49.95**

Nature Encyclopedia

The fascinating stories behind over 250 species of plants and animals.

Watch the behaviour of animals in their natural habitat, hear bird calls and understand complex environmental systems as microscopic life, the effects of climate and the prehistoric world. Features over 50 stunning video sequences, 60 original animations, 700 photos and illustrations, and two hours of exclusive sound clips.

DOR009 Eyewitness Encyclopedia of Nature **£49.95**

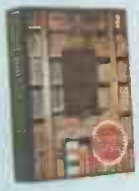
Eyewitness Science Encyclopedia

A highly interactive tour of the sciences for children aged 10 and up.

More than 1700 entries, 66 animations and 1000 screens and pop-ups are organised into 5 major categories: Chemistry, Maths, Physics, Life sciences and a who's who of science.

DOR005 Eyewitness Science Encyclopedia CD..... **£49.95**

Classic Library for Windows



Classic Library features bring you over 2000 unabridged texts on a fully interactive CD.

Browse through great literature from all ages and cultures, from the Code of the Hammurabi (1700BC) to President J.F. Kennedy's Inaugural speech.

Features a fully animated graphical user interface that is a stimulating way to approach these classics of world literature. There is a powerful search command which features five different types of search, plus biographies and an in-built word processor.

AND001 Classic Library **£24.95**

Complete Works of Shakespeare for Windows

A unique exploration of Shakespeare's world on interactive CD-ROM.

The Oxford Shakespeare on CD-ROM combines acclaimed scholarship with the latest in software and interactive technology. For the first time, through its powerful search facilities, connections and comparisons between and within plays are revealed and explained.

AND002 Compl. Shakespeare... **£24.95**

Interactive Space Encyclopedia for Windows

A powerful, interactive space reference on CD.

With 11 carefully structured themes with voiceovers by Patrick Moore, you can conduct your own space exploration. Topics include the Solar System, the US, Russian and European space programs, and the Apollo Project. Features over 150 3D full-screen animations, 2000 photographs, over 1000 text documents and a search facility that enables words, phrases, photographs and animations to be instantly retrieved.

AND003 Space Encyclopedia.. **£24.95**

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The most feature-packed lottery software available.

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A colourful 3D guide through the human body.

The human body is the ultimate machine, and now you can explore the body's systems, structures and functions in detail with BodyWorks 3.0.

With its vast database , BodyWorks lets you study specific areas from head to toe, down to the most elaborate cell level detail. State of the art animations bring the intricate functions of the body to life with 3D rotations of the body, video and much, much more.

BOD002 BodyWorks 3.0 CD..... **£31.95**

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The complete videotape editing system.

Everything you need is included! The SmartCable connects your 8mm camcorder, VCR and computer.

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VID038 Video Director 2..... **£83.90**

PFS Job Search

Successfully organise every step of your job search with PFS CV and Job Search

Start tackling those job interviews with confidence. Use this great Windows application to create impressive CVs and cover letters that stand out from the pack.

Includes 10 professional CV templates and 70 pre-set layouts. Also included is a full WYSIWYG word processor and 12 sample cover letters. A built-in database and mail-merge allows you to quickly distribute your professional CV.

PFS009 PFS Job Search..... **£29.45**

Family Tree Maker

Trace your family tree history.

Family Tree Maker is quick and easy to use. Just enter information about parents, children and marriages to create a great-looking family tree in just minutes. Record birth dates, occupation, medical history and any other information that you wish to print. You can save up to 15 pages per person and also automatically create ancestor, descendant and photo trees, or view your tree in any one of the many different styles.

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ART014 LANtastic OS/2 1-User £69

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WordScan Plus 3.0

Top Optical Character Recognition (OCR) software.

WordScan Plus 3.0 integrates with your favourite applications to give you unrivalled OCR power. It features excellent character recognition through its 32-bit neural network engine, plus, it's tuned to perform OCR quickly and accurately. For ease of use the Chameleon Toolbar integrates smoothly into leading Windows applications suites and OLE2 compliant apps. Plus there are four levels of help.

WOR124 WordScan Plus 3.0 ..... £390

OmniPage Prof. 5.0

Full-featured Windows OCR with great new features.

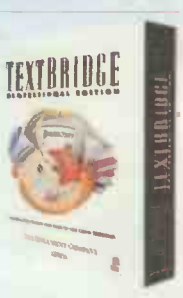
The market leader in OCR, Omnipage Professional 5.0 is a full-featured customisable OCR application for complete page recognition of text and graphics. It allows editing of both text and images, reproduces actual formats of complex documents, and trains OCR to recognize difficult-to-read special characters.

OMN002 OmniPage Prof. 5.0... £385

OMN002 OmniPage Direct £78

XEROX TextBridge

Windows-based OCR that redefines the industry standard.



Textbridge lets you convert paper documents to electronic files on your PC. You can then edit, store and distribute the text within Windows applications. It features the highest level of accuracy, and at a fraction of the cost of other OCR. Requires scanner.

TEX002 TextBridge £67.95

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OPERATING SYSTEMS

OS/2 Warp

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OS/2 comes with a Bonus Pack of full 32-Bit applications which collectively retail at over £1000. IBM Works, a mini-suite of 32-Bit applications including word processing, spreadsheet, charting, datafiling and report writing. IBM's Internet Connection Package, lets you seamlessly navigate through the Internet with easy-to-use graphical interfaces. IBM CompuServe Access software is also included. Fax Works, with this application you can fax documents from within your existing programs.

OS/2 Features:

- True multitasking
- Runs DOS, Windows & OS/2 programs
- More utilities than other O/S
- Drag and drop computing
- Advanced memory management
- Free Adobe Type Manager

OS2004 OS/2 Warp CD £48.75

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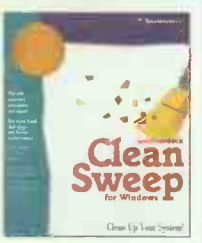
UTILITIES

CleanSweep

Removes all unwanted or redundant files!



Windows applications create many files - both small and large - that end up scattered throughout the hard drive. When it's time to uninstall applications, these files need to be located, verified and removed to free up valuable hard drive space.
CleanSweep actively seeks out, cleans up and clears out duplicate, obsolete or unused files.

CLE009 CleanSweep..... £31.75

Dr Solomon's Anti-Virus Toolkits

Combat viruses in DOS, OS/2 Windows and Netware.

Dr Solomon's range of Anti-Virus toolkits provide the best answer to the serious problem posed by viruses. Each toolkit is made up of four basic programs geared to locate, identify and destroy existing viruses and then protect your system.

FINDVIRUS - Detects and identifies viruses in files, partition code and boot sectors using an extensive database of virus recognition information - a technology that won S&S the Queen's Award for Technology in1993.

GENERIC DECRYPTION ENGINE - An amazing program that can actually detect those viruses that mutate, and avoid detection by looking different each time they infect a file.

VIRUS GUARD - This is the memory resident utility that is installed every time you restart your computer. It checks every program for viruses before it is opened or copied. A visual warning is displayed if there is any virus present.

SOL002 Toolkit Win & DOS 1/4'ly .. £71

SOL009 Toolkit Netware £299

WIN Checkit

Get the most out of your system with this 'All-in-one' Windows problem solver.

WIN Checkit's uninstall and Clean Up utilities make it easier and safer than ever to free up hard disk space. you can quickly restore critical system files and start up information should problems arrive. The Memory Tune Up consolidates Windows memory fragments to avoid having to restart Windows. Setup Advisor and Software Shopper simplify hardware and software installations, eliminating hours of frustration. You can also analyse and improve system performance as well as test hardware reliability, it is simply the best Windows utility package on the market.

Check out WINCheckit's sensational feature list!

- Uninstall unwanted applications
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- Resolve setup conflicts
- Free up Windows memory
- Analyse system performance
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WIN061 WIN Checkit..... £38.75

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LAP07 LapLink for Windows... **£88.42**

QEMM v7.5

The World's No.1 selling utility!

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QEM003 QEMM 7.5..... **£45.90**

First Aid

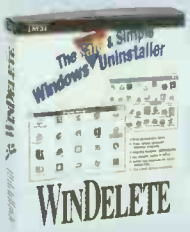
Don't spend time fixing Windows problems - let FIRST AID fix them for you!

First Aid is like having a technical support team inside your computer. It is the first software package that will actually fix technical problems for you. It not only tells you what has caused the problem but features an 'Auto fix' button to get your system running again. it has built-in support for multimedia, networks and Windows. There's a free hypertext user guide included too!

FIR006 FirstAid..... **£28.95**

WinDelete

Uninstalls Windows applications safely and easily.



If you're running out of hard disk space your computer's performance is likely to be suffering too. WinDelete is simply the best way to install and uninstall any Windows-based application, freeing up hard disk space and improving Windows' speed and efficiency. With colour coding of files, only those that you really want to be deleted are removed. When removing applications, WinDelete also tidies up the WIN.INI. file.

WIN050 WinDelete..... **£29.95**

SpellWrite

Spell-check any Windows application with SpellWrite

Once installed, this clever utility works in the background of Windows and is accessed by highlighting a piece of text and then pressing a hot key. If your highlighted text contains a word that doesn't match any in the supplied English 85,000-word dictionary, up pops a dialog box. Here you can perform all the usual activities you'd expect from a good spell-checker. SpellWrite also adds a unique toolbar to the Write application that comes as part of Windows, giving access to common functions.

SPE005 SpellWrite..... **£18.50**

Bubble Help for Windows

Helps the novice fly through Windows!

What could be easier, simply point at the area that you don't understand and press your right or middle mouse button for a Help bubble to appear. Learn Windows as you use it, no more frustrating manuals or evening watching training videos. Bubble Help explains Windows from the basics up to the finer points - that means that you don't have to stop working to pick up the manual.

BUB001 Bubble Help for Windows..... **£18.50**

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Accent Special Edition

Over thirty languages supported. Spellcheck and Thesaurus in all 8 popular European languages. Word-for-word translation with Berlitz Interpreter. 79 Truetype fonts in 5 language groups: Western Europe, Eastern Europe, Cyrillic, Greek and Turkish.

ACC003 Accent Special Ed... **£99.99**

Accent Pro

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ACC004 Accent Pro Ed..... **£195.49**

Accent Express

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ACC002 Accent Express..... **£39.49**

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MIC014	WIN	MS Word v6 C/U	£138
MIC135	WIN	MS Word v6 CCP U/G	£89
Q&A003	WIN	Q&A Write	£49
STA007	DOS	StarWriter	£79
TOP002	WIN	TopLevel Fine Words	£25
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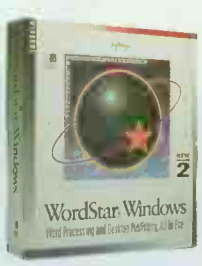

WordStar 2.0 has recently won more accolades in the computer press than any other word processor. It has been highly praised for its extensive feature set and incredible value for money. it includes English spell checker, grammar checker and thesaurus, in fact everything you would expect to find in a word processor costing ten times as much.

WOR077 WordStar 2.0..... **£27.99**

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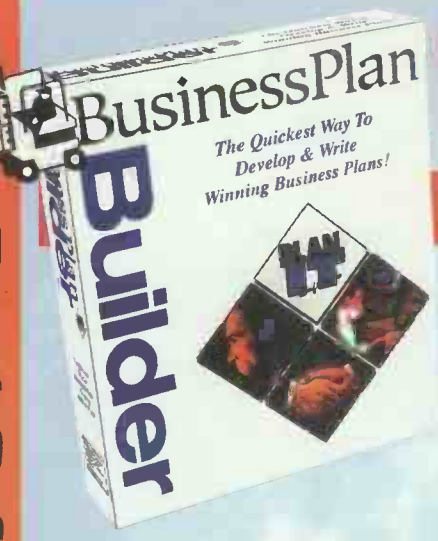

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- ☑ **3 Year projected financial forecasts.**

Writing business plans is a tedious and time consuming job at the best of times. BusinessPlan Builder has been designed to take users through the process of developing and writing effective business plans by providing the structure, automating repetitive tasks and providing all the information necessary to write a winning business plan.

Are you starting a business?

If you've had a great business idea, BusinessPlan Builder will help you to explore its feasibility and project your Cash Flows, Profit & Loss, Break-even analyses, and much more. It can help to shape your idea into a winning business plan and present it to financiers, banks or partners. PLUS it includes all the forms required by Companies House to incorporate a company - saving you up to £100!

SAVE up to £100 When incorporating a business.

BusinessPlan Builder

BusinessPlan Builder is an easy to use package that creates structured business plans for any size of company. It provides users with relevant questions and sample answers from which to create a business plan. It automatically formats it with headlines and subheads, even inserting your company details throughout. Simply answer the questions and fill in the blanks - Business Plan Builder does the rest!

You can preview your plan at any stage - BusinessPlan Builder files are compatible with practically all Windows Word Processor packages or you can print directly from within BusinessPlan Builder.

Market Analysis

BusinessPlan Builder helps you identify opportunities and threats to your business through an in-depth analysis of your company, products, competition and industry.

Sales and Marketing

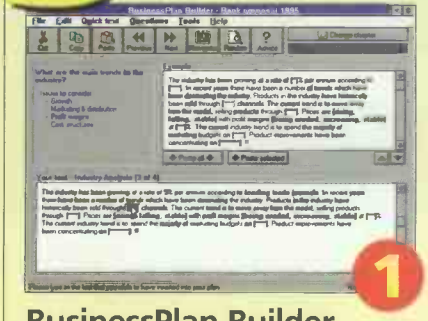
BusinessPlan Builder helps you to develop effective sales and marketing strategies and present them in a coherent manner, which both potential investors and employees will easily grasp. Business Plan Builder will provide the right marketing plan and information for you to cross check as your business starts to grow.

On-Line Information

Much valuable time is wasted collecting and collating information when developing and writing business plans. BusinessPlan Builder has done this work for you, providing information in a number of ways, namely:

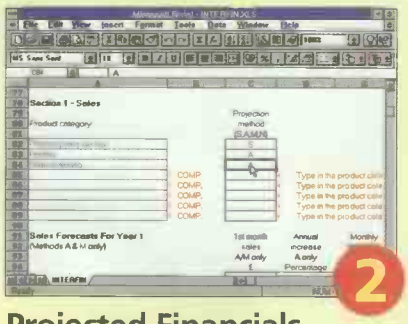
- On-Line Help & Advice
- Contact Database
- On-Line Business Forum

5 EASY STEPS TO PRODUCING EFFECTIVE BUSINESS PLANS



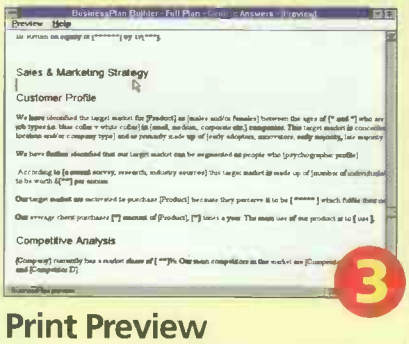
BusinessPlan Builder

Provides relevant questions and sample answers from which to create a business plan. Automatically formats your business plan with headlines, subheadings, and company details. Plus, QuickText allows you to insert recurring phrases, names and dates.



Projected Financials

Pre-structured financial templates are ready to use - simply type in your company income and expenditure details and BusinessPlan Builder will calculate totals, percentages and ratios, creating your projected financials for three years ahead.



Print Preview

View your plan at any time in Print Preview mode. Your plan is automatically formatted with all the headers and sub-headers in place. You can print directly from BusinessPlan Builder or use your favourite Word Processing package.

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Trying to grow your business?

If you own your own business, you'll have had plenty of ideas for expanding and diversifying your company. BusinessPlan Builder will enable you to find out how your ideas will do in a real-life context. You can test out the options available to you to help you decide which areas to expand into, plus you can prepare professional reports and charts to help you explain your idea to others in your business.
Also included are over 70 sources of funding to help you get the backing to expand your business.

Over 70 Sources of UK Funding

With over 70 sources and methods of gaining funding, BusinessPlan Builder is an invaluable source of information, advising you on how to effectively secure vital funds necessary for any successful business. Sources include venture capital, factoring, private financing, government and EC grants, and many more.

3 Year Business Plans Instantly!

BusinessPlan Builder financials include:

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- Ratios

BusinessPlan Builder removes the drudgery of creating financials from scratch, endlessly copying the same information between spreadsheets. BusinessPlan Builder features pre-structured financial templates ready for use, simply type in your company income and expenditure details and BusinessPlan Builder will automatically calculate totals, percentages and ratios, creating your projected financials for 3 years. Numbers flow from one financial statement to another and you can use your spreadsheet application to graph any item in your financials.

Reference Database

BusinessPlan Builder features an on-line database containing thousands of useful names and addresses - including MPs, ombudsmen, research institutes, trade and consumer associations, institutes and societies. These details can be copied and pasted into other packages.

Business Information Forum (BIF)

Users of BusinessPlan Builder are entitled to 90 days to free access to Plan-IT's on-line business forum, B.I.F., which contains extensive information on business subjects.

B.I.F. covers topics such as:

- Funding & Debt Collection
- Exporting
- Tax, Law & Accountancy
- Marketing Research & P.R.
- Direct Marketing & Advertising
- Employment & Health & Safety

Information provided on the B.I.F. is compiled by a panel of experts from a range of industries. Users will be kept abreast of current developments.

BusinessPlan Builder - 100% BRITISH business information.

You can be sure of BusinessPlan Builder's relevance to your business ideas because it is a 100% British development. All funding information is British and all the database information relates specifically to UK business needs. Over 2,500 names and addresses you need. Everything from the DTI, Health & Safety to MPs and Trade Unions!

What they say about BusinessPlan Builder

"This is an excellent example of business productivity software which will make the user's life easier as well as the intended recipient of the business plan, for example, bank managers like myself!"
Bank Manager, Small Business Loans Dept.

"I found this an intuitive package that lead me through the process of writing a business plan in an easy to follow step-by-step process!"
Graham Love, MD India Ocean Trading Co.

"This package will save me hours of time when developing business plans for my clients!"
Richard Wall, Management Consultant

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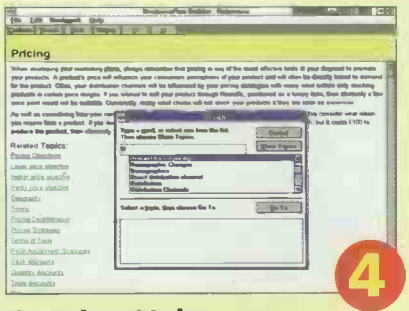
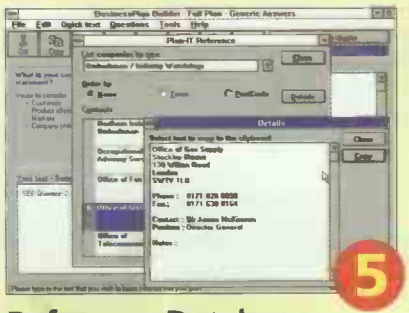


On-Line Help

Extensive on-line expert advice is available on the subject of writing business plans. Context-sensitive help ensures that all business reference information is available with a single mouse click, and comprehensive search options make it all easy.



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On-line database of thousands of useful names and addresses. Includes MPs, ombudsmen, research institutes, trade and consumer associations, institutes and societies, and health & safety organisations.
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LOTUS FEATURE

Lotus SmartSuite 3.1 - New release is now the best value suite available!

All five leading applications from Lotus are available individually (see features) or in this new release of Lotus SmartSuite Version 3.1.

SmartSuite 3.1 includes the Lotus 1-2-3 Release 5 spreadsheet, the Approach 3.0 database, the AmiPro 3.1 word processor, Lotus Organiser V2 and the Freelance Graphics presentation package. All are specifically designed to take advantage of Notes/FX 1.1, the Lotus facility for exchanging data bi-directionally between desktop applications and Lotus Notes.

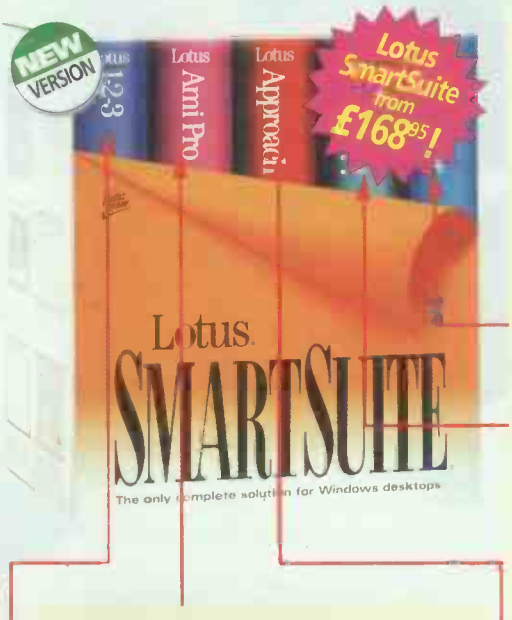
SmartSuite V3.1 now also includes Lotus' multimedia screen and sound-capture utility, ScreenCam 1.1. The SmartCenter Icon Palette is included and allows easy switching and drag-and-drop copying between applications.

SmartSuite V3 Version Upgrade (DISK or CD) If you own any Lotus product then you can buy the SmartSuite Upgrade pack.

LOT052 SmartSuite V3: Lotus User Upgrade **£168.95**

SmartSuite V3 Competitive Upgrade (DISK or CD) If you own ANY spreadsheet, word processor, database or graphics program, you qualify to buy the Lotus SmartSuite Competitive Upgrade.

LOT012 SmartSuite V3: Competitive Upgrade **£238.95**



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Lotus 1-2-3 V5

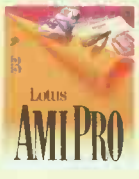
Dramatically boost your productivity.

Lotus 1-2-3 V5 features new drag and drop to move or copy cells, ranges, formulas and more. It also now includes Intelligent charting. Create a chart, complete with titles, labels and legends in a single step. New advanced spreadsheet publishing includes unlimited fonts, 256 colours, style gallery formats and the ability to preview styles before you apply them.

LOT034 Lotus 1-2-3 V5: Upgrade **£88.95**
LOT033 Lotus 1-2-3 V5: Competitive Upgrade **£128.95**

Lotus Ami Pro 3.0

The Best Windows Word Processor!



If you are looking for a word processor that's not only easy to use but packed with useful features, then look no further than Ami Pro. Using all the latest word processing features, AmiPro is the obvious choice for individuals and workgroups.

AmiPro also includes a spellchecker, thesaurus and dictionary facility, as well the ability to import graphics. It comes with pre-formatted templates to speed up letters, faxes and forms..

LOT039 Lotus AmiPro V3 ..... **£88.95**

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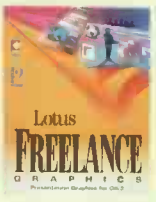

Lotus Freelance comes complete with an animated QuickStart tutorial that gets you up to speed in about thirty minutes. Simply choose one of 65 SmartMasters as your presentation design, to give you the same look and feel throughout your presentation.

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LOT033 Lotus Organiser V2 ..... **£88.95**

Lotus Approach 3

An easy-to-use, fully relational database.

If you're new to designing your own databases, then Lotus Approach V3 will help to make your first programming venture easy.
Even though it's straightforward to use, it's packed full of powerful features so you can develop and customise your database to your exact requirements.

LOT062 Lotus Approach V3 ..... **£88.95**

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Lotus Passport

Lotus Passport has been designed for organisations that require larger numbers of copies of any Lotus products. To register as a Passport customer, your first order must be for 100 points (see below), thereafter you can order in50 point blocks. The software may be installed in different sites, even in different countries and can be on DOS, Windows, Unix or MAC.. Passport is probably the most versatile license program available today. Example units: Organiser and CC Mail are worth half a point, Lotus 123, Ami Pro, & Approach are one point each, Smartsuite is worth 2 points.

These listings are just a sample of Lotus' products.

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Approach Single LLP	£73
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Lotus 123 20 User LLP	£3890
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SmartSuite Single LLP	£299
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SmartSuite Single LLP Upgrade	£170
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Lotus Notes 20 User LLP	£6039
Lotus Notes Single LLP Upgrade	£166

LOTUS Passport

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Lotus Notes 50+ Points	£265
Lotus Notes 500+ Points	£255
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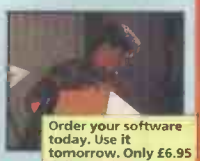

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ESSENTIAL for all non-techies!

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- ✔ FIRST AID is easy to use, it pops up automatically when there's a problem

What if your computer could fix itself?

FIRST AID is the first software package that will fix technical problems for you. It's like having a tech. support expert inside your computer! It's the essential utility for all "Non-Techies".

How does it work?

When an error message appears, FIRST AID pops up, analyses and explains the situation in plain English, then offers to fix it automatically. If you agree to FIRST AID's suggestion and click the 'Fix' button the problem will be corrected immediately. Rewriting system or configuration files need never be a nightmare again. BUT DON'T WORRY, all the changes you make are logged so you can print or even undo them later if you change your mind.

What sort of problems will it fix?

Every time a new application is installed on a Windows PC the configuration files (such as WIN.INI) are automatically modified and conflicts may occur. FIRST AID has a knowledge base that can detect and fix over 1,000 of these common configuration problems such as:

- Sound card and CD-ROM drive configurations
- OLE registration problems
- Errors in WIN.INI and SYSTEM.INI problems
- Network access
- Printing problems
- Misplaced drivers and DLLs
- Incorrect Parameter settings
- Bad Path settings

FREE BONUS - HyperText User Guide

In addition to FIRST AID's powerful problem fixing tools, there is also included a unique HyperText on-line user guide.

Packed with useful information, hints, tips and the accumulated wisdom of thousands of Windows experts, this HyperText guide acts as an invaluable reference as well as an effective learning tool.

Whether you need advice on hardware, software, printing or network issues - the HyperText User Guide tells you how to get the best performance from your system.

Auto Fix

D.I.Y Windows Support...

FIXES CD-ROMs

Resolve CD configuration problems instantly!

CD-ROM drives, interfaces and drivers are notoriously difficult to install and configure. FIRST AID will test, configure and explain (in plain English) what it suggests is done and what will happen.

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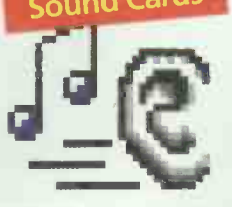
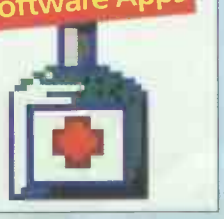


Test and optimise your Soundcard

FIRST AID's Problem Panel will show any Driver problems and then solve any conflicts with a click of the Fix button. Then simply press the Test button and hear the results!

RESTORES Software Apps



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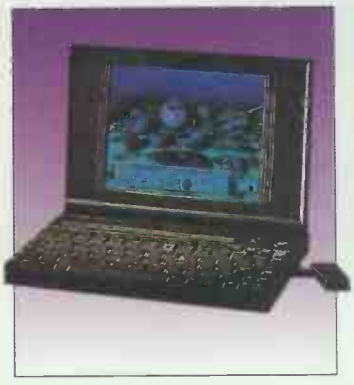

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HP Vectra VL 5/90 P/90		8	420	PCI/ISA	**£1475(a)**
HP Vectra VL 5/90 P/90		8	840	PCI/ISA	**£1560(a)**
HP Vectra VL 5/90 P/90		16	840	PCI/ISA	**£1780(a)**

Note: Systems do not include a monitor.

SCANNERS

Scanner shown withADF unit (opt)

HP SCANJET 3P
- ☆ Monochrome
- ☆ 300 dpi enhanced to 1200dpi
- ☆ Up to 12ppm Scan rate
- ☆ SCSI i/f for speed

HP PicturePlace
- an image editor

Calera Wordscan 3.0
- an OCR package

HP SCANJET 3C
- ☆ 600 dpi enhanced to 2400dpi
- ☆ 30bit colour & 10bit greyscale
- ☆ HP ColorSmart Support
- ☆ 1yr warranty

HP DeskScan II
- easy to use scanning utility

Corel PhotoPaint
- image editing software

Calera Wordscan 3.0
- an OCR package

SUPERB SOFTWARE BUNDLE

Mac versions have different software

HP SCANJET 3P £350(a)
A4 Scanner (PC/AT)

Auto Document Feeder £129(a)

HP SCANJET 3C £609(a)
A4 Scanner (PC/AT)

Auto Document Feeder £349(a)
Transparency Unit £449(a)

HP PLOTTERS

- •No Fuss
- •No Mess
- •No Pens

Sharper Faster Every time!

THE BEST IN PROFESSIONAL CAD

HP DESIGNJET 220
- ☆ 600x600dpi Mono
- ☆ Approx 6 mins for A0 plot
- ☆ Tabletop standard, legs option
- ☆ AutoCAD & Windows drivers
- ☆ 2MB RAM Buffer
- ☆ RS232C & Centronics i/f
- ☆ 1yr OSM warranty

HP DESIGNJET 650C
- ☆ 600x600dpi Mono
- ☆ 300x300dpi Colour
- ☆ Auto-switching HP-GL/2 & HP-RTL
- ☆ AutoCAD & Windows drivers
- ☆ 4MB RAM buffer
- ☆ RS232C & Centronics i/f
- ☆ 1yr OSM warranty

HP DESIGNJET 220 A0	£1989	Call for carriage rates	HP DESIGNJET 220 Legs	
HP DESIGNJET 220 A1	£1499		A0	A1
HP DESIGNJET 650C A0	£4529		£289(a)	£229(a)
HP DESIGNJET 650C A1	£3829			

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Simply purchase any one of :-
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b) A complete Compaq, IBM or HP Computer System
c) Over £500 (excl. carriage & VAT) of Software or Network Products or Multimedia Products or Storage Products or Modems

You must request your complimentary award with your order. Offer subject to availability. Its usage is governed by conditions as stated on the award. Conditions include paying for breakfast and dinner at the hotel, and some hotels list periods when reservations are not accepted. Only one award per order available whilst stocks last.

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Hewlett-Packard

THE AFFORDABLE PREMIUM BRAND - HP

HP VECTRA VL2

This is the best-selling range of desktop PCs from Hewlett-Packard. It is the most affordable premium brand offering unrivalled value without cutting corners. Every machine carries a 3 year warranty with the first year having on-site maintenance by HP engineers. This warranty will also cover 14" or 15" HP monitors (optional) purchased with the computer.

The Economy range offers entry-level computing whilst the Standard range offers higher specification computing and greater upgradability.

Both ranges come pre-loaded with MS Windows for WorkGroups 3.11 giving easier and cheaper networking options for the small office or department. A range of high quality, flicker-free monitors are available to provide the ideal match for your requirements. All computers are EPA Energy Star compliant.

MONITORS

HP 14" VGA mono	£149(a)
HP 14" SVGA colour	£195(a)
HP 14" Ergo SVGA colour	£235(a)
HP 14" SVGA ES colour	£220(a)
HP 15" Ergo Ultra SVGA col	£342(a)
HP 17" Ergo UVGA col	£655(a)

ECONOMY RANGE

VL2 4/50se	4/210/DWW	£655(a)
VL2 4/50se	4/340/DWW	£685(a)
VL2 4/50e	4/210/DWW	£685(a)
VL2 4/50e	4/340/DWW	£719(a)
VL2 4/66e	4/210/DWW	£719(a)
VL2 4/66e	4/340/DWW	£749(a)

STANDARD RANGE

VL2 4/50	8/270/DWW	£865(a)
VL2 4/50	8/540/DWW	£930(a)
VL2 4/66	8/270/DWW	£899(a)
VL2 4/66	8/540/DWW	£960(a)
VL2 4/100	8/270/DWW	£1040(a)
VL2 4/100	8/540/DWW	£1095(a)
HP Supportpack - 3 yr OSM		£115(a)

NETSERVERS

HP Servers feature built-in Automatic Server Restart capability, without administrator intervention, in the event of a hang. Further availability features include a temperature monitor which can warn of potential system overheat. Control is available via the HP Netserver Assistant 2.1 software which provides a pro-active system alerting and resolution. To aid in problem resolution every server is supplied with HP Support Assistant - a mine of technical information. VDU

HP NETSERVER LC

- ☆ File/Print Applications
- ☆ Intel 486DX2 & Pentium® CPUs
- ☆ Fast SCSI-2, PCI, EISA
- ☆ 4 bay deskside case
- ☆ 3 year OSM by HP

HP NETSERVER LF

- ☆ Client/Server Applications
- ☆ Intel 486DX2 & Pentium® CPUs
- ☆ PCI, EISA & SCSI-2
- ☆ Drive array options
- ☆ 3 year OSM by HP

HP NETSERVER LM

- ☆ Scaleable Client/Server
- ☆ Intel 486DX2 & Pentium® CPUs
- ☆ EISA, Fast SCSI-2, & IDE
- ☆ ECC Ram, Hot-Swap array options
- ☆ 3 year OSM by HP

Pentium is a trademark of Intel Corp

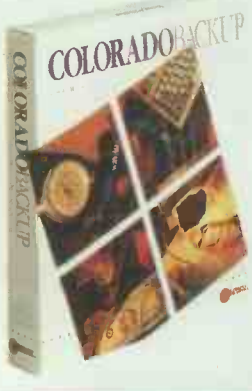
STANDARD SERVERS

HP Netserver	4/66LC-540	8/540/-	£1675
HP Netserver	4/100LC-1050	8/1Gb/-	£1915
HP Netserver	4/100LF-1050	8/1Gb/CD	£2615
HP Netserver	5/66LF-1050	16/1Gb/CD	£3095
HP Netserver	5/66LM-1050	16/1Gb/CD	£4059
HP Netserver	5/100LM-1	16/None/-	£4450

ARRAY SERVERS

HP Netserver	4/66LF-1 Array	8/Chassis/CD	£2990
HP Netserver	4/100LF-1 Array	8/Chassis/CD	£3320
HP Netserver	4/66LM-2000	16/2*1'Gb/CD	£6199
HP Netserver	5/60LM-2000	16/2*1'Gb/CD	£6099
HP Netserver	5/66LM-1 Array	16/Chassis/CD	£4899
HP Netserver	5/66LM2-1	16/None/-	£5699
HP Remote Assistant (Requres Modem)			£697

PERSONAL BACKUP



The Tape Drives (a)

		Jumbo		Trakker	
	250	350	700	350	700
Internal	•	•	•		
External				•	•
Interface		Floppy		Parallel	
Software	•	•	•	•	•
Format					
QIC-40		R/O	R/O	R/O	
QIC-80	R/W	R/W	R/O	R/W	
QIC-80XL		R/W		R/W	
QIC-3010			R/W		R/W
Normal Cap.(MB)	125	170	340	170	340
Max.Cap (MB)	<250	<340	<680	<340	<680
Warranty (RT-B)	1yr	2yr	2yr	1yr	2yr
Price	£92	£101	£165	£204	£271

The Tapes(b)

Colorado	3-pk	3M		each	5-pk
DT-250	fmt'd £45	DC2120	unfmt'd	£9.75	£45
DT-350	fmt'd £54	DC2120XXL	unfmt'd	£14	£66
DT-740	fmt'd £69	MC3000XL	unfmt'd	£21	£100

The Software £49(b)

Colorado Backup for Windows works with all Colorado tape drives and uses industry standard QIC and DDS formats. In addition, it supports most popular PC networks (upto Novell NetWare 3.x).

- Drag & Drop operation
- Automation capability
- Data Compression
- Runs in background
- Tape library facility
- Password Protection

HIGH CAPACITY BACKUP

WORLD LEADER IN DAT BACKUP

Conservative estimates state that: "After 1 year of use the data on your hard disk is worth 10 times the computer"

•

PROTECT YOUR INFORMATION

BACK IT UP

- ☆4Gb to 16Gb capacity (120m tape)*
- ☆510Kb/s sustained transfer rate*
- ☆8Gb in approx. 2 hours*
- ☆Find any file in 40 seconds
- ☆PC kits includes:-
  - Drive Unit
  - SCSI Cable
  - Host Bus Adapter
  - Cheyenne Arcserve/Arcsolo

3yr OSM £210

HP JetStore 6000*	**Drive only**	**from £855(a)**
HP JetStore 5000	**Drive only**	**from £735(a)**
HP JetStore 2000	**Drive only**	**from £645(a)**

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PROLINEA

High performance at entry level prices

The new Compaq Prolinea range boasts some key high-end technology from the Deskpro range as well as some new use-ability features, eg TriFlex/PCI architecture to realise optimum performance, PCI LB graphics and Enhanced IDE, Plug and Play compatible, Auto config for Compaq IDE HDs. MS-DOS 6.2 and MS Windows 3.1 are pre-loaded. All Prolineas carry a 3 year warranty. Pentium is a trademark of Intel Corp.

Model	CPU	RAM(MB)	HD(MB)	Case	Price
4/50	486DX2-50	4	270	3x3	**£745(a)**
4/66	486DX2-66	8	270	3x3	**£975(a)**
4/66	486DX2-66	8	420	4x4	**£1065(a)**
4/100	486DX4-100	8	270	3x3	**£1135(a)**
4/100	486DX4-100	8	420	4x4	**£1235(a)**
5/75	Pentium-75	8	270	3x3	**£1245(a)**
5/90	Pentium-90	8	420	4x4	**£1495(a)**

CONTURA 410

Performance on the move

The new Compaq Contura 410 builds on the legendary Contura line to provide more performance and higher reliability with even greater ease of use features such as PCMCIA and a built-in trackball. Every Contura 410 has a range of docking options and rechargeable standard Duracell batteries which can last up to 6 hours (mono) or 5.5 hours (colour). MS-DOS 6, MS Windows 3.1 and Lotus Organiser are pre-loaded. All Contura 410s carry a 3 year limited warranty.

Contura 410	486DX2-50(SL), 4MB Ram, 250MB HD, 9.5" mono STN	**£1319(a)**
Contura 410C	486DX2-50(SL), 4MB Ram, 350MB HD, 9.5" col STN	**£1765(a)**
Contura 410CX	486DX2-50(SL), 4MB Ram, 350MB HD, 8.4" col STN	**£2295(a)**

DESKPRO

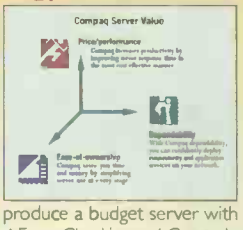
The manageable choice for networks

The new Compaq DeskPro range addresses the key issue facing PC networks - manageability. Every DeskPro is network ready (Ethernet) and features Compaq AssetControl - a unique means of identifying equipment spec down to serial numbers, revision numbers and configuration. MS-DOS 6.2, MS Windows and Network Setup Utility (Netware) are provided. All DeskPros carry a three year limited warranty. Asset management monitors are available separately.

Model	CPU	RAM(MB)	HD(MB)	Case	Price
4/66	486DX2-66	8	270	3x3	**£1125(a)**
4/100	486DX4-100	8	270	3x3	**£1295(a)**
4/100	486DX4-100	8	420	4x4	**£1395(a)**
5/75	Pentium-75	8	270	3x3	**£1475(a)**
5/75	Pentium-75	8	420	4x4	**£1579(a)**
5/90	Pentium-90	8	420	4x4	**£1750(a)**
5/90	Pentium-90	16	720	5x5	**£2100(a)**

PROSIGNIA 300

Server technology at Workstation prices



The new Compaq ProSignia 300 is a breakthrough in price/functionality for servers. Compaq has used many of the features first used in the Proliant and ProSignia servers to produce a budget server with qualities that matter.

☆Error Checking and Correcting memory ☆ Intel Pentium CPUs
☆ 32 bit Ethernet and Fast-SCSI2 controllers on PCI bus
☆ 6 expansion slots and 5 drive bays in total ☆ 256KB write-back cache
☆ 3 year On-site repair warranty (via Compaq)

ProSignia 300 5/75	Pentium-75, 16, 1GB, CD-ROM	**£2700(2b)**
ProSignia 300 5/75	Pentium-75, 16, 2GB, CD-ROM	**£3225(2b)**
ProSignia 300 5/90	Pentium-90, 16, 1GB, CD-ROM	**£2940(2b)**
ProSignia 300 5/90	Pentium-90, 16, 2GB, CD-ROM	**£3455(2b)**

OTHER RANGES

We are authorised Comaq dealers and can supply from the existing ranges ie LTE Elite, Presario, DeskPro XE & XL, ProSignia VS and Proliant. We are also able to offer lease finance (subject to status) for orders in exess of £1000

Contura Aero	from £879(a)	LTE Elite	from £2285(a)
Ehn. Prolinea	from £670(a)	ProSignia VS	from £1499(a)
Proliant	from £4239(a)		

COMPAQ WARRANTY

Please note that the on-site maintenance warranty service for Compaq products is through Compaq appointed Service Providers. This on-site maintenance service is also intended to address 'DOA' situations. Compaq notebooks do not carry an on-site warranty. Technomatic provide a 12 month RTB warranty as standard and can supply a 3yr on-site maintenance enhancement on certain products. Please call for details.

MONITORS

Compaq monitors are specified according to user choice and so are not included with the systems advertised. Asset management capable monitors are also available.

14" VGA colour	£170(a)	14" SVGA colour	£209(a)
14" 1024 colour	£250(a)	15" SVGA colour	£349(a)
17" SVGA colour	£675(a)		

THINKPADS

NEW ThinkPad 701C

The revolutionary new notebook from IBM. Subnotebook portability with full size screen & keyboard.

☆ 10.4" colour screen
☆ Full size keyboard,
☆ Weighs only 2kg
☆ Large HDs, Fast CPUs

	CPU	Screen	RAM	HD	
ThinkPad 340CSE	486SLC2-50	9.5" DSC	4	200	**£1395(a)**
ThinkPad 360	4/50	8.4" TFT	4	340	**£2115(a)**
ThinkPad 755	4/75	9.5" DSC	4	340	**£2968(2a)**
ThinkPad 755	4/75	10.4" TFT	4	340	**£3339(2a)**
ThinkPad 755CE	4/100	10.4" TFT	8	540	**£4275(2a)**
ThinkPad 755CD	4/100	10.4" TFT	8	540	**£5499(2a)**
ThinkPad 701CS	4/50	10.3" DSC	4	360	**£2675(2a)**
ThinkPad 701C	4/50	10.4" TFT	4	360	**£3135(2a)**

APTIVA

As seen on TV

INCLUDES MONITOR

IT'S WHATEVER YOU WANT

The Aptiva - a modern, state-of-the-art range of computers designed for you, designed to perform, designed to be the best value package from IBM. Each Aptiva has class leading software - from PC DOS v6.3, MS Windows v3.1 and MS Works to IBM's Learning Library, Personal Desktop, Custom Tools & First Steps. Every Aptiva comes with free membership of Helpware with access to the best 24 hour, 365 day telephone helpline. Aptiva comes complete with keyboard, mouse & 14" SVGA screen.

STANDARD		
Aptiva 745	4/50s, 4, 270, Sp	**£699(2a)**
Aptiva 767	4/50, 4, 270, Sp	**£729(2a)**
Aptiva 788	4/66, 4, 540, Sp	**£885(2a)**
Aptiva 792	4/66, 8, 540, Sp	**£1039(2a)**
Aptiva 798	P/60, 8, 540, Sp	**£1299(2a)**
MULTIMEDIA		
Aptiva 855	4/50, 4, 270, Sp + MM1 - Call for spec.	**£959(2a)**
Aptiva 888	4/66, 4, 540, Sp + MM1 - Call for spec.	**£1080(2a)**
Aptiva 857	4/66, 8, 540, Mt + MM2 - Call for spec.	**£1269(2a)**

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- ☆ Free Compuserve Membership Book
- ☆ Telemate Shareware Comms s/w
- ☆ Auto Speed Detect & Select
- ☆ 5 Year Manufacturers Warranty
- ☆ Fully BABT Approved
- ☆ Ideal for low volume comms user

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PC/AT modem cable with WS3000 £8

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Sportster®
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£189 FREE DATATALK 4 DOS*

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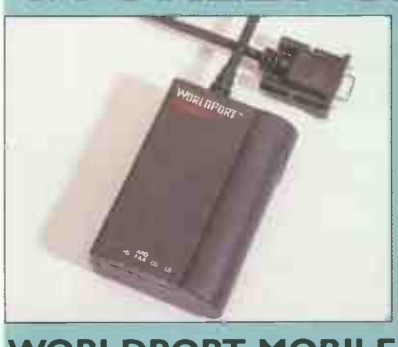
28.8 + Fax PC Card (Int)	£195
14.4 + Fax Desktop (Ext)	£126
14.4 + Fax PC Card (Int)	£127
28.8 + Fax Mac & Fax	£219
14.4 + Fax Mac & Fax	£139
PC/AT Modem Cable 9/25	£8

WORLDPORT

NEW 28.8. PCMCIA



WORLDPORT MOBILE RANGE(a)	
28.8 + Fax PCMCIA	£299
Dual Standard (14.4 + HST) + Fax PCMCIA	£195
Dual Standard (14.4 + HST) + Fax Pocket	£169

Courier

LIMITED OFFER SPECIAL COMMS BUNDLE

COURIER PROFESSIONAL RANGE(a)	
V34 + Fax Desktop Bundle	£299*
inc FREE USR High speed Dual Serial Port	
FREE 25+9/25 Modem Cable	
FREE Quicklink Gold upgrade voucher	
FREE Datatalk 4 DOS (Full Version) DS Fax (Win)	
FREE Internet Membership Kit	
V34 + Fax Desktop Modem only	£264
V34 + Fax PC Card modem	£265

US Robotics
AUTHORISED RESELLER
5 year WARRANTY

MODEL	SPEED: 28800 (V34)	19200 (V32 terbo)	14400 (V32bis)	9600 (V32)	2400 (V22bis)	1200 V22	1200/75 (V23)	300 (V21)	ERROR CORR.: V42	MNP 2-4	DATA COMP.: V42bis	MNP 5	FAX: 9600	14400 (V17)	ASYNCHRONOUS	SYNCHRONOUS	DIAL UP	LEASE LINE	FORMAT: DESKTOP (EXT)	PC CARD (INT)	POCKET	PCMCIA
SPORTSTER 28.8 + FAX	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓		✓			
SPORTSTER 14.4 + FAX			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓		✓	✓		
COURIER V34	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
WORLDPORT 28.8	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓					✓
WORLDPORT HST DUAL STD CELLULAR			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓				✓	✓

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Essential for all windows users faster than 9,600. 2 yr warranty **£49(a)***

*While stocks last, free S/W must be requested at time of purchase

APPROVED for Connection to telecommunication systems specified in the instruction for use subject to the Conditions set out in them.

5 YEAR WARRANTY

FREE DIRECT TECHNICAL SUPPORT

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- Up to 1280 x 1024 Non-interlaced
- Horizontal Freq 30-65KHz
- 0.28mm Dot Pitch

£275

ERGOVISION 880LR

- 17" FST Multiscanning Monitor
- Up to 1280 x 1024 Non-interlaced
- Horizontal Freq 30-64KHz
- 0.28mm Dot Pitch

£509

ERGOVISION 885LR

- 17" FST Multiscanning Monitor
- Up to 1600 x 1200 Non-interlaced
- Horizontal Freq 30-82KHz
- 0.26mm Dot Pitch

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- Super Fast 64 Bit Windows Accelerator
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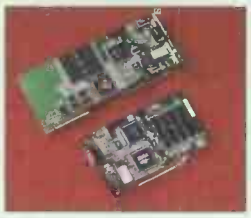
- 2MB & 4MB VRAM Versions Available
- Up to 1280 x 1024 Resolution
- Up to 100Hz Refresh Rate
- On-Screen Colour Calibration

2MB ISA **£204** VLB **£205** PCI **£206**
GTS WinTurbo Plus
4MB ISA **£344** VLB **£345** PCI **£346**

GTS WINTURBO POWERED BY



COMMON FEATURES FOR ABOVE MONITORS

- Microprocessor Control
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- Low Radiation & Anti-Static CRT (MPR2)
- EPA ENERGY STAR Compliant
- VESA DPMS Compatible

3 YEARS ON SITE MAINTENANCE £49

NEW 400LR 14" SVGA Colour Monitor **£185(a)**

Genius PCMCIA ME3000II-2 BNC/TP ETHERNET ADAPTER £109(a)

ETHERNET POCKET LAN ADAPTER

E3000II

NEW

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BNC & TP CONNECTORS

- Dual media with AutoDirect
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- Supports switchless hardware configuration
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- Superior performance using EPP mode
- Allows printing and networking together

ETHERNET COMBO ADAPTER

GE2000D

£32(b)

20-pack **£589(a)**

- Fully Novell NE2000 compatible
- Drivers for: IPX & ODI for Netware Windows for Workgroups NDIS for Lan Manager Packet for TCP/IP
- BNC & RJ45 connectors
- Jumper & Jumperless
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Multi-Tech

At Last... A Multi-Tech Modem For The Home Office And Small Business.

28,800bps (V34) £175
19,200bps (V32terbo) £112

ZDX™

MultiModem™

INCLUDES MULTIEXPRESS FAX SOFTWARE FOR WINDOWS

10 YEAR WARRANTY

Announcing the amazing value packed Multimodem 2834ZDX from Multi-Tech Systems.

Superior Performance. With blazing V34 data rates up to 28,800bps and fax speeds of 14,400bps,and with V42bis data compression data transfer rates of up to 115,200bps are achievable. Multi-Tech also gives you full backward compatibility to all ITU standards including V32bis (14,400bps) and the V32 terbo (19,200bps) standard.

Fully Featured. 10 LED indicators to monitor every aspect of your connection. Plus help screens, non-volatile memory and windows communications and fax software you need.

Unmatched Warranty. A 10-year warranty direct from Multi-Tech eliminates worry and makes the MultiModemZDX ideal for the home or small business.

BABT Approved - And it's a Multi-Tech!

TECHNO VALUE

ZDX 2834 NEW	£175(a)
ZDX 1932 LOWER PRICE	£112(a)

MULTI-TECH HIGH SPEED SERIAL PORT £49(b)

PC/AT MODEM CABLE 9/25 £9

FOR THE PROFESSIONAL COMMS USERS

MT2834 BLK DESKTOP NEW £395(a)
FREE HIGH SPEED SERIAL PORT

MT1432 BLK DESKTOP	£309(a)
MT1432 MK POCKET	£345(a)
MT1432 LTI PCMCIA	£199(a)

MultiTech Systems

APPROVED for Connection to telecommunication system specified in the instruction for use subject to the Conditions set out in them.

Government, Colleges, Schools, Hospitals, Local Councils, Large PLC etc, official orders welcome. Minimum credit card order value £20 (ex P&P & VAT). Please ensure the suitability of products with the manufacturer before ordering. All trademarks are acknowledged. Errors & omissions excepted. Prices exclude VAT @ 17.5%.

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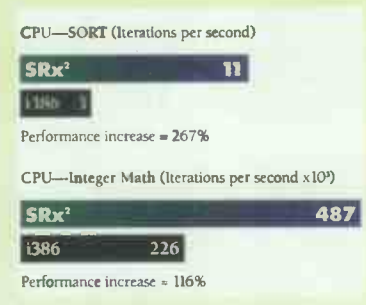
FROM £149

MAKE YOUR 386DX OR 386SX FLY!



yes It runs with NetWare

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- Single chip upgrade for 386SX & 386DX PCs
- Clock doubling technology for up to 70% increased performance
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- Easy installation - up and running within 15 minutes
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CYR/CP/U010	386SX 16MHZ to 486SX 32MHZ	£138(a)
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CYR/CP/U020	386SX 25MHZ to 486SX 50MHZ	£158(a)
CYR/CP/U030	386DX 16MHZ to 486DX 32MHZ	£138(a)
CYR/CP/U030	386DX 20MHZ to 486DX 40MHZ	£138(a)
CYR/CP/U050	386DX 25MHZ to 486DX 50MHZ	£158(a)
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3Com

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*** STOP PRESS * NOW NEW VERSION B AVAILABLE**

NETWORK ADAPTERS

LINKBUILDER FMS II HUBS

ETHERLINK III: THE PRICE PERFORMANCE ADVANTAGE

- ◆ Parallel Tasking Ethernet Adapters
  - Performing multiple tasks at the same time
- ◆ Automatic self-tuning during operation
  - To set and maintain optimum performance
- ◆ High level of component integration
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  - Trouble free installation
- ◆ Lifetime 3Com warranty

Full range of 3Com products, including LinkBuilder FMSII Hubs, available. Call for details

Adapter			1Pk(b)	5Pk(a)
3C509 B	BNC	ISA	£67	£319
3C509 B	TP	ISA	£68	£319
3C509 B	Combo	ISA	£76	£359
3C579 B	BNC	EISA	£149	£699
3C579 B	TP	EISA	£149	£699
3C590 B	Combo	PCI NEW	£149	POA
3C529 B	BNC	MCA	£155	£709
3C529 B	TP	MCA	£156	£709
3C589 B	Combo	PCMCIA	£149	£699

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PRICES EXCLUDE VAT @ 17.5%

Xircom The Mobile Networking Experts

£425(a) (Combo)

- Simultaneous Ethernet & modem operation in one slot
- Xircom's extensive Network O.S. support
- Full send/receive fax modem operation
- 19.2Kbps data & 14.4Kbps fax speeds supported
- Hot swappable & power management features
- Serial port emulation for increased compatability
- Comms & fax windows software included

TP Network + Modem	CEM2-10BT	£389(a)
BNC Network + Modem	CEM2-10B2	£399(a)
BNC/TP + Modem	CEM2-10BC	£425(a)

Xircom

NEW LOW PRICES Hayes

ACCURA 288 + FAX **£173(a)**
- up to 28,800 bps **NOW V34**

ACCURA 144 + FAX **£138(a)**
- up to 14,400 bps (V32 bis)

Common Features
- Full error correction & data compression
- Up to 14,400 (V17) fax incl. Group 3 fax
- FREE Hayes Smartcom LE data & fax Windows S/W
- AutoFax Detect between fax & data calls

ALSO NEW LOW PRICES ON OPTIMA MODELS - CALL NOW!

"If you want a top of the line portable data communications solution, this product is the best you can get" - PC Magazine (January 1995)

Benefits of Psion Dacom Gold Card:
- Add fax to your notebook
- High-Speed file transfer
- Real remote LAN access
- Flash Upgrades available
- UK Market Leader
- Guaranteed compatibility
- Free lifetime technical support

Gold Card V34 + Fax **£299(a)**
- Ratified 28.8Kbps - The ultimate tool for intensive data transfer and remote LAN connectivity applications. Twice the speed of V32bis, up to 115.2Kbps.
  eg 200Kbyte file-15.6 second transfer time

Gold Card V32bis + Fax **£195(a)**
- 14.4Kbps - Europe's leading PCMCIA Data + Fax modem, ideal for medium usage communications, BBS access and fax applications

PSION DACOM

NOKIA VALUEGRAPH 447V MONITOR

MULTIMEDIA READY

- 17" flat, square tube
- 0.28mm dot pitch
- 1024 x 768 at 80HZ
- Integral 2 watt speakers
- Digital controls
- Power saving
- MPR II

£499(a)

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Prices valid from 3/5/95

LASER PRINTERS(a)

HEWLETT-PACKARD	SPEED/RES	RAM/FONTS	LANG.	I/F	1 Year RHP	3 Year OSM
HP LaserJet 4L	4ppm/ 300dpi	1Mb/ 26S	PCL5e	BiPar	£365	£455
HP LaserJet 5P New	6ppm/ 600dpi	2Mb/ 45S	PCL5e	Par/Ser	£589	£745
HP LaserJet 5MP New	6ppm/ 600dpi	6Mb/ 80S	PCL5e PS L2	Par/Ser Mac	£699	£855
HP LaserJet 4 Plus	12ppm/ 600dpi	2Mb/ 45S	PCL5e	BiPar/Ser	£950	£1105
HP LaserJet 4M Plus	12ppm/ 600dpi	6Mb/ 80S	PCL5e PS L2	BiPar/Mac/ Ethernet	£1260	£1415
HP LaserJet 4V A3	16ppm/ 600dpi	4Mb/ 45S	PCL5e HPGL	BiPar/Ser	£1370(3xa)	£1570(3xa)
HP LaserJet 4MV A3	16ppm/ 600dpi	12Mb/ 80S	PCL5e PSLZ	BiPar/Mac/ Ethernet	£1989(3xa)	£2189(3xa)
HP LaserJet 4Si	1yr OSM 16ppm/ 600dpi	2Mb/ 45S	PCL5e	BiPar	£2099(3xa)	£2558(3xa)
HP LaserJet 4Si MX	1yr OSM 16ppm/ 600dpi	10Mb/ 80S	PCL5e PS L2	BiPar/Mac/ Ethernet	£2969(3xa)	£3460(3xa)

NEC 1 year OSM	Size	Speed	Res (Dpi)	RAM	Lang	I/F	Price
SuperScript 610+ New	A4	6ppm	300x300	256kb	G	B	£295
SuperScript 660 New	A4	6ppm	1200x600	256kb	G	B	£425
SuperScript 660i New	A4	6ppm	1200x600	256kb	G,P5	B	£575
SuperScript Color 3000	A4	1ppm	300x300		G	B	£649
EPSON 1 year OSM							
EPL3000 New	A4	4ppm	300	1Mb	5e	B	£390
EPL5200	A4	6ppm	300	1Mb	P5	P,S	£465
EPL5600	A4	6ppm	600	2Mb	5e	B,S	£599
EPL9000 New	A3	8ppm	600	2Mb	5e	B,S	£1199
EPL9000PS New	A3	8ppm	600	6Mb	5e,PS	B,S,A	£1549
PANASONIC							
KXP4400 1yr OSM	A4	4ppm	300	512Kb	P4	P	£280
KXP4401 1yr OSM	A4	4ppm	300	512Kb	P5	P	£345
KXP4430 2yr OSM	A4	5ppm	300	1Mb	P5	P,S	£485
KXP4440 2yr OSM	A4	10ppm	300	1Mb	P4	P,S	£719
KXP5400 1yr OSM	A4	4ppm	300	2Mb	P4,2S	P,A	£545
KXP6100 NEW	A4	6ppm	300	256Kb	G	B	£289

I/F:- P=Parallel, B=Bi-directional Parallel, S=Serial, A=Appletalk
Lang:- G=GDI (Win 3.1), P4=HP PCL4, P5=HP PCL5e, PS=PostScript, S2=PostScript Level 2

COMPATIBLE LASER RAM UPGRADES (b) Please phone for latest prices

	FOR HEWLETT-PACKARD					FOR EPSON					FOR PANASONIC				
	4(+,M,M+,P,V,Si) HiSi	II IID	IIP,IIIP, III,IIID	4L	XL300	4000,4100 4300	5000,5200	5600	EPL8000 8100	ActionLaser+ EPL6000	4410,4430 4451	4420,4450i 4510	4440	4400	4500
1Mb	£45	£65	£59	£65	£149	£62	£55	£45	£62	-	£89	£69	£72	£65	-
2Mb	£85	£95	£89	-	£185	£109	£89	£85	£109	£89	£129	£109	£109	£95	£95
3Mb	-	-	-	-	-	£159	-	-	£159	-	-	-	-	-	-
4Mb	£129	£159	£155	-	£225	£199	£185	£129	£199	£159	£199	£179	£193	£175	-
8Mb	£255	-	-	-	£355	-	-	-	-	-	-	-	-		

All prices include expansion card where needed (Please see our memory page for more memories)

TONER CARTRIDGES(b)

HEWLETT-PACKARD		4410/4430 Developer	£90
LaserJet IIP/IIP+/IIIP	£46	4420	£26
LaserJet II/IID/III/IIID	£47	4420 Drum	£57
LaserJet 4/4+/4M/4M+	£67	4420 Developer	£57
LaserJet 4V/4VM	£115	4400/5400 Drum	£55
LaserJet IIISi/4Si/MX	£77	**NEC**	
LaserJet 4L/4ML/4P/4MP	£44	S60/60P/62P/102/102P	£109
EPSON		610	£79
EPL 7100/7500/8100	£119	**LEXMARK**	
EPL 4000/4100/4300	£64	4039 Toner	£165
EPL 5000/5200	£85	4029 Toner	£162
EPL 5600	£110	**CANON**	
PANASONIC		LBP 4	£49
4410/4430	£28	LBP 8 MKII/III	£54
4410/4430 Drum	£95		

INKJET PRINTERS(a)

	Price	Cartridges Blk	Colour
Colour Inkjet printers			
Canon BJC4000 (A4)	£249		
Canon BJC600e (A4) NEW	£339	£6	£7*
Canon BJC800 (A3)	£1070	£14	£18*
Canon BJC-70 (NEW)	£245	POA	POA
Epson Stylus Colour (A4)	£332	£14	£29
HP Deskjet 320** (A4 Port)	£170	£13	-
HP DJ320 + CSF (A4 Port)	£189	£13	-
HP Deskjet 540C (A4)**	£215	£16	£16
HP Deskjet 660C (A4)	£309	POA	POA
HP Deskjet 850C (A4)	£399	POA	POA
HP Deskjet 1200C (A4)	£635	£19	£22*
HP Deskjet 1200C/PS (A4)	£999	£19	£22*
HP Deskjet 1600C	£849	POA	POA
HP Deskjet 1600CM	£1249	POA	POA
HP PaintJet XL300 (A3)	£1599	£15	£17*
Black Inkjet printers			
Canon BJ-30	£169	POA	-
Canon BJ-200ex NEW	£189	POA	-
Canon BJ200 (A4)	£185	£16	-
Canon BJ230 (A3)	£245	£16	-
Canon BJ300 (A4)	£361	£11	-
Canon BJ330 TF (A3 Port)	£423	£11	-
Epson Stylus 800+ (A4)	£174	£8.50	-
Epson Stylus 1000 (A3)	£315		

**Requires optional colour kit *Specify C/M/Y Cart

NEW HEWLETT-PACKARD COLOUR LASERJET £4279(3xa)

DOT MATRIX PRINTERS

EPSON

Model	PIN	Col	Price	Blk Rib	Model	PIN	Col	Price	Blk Rib
FX870	9	80	£229	£4.50	LQ570+	24	80	£192	£5
FX1170	9	136	£289	£6	LQ870	24	80	£355	£5
LX300	9	80	£95	£4.50	LQ1070+	24	136	£285	£7
LX1050	9	136	£179		LQ1170	24	136	£405	£7
LQ100	24	80	£105	£5	DFX5000+	9	136	£1119	£22.50
LQ150 Col	24	80	£165	£5.50	SQ870 Inkjet	80		£425	
LQ300 New!			£169	-	SQ1170 Inkjet	136		£569	

PRINTER MEDIA(b)

HP		**CANON**	
LX JETSeries Trans A4 50 shts	£33	BJ800C A4 Paper	£21
LX JETSeries Glossy A4 50 shts	£36	BJ800C A3 Paper	£36
CX JETSeries Coated A4 200 shts	£15	BJ800C Transparency CF101	£35
CX JETSeries Coated A3 200 shts	£31	BJ600C Transparency CF102	£35
UJ Transparencies A4 50 shts	£14	**FARGO PRIMERA**	
HP Labels various sizes	POA	Thermal Paper	
EPSON		Std A4 500 sheets	£18
STYLUS COLOUR COATED PAPER		Premium A4 500 sheets	£19
360 dpi A4 200 shts	£18	Special Long A4	£19
720 dpi A4 200 shts	£20	Transparency A4 50 sheets	£34
Transparencies A4	£49	A4 T-Shirt Transfer	£18

COLOUR THERMAL

NEC SuperScript Color 3000 New! £649(a)
NEC's new (GDI) Windows colour thermal printer, suitable for all multimedia applications with up to 16.7 million colours, high quality performance and the ability to use plain paper.

QMS magicolur plus laser printer £7950(2xa)
Magicolor plus combines the power of high resolution and laser sharp colour printer, which makes it ideal for business professionals, graphic artists, and network users, to affordably produce high quality laser text and graphics at 600x600dpi, and speeds up to 12ppm for text and 3-6ppm for full colour pages. (Pleae note network module is optional)

PRINTER CABLES(c)

Length	25M/36M	36M/36M	25M/25M
1.8m	£4	£6	£4
3m	£6	£8	£6
5m	£7	£10	£7
10m	£15	£17	£18

25M/36M is standard PC parallel cable 25/25 & 36/36 are for use with printer switches

PAPER HANDLING

EIT LASER TOWER for LJ4/4+
The Laser Tower System positions the printer on top of a stack of paper feeding cassettes. Each cassette will take a whole ream of paper - 500 sheets and the user can opt for selective feeding of different paper types.

3 paper cassettes laser tower £1999
6 paper cassettes laser tower £3349

PLOTTERS AND DIGITISING TABLETS

HP PLOTTERS

HEWLETT PACKARD

Size	A1		A0	
DesignJet 220 Black	C3187A	£1499*	C3188A	£1989*
DesignJet 600 Black	C2847A	£2799*	C2848A	£3349*
DesignJet 650C Col	C2858B	£3829*	C2859B	£4529*
DraftPro Plus	C3170A	£2339*	C3171A	£3129*

Draft Pro & Master comes with three years On Site Warranty.
DesignJet price includes one year OSM.
3 Year OSM Support Pack for DesignJet £300
**Carriage on request.*

PLOTTER MEDIA(a)

HP Paper A0 150 sheets	£64
HP Paper A1 200 sheets	£42
HP Paper 36" Roll	£29
HP DJ650C Paper 24"x150ft	£23
HP DJ650C Paper 36"x150ft	£29
HP DJ650C Paper A1 100 sheets	£43
HP DJ650C Paper A0 100 sheets	£83

HP PLOTTER PENS(c)

17825P, 17826P, 17725T, 17726T	£6.30

Ink Cartridges (c) Blk C/M/Y		
DesignJet 200/220	£16	-
DesignJet 600	£16	-
DesignJet 650	£20.40	£20.40

Summagraphics

INKJET PLOTTERS	A1	A0
SummaJet Mono	£1819*	£2399*
SummaJet Colour	£2579*	£2625*
LEGS	£220*	£320*

Call for cartridges & paper, *Call for carriage

DIGITISERS (S=Stand Opt)	A4	A3
SummaSketch III	£235(a)	£455(a)
SummaSketch FX	£305(a)	£499(a)
Summa Grid IV 1824 A2 Tablet (S)		£959*
Summa Grid IV 2436 A1 Tablet (S)		£1279*
Summa Grid IV 3648 A0 Tablet (S)		£1695*
Manual A1/A0 Tablet Floor Stand		£195(a)
Cursor: 4 Button £99(a)	16 Button	£125(a)
MicroGrid Ultra 1724 A2		£2199*
MicroGrid Ultra 2436 A1		£2649*
MicroGrid Ultra 3648 A0		£2999*

GENIUS TABLETS

HiSketch SP Model

1212 SP (12"x12")	£120(a)
1812 SP (18"x12")	£185(a)
1812D SP (18"x12") LCD coord disp	£210(a)

Features:-
- Windows 3.1 & ADI drivers • Up to 19,200 bps data rate
- 5 to 90 pairs/sec sampling rate
- 1000 lines per inch resolution
- ± 0.01 inch accuracy • Proximity sensing
- AutoCAD R10/11/12 compatible templates
- Multi-directional puck • 3 button stylus

Postage & Packing for UK mainland: (a) £8 (b) £6 (c) £3 (E&OE) All prices exclude carriage & VAT. All prices & specifications subject to change without notice. Our standard terms and conditions of sale apply to all sales (available on request). .Returned goods may be liable to a restocking charge

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A4 FLAT BED SCANNERS

NEW **HP SCANJET 3C**

Now 600dpi enhanced to 2400dpi, 30bit colour & 10bit greyscale includes Corel PhotoPaint. Calera Wordscan & Deskscan II.

HEWLETT PACKARD

HP SCANJET 3P NEW
- 256 greyscales
- 300 dpi, enhanced to 1200 dpi

PC/AT £350*
PS/2 £351*
Mac £359

HP SCANJET 3C NEW
PC/AT £609(a)
PS/2 £610(a)
Mac £611(a)

*Calera WordScan included in all PC versions

HP SCANNER OPTIONS

	3C	3P
SupportPack (3 yrs OSM)	£135	£85
Auto Document Feeder:	POA (50 shts)	POA (20 shts)
Transparency Adapter (3C ONLY)	POA	-
PC/AT or PS/2 interface kit (inc. s/w)	POA	£309

HEWLETT PACKARD

XEROX TEXT BRIDGE OCR S/W £79

EPSON A4, 24/30 BIT COLOUR FLATBED SCANNERS

All bundles, except scanner only, comes complete with software, interface (PC), cables and drivers.

GTX Bundle: Omnipage Direct, Photoshop LE
GTI Bundle: Photoshop V3.00 (full version),
Please specify clearly model and bundle when ordering.

Model	6500P	6500S	8000P	8000S	9000P	9000S
Bundle	Parallel	SCSI	Parallel	SCSI	Parallel	SCSI
Scanner only	-	-	£459		£559	
GTX-PC	£419	£499	£539	£610	£649	£709
GTI-PC	-	-	-	£825	-	£949
GTX-MAC	-	£419	-	£539	-	£649
GTI-MAC	-	£599	-	£739	-	£849

6500
Scan Res: 300 dpi
Output Res: 1200dpi
24 bit colour

8500 NEW
Scan Res: 400 dpi
Output Res: 1600dpi
30 bit colour

9000
Scan Res: 600 dpi
Output Res: 2400dpi
30 bit colour

EPSON

Auto Document Feeder £349(a)
Transparency Unit (up to 5"x5") £439(a)

Omnipage PRO £385(a) Direct Win £78 Textbridge V3 PRO WIN £275(a) STD WIN £79

HAND and A4 SCANNERS

GENIUS SCANMATE SERIES
Suitable for Windows 3.1x systems

Scanmate Colour NEW
24 bit, 16.7m colours TWAIN compliant
Photofinish 3.0 & SmartPage direct OCR
Complete with manuals & ISA bus card

Scanmate Color SE (800 dpi) £139(a)
Scanmate Color Pro (1600) £155(a)
(ColorPro includes Morph Editor CD)

Scanmate 256 £65(a)
True 256 Grey Scales. 800 dpi resolution, TWAIN compliant
DTP & OCR software included
Complete with manuals & ISA bus card

TRUST A4 Flatbed Scanners
CALL FOR FULL SPEC
Imagery 1200 @ £309(a)
Imagery 2400 @ £399(a)

LOGITECH

Scanman 32 PC DOS NEW	£56(a)
Scanman 32 PC Windows NEW	£56(a)
Scanman 256 PC Windows	£78(a)
Scanman Colour 24 bit Windows NEW	£165(a)
Scanman Easy Touch (Parallel Port Scanner)	£105(a)
Scanman Power Page (A4 Feed Scanner)	£299(a)
Dexxa Colour Media Scanner	£125(a)
Dexxa Colour Office Scanner	£199(a)

Xircom PCMCIA ETHERNET + MODEM II
Modem: V32TERBO (19,200) downwards
Fax: V17 (14,400) downwards
Ethernet: BNC, TP or Combo
CEM2-10BT - TP £389(a) CEM2-10B2 - BNC £399(a)
CEM2-10BC - BNC + TP £425(a)
BABT APPROVED

PRINTER ACCESSORIES

SWITCHES(b) See opp page for cables

AUTODATA SWITCHES

2:1 2 PCs to 1 PRN	£19
4:1 4 PCs to 1 PRN	£29
8:1 8 PCs to 1 PRN	£75(a)

MANUAL DATA SWITCHES

Reversible & Inexpensive	Par	Ser
2 in > 1 out	£10	£10
3 in > 1 out	£16	£16
4 in > 1 out	£20	£21
2 way cross over	£24	£24

AUTO CROSSOVER SWITCHES
4PCs > 2PRN Parallel
Once a data path has been set it can be switched by soft code. £85(b)

Bi-Directional Coverters
Par>Ser/Ser>Par £65(b)

PARALLEL BUFFERS
256K £139 1Mb £199

HEWLETT-PACKARD
For Networking see Network page
Adobe Postscript Level 2 Req Mem

LaserJet 4P	£190	IIISi/4Si	£425
LaserJet 4 (C2080A) 4+ (C3129A)			£229
DJ1200 + 2Mb			£439
PJ XL300			£1129

MEDIA ACCESSORIES

Duplex Unit LJ4+/4M+	£497
Output Stacker LJ4+/4M+	£279
For LJ4/4+/4M/M+	
Powered Env Feeder	£185
Lower Cassette Tray	£195
For LJ IIISi/4Si/MX	
Duplex Unit	£389
Powered Env Feeder	£269
Hi Cap Sheet Feeder	£395

A5 Paper Feeders

DJ500 Series (100 shts)	£55
LJ 4P/4MP (200 shts)	£59
LJ IIISi/MX/4Si/MX	£75
DeskJet 500 Series	
HP FX80 Emul Cartridge	£52
JetRAM 256K RAM Cart	£45
DJ310/20 C/Sht Feeder	£52
DJ310/20 Battery	£30
DJ310/20 Charger	£65

EPSON EPL500/5200

PostScript	£249
Local Talk Kit	£379

CANON SHEET FEEDERS

BJ10					£43
BJ300	1st	£87	2nd		£65
BJ330	1st	£90	2nd		£65

COMMUNICATION MANAGEMENT

AUTO PHONE/FAX/MODEM SWITCHES
T = No of handsets supported
F = Fax, M = Modem, A = Answerphone

MSL 1100	T1 & A & F		£89(a)
MSL 3300	T4 & A & F		£105(a)
MSL 3300M	T4 & A &	(F or M)	£125(a)
MSL 7700	T8 & A &	F & M	£145(a)

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FREE Pocket High Speed Serial Card
- Answerphone
- Full fax capability • Electronic mail
- Auto message forwarding
- Full remote control • Full modem capability
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- Ready to run, easy installation

VPA V22bis £335(a) VPA V32bis £435(a)

MODEMS (Carr a)

Please indicate internal or external when ordering

APPROVED for Connection to telecommunication systems specified in the instruction for use subject to the Conditions set out in them.

	V22bis	V32	V32bis	V32terbo	V34/VFC	Voice	V42	V42bis	FAX	Internal	External
IBM - For ThinkPad 750 & other PCMCIA Notebooks (OEM).											
IBM PCMCIA Fax/Modem Quad Speed	✔						✔	✔	✔		129
IBM PCMCIA Fax/Modem High Speed	✔	✔	✔				✔	✔	✔		199
US Robotics 5 yr. Manuf. warr., Free Hot Line Support. Sportster & Worldport have fax & comms software. Call for Mac models											
Sportster 28.8 +Fax	✔	✔	✔		✔		✔	✔	✔	---	189
Sportster 14.4 +Fax	✔	✔	✔				✔	✔	✔	127	126
Courier V34 Modem only	✔	✔	✔	✔	✔		✔	✔	✔	265	255
Worldport DS Cell Pckt	✔	✔	✔				✔	✔	✔	---	167
WP PCMCIA 28.8 + Fax	✔	✔	✔	✔	✔		✔	✔	✔	---	299
WP PCMCIA DS Cell + Fax	✔	✔	✔				✔	✔	✔	---	193
USR High Speed Dual Serial Port - 16550 AF 2 yr warr. (9F)											49*
PSION DACOM 2 yr. Manuf. warr., Free Hot Line Support. WinFax Lite s/w & Compuserve											
Goldcard v34+Fax PCMCIA	✔	✔	✔		✔		✔	✔	✔	---	299
Goldcard v32bis+Fax PCMCIA	✔	✔	✔				✔	✔	✔	---	195

US Robotics 5 YEARS MANUF. WARRANTY
WS3000 MKII £35(a)
While stocks last

Hayes Authorised Dealer **NEW LOW PRICES**

Accura 14.4 + Fax	✔	✔	✔			✔	✔	✔	✔	---	138
Accura 28.8 + Fax v34	✔	✔	✔		✔	✔	✔	✔	✔	---	173
Optima 144 + Fax	✔	✔	✔			✔	✔	✔	✔	---	249
Optima 28.8 + Fax v34	✔	✔	✔		✔	✔	✔	✔	✔	---	339
Optima PCMCIA144 + Fax	✔	✔	✔			✔	✔	✔	✔	---	199
LIMITED STOCKS - NOW V34, 5YR WARRANTY											
Bundle Offer 2 x Optima 288 + 2 x ESP II card											699*
Ultra 96	✔	✔				✔	✔			---	429
Ultra 144	✔	✔	✔			✔	✔			---	489
Hayes ESP card - High speed Serial port card with processor: PC/AT ESP II card 1 port £75 2 port £109 MCA ESP card £199											
MultiTech Systems 2 yr. manuf. warr., Free Hot Line Support. Free MultiExpress fax software											
ZDX 2834 Desktop	✔	✔	✔	✔	✔		✔	✔	✔	---	175
ZDX 1932 Desktop	✔	✔	✔	✔			✔	✔	✔	---	112
MT 2834 BLK Desktop	✔	✔	✔		✔		✔	✔	✔	---	395
FREE High Speed Serial Card While Stocks Last											
MT 1432BLK Desktop	✔	✔	✔				✔	✔	✔	---	309
MT 1432 MK Pocket	✔	✔	✔				✔	✔	✔	---	345
MT 1432LTI PCMCIA	✔	✔	✔				✔	✔	✔	---	199

PACE **MOBIFAX 32+ POCKET £95***

MobiFax 32+	✔	✔	✔			✔	✔	✔	✔	---	95*
Microlin FX	✔					✔	✔	✔	✔	79	89
Microlin FX32+	✔	✔	✔			✔	✔	✔	✔	139	159
Microlin FX34	✔	✔	✔		✔	✔	✔	✔	✔	249	250
MLin PCMCIA 32+ NB .	✔	✔	✔			✔	✔	✔	✔	---	197
MLin PCMCIA 34 NB	✔	✔	✔		✔	✔	✔	✔	✔	---	309
Linnet 32 Plus FX	✔	✔	✔			✔	✔	✔	✔	---	149*
Linnet Message Desk VFX	✔	✔	✔			✔	✔	✔	✔	---	239
Linnet 34 FX	✔	✔	✔		✔	✔	✔	✔	✔	---	269
Ultralink 32 Plus	✔	✔	✔			✔	✔			---	359

MODEM ACCESSORIES

PC Modem Cables 2M 9F to 25M (COM1 card below)	£8
PC Modem Cables 2M 25F to 25M (COM2 card below)	£9
NEW Multi I/O High Speed Card 2 X 16550 SER, 1 x EPP, 1 x Game	£29
Compuserve Information Manager Windows Software	£19(b)

*Special offer while stocks last

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Communications • Scanners

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STANDARD MEMORIES(b)

SIMMS

30 PIN SIMMS

1Mb x 9-60/70/80N (9 chip)	£34
1Mb x 9-70 (3 chip)	£31
4Mb x 9-70/80NS	£115
4Mb x 9-60NS	£119
256K x 9-80NS	£15

72 PIN SIMMS

1Mb 36 bit 70 NS	£42
4Mb 36 bit 70 NS	£129
8Mb 36 bit 70 NS	£259
16Mb 36 bit 70 NS	£409
4Mb 32 bit 70 NS	£119
8Mb 32 bit 70 NS	£249
16Mb 32 bit 70 NS	£389

DRAMS

44256-70NS (256K x 4)	£5.40
1Mb x 1-80/70NS	£4.90
1Mb x 4-80/70NS	£25

CACHE RAM (SRAMS)

8K x 8 20NS cache	£4.50
32K x 8 20NS cache	£7.00
32K x 8 15NS cache	£7.50

Recommended for most Elonex, Ambra, ICL, Olivetti, Opus, Tandon, Vale, Viglen, Gateway and most other clones. Please refer to your manual or manufacturer.

PRINTER MEMORY UPGRADES(b)

	1Mb	2Mb	4Mb
BROTHER			
HL4V/PS/VE	£79	£125	£185
HL-8/V/D/BE	£79	£115	-
HL-10-H	£49	£89	£145
HL-10V/DV/PS/DPS	-	£102	£179
STAR			
LP4/Starscript	£79	£119	£175
LP8Plus	£79	£119	£199
LS-5/5EX/5TT	£76	£131	£228
CANON			
LBP-4/4+/4 Lite	£89	£125	-
LBP-8 II Series	£65	£95	£159
LBP-8 III	£99	£129	£169
LBP-8IV, LBP-4U, LBP-4i	£49	-	£129
ALSO SEE PRINTER PAGE			

	1Mb	2Mb	4Mb
KYOCERA			
F-800/A/T	£75	£109	£179
FI20OS/3000/A/3300	£79	£115	£199
FS1500/820/5000	£65	£138	£260
FI500/A (Ecosys)	£79	£144	£274
SHARP			
JX-9500 PS	£59	-	-
JX-9500/E/H/9700	1.5Mb	£119	
9400/9600/PS/9460, 9660/9700E	£65	£99	£179
OKI			
OL830/840/850	-	£129	-
OL800/820	£69	£109	£179
OL400E/EX	£69	£109	£179
OL410E/EX	£69	£109	£179
OL400	£65	£99	-

RAM CARDS(b)

0-16Mb Half Length 16-bit Card

0Mb card	£99
Card with 2Mb installed	£160
Card with 4Mb installed	£220

(Suitable for most 286/386 AT/XT computer please check your manual or manufacturer)

PCMCIA(b)

Type I Version 1.0 SRAM

1Mb/2Mb	£125/£175

HP FLASH DISC CARD 12V

5Mb F1012A	£299
10Mb F1013A	£475
20Mb F1014A	£779

All memories supplied are compatible parts from reputable manufacturers. IBM, Compaq & HP original memories are also available. Please call for latest prices.

Memories for AST, Olivetti, Canon and NEC are available, please call if the upgrade you require is not listed.

MEMORY UPGRADES FOR PCs(b)

COMPUTER		2MB	4MB	8MB
IBM				
THINKPAD	700-720-750-755-360 (IBM original)		£245	£485
THINKPAD	700, C-720, C-750, C-755, C-360-330 EQUIV		£169	£299
THINKPAD	350, C-PS/2 L40SX PS/NOTE	£89	£145	£289
PS/VP	6381		£129	
PS/VP	6382		£129	£259
PS/VP	6384 F/M/W SERIES		£129	£259
PS/VP	C00-C2A-C20-C4A-C40	£85	£139	£259
PS/1	213S-G11-G13-W11-W13-S11-S13, 2155-G14-W14-S14	£85	£129	£259
PS/1	PRO 386SX 2123	£85	£129	£259
PS/1	386SX 2121	£89	£149	
PS/1	286 2011	£89		
PORTABLE	PS/2 P75	£85	£155	
PS/2	N51 SLC,SX	£89	£159	£299
PS/2	N33 SX	£89	£145	
PS/2	56-57-76-77 SERIES, PS/2 90-95 SERIES	£85	£129	£259
PS/2	SERVER 85, PS/2 E SERIES			
PS/2	95XP, 486 OMF, OHT (ECC)		£209	£399
PS/2	EXP-BOARD FOR PS/2 70 & 80 SERIES	£189	£235	£429
	ADD ON	£85	£139	
PS/2	65SX, 50 021, 60 041-071, 55LS-SX041, 081, 55SX 061-031 EXP. BOARD	£85	£139	
PS/2	50 021, PS/2 60 041-071 EXP. BOARD		£249	£369
PS/2	50Z 031-061 ADD ON	£85	£139	
	EXP. BOARD		£249	£369
PS/2	57SX, M57SLC, 56SLC/LS, 56SX, LS	£85	£129	£259
PS/2	35LS/SX, PS/2 40SX	£85	£139	£259
PS/2	30/286 E21-E31-341, 25-286 006, 036-G06-G36	£80		
DELL				
NOTEBOOK	325N/NC	£99		
NOTEBOOK	NL25, NL20	£110		
LAPTOP	320N/N+, 212N	£95		
SYSTEM	316SX, 325SX	£68		
SYSTEM	320SX, 325P, 325D, 333D/P		£129	
SYSTEM	433-333-325P,333-325D		£129	
POWER D/TOP	486P-66-50-33-25-20-16		£129	
POWER D/TOP	486D-66-50-33-25-20D		£129	
PERFORMANCE	ME SERIES		£129	£259
PERFORMANCE	T-L-M- SERIES		£119	
POWERLINE	466-450-433-425-	£95	£158	£258
POWERLINE	DE, SE SERIES	£95	£158	£258
DESKTOP	200-210-300 SERIES	£68	£136	£238
SHARP				
	PC-6881, 6781, 6891, 6785, 6700, 6741, 6800, 6841	£85	£169	
	PC-7700, 7750		£209	
	PC-8501	£129		
	PC-3000/3100	£175		

COMPUTER		2MB	4MB	8MB
COMPAQ				
CONTURA	3/20, 3/25, 3/25C	£75	£155	£259
CONTURA	4/25, CX, EX (COMPAQ ORIGINAL)		£155	£250
LTE	386 S20		£189	£299
LTE	LITE 4/25, 4/25C, 4/25E, 4/33C		£179	£329
LTE 386	LITE/20, 25, 25C, 25E	£89	£185	£299
SLT	386S/20	£110	£185	
PROLINEA	3/25S, 325ZS	£68		£230
PROLINEA	4/25S, 4/33, 4/50, 4/66, CDS	£79	£129	£259
PROLINEA	MT SERIES, NET 1/25	£79	£129	£259
PROLINEA	Enhanced Family	£79	£129	£259
PROSIGNIA	PC SERIES SP/LT,M & i SERIES	£85	£129	£259
PROSIGNIA	PC SERVER 486/33-DX2/66		£129	£259
PRESARIO	CDS 633-CDS 860-660		£129	£259
DESKPRO	386-33L, 486-25-33L-50L,	£119		£295
DESKPRO	M & SP/LT SERIES (NOT LT486-33)	£129	£249	£375
DESKPRO	XE 433S, 450, 466	£85	£129	£259
PROLIANT	1000 486DX2/66		£129	£259
SYSTEMPRO	486/E SERIES	£119		£295
TOSHIBA NOTEBOOKS				
	T2000/SX/SXE, T2200SX, T1800, T1850,	£85	£159	£295
	T1850C, T1000LE	£85	£159	£295
	T3100E	£95		
	T3100SX	£85	£159	
	T3200SX	£85	£159	
	T3200SXC	£85	£159	
	T3300SL	£85	£159	
	T2400, T3400, T3600		£169	£299
	T4400C/SX/SXC, T6400 T6600 SERIES	£85	£159	£289
	T4500, T4600, T1900/C, 1950/C T4700 SERIES		£169	£299
	T5100	£99		
	T5200-T5200C-T8500	£89		£345
HEWLETT-PACKARD				
VECTRA	486-33ST-66ST-25U PC-	£85		£259
VECTRA	486 33U PC-50U PC-66U PC	£85		£259
VECTRA	486S-20 PC-25T-33T-486VL	£85	£129	£259
VECTRA	VL2		£119	£249
VECTRA	486-25N-33N-50N-66N	£85	£129	£259
VECTRA	386-25N PC-16N PC-20N PC	£68	£160	£248
VECTRA	386-25 PC	£85		£259
VECTRA	Multimedia PC's VL 4/33SE - 4/50SE			
	VL 4/66 - 4/100 - M2 4/50-M2 4/66i		£119	£249
VECTRA	486N2-N21		£119	£249
VECTRA	486M2-M21-XM2 XP/60 - XU		£119	£249
NETSERVER	LE, LM, LF		£129	£259
HP95LX		£175		
PANASONIC				
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	CF380, CF480, CF580 NOTEBOOK	£109	£189	
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intel

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Performance accelerator for CAD, spreadsheets, graphics & DTP

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80387-DX-16 to 33MHz	£58

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2C87-12, 20	£46
3C87-20, 25, 33	£55
3C87SX-20, 25	£55
3C87SX-33	£55
3C87-40	£55

intel OVERDRIVE PROCESSORS (b)

Improve performance up to 70%

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486SX20 to DX2-40	£84
486DX20 to DX2-40	£84
486DX25 to DX2-50	£84
486SX25 to DX2-50	£84
486DX33 to DX2-66	£125

PLEASE CHECK YOUR SYSTEM COMPATIBILITY FOR OVERDRIVES

intel Overdrive DX4(b) "Speed Tripling"

25 MHZ with overdrive socket to 75 MHZ	£162(b)
25 MHZ replacement CPU to 75MHZ	£162(b)
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33 MHZ replacement CPU to 100MHZ	£208(b)

16MB & 32MB MEMORIES ARE AVAILABLE

MEMORY PRICES ARE FLUCTUATING PLEASE CALL FOR LATEST PRICES

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NOVELL
CALL FOR UPGRADES & EDUCATIONAL PRICES
NETWARE OR LAN MANAGER SERVER SUPPORT FOR 1 YEAR
Full telephone and dial-up on-line support by CNE team. Price of support contract includes modem. £1500

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COMMUNICATION SERVER(a)

US Robotics Fax Servers
- Direct Lan Connection (BNC/TP)
- Novell Netware support
- Dos & Windows s/w sit licence - Call for full details

Fax server 1 port £929 2 port £1149

US Robotics Comms Servers £999
- Direct Lan Connection (BNC/TP)
- Novell Netware support
- Host & Remote functionality - Call for full specifications

Software Comms Servers
Winport (Comms + Fax) 1 modem £225
Novell Connect 2 Port £279

PEER TO PEER NETWORKS

All Techno starter kits contain 5M BNC cable & terminators. All Techno add-on kits contain 3M BNC cable. All starter kits contain everything necessary to connect stated no of PCs.

Microsoft Windows for Workgroups

Item Description	Full Product	MLP
Windows for WG 3.11	£89	£87
Add-on for Win 3.1/W4WG 3.1	£42	£39
Add-on for MS-DOS	£42	£40
Techno W4WG Add-on Kits		
For those users with MS Windows 3.1 installed		
Techno W4WG 2 Stn Starter Kit	£149(a)	
Techno W4WG 1 Stn Add-on Kit	£69(a)	
Techno Hardware only Kits		
For those users with MS W4WG 3.11 installed		
Techno 5 Stn Starter Kit H/W only	£175(a)	
Techno 2 Stn Starter Kit H/W only	£66(a)	
Techno 1 Stn Add-on Kit H/W only	£35(a)	

NOVELL Personal Netware
- Share files, directories, printers & CD-ROMs in Dos & Windows
- Universal netware client
- Single Login to all resources

Personal Netware (PNW) £44(b)
Personal Netware 5 Pack £195(a)
Novell Dos 7 inc PNW £49(b)

Techno Personal Netware Kits
Techno PNW 5 Stn Starter Kits £215(a)
Techno PNW 2 Stn Starter KIts £105(a)
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The LANtastic Starter Kit has everything you need to connect your first 2 PC's, and when you want to grow an Add-On Kit will add 1 user, alternatively you can use software on it's own with any NE2000 compatible card. What could be easier?

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NodeRunner 2000Si 1 node kit ..... £110 2 node kit . £190
AI software Win + Dos only ..... £65 5 pack £315
NodeRunner 2000Si card only ..... £85 5 pack £365
AI upgrade 1 user .. £29 5 user ... £95 10 user £165
Lantastic for OS/2 1 user ..... £89 5 user £370
Lantastic Central Station II ..... £Call
Lantastic Utility Pack £249

NETWORKING

Call for quote on Novell Connectivity products

NOVELL NETWARE	5 User	10	25	50	100	250
Netware 4.1 CD ROM (a)	450	1025	1515	2045	2975	5950
Netware 3.12 (a)	426	975	1495	1945	2725	4575

PRINTER SERVER(a)

Please verify exact version of protocol supported with manufacturer

CONNECTION: PARALLEL	SERIAL	MIO(HP)	PROTOCOL: NOVELL (IPX)	NETBIOS	W4WG	WINDOW NT	TCP/IP (UNIX)	APPLE TALK	DEC LAT	PRICE
Intel Netport Express XL BNC/TP										£319
Intel Netport Express XL Token Ring										£449
2	1	-	✔	✔	P	P	✔	✔	-	
Intel Netport Express EL BNC/TP										£259
Intel Netport Express EL Token Ring										£389
2	-	-	✔	-	-	-	-	-	-	
HP JetDirect Ex										£249
1	-	-	✔	✔	✔	✔	✔	✔	-	
HP JetDirect J2552A MIO LJ4 Series										£289
-	-	✔	✔	✔	✔	✔	✔	✔	-	
EMULEX NetQue BNC/TP										£399
1	1	-	✔	✔	-	-	✔	✔	✔	
EMULEX NetJet MIO LJ4 Series										£369
-	-	✔	✔	✔	-	-	✔	✔	✔	

Xircom PCMCIA ETHERNET + MODEM II

Modem: V32TER, V32bis, V22bis + more) IN ONE
Fax: V17, V29, V27TER) TYPE II
Ethernet: BNC, TP, Combo) CARD
Supports all popular PCMCIA 2.0 & 2.1 PCs
Supports all popular networks inc Novell
CEM-10BT - TP £389 CEM-10B2 - BNC £399
CEM-10BC - BNC + TP £425
BABT APPROVED

UPS

TRIPP-LITE UPS - Made in USA. 2yr swap-out.

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SM 600 VA	£229(a)	BC600 VA	£179(a)
SM 750 VA	£289(a)	BC900 VA	£289(a)
SM 900 VA	£399(a)	Special Ltd Offer OMNI	
SM 1250 VA	£499(+)	600VA £189 900VA £299	

PowerAlert For: Netware £55 Unix £89 Dos/Win £55

American Power Conversion (APC) 2yr swap-out.

Smart-UPS (Line-interactive)		Back-UPS (off-line)	
SU250	£185(a)		
SU400	£239(a)	BK250	£89(a)
SU600	£219(a)	BK400	£135(a)
SU900	£419(a)	BK600	£175(a)
SU1250	£525(+)	BK900	£319(+)
SU2000	£925(+)	BK1250	£395(+)

Powerchute for Netware £55 For Unix £95 For Win £59
For VMS (Tape) £195 For Win NT £95 For HP/UX £119
+ = Call for catalogue, volume discounts available

HUBS & REPEATERS

Model carr (a)	Ports TP	Ports BNC	Ports AUI	SMNP Option	Stackable	Price
3COM						
LBuild FMS II	12	OPT	1	Yes	Yes	£399
LBuild FMS II	24	OPT	1	Yes	Yes	£699
SMC						
Tiger TP6	6	OPT	1	No	No	£155
Tiger TP6B	6	1	-	No	No	£165
Tiger TP12	12	-	1	No	No	£299
Tiger CX3	-	3	1	No	No	£219
Elite 3812TP	12	OPT	2	Yes	Yes	£429
Elite 3608TP	8	-	1	No	No	£169
Genius 1000/D	12	1	2	Yes	No	£199
Techno						
8TP Port	8	-	1	No	No	£129
4 Port Repeater	-	4	2	No	No	£339
2 Port Repeater	-	2	2	No	No	£185

NETWORK BACKUP
SEE STORAGE PAGE

ETHERNET PRODUCTS(a)

GENIUS COMBO CARD
GE2000D Lifetime warranty, BNC & TP, NE2000 compatible, s/w & h/w configure, T Piece. See Taxan/Genius page for more info.
£32(b) 20 pack £589(a)

NOVELL D-Link SMC 3Com intel Genius Xircom

B = BNC, A = AUI, T = TP, I = ISA, M = MCA, E = EISA, V = VLB, P = PCI

NETWORK BUS			1PK	5PK	20PK
3COM					
3C509B	B A -	I-16	£67	£319	£1199
3C509BTP	- - T	I-16	£68	£319	£1149
3C509B-Combo	B A T	I-16	£76	£359	£1299
3C529B	B A -	M-32	£155	£709	-
3C529B-TP	- A T	M-32	£156	£709	-
3C579	B A -	E-32	£149	£699	-
3C579-TP	- A T	E-32	£149	£699	-
3C503-16	B A -	I-16	£115	£535	-
SMC Ethercard Plus			1PK	6PK	24PK
Elite Ultra 16	B - -	I-8/16	£59	£339	£1200
Elite Ultra 16T	- - T	I-8/16	£60	£329	£1100
Elite Ultra 16C	B - T	I-8/16	£65	£379	£1379
Elite/A	B A -	M-16	£129	-	-
Elite 10T/A	- A T	M-16	£129	-	-
Ultra 32C EISA	B - T	E-32	£159	£849	-
Etherpower PCI	B - T	P-32	£149	£829	-
Ultra Boot Rom Multi-Protocol					£29
Novell - Genuine Cards			1PK	5PK	20PK
NE2000 +	B - -	I-16	£49	£219*	POA
NE2000T +	- - T	I-16	£40*	£235	POA
NE2000+3	B - T	I-16	£59	£279	POA
D-Link Ethernet			1PK	6PK	
DE220C	B - -	I-8/16	£55	£309	
DE220T	- - T	I-8/16	£55	£310	
DE220CT	B - T	I-8/16	£66	£389	
DE500CAT VLB	B A T	V-32	£199	-	
DE320CT MCA	B - T	M-32	£115	-	
DE400 EISA	B - T	E-32	£149	-	
DE530 PCI	B - T	P-32	£99	-	
DEDE220X Novell Boot Rom			-	£19	
Intel EtherExpress (E.XP)			1PK	5PK	20PK
E.XP PRO 16C	B - T	I-8/16	£57	£279	POA
E.XP PRO Flash 16C	B - T	I-8/16	£65	£315	POA

Ethernet for Portables

Parallel Port	BNC	TP	DUAL
Genius E3000D-II with printer Multiplexer built-in & EPP support	-	-	£76
Xircom Pocket III	£185	£186	£189*
SMC Elite Note	-	-	£169
D-Link DE600	-	£69*	£99
D-Link DE620 EPP Support	£114	£115	£129

PCMCIA	BNC	TP	DUAL
PC-ZEN BNC & TP PCMCIA GOLD CARD			**£149**
3COM 3C589B	-	£135	£149
Xircom PCMCIA - Performance range	£165	£155	£189
SMC Elite Card	-	£140	£159
Genius ME3000II - LOW PRICE	-	-	£109
D-Link DE650	£129	£130	£149

*While stocks last

Boot ROM for NE2000 & clones TEC/NK/R09R £10(c)

Cables & Accessories

Length (m)	3	5	10	15	20	25	30	50
Thin	£6	£8	£12	£16	£20	-	£27	£35
TP	£9	£12	£17	£22	-	£30	-	-
100M Reel	Thin		£45(2xa)		300M TP		£169(2a)	

BNC T-Piece 5 Pack £15(c) BNC F-F Barrel 5 Pack £15(c)
BNC 50ohm Earthed Terminator 2 Pack £4(c) BNC M-M Barrel 5 Pack £17(c)

Government, Colleges, Schools, Hospitals, Local Councils, Large PLC etc. official orders welcome. Minimum credit card order value £20 (ex P&P & VAT). Please ensure the suitability of products with the manufacturer before ordering. All trademarks are acknowledged. Errors & omissions excepted.

TECHNOMATIC

Techno House, 468 Church Lane, London NW9 8UF

PRICES EXCLUDE VAT @ 17.5%

24 YEARS – EXCELLENCE IN SERVICE – QUALITY AND RELIABILITY

Hours of Business:
Mon-Fri: 9.15am to 5.45pm
Sat: 10am to 5.00pm
Callers welcome, please check availability.
Prices valid from 3/5/95

MONITORS (MULTISYNC COLOUR) Carr £8 for 14"/15" £12 for 17"-21"

TAXAN — The Art of Vision

(1 year RTB warranty) — CALL FOR ON-SITE

Resolution:		A	B	C	D	E	Price
400LR	14"	75	60	8	-	-	£185
410LR	14"	75	75	60ni	-	-	£195
420LR	14"	100	100	80	60	-	£239
580+LR	15"	100	100	80	60	-	£275
880LR	17"	100	100	80	60	-	£509
885LR	17"	100	100	100	76	65	£579
895LR	17"	120	120	105	79	67	£799
1080LR	20"	110	110	100	76	65	£879
2100LR	21"	120	120	112	84	72	£1499
Crystall Vision 200 Dualscan LCD Panel							£1249

PHILIPS — Brilliance 15B

CALL FOR ON-SITE

- 15" flat, square tube
- Low radiation & static (MPR-II)
- 0.28mm dot pitch
- Built-in stereo speakers

£262

All Philips monitors are low radiation (MPR-II compliant)

Resolution:		A	B	C	D	E	Price
14C	14"	60	56	87i	-	-	£169
14A	14"	-	-	72	-	-	£203
15B	15"	100	-	72ni	-	-	£262
17A	17"	60	72	70ni	76ni	-	£659
17C	17"	100	72	60	60	-	£435
20T	20"	160	131	103	76ni	-	£1349
21B	21"	160	131	103	84	-	£1365

A=640x480 B=800x600 C=1024x768 D=1280x1024 E=1600x1200
All frequencies are shown in HZ, as per manufacturers spec

NEC — PLUG & PLAY MONITORS

XV - Value Range - Soho Market
XE - Efficiency Range - Corporate Market
XP - Professional Range - DTP/CAD Market

Resolution:		A	B	C	D	E	Price
2V	14"	75	75	70	-	-	£232
XV15	15"	100	100	80	60	-	£289
XE15	15"	120	100	80	60	-	£405
XV17	17"	100	100	80	60	-	£580
XE17	17"	120	100	80	60	-	£715
XP17	17"	160	130	100	76	-	£945
XE21	21"	120	100	80	60	-	£1379
XP21	21"	160	130	100	76	70	£1799

SONY NEW

CPD 15 SF1	15"	£295
CPD 17 SF1	17"	£575
GDM 17 SE1T	17"	£839
GDM 20 SE1T	20"	£1479
GDM 20 SEV	20"	£1319

Panasonic — 2 years on-site

TX-T1537	15"	£323
TX-D1751	17"	£645
TX-D1732	17"	£499
TX-D2032	20"	£1135
TX-D2131	21"	£1369

MONITORS

12" MONO SVGA MONITOR £79(a)
14" COLOUR SVGA MONITOR

- 1024 x 768 non-interlace Res.
- Low Radiation
- 0.28mm Dot pitch

£149(a)

GRAPHICS CARDS

MODEL	RAM	ISA	VLB	PCI
TAXAN 64 BIT ATI MACH ACCELERATOR				
WIN TURBO+ 64	V4MB	£344	£345	£346
WIN TURBO 64 (Upgradeable)	V2MB	£204	£205	£206
WIN BOOST + 64	D2MB	£138	£139	£140
WIN BOOST 64 (Upgradeable)	D1MB	£101	£102	£103
ULTRA PRO	V2MB	MCA £228 EISA £229		
DIAMOND				
STEALTH V64-2 VIDEO MPEG	V2MB	-	POA	POA
STEALTH V64-4	V4MB	-	£325	£329
STEALTH V64-2	V2MB	-	£231	£219
STEALTH D64-2	D2MB	-	£129	£131
STEALTH D64-1	D1MB	-	£98	£100
SPEEDSTAR 64	D1MB	£105	ISA D2MB	£169

TECHWORKS - NEW	RAM	ISA	VLB	PCI
THUNDERBOLT-2	D2MB	-	£135	£116
THUNDERBOLT-1	D1MB	£59	£96	£75

VLB - ET4000, PCI - TRIDENT DG1, ISA - CIRRUS 5422

MATROX - NEW 3D ABILITY ALSO AVAILABLE WITH 220HZ RAMDAC				
IMPRESSION PLUS	V2MB	£265	-	£249
IMPRESSION PLUS LITE	V2MB	-	£199	£200
MGA 2MB VRAM UPGRADE MODULE FOR PLUS RANGE				£199
ORCHID				
FAHRENHEIT PRO 64	V2MB	-	£245	£246
KELVIN 64-2	D2MB	£131	£132	£133
KELVIN 64-1	D1MB	£99	£100	£101
STANDARD SVGA	512KB	£29		
STANDARD SVGA	1MB	£39		

OVERHEAD PROJECTION PANEL

Ideal for large presentations

Quality product made in Norway

Impact 64 (Mono)	£989(a)
Impact 256 (256K colours)	£1949(a)
Impact 21 (2.1M colours)	£2699(a)
Impact 24 (16.7M col, data & video)	£3599(a)
ProLite 400W Portable projector	£599(a)

Designed to fit impact panels.

Red Spot Laser Pointer

Ideal for Presentations
Points up to 50ft GENNKZ031 **£45(c)**

PC PARTS

KEYBOARDS

Microsoft Natural Keyboard £66(a)

KeyPro Programmable Keyboard £39

- 12 programmable function keys
- Built in LCD calculator
- Diagonal cursor keys
- Key-lock function• XT/AT compatible
- Angled template holder with 5 templates

FREE WRIST REST

CHERRY 102 Key AT Keyboard £45
German made using high quality key switches

Mitsumi XT/AT Keyboard £25
Keyboard Extension. Cable XT/AT £7(c)
Keyboard Extension. Cable PS/2 £9(c)
AT Keyboard to PS/2 system Conv. cable £9(c)
Ergo Wrist Rest £4(c)

VDU FILTERS

Glass - TUV & SSI App (b)

	12"	14"
Mirus ECO 14"-15"		£39
Mirus CAD 16"-17"		£59
Carbon Fibre (c)		
Colour Monitor	£8	£9
Mono Monitor	£7	£8

MICE & TRACKER(b)

Microsoft(b)
MS Mouse V2 Serial & PS/2 £38
MS Mouse V2 5pk Serial & PS/2 £169(a)
MS Mouse V2 Bus £49
MS Home Mouse Serial + 18 games £27

Logitech(b)
Pilot II Mouse PC Serial £18
Pilot II Mouse PS/2 £18
Pilot Trackman PC Serial New! £27
Mouseman Serial (or PS/2) £33
Mouseman Cordless Small £49
Trackman II PC Combo £42
Trackman Portable Ser + PS/2 £32
Trackman Voyager £47
Hard Mouse Mat £4(c)

Genius(b)
Hi Mouse range includes mouse mat, 9-25 adaptor and Paintbrush IV
Hi Mouse Serial Only £19
Hi Mouse Serial & PS/2 £21
Mouse One Serial £9
Hi Point Serial £20
Clips on to keyboard, includes carry case and 9-25 adaptor, ideal for notebook user

Mini tablet & pen mouse
Genius Easy Painter: A budget price digitiser for those who want to exercise their free hand creativity. Includes PC Paintbrush for Windows, 3 button stylus, 25.
9 pin adaptor DOS/Windows/ADI Driver. **£69(b)**

Postage & Packing for UK mainland (a) £8 (b) £4 (c) £3 (VAT @ 17.5%) All prices exclude carriage & VAT. All prices & specifications subject to change without notice. Our standard terms and conditions of sale apply to all sales (available on request). Returned goods may be liable to a restocking charge

UNRIVALLED 24 YEARS OF EXPERIENCE

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TAPE BACKUP NEW

HP JETSTORE DAT BACKUP (a)
Fast & Secure Backup

Jetstore 2000 Workstation-based kit
2Gb drive, Arcsolo s/w & SCSI card

Jetstore 5000 Netware Server-based kit
2Gb to 8Gb drive, 250-user Arcserve v4/v5 & SCSI card

Jetstore 6000 Netware Server-based kit
4Gb to 16Gb drive, 250-user Arcserve v5 & SCSI card

(Drive Only:	Int	Ext)	ISA Kit
Jetstore 2000	£645	£775	£889
Jetstore 5000-v4	£735	£839	£1499
Jetstore 5000-v5	£735	£839	£1839
Jetstore 6000-v5	£885	£985	£2039

HP Support Pack for Jetstore £200(b)
(Provides 3 years OSM direct from HP)

TECHNO DAT Drives Kits (a) 1 yr RTB warranty

Leading DAT Drives (HP/Sony)	INT	EXT
TEC 2Gb DAT	£579	£699
TEC 2-8Gb DAT	£669	£769
TEC 4-16Gb DAT	£799	£899
TEC 24-48Gb DAT Autoloader	£1959	£2049

Cheyenne Backup Software (a)
Arcsolo DOS £89 Win £95 OS/2 £135

Arcserve NLM

No of Users	5	10	25	50	100	250
v4 for DOS	181	312	520	630	745	815
v5 for Win	181	330	630	735	855	1050

COLORADO BACKUP SYSTEMS (a)
NEW LARGER CAPACITIES

Internal Tape Backup Solutions
Run from PC's floppy controller, or use an optional fast controller card for speed and compression

Jumbo 250 80/250Mb (QIC-80)	£85
Jumbo 350 170/340Mb (QIC-80XL)	£95
Jumbo 700 340/680Mb (QIC-3010)	£149
KE-10 External Mounting Kit	£61
FC-20 Fast Controller card	£50

Full range of accessories & mounting kit - Call

Parallel Port Backup Solutions

Trakker 250 80/250MB (QIC-80)	£165
Trakker 350 170/340MB (QIC-80XL)	£183
Trakker 700 340/680MB (QIC-3010)	£243
Tracker Carrying Case	£39
Colorado Backup Software Win v2	£49
SK35 Colorado Backup for OS/2	£79
SU53J Unix/Xenix Backup s/w	£79

EXABYTE HIGH PERFORMANCE TAPE DRIVES
- SCSI-2 Interface • Mini cartridge (DC2000 format)
- 1Gb native, 2Gb compressed
- 567Kb/sec data transfer rate
- Kits complete with PC card, s/w, cable & 1 cartridge

EXABYTE 2501 FS1Gi Internal Kit	£539(a)
EXABYTE 2501 FS1Ge Internal Kit	£649(a)
EXABYTE 2501 Bare drive only	£399(a)

PARALLEL PORT DRIVES(a)

BackPack Hard Disk Drives
420Mb £329 850Mb £409 1.2Gb £515

BackPack Floppy Disk Drives
1.44Mb £125 2.88Mb £169 1.2Mb £129

BackPack CD-ROM Quad speed £259

Tape Drives - Also see Colorado section

BackPack 1080 250Mb (QIC-80) £225

BackPack 900 Up to 900Mb (QIC 3010) £365

FLOPPY DRIVES(b)

Teac. 1.44Mb 3½" FD + 5¼" Kit £36

Teac 1.2Mb 5¼" Floppy Drive £42

2 IN 1 : Dual Floppy Drive £89
3½" + 5¼" in half height frame

SCSI ACCESSORIES

SCSI DEVICE CASES WITH PSU(a)
Includes: 50-way Centronics input & output, PSU, mains cable, fan, activity LED, SCSI ID switch, mounting screws.

	Single	Dual	Quad
3.5" HH	£79	-	-
5.25" HH	£85	£109	£189

SCSI CABLES(c)

INTERNAL (50-way IDC-IDC)	Length		
1 device 28cm	£6	2 devices 45cm	£9
4 devices 1m	£22	6 devices 1.4m	£32

EXTERNAL

50-way Centronics each end	1m	£18
50-way Micro-D each end	1m	£45
50-way Centronics to Micro-D	1m	£38
25-way D to 50-way Centronics	1m	£25

TERMINATORS (50-way Centronics)
Passive £9 Active £29 Forced Perfect £69

PC PARTS(b)

High Speed Multi I/O Cards
- Enhanced IDE mode 3 (ATA-2) for VLB card
- Standard IDE mode for ISA card
- 2 x 16550 UART buffered serial ports
- 2 x 2.88Mb floppy disk support
- Multi-mode parallel port (standard, Bi-Dir, ECP, EPP)

IDE-4 ISA £39(b) IDE-5 VLB £59(b)

IDE-1 AT HD/FD only inc cables	£12
IDE-2 AT HD/FD/2S/1P inc cables	£16
IDE-3 VLB HD/FD/2S/1P card	£19
I/O-1 AT 2S/1P/1G	£14
I/O-2 XT/AT Dual Serial Port	£14

M-O DRIVES(a)

Fujitsu 3.5" Optical Drives

M2512A 230Mb drive only (int)	£475(a)
M2512A 230Mb Drive only (ext)	£575(a)
M2512A 230Mb PC SCSI Kit (ext)	£659(a)
M2512A 230Mb PC Parallel Port Kit	£749(a)

Panasonic 5.25" Optical Drives

LF7304 1.5Gb SCSI int drv	£1477(a)
LF7300B 1.5Gb SCSI ext drv	£1539(a)

SCSI CONTROLLERS(b)

COREL SCSI - Support the widest range of SCSI card & devices in Dos, Windows & Netware.
COREL SCSI! S/w for Dos/Win v2 £65
COREL SCSI! Network Manager £267

ADAPTEC - INDUSTRY STANDARD SCSI

	BUS TYPE	CARD ONLY	ASPI S/W KIT
1505	ISA	-	£42
1515	ISA	-	£67
1542C	ISA	£129	£172
1640	MCA	-	£235
2742T	EISA	£199*	£269
2842	VLB	-	£169
2940	PCI	-	£199

*Single Channel

ADAPTEC PARALLEL PORT ADAPTERS
T358 MiniSCSI EPP (1Mb/sec) £175

PCMCIA SCSI CONTROLLERS
ADAPTEC PCMCIA SCSI card £169
FUTURE DOMAIN PCMCIA SCSI 2GO £195
DPT FAST SCSI-2 Ideal for Servers

CACHING CONTROLLERS
DPT ISA 16 Bus Mastering kit £199
DPT EISA 32 High Performance kit 0MB £329
DPT Caching Module Upgrade 0MB £299
DPT Disk Array Module Upgrade £299

I/O-4 XT/AT Dual Parallel Port	£14
Monitor Extension Cable for SVGA	£15
Dual IDE Hard Drive Cable	£8
Dual Floppy Drive Cable	£7
Mains to PC 2m Cable inc Plug	£6
Mains to PC 4m Cable inc Plug	£9
PC to Monitor 2m Mains Cable	£7
Surge Protected 4 Way Mains Ext.	£19
File Transfer 2M Universal 9&25 cable	£18
- for PC to PC transfer Program in MS Dos 6	
PS/2 to AT Serial Port Adapter	£5

PCMCIA DEVICES (a)

HARD DISKS - TYPE III
NEW LOW PRICES

Maxtor 105Mb £235 170Mb £299
MiniStor with Stacker Anywhere on board
130Mb/260Mb £269 170Mb/340Mb £325

PCMCIA FOR DESKTOPS

DOCKET SOCKET £199
A standard Type III slot in a 3.5" drive bay. Inc. 5.25" adaptor & 16-bit interface with rear Type II slot.

MAXTOR DESKRUNNER
Provides 1 Type III front slot £95(a)

TAPE CARTRIDGES

Colorado Formatted - 3 Pack(c)
DT-120 (QIC-40) £49 DT-250 (QIC-80) £45
DT-350 (QIC-80XL) £54 DT-740 (QIC-3010) £69

3M QUALITY TAPE CARTRIDGES

Unformatted	1(c)	5pk (b)
DC2120 (QIC-80)	£9.75	£45
DC2120XL (QIC-80XL)	£14	£66
MC3000XL (QIC-3010)	£21	£100
DC6150	£12	£55
DC6250	£15	£70
DC6525	£17	£80
Exabyte DC3000XL (1Gb)	£23	£105

4mm DDS DAT tapes - 5 tapes per pack

	3M(1pk)	SONY	HP
1.3Gb 60m	-	-	£45
2Gb 90m	£9	£55	£55
4Gb 120m DDS-2	-	-	£79

HP DDS DAT Cleaning Kit - 2 tapes £24

DISKETTES(c)

3M 3.5" DISCS (10/PACK)
HD £6.00 HD Formatted £7.00

BULK DISCS 3.5" HD (1.44MB) FORMATTED
50: £25.00 100: £44.00 200: £82.00(b)

Floptical Diskettes 21Mb 5pk £70 10pk £130

Magneto Optical Diskettes

128Mb	£26	10pk	£240
230Mb	£40	10pk	£380
1.5Gb	£95	5pk	£459

CALL FOR HIGH VOLUME DISCOUNTS

JVC/Sony 5.25" HD Discs
100 £20(b) 200 £38(b)

PCI MOTHERBOARDS NEW

Intel Pentium PCI Boards
- 3 PCI slots • 4 ISA slots
- On board ATAPI/2 IDE, FD, EPP, 2 x high speed serial
- 72 Pin Simm Sockets (70ns)
- Baby AT size • 256Kb cache
- Intel PCI Chip Set

Designed and manufactured by Intel

Pentium 90 MHZ CPU + Board	£665(a)
Pentium 66 MHZ CPU + Board	£555(a)

SPECIAL OFFER
PENTIUM 90 + BOARD + 2 X 8MB RAM
£1175(a)

CACHING CONTROLLERS(b)

IDE - 0MB fitted
- Support for Dos, Windows, NT, OS/2 Netware, SCO AT&T UNIX
- Hardware disk mirroring (RAD 1)
- Up to 4 drives supported • Fast ATA support
- 4 x 30 pin Simm sockets (16MB max)
- Auto configure & drive select

TIC 10I	ISA	0Mb	£59
TIC 20V	VLB	0Mb	£99
TIC 30E	EISA	0Mb	£159
TIC 40P	PCI	0Mb	£149

SCSI - 0MB fitted
- Support for Dos, Windows, NT, OS/2 Netware, SCO AT&T UNIX
- AHA 154X compatible
- Supported by Corel SCSI (approved)
- Hardware disk mirroring • S/W configuration
- 4 x 30 pin Simm sockets (16MB max)

TSC 10I	ISA	0Mb	£149
TSC 20V	VLB	0Mb	£249
TSC 30E	EISA	0Mb	£289
TSC 40P	PCI	0Mb	£POA

HARD DISKS (a)

BAD BLOCK - EMERGENCY!!
Recover lost data on hard disk or floppy with SPINRITE 3.1 "the most comprehensive data recovery package available. If you can't get your data back with this, you're in trouble" PC PRO April 95. No PC should be without it.
CE80 S23 Spinrite 3.1 Data Recovery £99

For improved IDE performance upgrade to our enhanced -IDE VLB controller (IDE-5)

MODEL	SIZE (Mb)	PRICE
Fast - SCSI-2 Drives (a)		
HP 1GB	C3323S	£389
HP 2GB	C2490S	£725
IBM1GB	Pegasus	£365

CONNER

IDE		
CF-420A	420	£123
CF-540A	540	£133
CF-850A	850	£229
CF-1275A	1200	£299
Fast SCSI-2		
CFA540S	540	£235
CFP1080S	1080	£389

SEAGATE

IDE		
ST9385AG (2.5")	341	£260
ST3491A	428	£117
ST3660A	545	£139
ST5850A	850	£225
ST31220A	1050	£289
FAST SCSI-2		
ST5660N	528	£229
ST31230N	1050	£369
ST32430N Hawk	2100	£699
ST32550N B\cud	2100	£799
ST15230N Hawk	4000	£1299
ST15150N B/cud	4000	£1399
ST410800N	9090	£2479

FUJITSU(a)

IDE		
M2681T	264	£101
M2682T	352	£115
M2684T	528	£135
FAST SCSI-2		
M2637SA (2.5")	240	£199
M2684SA	530	£169
M2915 NEW	2170	£829

MICROPOLIS(a)

FAST SCSI-2		
4221S (LP) 3.5"	2050	£765
3243S (HH) 3.5"	4294	£1269
1991S (FH) 5.25"	9100	£1999

SPECIAL OFFER - Limited Stocks
3GB Fast SCSI-2 FH 5.25" 1936 **£845**

TEAC REMOVABLE DRIVES (a)

All kits contain removable HDD, docking bay (5.25" HH), configuration disk, carrying case and installation manual drives work with standard IDE controllers and are bootable.

Size	Dual Bay	Single Bay	Extra Drive
250Mb	£315	£285	£248
360Mb	£399	£363	£327
540Mb	£580	£545	£499

5.25" ADAPTOR KIT FOR 3.5" HARD DRIVES £12(c)
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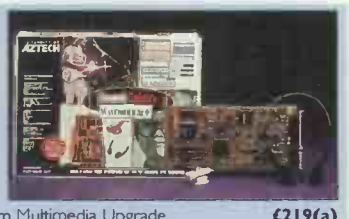

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TECHNO VALUE

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TECHNO VALUE

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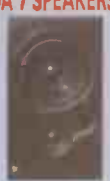

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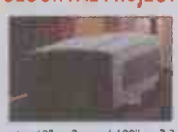

Picture size 60" at 2m and 100" at 3.3m, with superb picture quality, with a resolution of 320 lines horiz. "As with all LCD projection systems the picture does look dotty, akin to a picture superimposed on a fine mesh grid. The projection system gives no flicker and the picture is totally flat. The result is a persuasively realistic image, like watching a miniature cinema rather than a TV." What Home Entertainment April 1995.

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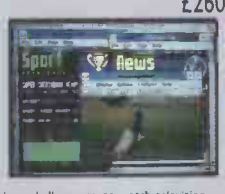

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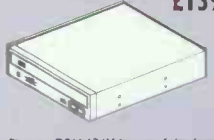

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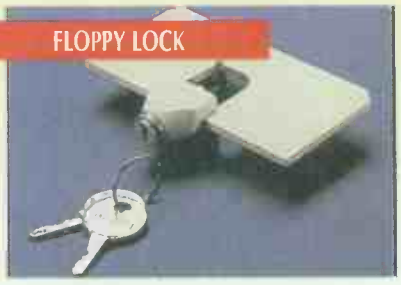

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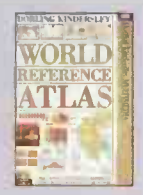

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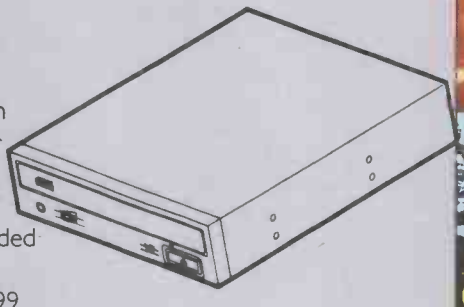

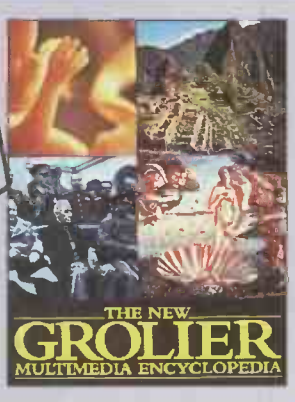

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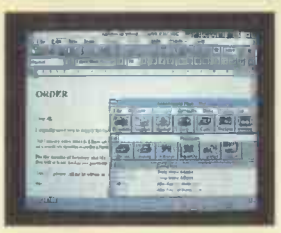

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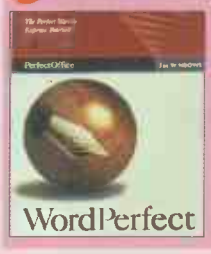

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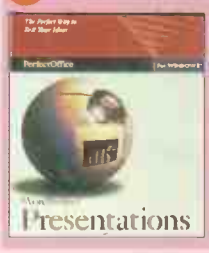

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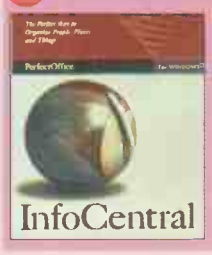

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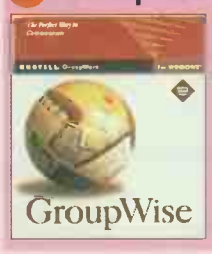

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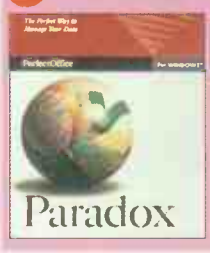

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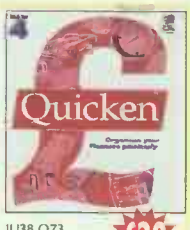

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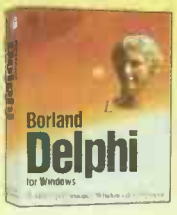

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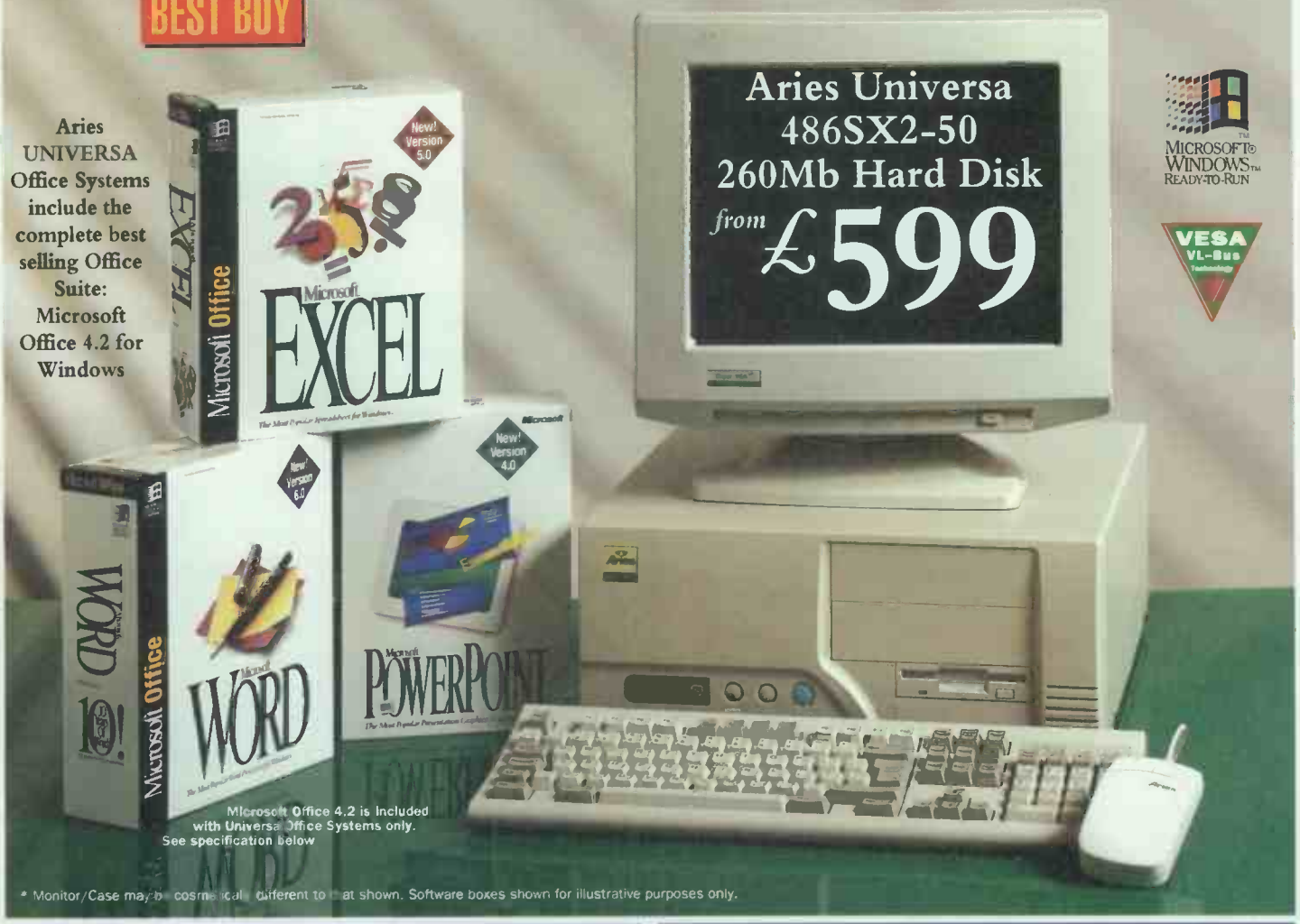

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- 1Mb PCI Graphics Accelerator
- **Microsoft Office 4.2** for Windows*

£1295

STRIPPED DOWN PRICES, YES. STRIPPED DOWN MACHINES, NEVER!

When a PC carries the Aries brand you know you are going to get the system you really want at the price you really want, without sacrificing features or quality. That's why we don't bundle loads of any old software that you'll never use. We offer you the world's best selling packages from Microsoft at a quite remarkable price.

Built to the most exacting standards, offering lots of expansion for the future and backed by the UK's premier computer dealer. You really can't buy better. Anywhere.

OPTIONS for Universa and Universa Office PC:

4Mb to 8Mb RAM upgrade	£135
8Mb to 16Mb RAM upgrade (Pentium)	£270
Upgrade to 15" Aries 6000i Monitor	£89
12 Months On-Site Maintenance	£29
3 years On-Site Maintenance	£98

All Systems Include:

- Super VGA 1024 x 768 Colour Monitor*
- 3.5" 1.44Mb Floppy Drive
- 102 key enhanced keyboard
- Dual Serial, Parallel & Games Port
- MS compatible mouse
- MS DOS v6.22
- MS Windows v3.11
- Lifetime Technical Support Hotline

***Microsoft Office 4.2 Includes:**

- MS Office Manager
- MS Word for Windows v6
- MS Excel for Windows v5
- MS Powerpoint for Windows v4
- MS Mail (Licence) Supplied when you purchase disks & manuals

Office Software supplied pre-loaded for your convenience with built-in tutorial. Disks & manuals available as an optional extra

Credit Card/Sales Order Line: 01582 745555 • Technical Support: 01582 745500 • Switchboard: 01582 487777

Universa MultiMedia

30 TITLES · 24 CDS ·

Bundled CD software with Aries Universa Multimedia systems

- MS Works for Windows
- MS Encarta 1995
- MS Money
- MS Dangerous Creatures
- MS Golf
- MS Scenes (3.5"Disks)
- MS Multimedia Jumpstart
- Paramount Movie Select
- Home Medical Advisor
- Arts & Letters Warbirds
- TIME Man of the Year
- PC Animation festival
- World Vista Atlas
- World Fact Book
- Best of Media Clips
- Fantasia's 2000 Fonts
- Rock, Rap'N Roll
- PC Karaoke - Classic Oldies
- PC Karaoke - Family Fun
- DOOM : Episode One
- Sherlock Holmes - Detective
- Space Quest 4
- Battle Chess Enhanced
- Steller 7
- Sierra's Kings Quest V

10 out of 10 titles on 3.5":

- English
- French
- Maths Numbers
- Maths Algebra
- Junior Essentials

CD Titles may vary due to availability

Microsoft Office 4.2 is included with Universa Office Systems only. See specification below

* Monitor/Case may be cosmetically different to that shown. Software boxes shown for illustrative purposes only.

ARIES *Universa* MULTIMEDIA PC SYSTEMS

486DX2-66M

- 486DX2 66MHz Processor
- Processor Upgradable VL-Bus Motherboard to Pentium® Overdrive
- 4Mb RAM expandable to 64Mb
- 260Mb Hard Disk (12ms)
- 16 bit Super VGA Graphics Card
- **Multimedia Kit** (see below)

£895

Pentium P60M

- Pentium P60 60MHz Processor
- 256K Cache Ram
- 8Mb RAM expandable to 64Mb
- 540Mb Hard Disk (12ms)
- 1Mb PCI Graphics Accelerator
- **Multimedia Kit** (see below)

£1399

ARIES *Universa* OFFICE MULTIMEDIA PC SYSTEMS

486DX2-66M Office

- 486DX2 66MHz Processor
- Processor Upgradable VL-Bus Motherboard to Pentium® Overdrive
- 4Mb RAM expandable to 64Mb
- 420Mb Hard Disk (12ms)
- 16 bit Super VGA Graphics Card
- **Microsoft Office 4.2** for Windows*
- **Multimedia Kit** (see below)

£1049

Pentium P60M Office

- Pentium P60 60MHz Processor
- 256K Cache Ram
- 8Mb RAM expandable to 64Mb
- 540Mb Hard Disk (12ms)
- 1Mb PCI Graphics Accelerator
- **Microsoft Office 4.2** for Windows*
- **Multimedia Kit** (see below)

£1489

All Multimedia Systems include:

- Dual Speed CD-ROM Drive
- 16 Bit Sound Blaster/Pro Compatible Sound Card
- Quality Hi-Fi Stereo Speakers
- 30 Software titles on 24 CDs worth over £500
- Super VGA 1024 x 768 Colour Monitor*
- 3.5" 1.44Mb Floppy Drive
- 102 key enhanced keyboard
- Dual Serial, Parallel & Games Port
- Microsoft compatible mouse
- MS-DOS v6.22
- MS Windows v3.11
- Lifetime Technical Support Hotline

Multimedia Bundle: 30 Titles on 24 CDs

OPTIONS for Universa and Universa Office PC:

4Mb to 8Mb RAM upgrade	**£135**
8Mb to 16Mb RAM upgrade (Pentium)	**£270**
Upgrade to 15" Aries 6000i Monitor	**£89**
12 Months On-Site Maintenance	**£29**
3 years On-Site Maintenance	**£98**

***Microsoft Office 4.2 includes:**

- MS Office Manager
- MS Word for Windows v6
- MS Excel for Windows v5
- MS Powerpoint for Windows v4
- MS Mail (Licence)

Supplied when you purchase disks & manuals

Office Software supplied pre-loaded for your convenience with built-in tutorial. Disks & manuals available as an optional extra

All prices, specifications and offers subject to change without notice. Please ensure suitability with manufacturer before ordering. All returns subject to handling charge. Goods not sold on a trial basis. Sales subject to our Terms & Conditions available on request. E & OE.

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The Aries Perfecta® 7000 Series

The Most Advanced Yet!

NOW WITH **340Mb** Hard Disk as Standard

Notebook shown here with 19mm Trackerball with 2 buttons supplied as standard

PC MAGAZINE EDITORS' CHOICE

Introducing a new range of beautifully designed notebooks that genuinely give you the power and facilities you expect from your desktop PC. The Aries Perfecta 7000 is packed with intelligent energy-saving features that ensure you get longer life and safer data. PCMCIA flexibility gives fax/modem communications on the move and Ethernet in the office (with optional cards). With a choice of processors up to DX4 100MHz and RAM expandable to a mammoth 32Mb, the 7000 packs the power to run your Windows applications, and an ergonomic design to make them easier to use. While the standard trackerball or the new optional trackpoint control stick allows you to control the cursor smoothly and effortlessly.

We've taken the portable computer a long way, think where you can take it.

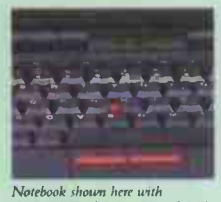
intel inside

> "With plenty of processing power, (and) enough battery life to handle a transcontinental flight easily, ...a value winner." "...the lightest full-size notebook in the roundup; it also had excellent battery life..., optional audio and a good price..."
>
> ***PC MAGAZINE, Cover Story: Notebooks***

> "...A great Windows PC, and an excellent value." "...the fact that you get the amount of performance we did from a battery charge speaks highly of the engineering."
>
> ***LAPTOP BUYERS GUIDE & HANDBOOK, First Look***

> "Ranks above many famous-name notebooks. And in terms of pointing devices, it's definitely got them out-numbered." "...deserves a spot on your short list."
>
> ***COMPUTER SHOPPER, PC Reviews***

> "Represents the best kind of innovation in the rapidly changing field of notebook computers. It keeps the best of proven technologies, such as a sharp display, and complements them with new technologies, such as those employed to stretch battery life. The long battery life makes it a good choice for anyone who needs a basic notebook that also delivers solid performance."
>
> ***WINDOWS MAGAZINE, WinLab First Impressions***
>
> *Reviews done on identical NoteBook in the USA*



Notebook shown here with Optional TrackPoint Control Stick

Ergonomical designed sloping palm rests

NEW LOW PRICES

i486sx™-33 Mono
£1029

i486sx™-33 Dual Scan Colour
£1399

Aries Perfecta 7000 Series

- Intel SL-Enhanced CPU
- 4Mb RAM expandable to 32Mb
- 340Mb Hard Disk Drive
- Advanced Power Management
- LCD Status Indicator
- Fully Modularised Design - Upgradable CPU, LCD, Removable Hard Disk & Keyboard
- VESA Bus Video with GUI accelerator
- Advance PMU Function
- Mono/Stereo 16 bit Sound System (Optional)
- Audio Line (In/Out) with volume control
- Built-in Speaker/Microphone (requires sound system)
- 1.44Mb 3.5" Floppy Drive
- 82 key QWERTY Keyboard
- 19mm Trackerball (Optional Track-point device)
- PCMCIA slots (2 x Type II/1 x Type III)
- Hi-Speed 16C550 Serial Port
- Enhanced Parallel Port (EPP/ECP support)
- External Super VGA Monitor Port
- External Keyboard/PS/2 Mouse connector
- Optional Internal 14.4K Fax/Modem
- Rechargeable Ni-MH Battery Pack
- MS-DOS v6.22 & Windows v3.11
- Weight: 3Kg
- Carrying Case

NEW LOW PRICING

The Power & Facilities of a Desktop in a Notebook

LOW POWER 3.3V	All the components in the notebook run at 3.3V, giving up to three times longer life.
SOUND PLUG-IN	Mono/Stereo sound system with built-in speaker/microphone by adding a soundcard.
SUSPEND TO DISK	Suspend to memory or suspend to disk ensures data is never lost when you leave the notebook.
EXTERNAL STATUS INDICATOR	"At a glance" multi colour indicator on the top cover shows if machine is charging, charged, suspended with battery charging or charged.
INTERNAL STATUS INDICATOR PANEL	12 distinct icons will display, flash or change appearance to give you a complete report on the state of the machine including a 5 step graduated remaining charge gauge.
ADVANCED POWER MANAGEMENT	Complete with a comprehensive set of 16 features that will allow you to customise the operation of the machine to your benefit.
FLEXIBLE PCMCIA	Compartment for two type I/II or one type III PCMCIA slot with removable cover.
UP TO 32Mb RAM	If your applications demand it, then we can supply it.
REPLACEABLE HARD DISK DRIVE	Running out of space? Replace the Hard Disk Drive easily. The system BIOS will automatically detect the new HDD
SUPERB PERFORMANCE	CPU Upgrade up to Intel DX4-100 and 512KB of level 2 Cache! External connectivity enhanced by use of 16C550 Serial Port and Parallel Port with support for EPP/ECP

All prices are for standard 340Mb Hard Disk Supplied with FREE Carrying Case

Display	10" Mono 64 Grey Scale	10" Colour Dual Scan	10" Colour TFT Active Matrix
7000 Series	**7100**	**7300**	**7400**
SL i486SX™-33	£1029	£1399	£1999
SL i486DX2™-50	£1129	£1429	£2029
SL i486DX4™-75	£1159	£1459	£2059
SL i486DX4™-100	£1199	£1499	£2099

ADDITIONAL OPTIONS

4 to 8Mb RAM Upgrade*	£159	PCMCIA 14400 Fax/Modem	£129
4 to 16Mb RAM Upgrade*	£525	PCMCIA Ethernet Card	£99
4 to 32Mb RAM Upgrade*	£1089	Spare NiMH Battery Pack	£69
Track-point device	£25	Spare AC Mains Adaptor	£49
8 bit Internal Sound Card	£25	Car Lighter Adaptor	£29
16 bit Internal Sound Card	£49	Docking Station	£339
Aries HiFi Speakers	£29	External Keyboard	£25
PCMCIA 9600 Fax/Modem	£59	*Requires module exchange*	

7000 Notebook Hard Disk Upgrades
(Prices valid when purchasing Notebooks only)

UGA0530/A	340Mb to 540Mb HDD	£125
UGA0540/A	340Mb to 730Mb HDD	£249

BUSINESS LEASING Low Cost Leasing - Call for details

1 YEAR SUPPORT
All Perfecta Notebooks are covered by a FREE 12 Months Warranty in mainland UK.

2 YEAR GOLD CARE
For 12% of the cost, we will collect, repair and return your notebook within mainland UK for the first 24 months.

HOTLINE SUPPORT
All Perfecta Notebooks are covered by Unlimited Lifetime Support. We want you to get the best from your machine, so we offer a comprehensive support package over the phone.

All prices, specifications and offers subject to change without notice. Please ensure suitability with manufacturer before ordering. All returns subject to handling charge. Goods not sold on a trial basis. Sales subject to our Terms & Conditions available on request. E & OE.

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Networking Made Easy

Watford Electronics can now offer you a solution to your networking requirements, no matter how large or small. You can be confident that we will give the best advice and support that you have come to expect from Watford. We stock a wide range of Ethernet products from manufacturers such as SMC, 3Com, Intel, Genius and others, and we also have our own Aries branded products.

WATFORD
the Award Winners
PRICE PROMISE
If you can find a better price call us, we'll try and beat it.

ETHERNET ADAPTERS

16-bit ISA Bus Adapters	Connection	Single Card Pack Part No.		5 Card Pack Part No.	
3Com EtherLink III	BNC/AUI	CNA0610	£65	CNA1900	£319
3Com EtherLink III	UTP/AUI	CNA0620	£65	CNA1910	£319
3Com EtherLink III	BNC/UTP/AUI	CNA0630	£75	CNA1920	£355
Aries NE2000 II	BNC/UTP	CNA0040	£30	CNA1710	£145
D-Link DE-220CT	BNC/UTP	CNA1570	£69	CNA1730	£379 (6pk)
Genius GE2000 II	BNC/UTP	CNA1130	£32	CNA0940	£145
Genius GE2000 PnP	BNC/UTP	CNA2130	£tba	CNA2140	£tba
Intel EtherExp. 16C Pro	BNC/UTP	CNA1260	£64	CNA1270	£295
Intel EtherExp. 16C Pro Flash	BNC/UTP	CNA1280	£66	CNA1290	£320
Novell NE2000 Plus	BNC	CNA1510	£48	CNA2070	£235
Novell NE2000T Plus	UTP	CNA1250	£48	CNA2080	£235
SMC Elite 16 Ultra	BNC	CNA0910	£59	CNA1200	£339 (6pk)
SMC Elite 16T Ultra	UTP	CNA0880	£59	CNA0900	£339 (6pk)
SMC Elite 16C Ultra	BNC/UTP/AUI	CNA0890	£64	CNA1210	£379 (6pk)
SMC EtherEZ	BNC	CNA2600	£65	CNA2640	£309
SMC EtherEZ	UTP	CNA2610	£65	CNA2650	£309
SMC EtherEZ	BNC/UTP	CNA2620	£72	CNA2660	£339
32-bit EISA Bus Adapters	**Connection**	**Single Card Pack**		**5 Card Pack**	
3Com EtherLink III	BNC/AUI	CNA0710	£140	CNA1950	£699
3Com EtherLink III	UTP/AUI	CNA0720	£140	CNA1960	£699
Genius E1320	BNC/UTP	CNA1370	£169	CNA0960	£830
Intel EtherExpress 32 Flash	BNC/UTP/AUI	CNA1420	£189		-
SMC Elite 32C Ultra	BNC/UTP/AUI	CNA1780	£159	CNA1740	£829
MCA Bus (PS/2) Adapters	**Connection**	**Single Card Pack**		**5 Card Pack**	
3Com EtherLink III	BNC/AUI	CNA0730	£146	CNA1930	£709
3Com EtherLink III	UTP/AUI	CNA0740	£146	CNA1940	£709
D-Link DE-320	BNC/UTP	CNA1580	£99		-
Genius E1162M	BNC/UTP	CNA1360	£159	CNA0960	£779
SMC Elite/A	BNC	CNA0350	£119		-
SMC Elite 10T/A	UTP	CNA0790	£119		-
VESA Local Bus Adapters	**Connection**	**Single Card Pack**		**5 Card Pack**	
Aries CE3200-VL	BNC/UTP/AUI	CNA1880	£99	CNA2670	£475
D-Link DE-500CT	BNC/UTP	CNA1750	£189		
PCI Bus Adapters	**Connection**	**Single Card Pack**		**5 Card Pack**	
SMC EtherPower	BNC/UTP	CNA1240	£125	CNA2700	£579
D-Link DE-530CT	BNC/UTP	CNA2710	£95		
Genius GE2500	BNC/UTP	CNA2110	£89	CNA2120	£439
Parallel Port Adapters	**Connection**	**Single Card Pack**		**5 Card Pack**	
Genius E3000 II	BNC/UTP	CNA1145	£73	CNA1230	£360
D-Link DE-620CT	BNC/UTP	CNA1660	£129		-
SMC EliteNote	BNC/UTP	CNA1630	£159		-
PCMCIA Adapters	**Connection**	**Single Card Pack**		**5 Card Pack**	
3Com EtherLink III	BNC/UTP	CNA1490	£145		-
D-Link DE-650CT	BNC/UTP	CNA2720	£135		-
Genius ME3000 II	BNC/UTP	CNA1620	£99	CNA1770	£489
SMC EliteCard	BNC/UTP	CNA2630	£149		-

Genius® Ethernet Products

GE2000 II
Ethernet Card

£32

The GE2000 is a 16-bit Ethernet card which is 100% NE2000 compatible. Installation is simple - just plug in and run the software.

- BNC and UTP connections as standard
- 35% faster than Novell NE2000 cards
- Support for Netware, WFWG & TCP/IP

Single: £32 3 Pack: £89 5 Pack: £145

£73

E3000 II
Parallel Port Adapter

The E3000 II Ethernet adapter offers higher performance than any other similarly priced model available.

- BNC and UTP connections as standard
- Through connector for local printer
- Support for bi-directional and enhanced parallel port
- PS/2 mouse port power cable included

Single: £73 3 Pack: £215 5 Pack: £360

yes NetWare Tested and Approved

Personal Netware Card Pack
-Genius GE2000 II Ethernet card
-Novell Personal Netware
Special Offer Price £49

NOVELL NETWARE

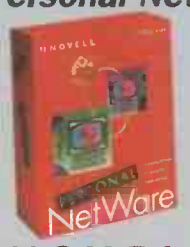
No of Users	5	10	25	50	100	250	Manuals
Netware 3.12	£426	£965	£1445	£1945	£2699	£4575	£155
Netware 4.1 (CD)	£450	£1025	£1515	£2045	£2865	£5950	£135

Call for prices on Netware Upgrades and also for Educational Discounts

Netware 4.1 Upgrades - from any previous version

Upgrade From	Upgrade To 5	10	25	50	100	250
5 User	£239	£879	£1429	-	-	-
10 User	-	£459	£1169	£1639	-	-
25 User	-	-	£699	£1289	£2249	-
50 User	-	-	-	£939	£1799	£4179
100 User	-	-	-	-	£1249	£3879
250 User	-	-	-	-	-	£2339

Personal Netware Networking Kits



Link up to 30 PCs with Novell's new Peer to Peer networking software, and have shared access to files, printers and CD ROM drives, all at the push of a button. With support for DOS and Windows, Personal Netware is the ideal low cost solution for small scale installations.

- 2 User Pack £89
- 5 User Pack £210
- 10 User Pack £425
- Extra User Pack £55
- Notebook Pack £119
- PCMCIA Pack £179

NOVELL

All kits contain Ethernet card, 5m cables, software and connectors*

Microsoft®
Windows for Workgroups Networking Kits

MICROSOFT® WINDOWS™

Now, Windows 3.1 users can have easy acces to shared resources - such as printers, fax modems, CD-ROM drives and data files, all at the click of a mouse button. Send messages to other users or even have 'live' conversations over the network.

For users without Windows 3.1		For users with Windows 3.1	
2 User Starter Kit	£235	2 User Add-On Kit	£149
5 User Starter Kit	£595	5 User Add-On Kit	£375
Extra User Starter Kit	£115	Extra User Add-On Kit	£69
Notebook Starter Kit	£155	Notebook Add-On Kit	£119

All packs contain Ethernet card, 5m cables, software and connectors.

ETHERNET CABLING

Length	1m	3m	5m	10m	15m	20m	30m	50m	100m	300m
Thinnet	£3	£5	£6	£8	£10	£15	£21	£29	£35	£115
UTP	£2	£4	£6	£9	£13	£16	£22	£30	-	£149

**Software supplied will be cosmetically different from that shown*

ETHERNET HUBS

3 Com	UTP	BNC	AUI	SMNP	
LinkBuilder TP/12	12	-	1	no	£259
LinkBuilder FMS II	12	opt	1	opt	£399
Aries	**UTP**	**BNC**	**AUI**	**SMNP**	
EH-8	8	1	1	no	£129
EH-12	12	1	1	no	£249
EH-16	16	1	1	no	£279
EH-32	32	1	1	no	£459
Genius	**UTP**	**BNC**	**AUI**	**SMNP**	
GH4080	8	1	0	no	£115
GH1000	12	1	2	opt	£249
SMC	**UTP**	**BNC**	**AUI**	**SMNP**	
Elite 3812TP	12	opt	2	opt	£399
Tiger TP6	6	-	1	no	£155
Tiger TP12	12	-	1	no	£299

UPS SYSTEMS

Upsonic Standby UPS
- Station 28 - 280VA Backup UPS £84
- Station 40 - 400VA Backup UPS £129
- Station 60 - 600VA Backup UPS £169
- System 60 - 600VA On-line UPS £389
- System 100 - 1kVA On-line UPS £499

American Power Conversion UPS
- BK250i-250VA Backup UPS £87
- BK600i-600VA Backup UPS £175
- AP250i-250VA Smart UPS £185
- AP600i-600VA Smart UPS £225
- AP900i-900VA Smart UPS £465
- AP1250i-1250VA Smart UPS £525
- PowerChute Interface/Software (state OS) £59

REPEATERS

- Aries ER-2BA 2 port Repeater £199
- Aries ER-4BA 4 port Repeater £339
- D-Link DE808 8 port Repeater £449
- Genius E5020 2 port Repeater £299
- Genius E5021 4 port Repeater £499

PRINTER SERVERS

HP JetDirect
- JetDirect Card - LaserJet 4/4Si £285
- JetDirect Card - LaserJet III/IIID £279
- JetDirect - External £245

Intel NetPort
- NetPort II - 2 printers £255
- NetPort Express EL - 2 printers £259
- NetPort Express XL - 3 printers £320

TOOLS & CONNECTORS

- Thin Ethernet Crimp Tool £17.00
- RJ45 Crimp Tool £19.00
- Thin Ethernet Cable Stripper £9.00
- Round Cable Stripper £12.00
- BNC Crimp Plug £0.75
- BNC T Connector £1.75
- BNC In-line coupler £1.75
- BNC 50ohm Terminator £0.95
- BNC 50ohm Terminator & Earth £1.25
- RJ45 Crimp Plug £0.40
- EAD Thinwire Tap Socket System £25.00
- EAD Thinwire Drop Leads - from £17.00
- AMP Thinnet Tap Socket System £17.00
- AMP Thinnet Drop Leads - from £26.00
- Safernet Cabling System £15.00
- Safernet Drop Leads - from £15.00
- RJ45 24 Way Patch Panel - 19" rack mount £145

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All Prices exclude Carriage & VAT @ 17.5%

NEW from GENIUS

Handy Scanners from the UK's No.1 Genius Supplier

Up to true 800dpi resolution and supplied complete with OCR software, a powerful presentation graphics package and an advanced image scanning, enhancment and editing application.

ScanMate 32 & 256

800 dpi

- **Powerful image software** - PhotoFinish 3.0 software has image auto enhancement functions and 87 tools to satisfy your creativity.
- **HI resolution** - up to 800 dpi gives you the best image quality available.
- **Powerful OCR** - included SmartPage Direct means you'll never have to re-key data again.
- **TWAIN Compliant** - Lets you use the scannerwith all TWAIN compatible programs
- **Includes:** Interface card, PhotoFinish 3.0, Media Mate presentation software, Smart Page Direct OCR software, TWAIN compliant software, User's manuals.

ScanMate/32 Black and White scanner with 32 Halftones	£49
ScanMate/256 256 true grey scale & B/W scanner	£69

MOUSE 3+ £20 - with driver only **£12**

Designed for maximum comfort with a raised centre that fits the hollow of your palm. Includes powerful imaging software: PC Paintbrush for Windows, Media Mate Presentation Software, MouseMate Driver and Pad.

ScanMate Colour

"As perfect as a hand scanner will ever be"
COMPUTER SHOPPER

£158

800 dpi
24 bit Colour

- **Brilliant colour**- add the power of brilliant 24 bit true colour images to your DTP and presentation packages
- **Powerful image software** - PhotoFinish 3.0 software has image auto-enhancement functions and 87 tools to satisfy your creativity.
- **High resolution** - up to 800 dpi gives you the best image quality available
- **Powerful OCR** - included SmartPage Direct means you'll never have to re-key data again.
- **TWAIN compliant** - Lets you use the scanner with all the TWAIN compatible products
- **Includes;** Interface card, Photofinish 3.0, Media Mate presentaiton software, SmartPage Direct OCR software, TWAIN compliant software, User's manuals

Smarter Input - Smarter Output

Multi Media Products	
HiVideo frame grabber	£169
HiVideo Pro 24-bit colour digitised video	£229
HiTuner TV Tuner add in card (requires video card)	£58
HiEncoder Record Computer graphics to VCR or TV	£115
Game Pad greater hand held control	£9
New Sketch	
New Sketch 1212	£119
New Sketch 1812	£185
New Sketch 1812D	£209
HiMouse The Advanced Mouse	
HiMouse - Serial	£19
HiMouse- Serial & PS/2	£21
HiMouse -Cordless	£20
MouseOne	
MouseOne PS/2	£8
HiTrak	
Stationary Trackball Serial & PS/2	£22
HiMouse Optical	
High performance Optical Mouse	£35
HiPoint	
The Smart Mini-Trakerball	£28
Genius Windows Hand Scanners	
Powerful scanning for professional image processing	
GS-4500 - 32 Grey scales	£29
GS-B105W -256 grey scales	£65

EASY PAINTER £69

Amazing value graphics tablet gives you the chance to exercise your creativity. Includes PC Paintbrush for Windows that provides dozens of natural paint tools, complete Utilities Disk, Stylus Pen and keyboard power adaptor.

SyQuest Data Storage

The World Standard in Removable Cartridge Hard Disk Drives

The unique concept of SyQuest removable hard disk drives means separating the data from the drive. It's like having a hard disk, a high-capacity floppy and backup all in one - all this with fast access hard disk perfromance.

SyQuest technology is the world standard in removability with more than 6,000,000 cartridges shipped. Drives are compatible with computer systems running MS-DOS, Windows, OS/2, Macintosh, DEC, SUN and others.

Syquest Cartridges

Model No.	Capacity	Form.	Unit £	5 Pack
SQ327	270Mb	3.5"	£48	£225
SQ310	105Mb	3.5"	£39	£185
SQ2000	200Mb	5.25"	£59	£275
SQ800	88Mb	5.25"	£49	£225
SQ400	44Mb	5.25"	£39	£175

- **Unlimited Incremental Storage**
- **High Speed Backup**
- **Instantaneous Restore**
- **Data Security**
- **Data Portability**
- **Ready for MultiMedia**

There are three families of SyQuest drives:

The 5.25" family - *The Standard*
The 3.5" range - *High Performers*
The 1.8" PCMCIA - *On The Move*

SyQuest®

Syquest Removable Cartridge Hard Disk Drives

Model No.	Form.	Type	Capacity	Internal	External
SQ1080	PCMCIA	-	80Mb	£TBA	
SQ3270A	3.5"	IDE	270Mb	£259	
SQ3270S	3.5"	SCSI	270Mb	£269	
SQ3270 P/P	3.5"	PARALLEL	270Mb		£459
SQ3270 Ext	3.5"	SCSI	270Mb		£369
SQ5200	5.25"	SCSI	200Mb	£265	
SQ5200 Ext	5.25"	SCSI	200Mb		£375

NOTE: The SQ5200 drives will both read/write 44Mb and 88Mb cartridges

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Aries Award-Winning Scanners

RELI Series for Apple Mac now available
Complete with Graphics & OCR Software

Optional Automatic Sheet Feeder available with all Aries Relysis Scanners

Colour Transparency reader

SPECIAL OFFER from only £339

ISO-9001 Manufactured to BSI Quality Standard Certificate

STOP PRESS £35 OFF Advertised Prices of RELI Scanners (2412/4816/9624)

All Aries Relisys models will scan full A4 legal size

The Relisys Scanner has been voted the 'BEST SCANNER OF THE YEAR' by the readers of PC Direct

"better all round, and therefore a Best Buy, is Watford's Relisys...which combines value for money and good software support with quality output"
Computer Shopper

"...It is a considerable feat to produce a unit of this quality but Watford have stolen a march on everyone in so doing. Add the bundled software and it is undoubtedly the best buy."
PC Today

Winner of the Best Peripheral Award

With the Aries Relisys you'll open up a whole new world of possibilities. Imagine being able to scan pictures, diagrams, photographs in perfectly matched colour. To use unlimited zoom to create precisely the size you need. And then to combine them with other files to produce truly professional documents.

Aries Relisys Scanners are the perfect answer for Desk Top Publishing (DTP) and Optical Character Recognition (OCR) applications in both the PC and MAC environments. With Firmware Interpolated, they have outstanding Scanning Resolution in addition to stunning colours (16.7 million) and mono (256 greyscales) definition. Now industry standard TWAIN compliant, Aries Relisys Scanners can be used directly with Windows software.

With the new Hi-speed scanners you can scan an A4 image in colour in just minutes. And in a breathtaking 15 seconds deliver an A4 mono. It's simplicity itself to set up and use, and the new comprehensive range offers a model for every need.

FREE Software Worth *over* £500

The Relisys comes bundled with three FREE packages *(requires Windows 3.1)*

- **Micrografx Picture Publisher v4 LE-** Graphics Image Scanning/Editing
- **Caere Omnipage Direct or Calera Wordscan*** OCR (optical character recognition)

** Depending on availability*

Software Options for Aries Relisys Scanners
Special upgrade pricing valid at the time of purchase

UGA 1800	Upg Picture Publisher LE to v4	£75
UGA 1810	Upg OmniPage Direct v2 to Omnipage Professional v5	£185
UGA 1820	Upg PageKeeper Portfolio to PageKeeper Personal	£85
UGA 1830	Upg PageKeeper Portfolio to PageKeeper Network	£279

Aries Relisys Scanners

VM3420 SCSI II 256 Grey Scale	£339
VM3520 SCSI II 16.7 million Colours 24 bit	£379

- Up to 1200dpi resolution
- TWAIN standard
- Opt. Document Feeder
- Bundled Software
- Optional Transparency Adapter (Mono only)

Auto Document Feeders

Specification
- Capacity: 50 pages
- Paper size - Max: 8.5"x14" - Min: 5.0" x 7.2"
- Paper Thickness .05 to .15mm sheet

ADF-30	£259
ADF-40	£295
ADF-60	£345

Hi-Speed SCSI II Colour Flatbed Scanners

Aries	RELI 2412 2400dpi	RELI 4816 4800dpi	RELI 9624 9600dpi
Flat Bed Scanner type	Colour	Colour	Colour
Scanning Process	Single Pass	Single Pass	Single Pass
Image Data Colour - 24 bit	16.7 million Colours	16.7 million Colours	16.7 million Colours
Image Data mono - 8 bit	256 Greyscale	256 Greyscale	256 Greyscale
Effective Scanning Area	216 x 356mm	216 x 356mm	216 x 356mm
Zoom Out Feature	Unlimited	Unlimited	Unlimited
Scanning Resolution - Max*	2400 x 2400	4800 x 4800	9600 x 9600
Brightness/Contrast Settings	256/256	256/256	256/256
Interface	SCSI II	SCSI II	SCSI II
Auto Document Option	ADF-30	ADF-40	ADF-60
Transparency Adaptor	VMT-68S optional £295	VMT-68S optional £295	Included - Worth £500
Price	**£575 PC/£595 Mac**	**£785 PC/£795 Mac**	**£1425 PC/£1495 Mac**

* Resolution quoted is the maximum achievable using interpolation

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PRICE BREAKTHROUGH

HIGHSPEED

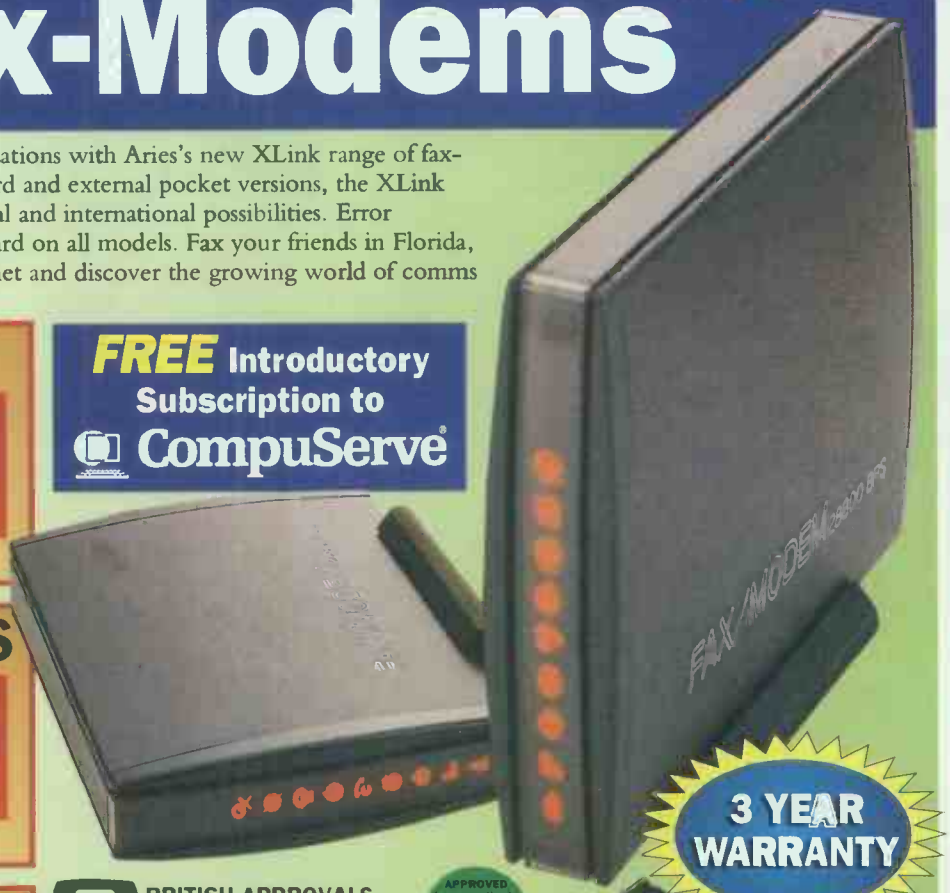
InterNET READY*

Aries Fax-Modems

Enter the realm of high speed communications with Aries's new XLink range of fax-modems. Available in both internal PC card and external pocket versions, the XLink range will open up a whole host of national and international possibilities. Error correction and data compression are standard on all models. Fax your friends in Florida, transmit TIFFs to Turkey, enter the Internet and discover the growing world of comms with an Aries XLink Fax-Modem.

14,400 BPS
V.32 bis
£89
External Modem XL-144E

FREE Introductory Subscription to CompuServe



SPECIAL OFFER
28,800BPS
V.FAST CLASS
£138 while stocks last
External Fax Modem XL-VFC-288E

3 YEAR WARRANTY

28,800BPS
V.34 CLASS
£175
External Modem XL-V34-288E

BABT REN-1 BRITISH APPROVALS BOARD FOR TELECOMMUNICATIONS

APPROVED for connection to telecommunication systems specified in the instructions for use subject to the conditions set out in them

ARIES XLink RANGE
Choose from V.32bis, V.FAST Class & V.34

All models feature:

- 28,800 (V.34) or 14,400 (V.32bis) bps top data transmission speed
- V.32, V.32bis, V.23, V.22, V.22bis & V.21
- Error Correction to MNP2-5 and V.42 standards
- Data compression to MNP5 and V.42bis standards
- Call back security
- Sync & Async Operation
- Group 3, Class I & II Fax at up to 14400bps (V.17)
- Group 1 and 2 fax compatible (V.27ter and V.29)
- 16550 UART Buffer (Internal models only)
- Fully Hayes compatible
- 3 years warranty
- BABT Approved plus additional Six European Approvals
- Supplied complete with Delrina Winfax Lite, DOS Fax Lite plus COMit Lite for DOS and Windows

*VIA CompuServe

14,400 BPS
£87
Internal Modem XL-144i

28,800 BPS
£168
Internal Modem XL-V34-288i

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Aries Monitors

The New range of Aries Monitors have been designed to easily meet the rigorous standards for energy conservation laid down in the US by the Environmental Protection Agnecy's Energy Star Program. With Aries EnergyPro Monitors saving energy doesn't mean compromising on features or quality. But best of all you will not have to pay any premium - The new Models are better value than ever.

Clearly a better Image

For the ultimate in high-definition, flicker-free monitors displaying the sharpest text and graphics look no further than the new Aries Monitor range.

15" Aries Monitors

Aries EnergyPro 6000i *NEW*

Latest design auto-scanning colour display with micro processor controls giving you precise adjustments over all the major display functions. Offers exceptional value.

- 15" Flat screen colour display
- 0.28 dot pitch, non-glare tube
- EPA Energy Star compliant
- 1280 x 1024 @ 60Hz (NI)
- Front panel controls
- Microprocessor Control
- Horiz. frequency: 29KHz-70KHz
- Digital Control with LCD providing 13 preset and 4 user modes
- Adjustable Horizontal and Vertical sizes

£239

SHOPPER LABS

"The Aries is an excellent low-cost monitor that is easy to use and has all the features that you could wish for. We definitely wouldn't have any qualms about using it all day long as a Windows monitor."

17" Aries Monitors

Aries EnergyPro 7560i *NEW*

At 0.26 dot pitch the 7560i is the finest quality display in its class and an unbeatable price. Featuring latest design auto-scanning colour display and precise adjustments over all display functions.

- 17" Flat screen colour display
- 0.26 dot pitch, non-glare tube
- EPA Energy Star compliant
- 1280 x 1024 @ 70Hz (NI)
- Horizontal frequency: 29KHz-80KHz
- Precise colour adjustment
- 20 preset and 4 user modes
- Front digital controls
- Pincushion and Trapezoid adjust
- MPRII Low Radiation

£449

SHOPPER LABS

"In terms of price and features this monitor offers excellent value for money."

14" Aries Monitors

Aries EnergyPro SVGA LR

- 14" high resolution colour display
- 0.28 dot pitch, non-glare tube
- EPA Energy Star compliant
- Low radiation Swedish MPRII Standard
- 800 x 600 (Non-Interlaced)
- 1024 x 768 (Maximum Resolution)
- Horizontal frequency: 29KHz-38KHz
- Controls: Horz Width/Phase, Vert size/centre, tilt, Pincushion, Focus & Screen
- Includes Swivel base

£165

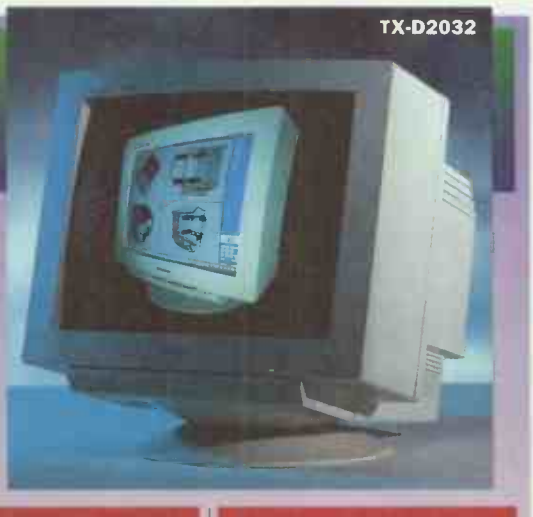
Aries AlphaScan Pro LR

- 14" high resolution colour display
- 0.28 dot pitch, P22 non-glare tube
- 1024 x 768 @ 72Hz (non-interlaced)
- Horizontal frequency: 29KHz-70KHz
- Low radiation Swedish MPRII Standard
- Front mounted user controls
- Controls: Horz Width/Phase, Vert size/ centre, tilt, Pincushion, Focus & Screen
- Includes Swivel base

£199

Panasync/Pro

Digital Multi-Scan Colour CRT Displays



The PanaSync/Pro™ is the result of Panasonic's thorough approach to achieving a user-friendly design offering extra comfort and convenience. Electromagnetic radiation is minimal. And all the digital controls are built into the front panel for easy access. The finishing touch is an attractive pale beige cabinet.

Low Electromagnetic Radiation
Panasonic has tackled the problem of radiation from VDTs head-on together with the electrostatic-free screen and other innovations. The result is an electromagnetic radiation level low enough to satisfy such strict standards as MPR II.

AGRASCOAT™
For easy-to-view images that don't tire the eyes, the screen features unique AGRASCOAT (Anti-Glare, Anti-Reflection, and Anti-Static Coat). The AGRASCOAT is an original Panasonic coating technology that employs AR and silica coating methods to provide the advantages of both.

Flicker-Free
A PanaSync/Pro™ provides a vertical scanning rate up to 90Hz for stable, flicker-free images, meeting ISO 9241.

Front Design Puts Images First
Non-essential controls have been eliminated to assure a simple design that dose not distract the viewer from the images on the screen.

PanaSync/Pro 7

TX-D2131

Top-End Model with a 21" FS Screen. Delivering 1,600 x 1,280 High Resolution

- High 1,600 x 1,280 resolution
- 0.25mm fine dot pitch
- DQ-DAF gun and Advanced Invar Mask
- AGRASCOAT™
- 13 factory and 8 user presets
- 3 mode full front panel digital controls

£1359

PanaSync/Pro 6a

TX-D2032

Easy-to-use Multi-Scan Display with Large 20" Screen

- High 1,280 x 1,024 resolution
- 0.28mm fine dot pitch
- DQ-DAF gun and Advanced Invar Mask
- AGRASCOAT™
- 13 factory and 8 user presets
- 3 mode full front panel digital controls

£1125

PanaSync 5G

TX-D1732 **SPECIAL OFFER**

17" Multiscan Colour Monitor with On-Scren Display and Environment-Friendly Power Saving Function

- 1,280 x 1,024 NI (60Hz) res.
- High refresh rate: 75Hz
- Colour temperature adjustment
- On-screen display
- 11 timing mode presets
- Stereoscopic display possible

2 Years ON-SITE Maintenance

£479

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VideoLogic

QUALITY MULTIMEDIA SOLUTIONS
from the Experts

"VideoLogic 928Movie - Best Multimedia Product 1994"

PCIMovie

Super fast graphics for PCI machines

- All the benefits of 928Movie but with even faster windows acceleration
- Weitek P9100 graphics processor- 16 times faster than SVGA
- 2Mb high speed VRAM

SPECIAL PRICE

PCIMOVIE 2Mb **£329**

928Movie

928Movie "...probably the finest multimedia card in the world..." *MPC & CD ROM User October 1994*

- Up to 1280 x 1024 resolution. Up to 16.7 million colours
- Up to 6x performance over ordinary SVGAs
- Postage stamp-sized video clips become high quality full screen movies
- Optional CD-quality, 16-bit stereo sound
- Built-in VESA media channel connector

ISA 1Mb		VLB 1Mb	
928*MOVIE*	£189	928*MOVIE*	£189
928*MOVIE* with sound	£249	928*MOVIE* with sound	£249
928*MOVIE* with MPEG Player	£420	928*MOVIE* with MPEG Player	£421

MPEG Player

The Quality solution for Video CD playback

- Exceptional quality video/audio playback of Video CD, CD-I and Interactive CD Rom titles
- Fully adjustable picture quality
- Full support for application developers via Microsoft Windows MCI
- Connects to the 928Movie/PCIMovie card via the VESA media channel connector
- Requires 928Movie or PCIMovie

MPEG PLAYER **£229**

Captivator Pro TV

Sensational quality video and TV

- Exceptionally sharp live TV or live video in a window
- Full support for application developers via Microsoft Windows MCI
- High quality stills and video capture with full picture control
- Connects to the 928Movie/PCIMovie card via the VESA media channel connector
- Requires 928Movie or PCIMovie

CAPTIVATOR PRO TV **£219**
CAPTIVATOR PRO **£165**

GrafixStar 64-bit graphics accelerators

The GrafixStar range from VideoLogic is a new generation of leading price/performance 64-bit Windows accelerators, expandable with low cost multimedia options. GrafixStar 64-bit graphics acceleration provides great performance from even the most demanding graphics applications at an unbeatable price!

GRAFIXSTAR 300	1Mb	£97
85+ million Winmarks, 1280 x 1024	2Mb	£135
GRAFIXSTAR 500	1Mb	£132
85+ million Winmarks, 1280 x 1024	2Mb	£185
GRAFIXSTAR 700	2Mb	£235
85+ million Winmarks, 1280 x 1024	4Mb	£379

Please specify PCI or VL-Bus when ordering

Video Director
Puts you in the Director's Chair

Video Director turns your computer (Windows PC or Amiga), camcorder and VCR into a complete video editing system. Just by pointing and clicking, it's easy to turn hours of video footage into well organised, entertaining and informative tapes that you audience will delight in. Video Director is perfect for editing home video, industrial training tapes, sales tapes, and more. A special "Smart Cable" interface for most camcorders and VCR's is included, so there is nothing else to buy!

£75

- Simple to use on-screen VCR style controls
- Point and Click Marking
- Automatic logging of video clips for re-use
- Genlock support for overlay of titles

NEW FloorPlan Plus 3D

Turn your imagination into reality with FloorPlan Plus 3D, the best selling space planning and home design program with 'virtual reality' and real-time walk-through'. Quickly and easily create 2-dimensional plans choosing from vast libraries of drag and drop symbols including walls, floors, staircases, furniture, even roofs and chimneys - or draw up your own symbols with 3D Design Plus. Then with a couple of clicks of the mouse turn your plan of a building into a 3 dimensional plan ready to walk around and view! You can even produce a full bill of materials list to export to Estimator Plus for a detailed costing.

£59

SPECIAL BUNDLE OFFER

FloorPlan Plus 3D + 3D Design Plus
Draw up your own 3D symbols or add the perfect photographic finish to your drawing with 3D Design - the powerful 3D drawing, modelling and animation program!
£109 *save over £150*

FloorPlan Plus with Estimator
Save hours calculating labour and material costs with Estimator Plus - the powerful project budgeting and estimation program.
£79

Open up the World.... join the Information Superhighway.

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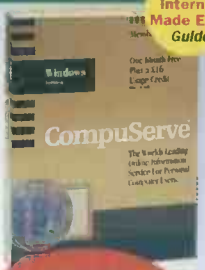
Contains Internet Made Easy Guide



CompuServe is the world's premier online information service with over 2.8 million members worldwide and over 2000 services - including Internet Services - offered online. The CompuServe Value Pack is the best way to connect your PC and Modem into the Information Superhighway, and turn it into a communications, information, and entertainment centre. Within each CompuServe Value Pack you will find everything to help you get started, understand, and enjoy the new and exciting world of online services, including the Internet.

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- FREE subscription to the monthly magazine

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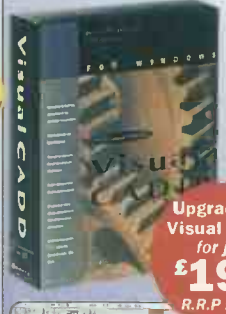
NEW Visual CADD for Windows



From the programmers of Generic CADD® comes the first affordable, professional-level CADD program to combine ease of use, efficiency and user programmability into a single, unlimited package

Finally there's a powerful 2D design and drafting program that offers both experienced users and beginners the features they expect from a professional Windows CAD program - with the speed and high performance to produce your designs quickly easily and accurately. New Visual CADD for Windows gives you direct support for AutoCAD DWG files, Generic GCD files plus OLE 2.0 support and using Visual BASIC you can tailor the program and develop your own add-ons. There's associative dimensioning, an inbuilt word processor with TrueType support, a customisable toolbar, plus a whole host of other features designed to make CAD really work for you.

Upgrade to Visual CADD for just £199
R.R.P £495

LIMITED SPECIAL OFFER

Upgrade to Visual CADD for just £199
Trade in from Generic CADD or other CADD drawing programs*
Simply tell us which CAD or Drawing program you own when you return your registration card

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PerfectOffice v3.0 for Windows

The Perfect Place to Work

SPECIAL INTRODUCTORY OFFERS
PerfectOffice v3.0
only £179*
or £149 (Version Upgrade from any WordPerfect or Novell Product)

With PerfectOffice™, Novell has truly responded to your needs by integrating all of WordPerfect's leading business applications into one computing solution.

PerfectOffice is the first suite to give you all the features you've requested: software that's easy to use, open network integration and a convenient way to build custom solutions on top of your suite. All of which will revolutionise the way you perceive software suites today. As well as provide you with a truly effective solution to utilise all that your computer can do.

True Integration. PerfectOffice integrates software programs like no other suite on the market. New PerfectFit™ technology takes you beyond common look-and-feel integration to a deeper level than competing suites.

With a common user interface, all your programs share consistent tool bars, pull-down menus and key dialogue boxes. Each program looks and feels alike - making it easy to get up and running in every program.

NEW

The Perfect Way to Create Documents

Write better... Now with PerfectSense technology, WordPerfect 6.1 not only understands your words, but can automatically fix grammar and search for all forms of a word (drive, drove) and replace them with the proper form.

Work smarter... Your document processor should work with you, being smart enough to take care of common tasks to get more done in less time. New Table Expert simplifies the usually time-consuming task of formatting tables. Multiple-level Undo and Redo, Cut and Paste.

NEW

The Perfect Way to Make Numbers Count

You can forget about "learning curves" with Quattro Pro. This powerful spreadsheet has Interactive tutors, Experts, Spreadsheet Notebooks for data organisation, and an online manual to make learning and using the program a breeze.

Get organised and stay organised. Quattro Pro lets you file multiple sheets into distinct pages in a Notebook - each holding up to 256 pages. Notebook Tabs let you flip through quickly and easily. No other spreadsheet filing system keeps your data in better order.

NEW

The Perfect Way to Sell Your Ideas

Presentations takes what you've done in WordPerfect and Quattro Pro and turns it into a slide show complete with graphics, Video & sound.

Sounds difficult?, it's not. Just import your information. Or organise your thoughts into an outline. Presentations take care of the rest. Our Show Expert suggests different professionally designed styles for the content and structure.

Since presentation supports OLE 2.0 adding video or Quattro Pro graphs is simple. And of course, there are lots of ways to create special effects.

PerfectOffice Standard

Consists of:

WordPerfect	word processor
Quattro Pro	spreadsheet
Presentations	presentation graphics
Info Central	personal information manager
GroupWise	e-mail, calendering and scheduling client
Envoy	electronic publisher and viewer

only £179*
Version Upgrade from any WordPerfect or Novell Product **£149**

NEW from NOVELL

PerfectOffice Professional

Consists of:

WordPerfect	word processor
QuattroPro	spreadsheet
Paradox	database
Presentations	presentation graphics
InfoCentral	personal information manager
GroupWise	e-mail, calendering and scheduling client
Envoy	electronic publisher and viewer
Visual AppBuilder	visual application development program

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Full CD Version **£429**
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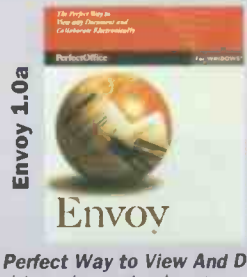
NEW

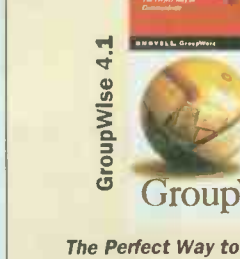


The Perfect Way to View And Document

Why print your documents, when you can send them to people electronically? Envoy lets anyone view, annotate, manipulate and distribute your fully formatted documents. Even if they don't have the application or fonts you used to create them.

Creating an Envoy document is as easy as printing. Electronic sticky notes and highlighter pens make adding comments or annotating easy and familiar. Plus, native Envoy documents work across platforms. You can send a Windows document to someone with a Macintosh and vice versa.

NEW

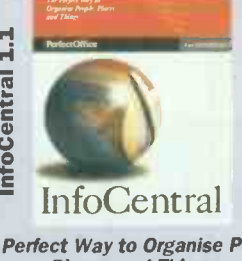


The Perfect Way to Share Information

GroupWise (formerly WordPerfect Office) makes it easy for your entire company to stay in touch. You can send E-mail and schedule group meetings. Even co-ordinate and reserve resources like meeting rooms and shared computers. Plus you can assign and follow up on tasks.

And GroupWise Remote keeps you informed when your not in the office. Simply get your E-mail messages by phone. The optional Telephone Access Server reads your messages to you. Really.

NEW



The Perfect Way to Organise People, Places and Things

InfoCentral is software that works just like a daily planner. Only smarter. It gives you a calendar, address book and task list. But unlike paper planners, it actually connects the information you enter. So you don't have to look up phone numbers for your appointments. Or flip through lots of pages to find things. InfoCentral even reminds you of upcoming appointments and tasks.

Plus, you can connect information from other PerfectOffice applications. So you're not constantly jumping from program to program.

**Competitive Upgrade Packaging*

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KEYS

CCP = Compliance Checking Product
LLP = Lotus Licence Pack
MLP = Microsoft Licence Pack
U/G = Upgrade
Comp U/G = Competitive (or sidegrade) upgrade
DOS = Program designed to work in DOS environment
WIN = Program designed for MS Windows 3.1 or later

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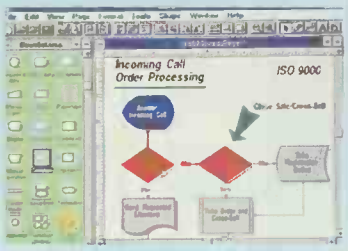

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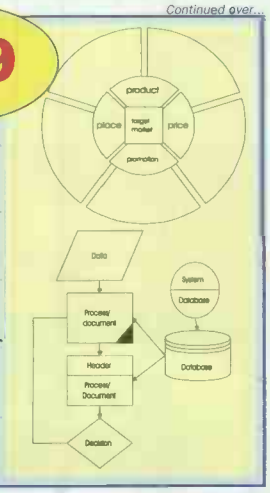

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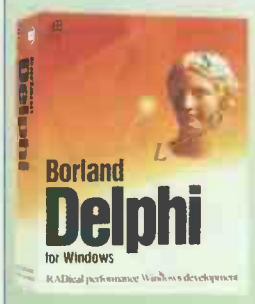

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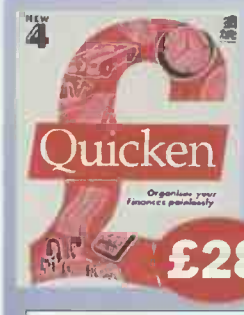

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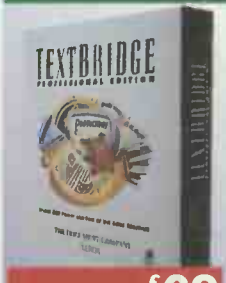

TextBridge Professional Edition not only delivers the highest quality accuracy but does much more. It actually re-constructs your documents in your word processor and are fully editable, just as if they had been re-typed - that goes for cell tables, columns and graphics as well as text. An exclusive from Xerox.

TextBridge Professional Edition delivers;

- **Award winning accuracy on normal, faxed and dot matrix text.**
- **Exclusive DocRT™ technology re-constructs cell tables that can be edited as if you created them**
- **Pages layouts with columns and pictures are maintained for true text flow editing**
- **Instant Access OCR™from within your windows™ application**
- **On-line word training and user dictionaries**

TextBridge 3.0 £69

TextBridge Professional Edition £275

Call now to determine what will best fit your needs - TextBridge 3.0 or TextBridge Professional Edition, they both have the same superior accuracy.

OS/2 WARP

Making your computer easier, faster and fun.

Now your computer can be even easier to use, even more powerful. IBM's new award winning OS/2 Warp Version 3 gives you a miniature office desktop on your PC, customised the way you want it - with folders to file documents away safely, a launch pad for frequently used applications, and a style of working based on dragging and dropping icons.

OS/2 Warp Version 3 makes more efficient use of your computer's memory. So you could, for instance, work on a spreadsheet, print another document and recieve a fax into your computer - all at the same time. And even if, for some reason, one application were to fail, Crash Protection would keep the others running.

OS/2 Warp is simply the best way to get onto the Information Superhighway. Included free in the BonusPak is all the software you need to speed to the Internet. You get your own unique E-mail address, 3 hours free access to the net and a whole month of CompuServe free!

OS/2 Warp v3 CD £44

OS/2 Warp V3 3.5" £52

- Intuitive and easy-to-use, with fast access to important applications
- Tuned to run faster, in as little as 4Mb of memory
- Runs DOS, Windows, and OS/2 applications simultaneously
- Crash Protection keeps the system running even if one program stops working

FREE BONUS PACK

The OS/2 BonusPak, included at no extra charge with OS/2 Warp Version 3, puts a wealth of powerful productivity applications at your fingertips right from day one!

- Comes with OS/2 Warp Version 3 at no extra charge
- Suite of 32-bit OS/2 applications using the computer's full power
- Wordprocessor, spreadsheet, and calendar applications
- Information highway access applications including Internet, CompuServe and BBS's.

All Software supplied on 3.5" disks unless otherwise specified. For Windows Software we would recommend a minimum hardware requirement of a 386SX PC compatible with 4Mb RAM. Please check with the software publisher for suitability and system requirements before ordering. Software is not sold on trial basis. Special and bonus offer products may differ cosmetically from the standard product.

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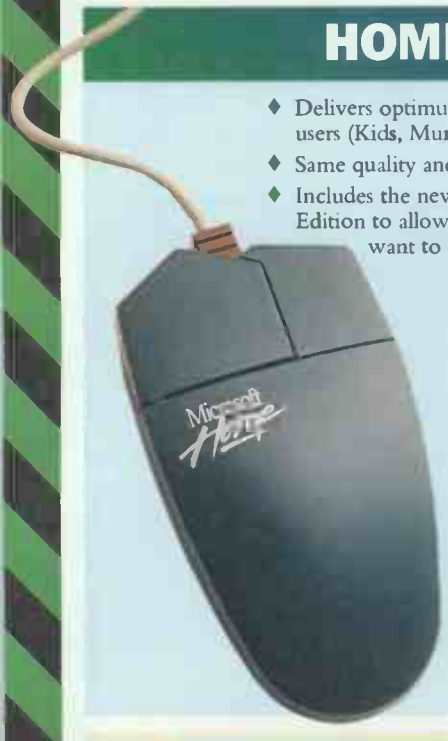
Catch a Great Offer on a Microsoft Mouse

HOME MOUSE - NOW With 18 Games



- Delivers optimum comfort and usability for all home PC users (Kids, Mum and Dad) based on it's unique design.
- Same quality and reliability as the Mouse 2.0
- Includes the new Intellipoint Software - Home Edition to allow users to customise the way they want to work, with increased productivity and fun

➤ SAVE TIME
➤ INCREASE EFFICIENCY
➤ HAVE FUN

FEATURES

- Change your pointer into a ship, seal or many other alternatives
- Short cut assignations of buttons
- Double speed click Acceleration
- Sonar Trails

Microsoft® Home Mouse
plus
Microsoft® The Best of the Entertainment Pack
plus
Microsoft® Arcade
FOR ONE GREAT PRICE
£27

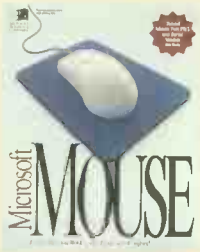
Software will be cosmetically different from that shown

Mouse 2.0 *Intellipoint Version*

- Still the No 1 selling mouse in the UK
- One mouse suits all (PS/2 or Serial, Left or right handed)
- THE ergonomic mouse - it increases comfort and efficiency when using Windows
- Now with New improved Intellipoint Software, to allow the users to customise the mouse to the way they want to work, with increased productivity and fun!

£35

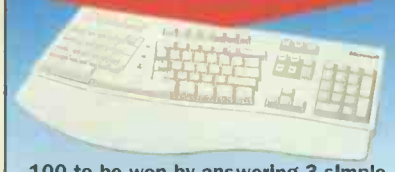
"Frankly, there is only one mouse and it's the Microsoft® Mouse 2.0. If you haven't got it you need it"
What Personal Computer Mag



FEATURES

- On screen toolbar allows easy access to the improved software
- Autoscroll - allows scrolling of page when moving pointer to edge of screen
- Allow up to 6x magnification
- Short cut assignation of buttons Single click option
- Speed variation
- Smart speed - allows pointer to slow down over icons and responsive areas
- Vanish option - Pointer disappears when not being used
- Line Lock option - Pointer only moves in straight lines
- Change your pointer into a pizza slice or many other alternatives

Win a Microsoft Natural Keyboard



100 to be won by answering 3 simple questions and explaining why you would like a Microsoft Natural Keyboard

Details included with the Microsoft Mouse

Microsoft®, in conjunction with the world famous Joyce Institute of Ergonomics, bring you two pieces of user-friendly hardware: the Microsoft® Mouse 2.0 - comfortable, accurate, responsive, versatile, reliable pointing device: and the Microsoft® Natural Keyboard™ - offering users a more natural and relaxed posture while typing and customised software for improved Windows®.

Natural Keyboard

The Natural keyboard is responsibly designed for comfort and made to simplify Windows. The keyboard does promote a more comfortable, natural position for the hands, arms wrists, forearms and shoulders. It comes with safety labels, an ergonomic guide and detailed on-line documentation to provide the user with the information needs to manage their keyboard work.

- Unique contoured design - encourages a balanced, more natural hand and wrist position
- 104 key design - extra function keys
- Intellitype software - customised for Improved Windows-based computing performance

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The New Generation Laser Printer

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- Six pages per minute
- GDI mode for windows
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- Low cost per copy
- Network connectivity
- Microfine toner
- Straight paper path
- Auto emulation switching
- Economy print mode

£325

TECHNICAL~INNOVATION~AWARDS PC MAGAZINE 1994

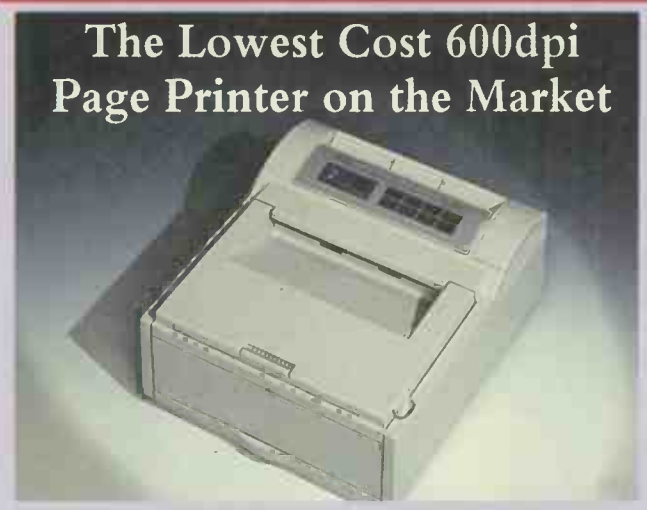
Brother HL-660
True 600dpi Resolution Laser Printer

- 600dpi resolution
- 2Mb RAM exp. to 10Mb
- HP LaserJet™ 4, Epson FX-850 and IBM Proprinter XL emulations
- Superfast first page out
- Six pages per minute
- GDI mode for windows
- Network connectivity
- Microfine toner
- Auto emulation switching
- Economy print mode

£465

Oki LED Printers

The Lowest Cost 600dpi Page Printer on the Market



OKI 400ex LED Page Printer

- 4 page per minute
- 300 x 300dpi
- Now 1Mb memory,
- 25 resident fonts
- 1 font card slot
- 16 chr LCD
- HP Laserjet™ Series II.
- Optional 2nd paper tray.

£285

OKI 410ex LED Page Printer

- 4 page per minute
- 600 dpi with MicroRes
- HP LaserJet™ Series III.
- 1Mb memory
- 8 scalable fonts
- 42 bitmapped fonts, 1 font card slot
- 2nd paper tray option
- Centronics and RS232 serial interfaces.

£385

HP Deskjet 540

NEW

The perfect place to start with professional quality printing

Affordable, professional-quality black printing that is great for the home, office and small businesses. Whether you need a printer to catch up on office work or help you with your personal correspondence, the HP DeskJet 540 is the perfect place to start. And with the low-cost optional HP Colour Kit, adding vivid colour is a snap!

- 600 x 300 dpi resolution
- 512K built-in RAM
- 32K buffer memory
- Centronics parallel interface
- 14 TrueType scalable fonts
- Optional Colour Kit with ColorSmart technology
- HP PCL Level 3 language
- Built-in sheet feeder

£209

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Microsoft Solution Kit includes:

- SoundBlaster 16 Stereo Soundcard
- Aries Stereo Speakers (Opt. Upgrade to Aries HiFi Pro Speakers Only £18 + VAT)
- Complete Solution Bundle Software Pack
- **MS Encarta '95** *Encyclopaedia*
- MS MultiMedia Works
- MS Dangerous Creatures
- MS Money
- MS Golf
- MS Scenes (3.5" disks)

Plus FREE

Legend Pack CD Bundle

- Robocop 3D
- F29
- Mega Race
- Pushover
- Epic
- Might and Magic II
- D/Generation
- Contraption Zack
- ChessMaster 2100
- Life & Death II - The Brain
- Kids can Read - Cinderella, Mud Puddle, Thomas Snowsuit, Paper Bag Princess
- Spiders - National Geographic

CD-ROM DRIVE OFFERS

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Sound BLASTER

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WEPn Kit 2:	CR562 with I'Face & Leads	£89
WEPn Kit 3:	CR562 with SoundBlaster 16 Stereo Soundcard	£129
WEPn Kit 4:	CR562 with SoundBlaster 16 Stereo Soundcard, MegaPAK 2 with 11 CDs, Stereo Speakers	£156

Creative CR-563 Dual Speed CD-ROM

Sound BLASTER

WECr Kit 1:	CR563 with Audio/Data Leads	£88
WECr Kit 3:	CR563 with SoundBlaster 16 Stereo Soundcard	£157
WECr Kit 4:	CR563 with SoundBlaster 16 Stereo Soundcard, MegaPAK 2 with 11 CDs, Stereo Speakers	£182

Teac CD-55A Quad Speed CD-ROM

Sound BLASTER

WETc Kit 2:	CD-55A with I'Face & Leads	£149
WETc Kit 3:	CD-55A with SoundBlaster 16 Stereo Soundcard	£199
WETc Kit 4:	CD-55A with SoundBlaster 16 Stereo Soundcard, MegaPAK 2 with 11 CDs, Stereo Speakers	£224

Mitsumi FX400 Quad Speed CD-ROM

Sound BLASTER

WEMt Kit 1:	FX400 IDE Drive	£123
WEMt Kit 3:	FX400 with SoundBlaster 16 Stereo Soundcard	£173
WEMt Kit 4:	FX400 with SoundBlaster 16 Stereo Soundcard, MegaPAK 2 with 11 CDs, Stereo Speakers	£198

Toshiba 4X IDE Quad Speed CD-ROM

Sound BLASTER

WETo Kit 1:	XM5302B IDE Drive	£149
WETo Kit 3:	XM5302B with SoundBlaster 16 Stereo Soundcard	£199
WETo Kit 4:	XM5302B with SoundBlaster 16 Stereo Soundcard, MegaPAK 2 with 11 CDs, Stereo Speakers	£215

MegaPAK 2 - The Ultimate CD Bundle with 11 CDs

Included in Kit 4's above or available for £28

- Jurassic Park
- Compuserve Starter CD
- Bodyworks Voyager
- Sleepwalker
- Return to Ringworld
- Shadowlands
- Spectre VR
- The Psychotron
- Jutland
- The Cyberplasm Formula
- Microcosm

Aries ATAPI IDE Dual Speed CD-ROM

- **ATAPI IDE Drive**
- Supports Kodak Multisession Photo CD, Audio CD-DA, CD-XA, CD-I & High Sierra (White Book Compatible)
- High Speed with 300Kb/sec Data Transfer Rate
- MPC Level 2 Compliant with 250ms Seek Time
- Supports Audio Scan, Skip Back and Random Play
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- Supplied with Audio Lead

Aries ATAPI IDE Dual Speed CD-ROM

Sound BLASTER

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Aries Quality Speakers

Ideal for PC Multimedia System

Magnetically Shielded

Aries Digital Plus Speakers (inc. stand)

Aries Stereo Speakers		£6	*HiFi and Digital series speakers have built-in Power Amplifier, Base, Treble and Volume controls.*
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Aries Screen Microphone		£4.50	
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CREATIVE MULTIMEDIA KITS

CREATIVE BUNDLE KIT OFFERS

CREATIVE BUNDLE 1

- Creative CR-563 Dual Speed CD-ROM
- Creative SoundBlaster 16 Sound Card
- Aries Stereo Speakers (Upg. to HiFi Pro Speakers for only £18 + VAT)
- MSBundle CD Software -worth £300+
  - MS Encarta 1995
  - MS Golf
  - MS MultiMedia Works
  - MS Scenes (3.5")
  - MS Dangerous Creatures
  - MS Money

£198

CREATIVE/ARIES BUNDLE 3

- Aries Dual Speed IDE CD-ROM Drive
- Creative SoundBlaster 16 IDE Sound Card
- Stereo Speakers
- MSBundle CD Software -worth £300+
  - MS Encarta 1995
  - MS Golf
  - MS MultiMedia Works
  - MS Scenes (3.5")
  - MS Dangerous Creatures
  - MS Money

£179

CREATIVE/MITSUMI BUNDLE 4

- Mitsumi FX400 Quad Speed CD-ROM
- Creative SoundBlaster 16 IDE Sound Card
- Stereo Speakers
- MSBundle CD Software -worth £300+
  - MS Encarta 1995
  - MS Golf
  - MS MultiMedia Works
  - MS Scenes (3.5")
  - MS Dangerous Creatures
  - MS Money

£216

CREATIVE/TOSHIBA BUNDLE 5

- Toshiba XM5302B Quad Speed CD-ROM
- Creative SoundBlaster 16 IDE Sound Card
- Stereo Speakers
- MSBundle CD Software -worth £300+
  - MS Encarta 1995
  - MS Golf
  - MS MultiMedia Works
  - MS Scenes (3.5")
  - MS Dangerous Creatures
  - MS Money

£249

CREATIVE DIGITAL 3X MULTIMEDIA KIT

- Creative/NEC Triple Speed SCSI CD-ROM
- SoundBlaster 16 SCSI-2 ADSP Card
- High Quality Stereo Speakers
- Microphone
- The following Bundled Software Included
  - Creative TextAssist, VoiceAssist, WaveStudio, Ensembler, Qsound Control
  - Aldus Photostyler SE
  - Altamira Composer SE
  - Kai's Power Tools, Asymetrix Presentation
  - Groliers Encylopaedia
  - Conspiracy, Syndicate, Rebel Assault & Speed

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Desktop video conferencing over a regular telephone line
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"Whether you want to Work, Learn or Play, Creative have the MultiMedia solution for you"

Sound Blaster 4x MultiMedia Home CD

This high quality kit was designed specifically for your home and office, and allows you to work, learn and play. The kit includes a quad speed drive, 16 bit sound card with Advanced Signal Processing, stereo speakers and a complete range of Microsoft titles that makes this kit both versatile and invaluable. It is perfect for the home as well as an excellent choice for games and education applications for all the family.

CPA0950 **£299**

FREE Software Bundle

Included with SoundBlaster MultiMedia Home CD Kit

Boxes shown for illustration only

Sound Blaster 16 Value IDE CD-Interface

A true 16 bit sound card that fits effortlessly into your PC and gives CD quality audio at a price you can afford. The card features 16 bit stereo sampling and playback, an enhanced FM OPL3 stereo music synthesiser, MIDI / joystick interface and 4W per channel amplifier. It has the new IDE interface system that allows simple connection to any compatible CD-ROM drive, and includes a whole host of audio software.

£69

CEA1960

Sound Blaster AWE32 & AWE32 Value

This top of the range sound card features Advanced WavEffects™ Synthesis which offers real instrument sound stored on the card to make MIDI and games sound more realistic. The card supports Qsound and the E-mu Soundfont library. The value edition includes an upgrade socket for the Advanced Signal processing chip and IDE interface.

The full edition includes an upgradable onboard RAM capability for sampling, a connector for the Wave Blaster and the Advanced Signal Processor chip on the card.

AWE32 Value **£135** CEA1980

AWE32 **£176** CEA3350

Sound Blaster 16 pro IDE CD-Interface
(Also available with Advanced Signal Processing)

CEA1970 **£89**

This 16 bit sound card is ideal for the multimedia enthusiast who wants to upgrade at a later stage. It offers all the functionality of the value edition plus a whole host of upgrade options, including a Panasonic/Creative and IDE interface for CD-Rom drive upgrade, a connector for the Wave Blaster MIDI music daughterboard and a socket for Advanced Signal Processor chip. This card also includes Voice Assist and Text Assist software.

With ADSP **£115** CEA1990

New Sound Blaster MultiMedia Kits

Discovery 2x Value CPA0920 **£169**

Low cost upgrade kit includes Dual Speed CD-ROM Drive, SoundBlaster sound card, stereo speakers and top quality MultiMedia CD titles

Discovery 4x Kit CPA0930 **£275**

Low cost upgrade kit includes Quad Speed CD-ROM Drive, stereo speakers and top quality MultiMedia CD titles including MultiMedia encyclopaedia

Games Blaster AWE 32 Kit CPA0940 **£298**

Leading edge upgrade kit includes Quad Speed CD-ROM Drive, SoundBlaster AWE 32 sound card, stereo speakers and joystick

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CD ROM Software

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Explorapedia MS	£24	Eyewitness Ency of Science (DK)	£40
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Carmen San Diego World Deluxe	£36	Creative Writer MS	£28
Dangerous Creatures MS	£29	Day of the Tentacle	£18
Dinosaurs MS	£27	Easykeys	£29
Fine Artist MS	£28	Four Footed Friends	£19
Fun & Learn	£21	Gahan's Ultimate Haunted House MS	£28
Home Sweet Home	£29	I Can Spell	£9
Kids Farm	£9	Kids Games	£9
Kids Rhymes	£9	Legend Pack	£29
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• Epson SQ870	80col	£415
• Epson SQ1170	132col	£559

HEWLETT PACKARD

NEW LAUNCH

HP DeskJet 540	£209
HP DeskJet 660C	£294
HP DeskJet 850C	£391

• HP DeskJet 320	80col	£165
• HP DeskJet 320 & CSF	80col	£180
• HP DeskJet 1200C	80col	£630
• HP DeskJet 1200C PS	80col	£945
• HP DeskJet 1600C	80col	£POA
• HP PaintJet XL300+ A4	80col	£1599
• HP PaintJet XL300+ A3	132col	£1769
• HP PaintJet XL300 PS A4	80col	£2568
• HP PaintJet XL300 PS A3	132col	£2719
• Star SJ48	80col	£182
• Star SJ144	80col	£178
• Star Wintype 800C Thermal Colour		£592

Sheet Feeders

• Canon BJ10ex/BJ10sx			£40
• Canon BJ300	£88	• Canon BJ330	£92
• Citizen Swift 24/200/240			£75
• Epson LX400			£69
• Epson LQ570/LQ870			£47
• Epson LQ1070/LQ1170			£89
• HP DeskJet 310/320			£48
• NEC P20/P220			£59
• NEC P3Q/P32Q			£85
• Panasonic 1170/1180/1123			£59
• Panasonic 1124/1124i/2124			£79
• Panasonic 1824/2824			£128
• Panasonic KX-P2135			£30
• Star LC100	£69	• Star LC24-20	£69
• Star LC200/LC24-200			£69

INKJET REFILL PACKS FOR:

• Canon BJ10ex/BJ10sx - 2 pack	£12
• Canon BJ10ex/BJ10sx - 5 pack	£24
• Canon BJ10ex Cart & 3 Refills	£29
• Canon BJ200 2 Refills	£34
• Epson SQ 870/1170 - 2 Refills	£9
• HP DeskJet Std Capacity - 2 pack	£8
• HP DeskJet Hi-Capacity - 2 pack	£24
• HP DeskJet Std Capacity - 5 pack	£14
• HP DeskJet Hi-Capacity - 5 pack	£35
• HP DeskJet Colour - Cart & 4 Refills	£49

Accessories

• Citizen Swift 200/240/ABC Colour Kit	£32
• Citizen Projet II Cartridge	£3
• Canon BJ10sx Battery Pack	£32
• Epson 0K Serial Interface	£29
• Epson 8K Serial Interface	£75
• Epson 32K Serial Interface	£95
• Epson LQ100 Tractor Unit	£29
• HP DeskJet FX Emulation Cartridge	£49
• HP DeskJet IBM Emulation Cartridge	£57
• HP DeskJet 256K RAM Cartridge	£89
• HP Deskjet 310 Black Cartridge	£14
• HP DeskJet 310 Battery Pack	£33
• HP DeskJet Carry Case	£49
• HP DeskJet 310 Colour Kit	£28
• HP DeskJet 1200 Postscript Upgrade	£499
• HP DeskJet Prestige Elite Fonts	£55
• HP DeskJet Letter Gothic Fonts	£56
• HP DeskJet 310 Parallel Cable	£12
• Panasonic Serial Interface	£49
• Panasonic 32K Buffer	£16
• Panasonic 2180/2123 Colour Kit	£30
• Star 8K Serial Interface - LC range	£52
• Star 8K Serial Interface - XB range	£39
• Star 32K Buffer - LC24/XB24	£52
• Dustcovers for 80col printers	£6
• Dustcovers for 132col printers	£9

LUTON SHOWROOM
Finway, Dallow Road, Luton, Beds.
Tel: 01582 74 55 55

WATFORD SHOWROOM
250 Lower High Street, Watford, Herts.
Tel: 01923 23 77 74

HP On-site Warranty Packs

Model	1yr	3yr
Mono DeskJet/Deskwriter	£32	£40
Colour DeskJet/Deskwriter	£45	£85
LaserJet 4L/4ML	£78	£100
LaserJet 4+/4M+	£135	£185
LaserJet 4V/4MV	£425	£485

Manual Printer Sharers

Professional Sharers

Connects	Serial	Parallel
• 2 to 1	£12	£13
• 3 to 1	£15	£17
• 4 to 1	£24	£26
• 5 to 1	–	£38

Crossover Sharers

Connects	Serial	Parallel
• 2 in/2 out	£28	£29
• 4 in/2 out	–	£49

Auto Printer Sharers

Uni-Directional

Connects	Serial	Parallel
• 2 to 1	£27	£29
• 4 to 1	£44	£45
• 8 to 1	£62	–

Bi-Directional

Connects	Serial	Parallel
• 2 to 1	£38	£39
• 4 to 1	–	£42

256K RAM module for above £59

256K Auto Sharers

Parallel Auto sharers with 256K RAM

• 2 in/2 out	£99	• 4 in/2 out	£115
• 8 in/1 out	£149		

Compact Converter

• Serial/Parallel Converter	£40
• Serial/Parallel Converter – 256K Buffer	£49
• IEEE-488/Centronics Converter	£49

Buffers

	256K	1Mb	2Mb
Flash Buffer	£65	£98	£119
Fast Flash Buffer	£85	£125	£158
Plotter Buffer	£155	£184	£330

Printer Leads

	2m	5m	10m
• PC Parallel	£4	£8	£13
• 25 'D' Male/Male	£4	£8	£13
• 25 'D' Male/Female	£5	£9	£14
• Centronics D/Ended	£8	£10	£15
• BBC Parallel	£6	–	–

Other standard cables available on request

Paper & Transparencies

• 500sht A4 80g Laser/Copier paper	£2.50
• 500sht A4 80g Coloured paper	£3.50
Pink, Green, Gold, Daffodil, Blue, Vellum	
• 1000sht 9.5" x 11" Fanfold paper	£6.50
• 2000sht 9.5" x 11" Fanfold paper	£11
• 1000sht 15" x 11" Fanfold paper	£7.50
• 2000sht 15" x 11" Fanfold paper	£14.50
• 1000sht A4 70g Fanfold paper	£9
• 2000sht A4 70g Fanfold paper	£15
• 51636G - 50 x DJ500 Transparencies	£35
• 51838J - 50 x DJ500 Glossy A4 Paper	£35
• 51630Z - 50 x DJ500 A4 Paper	£15

High Quality Paper
500 sheets A4 90gm pure white
ideal for laser & inkjet printers
£5.50

Labels

On continuous fanfold sheets

• 1000 90mm x 38mm Single Row	£4.50
• 1000 90mm x 36mm Twin Row	£4.80
• 1000 90mm x 49mm Twin Row	£4.95
• 1000 102mm x 36mm Twin Row	£4.70
• 2400 70mm x 37mm Laser Labels	£15.25

All prices, specifications and offers are subject to change without notice. Please ensure suitability with the manufacturer before ordering. All returns are subject to a handling charge. Goods not sold on a trial basis. Sales subject to our Terms & Conditions available on request. Prices exclude VAT @ 17.5%. E & OE.

Monitors & Video Cards

Aries 14" VGA Monitors

Mono: 14" Flat Screen Paper White £85
Colour Super VGA LR: State of Art Colour Monitor, Swedish Low Radiation MPRII, supporting resolution of upto 1024 x 768 with an 0.28mm dot pitch tube. (EPA: EnergyStar Compliant)

- EnergyPro 14" SVGA Colour MRPII £165
- Above with 512K SVGA Card £185

Aries Multiscan Monitors

The NEW Aries Multiscan monitors, with Horizontal Frequency ranging from 29KHz to 75KHz providing rock solid images at resolutions of upto 1280 x 1024 Non-Interlaced, coupled with the 0.28mm dot pitch Picture Tube provides the Ultra High Image that is expected from the Aries range of Low Radiation Swedish MPRII Standard Monitors. Supplied complete with tilt and swivel base.

- **Aries Alphascan Pro LR**
  1024 x 768/72Hz (NI) H-Sync 70KHz, Front Mounted user controls £199
- **Aries EnergyPro 6000i LR**
  15" Colour Display, 0.28mm dot pitch, 1280 x 1024/60Hz NI, Microprocessor Control with digital display. Incls Pincushion, Trapezoid, Rotation settings. EPA EnergyStar Compliant £239
- **Aries EnergyPro 7560i LR**
  17" Flat Screen 0.26mm, 1280 x 1024/70Hz (NI) H-Sync 80KHz, Microprocessor Controls incl. Pincusion, Trapezoid, Rotation & Individual RGB Colours. EPA EnergyStar Compliant £449

Multiscan Monitors

NEC XV15	£279	Taxan EV410LR	£190
NEC XV17	£559	Taxan Ergo 580LR	£282
NEC XE17	£695	Taxan Ergo 895LR	£834
NEC XE21	£1329	Taxan Ergo1080LR	£909
Panasync TX-T1537	£315	Taxan Ergo 2100LR	£1530
Panasync TX-D1751	£599	Sony CPD-15SF1	£287
Panasync TX-D1732	£535	Sony GDM-17SE1 17"	£815
Panasync TX-D2032	£1125	Sony GDM-20SE1VT	£1295
Panasync Pro 7 TX-D2131	£1359	Sony GDM-20SE1 20"	£1409

Panasonic monitors carry 2 years on-site maintenance warranty

Controller Cards

ISA

CEA 0110	Multi I/O - 2S/1P/1G	£9
CEA0290	Multi I/O - IDE/FDD/2S/1P/1G	£11
CEA1910	Multi I/O - IDE/FDD/2S (16550)/1P (EPP) (Enhanced IDE/2.88Mb FDD)	£39
CEA2400	Multi I/O - 2S (16550)1p	£32
CEA0230	2x IDE/2x FDD Controller	£9
CEA0100	Dual RS232 Serial Port Card	£8
CEA2410	Enhanced 16550 Serial Port Card	£29
CEA0110	Parallel Port Card	£9
CEA0300	Game Port Card	£11

ISA Caching Controllers

Promise DC-100	0K	£69
Promise DC-100	1Mb	£95
Promise DC-200	0K	£75

VESA Local Bus

CEA1610	Multi I/O - IDE/FDD/2S (14550)/1P/1G (Enhanced IDE/1.44Mb FDD)	£28
CEA1900	Multi I/O - IDE/FDD/2S (16550)/1P (EPP) (Enhanced IDE/2.88Mb FDD)	£39
CEA2060	Multi I/O - IDE/FDD/2S/1P	£16

SCSI Controllers

Adaptec 1542 Controller Kit	ISA	£174
Adaptec 1542 Controller Bare	ISA	£132
Adaptec 2842 Controller Kit	VLB	£198
Adaptec 2940 Controller Kit	PCI	£239
Adaptec 2742 Controller Kit	EISA	£289
Promise DC2040	ISA	£149
Future Domain TMC1610MCD 16 bit		£89
Future Domain TMC850MCD 8 bit		£45

MS Input Devices

- MS Mouse v2 (Serial) £35
- MS Mouse v2 (PS/2) £35
- MS Bus Mouse £48
- MS HomeMouse £27
- MS Natural Keyboard £69

Graphics Card

- 256K VGA Card ISA £21
- 512K SVGA Card ISA £26
- 1Mb Super VGA ISA £39
- 1Mb Accelerator Graphics Card VLB £58

DIAMOND

- 1Mb Stealth 64 DRAM VLB £92
- 2Mb Stealth 64 DRAM VLB £127
- 2Mb Stealth 64 VRAM VLB £231
- 4Mb Stealth 64 VRAM VLB £318
- 2Mb Viper SE VRAM VLB £245
- 4Mb Viper SE VRAM VLB £348
- 1Mb Stealth 64 DRAM PCI £95
- 2Mb Stealth 64 DRAM PCI £129
- 2Mb Stealth 64 VRAM PCI £216
- 4Mb Stealth 64 VRAM PCI £319
- 2Mb Viper SE VRAM PCI £248
- 4Mb Viper SE VRAM PCI £355

ORCHID

- 1Mb Kelvin EZ VLB £87
- 1Mb Kelvin EZ PCI £88
- 1Mb Kelvin 64 ISA £98
- 2Mb Kelvin 64 ISA £129
- 1Mb Kelvin 64 PCI £98
- 2Mb Kelvin 64 PCI £129
- 1Mb Kelvln 64 VLB £97
- 2Mb Kelvin 64 VLB £130
- 1Mb Fahrenheit 64 PCI £117
- 2Mb Fahrenheit 64 PCI £155
- 1Mb Fahrenheit 64 VLB £115
- 2Mb Fahrenheit 64 VLB £154
- 2Mb Fahrenheit Pro 64 PCI £244
- 4Mb Fahrenheit Pro 64 PCI £345
- 2Mb Fahrenheit Pro 64 VLB £232
- 4Mb Fahrenheit Pro 64 VLB £346

SPEA

- 1Mb V7 Mirage P64 VLB £122
- 2Mb V7 Mercury P64 VLB £232
- 2Mb V7 Mirage P64 PCI £179
- 2Mb V7 Mercury P64 PCI £247

TAXAN

- Ultra Pro 2Mb MCA £228
- Ultra Pro 2Mb EISA £229
- WinBoost ISA £114
- WinBoost VLB £115
- WinBoost PCI £116
- 2Mb GTS WinTurbo ISA £248
- 2Mb GTS WinTurbo VLB £249
- 2Mb GTS WinTurbo PCI £250
- 4Mb WinTurbo Plus ISA £398
- 4Mb WinTurbo Plus VLB £399
- 4Mb WinTurbo Plus PCI £400

TECHWORKS

- 1Mb ThunderBolt 64 DRAM ISA £95
- 2Mb ThunderBolt 64 DRAM ISA £129
- 1Mb ThunderBolt 64 DRAM VLB £96
- 2Mb ThunderBolt 64 DRAM VLB £132
- 1Mb ThunderBolt 64 DRAM PCI £97
- 2Mb ThunderBolt 64 DRAM PCI £134
- 1Mb ThunderBolt-T 9420DGi PCI £75
- 2Mb ThunderBolt-T 9420DGi PCI £116

Hard Drives

AT IDE Hard Drives

CONNER				
CFA540A	540Mb	12ms	3.5"	£122
CFA850A	850Mb	12ms	3.5"	£246
CFA1080A	1Gb	12ms	3.5"	£275
HITACHI				
DK221A-34	340Mb	11ms	2.5"	£215
DK211A-51	510Mb	11ms	2.5"	£299
DK212A-81	810Mb		2.5"	£495
DK212A-10	1Gb	10ms	2.5"	£649
DK328C-10	1Gb		3.5"	£POA
IBM				
84G8998	1Gb		3.5"	£229
MAXTOR				
7420AV	420Mb	12ms	3.5"	£125
7540AV	540Mb	12ms	3.5"	£139
QUANTUM				
Maverick	540Mb	10ms	3.5"	£129
SEAGATE				
ST3491A	428Mb	12ms	3.5"	£116
ST3660A	545Mb	12ms	3.5"	£139
ST5850A	850Mb	12ms	3.5"	£199
ST31220A	1050Mb	12ms	3.5"	£299
ST9190AG	172Mb	16ms	2.5"	£189
ST9385AG	341Mb	16ms	2.5"	£239
ST9550AG	455Mb	16ms	2.5"	£387
WESTERN DIGITAL				
AC2420	420Mb	12ms	3.5"	£115
AC2540	540MB	12ms	3.5"	£145
AC2700	740Mb	10ms	3.5"	£169
AC31000	1.1Gb	10ms	3.5"	£265
AC2850	810Mb	10ms	3.5"	£189

Disk Manager v7. NEW! Now supports DOS OS/2 NT & W95. Overcomes large IDE drive (>528Mb) problems on older BIOS. Only £28 when purchased with a hard disk drive.

SCSI Hard Drives

FUJITSU				
M2682S	355Mb	12ms		£135
M2684S	532Mb	12ms		£162
M1606SA	1.1Gb	10ms		£379
M2903SA	2.0Gb	12ms		£828
M2909S	3.0Gb	11ms		£1125
IBM (5 year warranty)				
	1.0Gb	9ms		£369
0664-M1H	2.0Gb	10ms		£799
Wildcat	4.0Gb	9ms		£1550
HITACHI				
DK326C-10	1Gb	10ms		£345
QUANTUM				
Maverick	540Mb	12ms	3.5"	£149
Empire	1.08Gb	9ms	3.5"	£399
Empire	1.4Gb	9ms	3.5"	£645
Empire	2.1Gb	9ms	3.5"	£845
SEAGATE				
ST3390N	341Mb		12ms	£215
ST3660N	528Mb		12ms	£216
ST31230N	1.05Gb		9ms	£369
ST32430N	2.1Gb		9ms	£735
ST15150N	4.2Gb			£1569

SCSI Cables & Accessories

Single Drive Cable (Internal IDC)	£8
Dual Drive Cable (Internal IDC)	£9
Cent. to Cent. 50 way	£16
25 way D'Connector to 50 way Cent.	£16
25 way Mini D'Conn. to 50 way Cent.	£25
25 way Mini D'Conn. to 25 way Mini D'	£26
Removable SCSI Drive Rack	£29
External Case with PSU	£POA

Removable Drives

Syquest

SQ3105A	105Mb	IDE Internal	£215
SQ3105S	105Mb	SCSI Internal	£235
SQ3270A	270Mb	IDE Internal	£289
SQ3270S	270Mb	SCSI Internal	£290
SQ400	44Mb Cartridge		£44
SQ310	105Mb Cartridge		£41
SQ327	270Mb Cartridge		£51

Parallel Port Drives

BackPack Hard Disk Drives
420Mb £326 850Mb £495 1Gb £615

BackPack Floppy Disk Drives
3.5" 1.44Mb £115 5.25" 1.2Mb £131

BackPack CD ROM Drives
Dual Speed £314
4S Quad Speed £349

BackPack Tape Drives
BP 1080 250Mb (QIC-80) £218
BP 90 680Mb £369

Input Devices

PC Mouse

- 2 Button Aries Mouse (Serial) £12
- 2 button Mouse (Serial) £8
- 2 button PS/2 Mouse £8

Logitech Products

SCANNERS

ScanMan – Colour 24 bit with OmniPage Direct	£165
ScanMan EasyTouch	£104
ScanMan PowerPage	£298
ScanMan 256 PC Win	£77
ScanMan 32 PC Win with OmniPage Direct	£63

MOUSE

Chroma Mouse	£24
Mouseman Sensa Mouse	£38
Mouseman Bus	£38
My Mouse	£18
MouseMan Cordless (Small)	£49
MouseMan 10 pack Bulk	£249
Pilot II Mouse – Serial	£17
Pilot II Mouse – PS/2	£17

TRACKERBALL

Pilot TrackMan	£27
TrackMan Voyager	£48
TrackMan II Combo (Serial/PS2)	£42
TrackMan Portable (Serial/PS2)	£32

JOYSTICK

CyberMan	£59
WingMan	£24
WingMan Extreme	£30

MULTIMEDIA

AudioMan	£76
SoundMan Wave Sound Card	£139
FotoMan Plus	£376

Genius Products

Mouse 3+
Includes powerful imaging software: PC Paintbrush for Windows, Media Mate Presentation Software, MouseMate Driver and Pad £20
Mouse 3 with Driver only £12

HiMouse The Advanced Mouse

HiMouse – Serial	£19
HiMouse – Serial & PS/2	£21
HiMouse – Cordless	£20

Mouse Too & Mouse 3

MouseToo – 350-1050dpi	£11
Mouse 3 (Driver only)	£12
Mouse 3+ Includes powerful imaging software	£20

HiMouse Lite
High performance Optical Mouse £35

HiPoint

The Smart Mini-Trakerball	£19
HiTrak – (Serial & PS/2)	£22

New Sketch

New Sketch 1812	£185
New Sketch 1812D	£209

ScanMate 32 & 256 800 dpi
Black and White scanner with 32 Halftones £49
256 true grey scale & B/W scanner £65

ScanMate Colour
ScanMate Colour, 24 bit 800 dpi Scanner £155

Easy Painter
Amazing value graphics tablet gives you the chance to exercise your creativity. Includes PC Paintbrush for Windows that provides dozens of natural paint tools, complete Utilities Disk, Stylus Pen and keyboard power adaptor £67

Max dpi is dependent on available system memory.

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Memories, Modems, Data-Storage, Facsimile, Spares, Accessories

Luton HQ and Showroom

Motherboards – EnergyStar

CEA1800 – (VL) 486 Upgradeable 5V, 256K Cache, ZIF Socket (3 x VL, 4 x ISA slots) RAM: 2 x 72 Pin, 4 x 30 Pin Max 64Mb **£56**

CEA5000 – (PCI) Upgradeable to Pentium Overdrive, 486 (EPP, ECP) 256K Cache, 4 x IDE HD, 2 x Serial (16550), 3 PCI, White ZIF. (3v3 & 5v CPU) RAM 4 x 72 Pin **£109**

CEA5010 – (PCI) Pentium P60/66MHz, 256K Cache, Enhanced IDE, 2 x 16550 Serial, 4 x PCI, 4 x IDE HD, max. 128Mb Ram, White ZIF **£135**

CEA5050 – (PCI) Pentium P90MHz, 256K Cache, Enhanced Parallel, IDE, 2 x 16550 Serial, 4 x PCI, 4 x IDE HD, max. 128Mb RAM, White ZIF **£149**

Processors (CPU)

	INTEL	
CIA0020	i486SX-33MHz 5V	£49
CIA0050	i486DX2-50MHz 5V	£59
CIA0060	i486DX2-66MHz 5V	£89
CIA0820	i486DX4-75MHz 3v3	£135
CIA0830	i486DX4-100MHz 3v3	£179
CIA0100	Pentium P60MHz 3v3	£189
CIA0110	Pentium P66MHz 3v3	£219
CIA0750	Pentium P75MHz 3v3	£249
CIA0120	Pentium P90MHz 3v3	£379
CIA0490	Pentium P100MHz 3v3	£449
	AMD	
CIA0720	AMD486DX2-66MHz 5V	£79
CIA0730	AMD486DX2-80MHz 3v3	£99
CIA0740	AMD486DX4-100MHz 3v3	£165
	SGS	
CIA0470	SGS486DX2-66MHz 5V	£76
CIA0480	SGS486DX2-80MHz 3v3	£95
	CPU Cooling Fans	
CIA0460	with Heatsink for 486	£12
CIA0600	with Heatsink for P60/P66	£16
CIA0610	with Heatsink for P90	£19

PC AT Keyboards

- EntryLevel (ELV) Keyboard **£14**
- Aries Click-Action Professional. Has quality Alps Keys & Dust Cover. Recommended **£29**
- KeyPro a Programmable Keyboard with LCD Calculator, Diagonal Cursor Keys and Keylock. Professional **£49**
- KeyTrack Keyboard with built-in Trackerball. Alps Keys **£39**
- Cherry G83-6000 Membrane **£18**
- Cherry G83-3210 Membrane **£23**
- Cherry G80-3000 Click-Action **£33**
- Cherry G81-3000 Soft-Action **£31**
- MS Natural Keyboard **£67**

All Keyboards have 102 Keys

PC Spares

- Coiled Keyboard Extension Lead **£6**
- PS/2 - AT Keyboard Adapter **£4**
- 200W PSU Unit (Desktop/Mini Tower) **£25**
- 230W PSU Unit (Full Tower) **£39**

3.5" Quality Excel Disks

Pre-formatted Lifetime Warranty, High Quality (65 Clip rate) Disks

- 10 x DSHD: Black **£5** Multicolour **£6**
- 10 x DSDD **£4** • 50 x DSHD **£22**

Floppy Disk Drives

- UC600 5.25" 1.2Mb Drive **£35**
- UC35/6 3.5" 1.44M Drive **£22**
- UC35/55 – Combined 2 in 1 – 3.5" 1.44Mb & 5.25" 1.2Mb Drive **£85**
- 5 Head Floppy Cable **£5**
- 5.25" Fixing kit for 3.5" Drives. Complete with power/data adaptors **£5**

X-Link Fax/Modems

XL-144i Internal 14400bps V.Fast, V32bis, V42bis, MNP5 **£87**

XL-144E External 14400bps V.Fast, V32bis, V42bis, MNP5 **£89**

XL-V34i Internal 28800bps V34, V32bis, V42bis, MNP5 **£168**

XL-V34E External 28800bps V34, V32bis, V42bis, MNP5 **£175**

All above Modems are BABT approved, carry 3 years warranty & are supplied complete with cables & Winfax Lite software

IBM PCMCIA Fax/Modems
Ideal for Thinkpads

14.4	£129	9624	£59

PACE Fax/Modems

Manufacturer's 5 Year No-Quibble Warranty

GOA0670	Mobifax Quad Pocket	£75
GOA0900	Mobifax 14.4 Pocket	£98
GOA0770	Linnet 32+ FX	£149
GOA1010	Linnet Message Desk	£209
GOA0780	Linnet 34 FX	£267
GOA0270	Microlin Quad FX Pocket	£89
GOA0020	Microlin Quad FX Internal	£79
GOA0420	Microlin 32+ FX Pocket	£149
GOA0290	Microlin 32+ FX Internal	£134
GOA1020	Microlin 34 FX Pocket	£235
GOA0510	Microlin 32 PCMCIA	£190
GOA1030	Microlin NB 34 PCMCIA	£275
GOA0260	Ultralink 32	£330

Except for Linnet, all PACE Fax/Modems are supplied with Cables, Win/DosFax & COMit softwares

US Robotics Modems

	Int	Ext
Sportster 14.4 Fax/Modem	£126	£126
Sportster 28.8 Fax/Modem	£195	£193
Worldport Dual Cellular		£167
Courier v34 Fx/Md	£260	£260
Worldport PCMCIA 2496 Fx/Md	–	£129
Worldport Dual standard cellular PCMCIA	–	£193
Worldport v34 PCMCIA	–	£268
Connecting Cable 9/25	–	£8

Price includes software.

Dataflex Fax/Modems

Rapier Plus Desktop **£338**
3 year warranty
Complete with Cables & Software

PCMCIA Game Card II

- Play PC games on portable computers
- One or two joysticks as standard
- No software modification needed
- Simple installation and configuration
- 100% British designed and manufactured **£69**

PC Joysticks

- NEW! FX3000 **£26**
- FX2000 **£16**
- Command Control (PAD) **£16**
- Quick Shot Aviator 5 **£29**
- FlightMAX Advance **£24**
- NEW! G-Force Flight Yoke **£37**
- Axys **£18**
- 2-into-1 Joystick Adapter **£5**

CH PRODUCTS

- NEW! Flightstick **£29**
- NEW! Flightstick Pro **£54**

LOGITECH JOYSTICKS

● CyberMan £59; ● WingMan £25 ● WingMan Extreme £32

Scanners

HEWLETT PACKARD

AT – HP-Scanjet 3P	£338	3C	£649
PS/2 – HP-Scanjet 3P	£338	3C	£649
HP Auto Doc Feeder 3P	£145	IIC	£265

EPSON

Epson A4, 24 bit colour Flatbed Scanner: Supplied complete with Pic. Publisher LE, Omni Direct OCR, Interface Card & Cables

- GTX6500 Parallel I/F **£399**
- GXT6500 SCSI I/F **£465**
- GTX8000 Parallel **£495**
- GTX8000 SCSI **£575**
- GTX9000 SCSI **£686**

Canon

- Canon IX-4015 Colour Scanner with AT-SCSI Interface & OFOTO Software **£579**

Psion Computers

● Ser 3A 256K **£219** ● Ser 3A 512K **£229**
● Ser 3A 1Mb **£249** ● Ser 3A 2Mb **£299**

RAM Solid State Discs (SSD)
● 128K **£48;** ● 512K **£97** ● 1Mb **£199**

Flash Solid State Discs (SSD)
● 128K **£30;** ● 256K **£48** ● 512K **£79**
● 1Mb **£139;** ● 2Mb **£199**

- Parallel Interface Link **£24**
- RS 232 Serial Link for PC **£58;** Mac **£59**
- Mains Adaptor 9V AC **£12**
- Professional Finance **£47**
- Spelling Checker/Thesaurus **£39**
- Spreadsheet **£50** ● WinLink **£25**
- Leather Case **£21** ● Desk Stand **£15**
- Finance Pack **£50** ● Paint and compose **£58**
- Games Pack 3 **£28** ● VT100 Emulator **£49**
- Comcard Compute-a-diet **£98**
- WINLink Windows upgrade to serial link **£24**
- Black Anodised Psion 3/3A Desk Stand **£14**

Memory (RAM) Simms

256K 3 Chip	£18	4Mb - 1Mb x 36	£113
1Mb x 9 3 Chip	£28	8Mb - 2Mb x 32	£119
1Mb x 9 9 Chip	£33	8Mb - 2Mb x 36	£219
4Mb x 9 9 Chip	£104	16Mb - 4Mb x 32	£232
4Mb - 1Mb x 32	£105	16Mb - 4Mb x 36	£339

Maths Co-Processors

8087-4. 77MHz	£87	80387DX-20/25/33MHz	£42
80287-20MHz	£45	80387DX-40MHz	£45
80387SX-16/20MHz	£38	80487SX-25MHz	£275
80387SX-25MHz	£38	Overdrive 486SX-25MHz-50M	£188
80387SX-33MHz	£42		
80387SX-40MHz	£44		

Computer Cases – Chic

- Mini Tower Case with PSU **£35**
- Midl Tower Case with PSU **£58**
- Full Tower Case with PSU **£74**
- Slim Line (Desk) Case with PSU **£44**
- Desk Top Std Case with PSU **£33**

Fax Machines

HP Fax 900	£526	Pana UFV60	£339
HP Fax 950	£678	Pana UF321	£569
Pana UFV40	£259	Pana UF322E	£675
Fax PaperRoll	£5	Pana UF315	£569

Tape Streamers

HEWLETT PACKARD

HP Colorado

DJ-20 250Mb Internal	£92
DJ-35 350Mb Internal	£112
DJ-25 680Mb Internal	£165
KE-10 PC External Kit	£59
KE-15 PS/2 External Kit	£77
FC-20 Fast Tape Controller	£49
TC-15 Fast Cont with H'Ware Comp.	£105

Parallel Port Tape Drive

Trakker 250 JT-20	£183
Trakker 350 JT-35	£205
Trakker 700 JT-25	£269

Colorado Backup Software

SK-7 Windows Software Pack	£39
SK-1 Sytos Plus for OS/2	£78
SU53-J – SCO Unix/Xenix Pack	£72

iOmega Storage Solutions

	Internal	External
250Mb Tape Drive	£79	£149
680 Mb Tape 700	£185	£259

Data Cartridges

DC2000	£12	DC2120	£9
DC6150	£11	DC6250	£16
DC6525	£17	MC3000 XL	£18

Aries

Leasing finance at very attractive rates now available to Businesses (subject to status), Schools, Colleges, Universities, Government Depts. and Local Councils. Minimum order £1,000. Please telephone for details.

- Official orders accepted from government, educational establishments and PLCs.
- Showroom and shop hours: 9am to 5.30pm, Monday to Saturday. Late night Thursday until 8pm. Free customer car park.
- Mail Order Inquiries: 9am to 6pm. Monday to Friday only.
- Technical Inquiries: 9.30am to 5.00pm, Monday to Friday.
- VAT: EC customers please add 17.5%VAT to value of order including carriage.

Carriage (incl. Insurance) Charges

	1st Item	2nd & Subsequent Item
Software	£6.00	£2.00
Hardware	£8.00	£5.00
Lasers	£9.00	£7.00
Accessories	£6.00	£2.00
Small Items	£6.00	£2.00

Please note that £6.00 is our minimum carriage charge.

Standard Delivery Charges shown above for delivery within 2-4 working days after despatch. For **Express Delivery** (next working day) double the total carriage. All delivery charges subject to VAT. Please allow 7 working days for delivery of orders and 28 days for non-stock orders. Above carriage charges apply to most of the UK mainland except for certain outlying areas. Please confirm when placing your order. On export orders, carriage is charged at cost.

Offers and all items are subject to availability. Prices may have to change for reasons beyond our control. Specifications on products are correct at the time of going to press and given in good faith, but may have to change without notice. Please check suitability of products with your systems and/or manufacturers, before ordering. All trademarks are acknowledged. Goods are sold subject to our standard terms and conditions of sale and are available on request. Goods are not sold on trial basis. E&OE.

Watford Electronics Ltd.

Jessa Group of Companies – Established 1972

Mail Order & Showroom: Finway, off Dallow Rd., LUTON, LU1 1TR, England
Tel: 01582 48 77 77; Fax: 01582 488588

Showroom Only: 250 Lower High Street, WATFORD, WD1 2AN, England
Tel: 01923 237774; Fax: 01923 233642

Power Mark®

MEMORY

Technical Sales Order Lines
0181-951 3355
(50 lines)

40 pages!

CONTENTS

Memory.....1-5
Processor Upgrades.....6
Mass Storage.....7-11
Scanners.....12
Modems.....13-18
Networking.....19-22
Printers.....23-26
Multimedia.....27-31
Monitors.....32
CD ROMs.....34
Software.....35-40

OUR TOP TEN SOFTWARE PACKAGES AND THEIR MEMORY REQUIREMENTS

	Minimum	Recommended
Word Perfect V.6	4MB	8MB+
MS Excel V.5	4MB	8MB+
Lotus 1.2.3 V.5	4MB	8MB+
MS Word V.6	4MB	8MB+
MS Office V.4.3	4MB	8MB+
MS Access V.4	6MB	8MB+
MS Powerpoint	4MB	8MB+
Norton Utilities V.8	4MB	8MB+
Corel Draw 5	4MB	8MB+/16MB
Aldus PageMaker 5	4MB	8MB+

Source: Manufacturers figures

MEMORY LANE

Do you remember...?

... Dubbin

... Detatchable collars

... anything tie-dyed

... TTY terminals

WELCOME TO POWERMARK - *Part 7*

I'm passionate about my company and I do feel that it is important that you know about the culture and ethos of the organisation that you are dealing with.

Mark Simon

Mark Simon
Chairman

Here are just some of the things that make Powermark so different:

- Every once in a while, we have mime artists, **jugglers**, *caricaturists* and clowns that spend an afternoon with us, making Powermark an enjoyable place to work.
- The Powermark **Academy** is open to all 60 members of staff.

POWERMARK ACADEMY

MATCHED MEMORY — THE LARGEST DIRECT MEMORY SUPPLIER

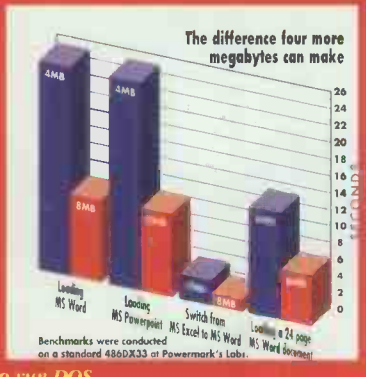
Every month Powermark plc supply thousands of memory upgrades to thousands of satisfied customers, making us the largest direct supplier of memory in the UK.

"Adding memory to your computer is undoubtedly the easiest, most cost effective way of increasing the performance of your system"

More and more applications demand large amounts of memory to work effectively.
By increasing the standard memory in your PC you can:

- **Radically increase the performance of your system**
- **Run multimedia applications at optimum speed**
- **Keep fonts and desktop accessories in RAM for instant access**
- **Run more than one application at a time, enabling true multi-tasking**

DON'T JUST TAKE OUR WORD FOR IT...



"There's no question that you need more memory to run Windows or OS/2 than you ever did to run DOS.

The amount of memory made an even greater difference when we tried features like dragging and dropping between applications. The system was very slow with 4MB, significantly faster with 8MB, and faster still with 12MB.

On the basis of our tests, 8MB - not 4MB - is the minimum amount of memory you'll need to run Windows 3.1 satisfactorily. With 12MB, you'll get optimal performance in many cases."

PC Magazine, February 1995

"Possibly the greatest upgrade you can offer a flagging PC is an increase in memory.

The difference in speed between 4MB and 8MB is enormous, as is the jump from 8MB to 16MB. Anyone attempting to run Windows 3.1 in less than 4MB should upgrade now."

Personal Computer World, January 1995

MATCHED MEMORY SIMM KITS

If you're unsure about upgrading then our **Matched Memory SIMM Kits** are for you. They're guaranteed to be totally memory matched. That means speed, voltage, refresh, parity and physical characteristics are all matched to give optimum performance to your system.

From our listings on the following pages, just select the upgrade kit for your PC. They cost a little more but you get:

- full installation instructions
- anti-static wrist strap
- dedicated support hotline
- our famous double guarantee - full lifetime warranty **and** the Powermark Promise - our 14 day 'no-quibble' money back guarantee

If your PC is not listed then call us. Our Memory Database has the upgrade path for almost every PC supplied in the UK over the last five years.

UPGRADING IS EASY

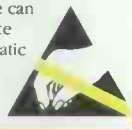
With most memory upgrades it's just a case of:

- *switching off PC*
- *removing lid*
- *locating SIMM sockets*
- *installing SIMMs*
- *closing lid*
- *switching back on*

HANDLING MEMORY

Static can degrade a DRAM, shortening its life. Thats why we include an anti-static wrist strap in every **Matched Memory SIMM Kit.**

If you're buying loose SIMMs then do ask for an anti-static wrist strap. For multiple installations we can supply complete ESD (Electro Static Device) protection equipment.



PRICE INSTABILITY!
CALL FOR LATEST OFFERS ON MEMORY BEFORE ORDERING

QUALITY, QUALITY, QUALITY

Being the largest direct supplier means we buy memory direct from world class manufacturers. Powermark never supply memory that is non-factory original.

REGULAR SIMMS

30 PIN SIMMS

- 5 year warranty on all SIMMs listed here

Type	*Capacity*	*Speed*	
256K x 9	256K	100ns	£12
256K x 9	256K	80ns	£12
1M x 8	1MB	80ns	£33
1M x 9	1MB	80ns	£33
1M x 9	1MB	70ns	£31
1M x 9 (9cs)	1MB	70ns	£33
1M x 9	1MB	60ns	£36
4M x 8	4MB	80ns	£125
4M x 9	4MB	80ns	£128
4M x 9	4MB	70ns	£119
4M x 9	4MB	60ns	£125
16M x 9	16MB	70ns	£579
16M x 9	16MB	60ns	£599

GOLD EDGED SIMMS

- Specified by many PC manufacturers
- Longer MTBF

1M x 9	1MB	70ns	£41
1M x 9	1MB	60ns	£45

72 PIN SIMMS

- 10 year warranty on all SIMMs listed here

Type	*Capacity*	*Speed*	
256K x 36	1MB	80ns	£59
256K x 36	1MB	70ns	£59
512K x 32	2MB	70ns	£82
512K x 36	2MB	70ns	£82
1MB x 32	4MB	80ns	£122
1MB x 32	4MB	70ns	£125
1MB x 36	4MB	80ns	£135
1MB x 36	4MB	70ns	£135
1MB x 36	4MB	60ns	£145
2MB x 32	8MB	80ns	£265
2MB x 32	8MB	70ns	£275
2MB x 36	8MB	80ns	£265
2MB x 36	8MB	70ns	£275
2MB x 36	8MB	60ns	£279
4MB x 32	16MB	70ns	£499
4MB x 36	16MB	70ns	£499
4MB x 36	16MB	60ns	£529
8MB x 32	32MB	70ns	£949
8MB x 36	32MB	70ns	£949
8MB x 36	32MB	60ns	£1049
16MB x 36	64MB	60ns	£Call

NEW! 72 PIN EDO SIMMS

- Can increase performance by up to 40% on non-EDO systems and up to 60% on EDO designed systems
- Call for full details

POWER THE NET!

Access the Internet through Powermark's PNet
• Full Internet connection • POP3 Email • Worldwide Web Browsing
• FTP • Telnet • Usenet • Many local points of presence
• On-line or telephone support • Free Internet guide

BANK at Powermark

MATCHED MEMORY FEATURE

MATCHED MEMORY FOR COMPAQ

COMPAQ ASSOCIATE

DESKPRO 386/20/25/e/s
4MB add-on Module £159
4MB Expansion Board £209
SYSTEMPRO, DESKPRO 486/33L, 50L & 486/25
8MB Module £299
32MB Module £1444
SYSTEMPRO XL 486/50, PENTIUM
256MB Board with 16MB £799
DESKPRO 386N, 386S/20 & PROSIGNIA
2MB Module POWERCUT! £85
4MB Module POWERCUT! £145
DESKPRO 386A/486, 486/25M, 486S/33M, 486DX2
64MB Board with 4MB £292
64MB Board with 8MB £444
DESKPRO XE & XL FAMILY
4MB £167
8MB £325
DESKPRO DESKPRO 5/90
8MB Module £269
PROLINEA 4/25S, 4/33, 4/50, 4/66, NET 1, MT
4MB POWERCUT! £145
8MB £299

PROLIANT 1000, 2000, 4000
4MB £168
8MB £336
16MB £639
PORTABLE 486M/COLOUR 486/66
2MB Kit £87
8MB Kit £310
SLT386
2MB Board £129
4MB Board £189
LTE LITE 386, 386s/20
2MB Board £129
4MB Board £189
8MB Board £349
LTE LITE 486C
4MB Card £189
8MB Card £349
16MB Card £773
LTE ELITE SERIES
4MB Card £185
8MB Card £349
CONTURA 400 C/CX
8MB Module POWERCUT! £285
CONTURA 3/25/20/25C, 4/25
2MB Card £85
4MB Card £159
8MB Card £299
CONCERTO 4/25, 4/33
8MB £389
16MB £1215
COMPAQ AERO 4/25/33
4MB £159
COMPAQ PRESARIO 425, 633, 833, 850, 866 / 800 SERIES
4MB £149
8MB £279
COMPAQ PRESARIO 700/900
16MB Module £499

MATCHED MEMORY FOR DELL

200 / 300 SERIES
2MB Kit £64
4MB Kit £129
325/D/P, 333/D/P
2MB → 6MB £129
2MB → 10MB £289
POWERLINE WORKSTATION SERIES
4MB Kit £189
8MB Kit £336
16MB Kit POWERCUT! £495
POWER DESKTOP SERIES
4MB Module POWERCUT! £149
8MB Module £299
LOW PROFILE POWER DESKTOP
4MB £139
16MB POWERCUT! £495
POWEREDGE SP/XE SERIES
8MB Kit £279
NL20, NL25
2MB Module £114
320SLi
1MB £149
DIMENSION 'i'
4MB £149
8MB £289
DIMENSION XPS
16MB Kit £559
OMNIPLEX SERIES
16MB Module £499
OPTIPLEX SERIES
16MB Module £549
LATITUDE SERIES/M
4MB POWERCUT! £149
16MB £495

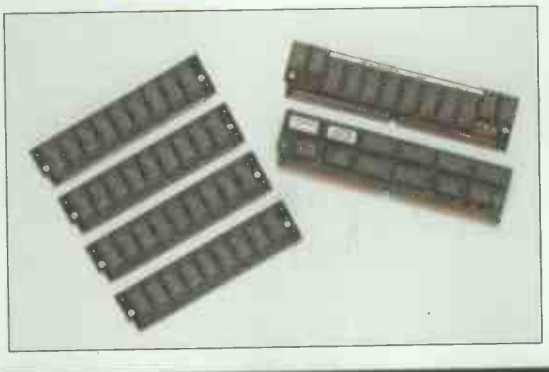
MATCHED MEMORY FOR SHARP

SHARP 3000/3100, 6700
512K £89
1MB £149
SHARP 6220/6221
1MB ~~£88~~
2MB £168
SHARP 6641, 8501
1MB £94
2MB £146

PCMCIA MEMORY

- All formats stocked: JEDEC, FLASH, OTPROM, DRAM, etc
- Check compatibility before ordering

256K SRAM £48
512K SRAM £74
1MB SRAM £122
2MB SRAM POWERCUT! £99



MATCHED MEMORY FOR NOTEBOOKS & PALMTOPS

- More memory can increase battery life by up to 18%

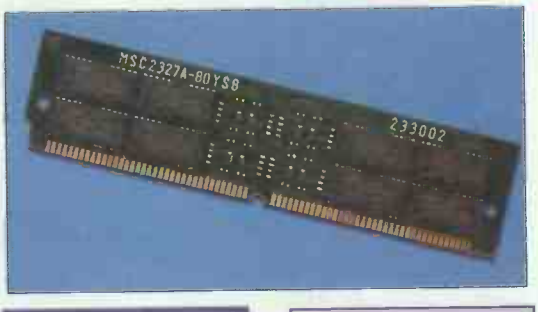
COMMODORE LT286/386
2MB Module POWERCUT! £83
4MB Kit POWERCUT! £169
SANYO 17NB, 18NB
2MB POWERCUT! £82
4MB POWERCUT! £165
PANASONIC CF170, 270, 370
1MB £69
2MB £129
PANASONIC CF280, 380, 480
2MB £130
6MB £320
CF1000
4MB Module £198
CF580
4MB Module £185
LIBREX V386SX
1MB → 4MB POWERCUT! £199
POQET
256K £58

BSI REGISTERED FIRM — NATIONAL ACCREDITATION OF CERTIFICATION BODIES

Certificate no. FS 26535
BS5750 registered for the supply of computer, printer and workstation memory, processor and other upgrades.

Powermark plc is regularly assessed by the British Standards Institution to ensure compliance with the quality standard.

Technical Sales Order Lines
0181-951 3355
(50 lines)



MEMORY TOOLS

- Complete range of anti-static products available

ANTI-STATIC WRIST STRAP
- Essential when handling electrostatic devices £8

IC EXTRACTOR TOOL £9
SIMM TESTER £779
WRIST STRAP TESTER £99

LIFETIME WARRANTY ON ALL MATCHED MEMORY

WE ALSO SUPPLY UPGRADES FOR...
Acorn, ALR, AST, Austin, Canon, Commodore, Dan, Goldstar, Hyundai, Locland, MJN, Multiplex, NEC, NeXT, Opus, Philips, QMS, Sharp, Tandy, TI, Unisys, Wyse and many more.

DRAMS

- Call for devices not shown
- Full range of PROMs, SRAMs & ZIPs available
- 5 year warranty

64K x 1 - 120ns £1.79
256K x 1 - 100ns £2.62
256K x 1 - 80ns £2.80
256K x 4 - 80ns £5.77
1M x 1 - 80ns £4.99
1M x 1 - 70ns £5.20
1M x 4 - 80ns £17.80

EARLY BIRD
Order Bonus
See page 33 of this advertisement

HMSO
Public Sector customers can purchase through HMSO by calling 01603 694153.

BEWARE
Beware of third party, low grade memory. Powermark plc only supply premium upgrades from market leaders with manufacturers' approvals.

Technical Sales Order Lines
0181-951 3355
(50 lines)

MEMORY

- **HUGE STOCKS** Guaranteed same day despatch on virtually all orders placed even up to 4.00pm.
- **TECHNICAL SALES PEOPLE** Our sales people are the best. They are trained specialists in their chosen field - multimedia, memory of all types, mass storage, networking and communications.
- **FINANCIAL STABILITY** Powermark plc has been supplying upgrades for over 4 years and has an annual turnover exceeding £18 million with a healthy balance sheet.
- **LOW PRICES** We only supply products from leading manufacturers and at low, low prices too.
- **TECHNICAL SUPPORT** Dedicated after sales technical support teams on line to help with installation.
- **CORPORATE & PUBLIC SECTOR** We welcome orders from corporate, education and public sector organisations. Just fax or phone your order number.
- **FULL MANUFACTURERS' WARRANTIES** All products supplied by Powermark plc carry manufacturers' warranties and of course full Powermark plc guarantees.

Use the red numbers to find these pages easily

TURN THE PAGE FOR MORE

- **UPGRADE DRIVE THRU** While you wait installation service available. See page 3 for details.
- **PERSONAL CALLERS** Save on delivery charges - there's plenty of parking. Telephone first to check our stock position on the items you want. We're open from 9.00am to 6.00pm Monday to Friday. Saturdays: Sales from 9.30am to 4.00pm, Technical Support and Customer Service from 10.00am to 2.00pm.

Powermark plc
Premier House, 112 Station Rd, Edgware, Middlesex HA8 7AQ
Tel: 0181-951 3355
(50 lines)
Fax: 0181 905 6233
Email: sales@powermark.com

VISA MasterCard SWITCH DELTA
Cards are not debited until despatch
VAT at 17.5% will be added to all prices

POWER THE NET! RATES
£12.50 once-only membership
£15 per month subscription
ABSOLUTELY NO OTHER HIDDEN SERVICE CHARGES
Quit at any time without penalties
Call 0181-951-3355 and ask for our PNet specialists
Join for only £9.95 when you buy any modem from Powermark

Power Mark®

MEMORY

MATCHED MEMORY FEATURE

Technical Sales Order Lines 0181-951 3355 (50 lines)

UPGRADE DRIVE THRU

Unsure about upgrading?

Upgrading is easy but if you would like us to upgrade your computer then our **UPGRADE DRIVE THRU** is for you. It's fast, it's simple and it's convenient. Just drive into our loading bay at the rear of Premier House and your computer will go directly to our on-site labs for instant upgrading by our fully qualified engineers.

For upgrades that take a little while we'll even hand you a Pager enabling you to visit the shopping centre next door. You'll be paged the minute your computer is ready.

In most cases you need only bring your base unit along, but do call first to discuss your requirements and to confirm our stock position on the upgrades you require.

DESKTOP MENU
(Call for notebook menu)

Memory	£27
Hard Disk	£39
Processor	£28
Tape Backup	£31
Sound or Modem Card	£25
Graphics or Video Card	£26
Multimedia Kit	£39

Save £££s with

TURN THE PAGE FOR MORE

MATCHED MEMORY FOR AMSTRAD

PC1286/PC1386/PC3286/ PC3386/PC5286
1MB → 4MB £132
ALT286/386SX
1MB → 4MB £149
1MB → 4MB (Zero-wait state) £199
NC100
256K Card £58
512K Card £89
1MB Card £129
PC7286, 7386
2MB POWERCUT! £62
4MB POWERCUT! £129
PC7486 SLC
8MB Kit £229
16MB Kit POWERCUT! £459
PC9486
4MB Module £139
16MB Module £499
ANB386SX
4MB Module POWERCUT! £185
386SX25
MEGA PC
4MB Kit £139
16MB Kit £469

All our Matched Memory Kits come with our famous double guarantee - full lifetime warranty *and* 14 day money back guarantee

MATCHED MEMORY FOR TANDON

PC 386/20
8MB Kit £336
PC386SX/20
4MB Kit POWERCUT! £129
6MB Kit £219
386SX NOTEBOOK
2MB → 4MB £72
2MB → 10MB £289
POSITIVE 386SX25, 386DX40, 486SX25, 486DX33
4MB Kit POWERCUT! £129
16MB Kit £479

MATCHED MEMORY FOR PACKARD BELL

LEGEND 200/316SX
2MB Kit POWERCUT! £72
4MB Kit POWERCUT! £144
LEGEND 600, 900
4MB Kit POWERCUT! £129
8MB Kit POWERCUT! £279
486 LOCAL BUS
2MB Module £85
4MB Module £149
FORCE RANGE
XL410/416/486 £Call
16MB Kit POWERCUT! £459

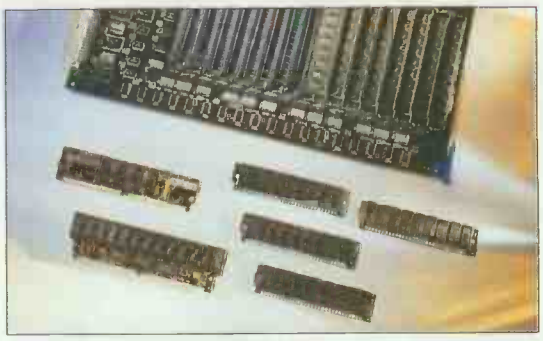
MATCHED MEMORY FOR HP

• Authorised HP dealer
VECTRA 386/25 PC, 486 PC, 486s/20
4MB Kit £169
8MB Kit £336
HP VALUELINE 486, NETSERVER SERIES
8MB £299
16MB Module £599
HP95
512K Card £89
1MB Card £149
HP OMNIBOOK RANGE £Call

MATCHED MEMORY FOR OLIVETTI

PCS386SX
1MB → 2MB POWERCUT! £64
1MB → 4MB POWERCUT! £129
1MB → 6MB POWERCUT! £209
1MB → 8MB £272
PCS40
8MB Kit £336
M290
2MB Kit POWERCUT! £74
4MB Kit POWERCUT! £149
M486/CP386
2MB Kit £99
4MB Kit £168
PCS33
2MB Kit POWERCUT! £66
M300-30
4MB Kit £168
8MB Kit £299
M400-10/40/60
4MB Kit £156
16MB Kit £539
QUADERNO
512K £89
1MB Kit £149
MODULO & SUPREMA RANGE
8MB Module £289
16MB Module £529
32MB Module £1199

BEWARE
Beware of low grade 5 volt notebook memory that reduces battery life by up to 40%. Powermark plc only supplies 3.3 volt devices from market leaders with manufacturers' approvals.



MATCHED MEMORY FOR TOSHIBA

T1000/E/XE/LE, T1800, T1850C, T2000SX, T2000SXE, T2200SXE
2MB Card £89
4MB Card £169
8MB Card £319
T3300SL
2MB £66
T1200XE
2MB Card £93
T1600/T5100
2MB Card £75
T2400CS/T3600
16MB £649
T2450 CT/2400 CT
8MB Card £359
T3100SX
2MB Card £89
4MB Card £169
T3200SX/C
4MB Module £162
8MB Module £329
T3200
3MB Card £169
T4400, T6400 SX/C, DX/C
4MB Card £169
8MB Card £329
T1950CT, T3400CT, T4500, T4600, T4700CT, T4800CT
8MB Module £329
16MB Module £629
T4850/4900
8MB £329
T5200/C & T8500/ 6400/6600
2MB Module £94
8MB Module £349
DYNAPAD T100X
6MB Card £269

MATCHED MEMORY FOR ZENITH

SUPERSPORT SX
2MB Module £127
TURBOSPORT 386E
2MB Kit £424
MASTERSPORT SL/SLe, 620NL
2MB Module £109
Z-NOTE L SERIES, 320, 325
1MB £114
2MB £408
Z-SERVER/STATION/ 425/433/450
8MB Module £279
Z-SPORT
4MB £179
Z-SELECT SERIES
8MB Module £279

MATCHED MEMORY FOR GATEWAY

PC 4SX-33
4MB Module £139
16MB Module £499
PC 4DX-33V, PC 4DX-66V
4MB Module £139
16MB Module £499
32MB Module £1199
PC 4DX2-66P/V
16MB Module £499
32MB Module £1199
PC P5-60, P5-66
64MB Kit £2622
PC 4D-66, PC 4D-100
8MB Kit £299
32MB Kit £1199

MATCHED MEMORY FOR ELONEX

PC386SXM, SXB, 386/16, B/33
2MB Kit £64
4MB Kit £129
8MB Kit £249
PC386 V/E, 486 V/E
4MB Kit £139
8MB Kit £279
16MB Kit £469
WS RANGE
4MB Kit POWERCUT! £139
8MB Kit POWERCUT! £279
16MB Kit POWERCUT! £499
PC433M, 450M, 466M
4MB Kit £129
8MB Kit £279
16MB Kit £469
LT386SX/P
2MB Kit £64
4MB Kit £139
PC500 SERIES
8MB Module POWERCUT! £279
16MB Module POWERCUT! £499
ELONEX 560F EISA
8MB Kit POWERCUT! £279
16MB Kit POWERCUT! £475

PRICE INSTABILITY!
CALL FOR LATEST OFFERS ON MEMORY BEFORE ORDERING

HMSO
Public Sector customers can purchase through HMSO by calling 01603 694153.

POWER THE NET!

Access the Internet through Powermark's PNet
• Full Internet connection • POP3 Email • Worldwide Web Browsing
• FTP • Telnet • Usenet • Many local points of presence
• On-line or telephone support • Free Internet guide

BANK at Powermark

MATCHED MEMORY FEATURE

MATCHED MEMORY FOR IBM

Authorised Dealer
IBM Personal Computers

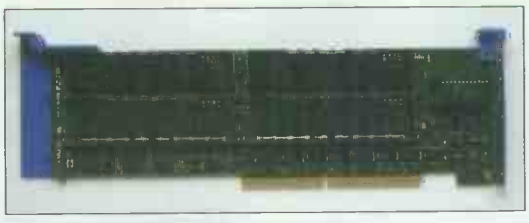
- Planar memory plugs directly onto system board
- Price instability - check latest offers on IBM matched memory before ordering

PS/2 35LS, 35SX, 40SX
4MB £159
8MB £299
PS/2 50Z
1MB → 2MB £85
PS/2 55SX, 60, 65SX/57SX/M57
4MB £168
PS/2 70, Portable 70/75
4MB POWERCUT! £159
8MB £289
PS/2 80
4MB £239
PS/2 L40SX, N33SSX, NSL
4MB Card POWERCUT! £149
8MB Card £349
PS/2 90, 95, 95A
4MB Module £168
PS/2 195 & 295
32MB Module £Call
PS/2 95 ARRAY PENTIUM
16MB Kit £679
VALUEPOINT 6381, 6382, 6384
4MB £149
8MB POWERCUT! £269
PENTIUM VALUEPOINT SERIES
8MB Kit POWERCUT! £289
16MB Kit £529
THINKPAD 300, 350, 355, 500, 700, 710, 720, 750, 755c
2MB £179
8MB £349
PC466DX2, 100DX4
8MB Module £299
CL57SX
4MB £189
8MB £383
TREKKA
2MB £89
HURDLA, SPRINTA
4MB Kit £149
16MB Kit £476
PS/1
2MB £85
PS/1 - 386
4MB £149
PS/1 - PRO 486
4MB £149
8MB £289
CONSULTANT, ESSENTIAL, EXPERT
4MB £149
8MB £279
NEW! **APTIVA**
4MB £149
PC 300 SERIES
4MB Module £149
PC 700 SERIES
8MB Module £279

MATHS CO-PROCESSORS

Installation of a Co-Processor results in a significant speed increase in maths intensive applications eg: spreadsheets, databases, CAD and graphics packages.

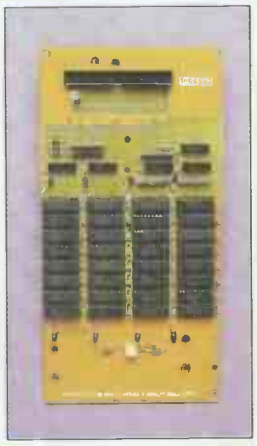
	INTEL	ULSI		IIT/ CYRIX
80387 SX (16 MHz → 33MHz)	£58	£49	POWERCUT!	£42
80387 SX (40 MHz)	£58	-		£48
80387 SL (25 MHz)	£58	-		-
80387 DX (16 MHz → 33MHz)	£59	£32	POWERCUT!	£49
80387 DX (40 MHz)	-	-		£51
80487 SX (25 MHz)	£277	-		-
80386 RapidCAD	£189	-		-



MATCHED ADAPTER BOARDS FOR IBM PS/2

- Completely user expandable

PS/2 50, 50Z, 60 & 65
16MB Board with 4MB £295
16MB Board with 8MB £425
PS/2 70, 80, 90 & 95
64MB Board with 4MB £295
64MB Board with 8MB £465



MATCHED MEMORY FOR VIGLEN

- Complete range for Executive, Professional and Tower

GENIE 386SX
2MB Kit £64
4MB Kit £128
VIG II ELITE
2MB Kit £98
4MB Kit £196
VIG III LS (Type 1)
4MB Kit £169
8MB Kit £399
VIG III/25, III/33
4MB Kit £139
8MB Kit £279
16MB Kit £469
VIGLEN EX PENTIUM SERIES
8MB Kit £269
VIGLEN EX 4DX33/50
4MB £149
8MB £269
VIGLEN PENTIUM SERIES
EDO 8MB Kit £Call
VIG 4SX25, 4DX33, 4DX50, 4DX2-50, 4DX2-66
4MB Kit £139
8MB Kit £279
16MB Kit POWERCUT! £469
CONTENDER RANGE
4MB £149
8MB £269
GENIE 486VLB RANGE
16MB Module £499
64MB Kit £2396
GENIE PCI RANGE
16MB Module £499
32MB Module £1199

MATCHED MEMORY FOR ICL

DRS 40, 45
2MB Kit £69
4MB Kit £155
ERGOPRO C4, D4
8MB Kit £149
16MB Kit £539
DRS M95
4MB Kit POWERCUT! £179
32MB Kit £1199
VALUEPLUS DL RANGE
4MB £168
ZENO SERIES
4MB Kit £149
16MB Kit £539

BSI REGISTERED FIRM — NATIONAL ACCREDITATION OF CERTIFICATION BODIES

Certificate no. FS 26535

BS5750 registered for the supply of computer, printer and workstation memory, processor and other upgrades.

Powermark plc is regularly assessed by the British Standards Institution to ensure compliance with the quality standard.

MATCHED MEMORY FOR APRICOT

XEN 486SX-25, 486DX2-50, 486 DX2-66, PCM
4MB Module £168
16MB Module £599

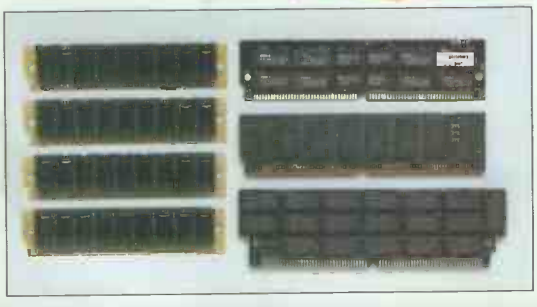
MEMORY EXPANSION BOARDS

KINGSTON ATA BOARD
16MB Board with 4MB £239
16MB Board with 8MB £349
16MB Board with 16MB £649

MATCHED MEMORY FOR APPLE

- Complete range stocked

Authorised Reseller



Technical Sales Order Lines

0181-951 3355
(50 lines)

MEMORY

- **HUGE STOCKS** Guaranteed same day despatch on virtually all orders placed even up to 4.00pm.
- **TECHNICAL SALES PEOPLE** Our sales people are the best. They are trained specialists in their chosen field - multimedia, memory of all types, mass storage, networking and communications.
- **FINANCIAL STABILITY** Powermark plc has been supplying upgrades for over 4 years and has an annual turnover exceeding £18 million with a healthy balance sheet.
- **LOW PRICES** We only supply products from leading manufacturers and at low, low prices too.
- **TECHNICAL SUPPORT** Dedicated after sales technical support teams on line to help with installation.
- **CORPORATE & PUBLIC SECTOR** We welcome orders from corporate, education and public sector organisations. Just fax or phone your order number.
- **FULL MANUFACTURERS' WARRANTIES** All products supplied by Powermark plc carry manufacturers' warranties and of course full Powermark plc guarantees.

Use the red border to find these pages easily

TURN THE PAGE FOR MORE

- **UPGRADE DRIVE THRU** While-you-wait installation service available. See page 3 for details.
- **PERSONAL CALLERS** Save on delivery charges - there's plenty of parking. Telephone first to check our stock position on the items you want. We're open from 9.00am to 6.00pm Monday to Friday. Saturdays: Sales from 9.30am to 4.00pm, Technical Support and Customer Service from 10.00am to 2.00pm.

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Edgware, Middlesex HA8 7AQ
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(50 lines)
Fax: 0181 905 6233
Email: sales@powermark.com

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£15 per month subscription
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Call 0181-951-3355 and ask for our PNet specialists
Join for only £9.95 when you buy any modem from Powermark

Power Mark®

MEMORY

MATCHED MEMORY FEATURE

Technical Sales Order Lines 0181-951 3355 (50 lines)

MATCHED MEMORY FOR IBM PRINTERS

IBM Authorised Dealer – IBM Personal Computers

IBM 4019 & 4019E
3MB £149
IBM 4029
2MB POWERCUT! £79
IBM 4039 & 4079
4MB POWERCUT! £149
8MB POWERCUT! £339
LEXMARK OPTRA LX/L/R/RX
16MB £149
WINWRITER 200/400/600
2MB £79

DELIVERY CHARGES SEE PAGE 19

TURN THE PAGE FOR MORE

MEMORY QUIZ

??????

"Your starter for 10MB"

1. What was the first Bond film?
2. What year was it released?
3. In Thunderball, what was the other use of Bond's Rolex?

Answers on fax form page

MATCHED LASERPRINTER MEMORY

- Price instability - check latest offers on laser printer memory before ordering

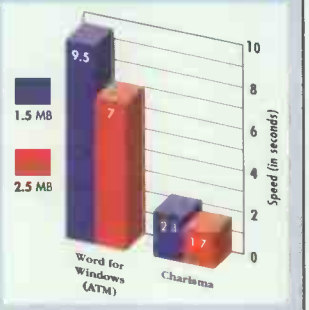
APPLE LASER WRITER SELECT 300/310
4MB £149
APPLE LASER WRITER PRO 810
4MB £179
APPLE LASER WRITER PRO 600/630
4MB £149
BROTHER HL8/E/V, HL10, DPS
2MB £129
CANON NOTEJET 486, BN22/BJC-880
4MB Module £149
CANON LBP4, 4+, LITE, SX
2MB £159
CANON LBP8II
2MB £109
CANON LBP8IV
4MB £144
CANON LBP 860
16MB £Call
CANON LPB-1260
4MB £149
COMPAQ PAGEMARQ 15/20
8MB £299
16MB £599
DEC LASER 2200/2100
1MB £79
EPSON EPL4000/4100/4300/8100
2MB £109
EPSON EPL7000
4MB £199
EPSON ACTION LASER 1600/1100
4MB £149
8MB £279
KYOCERA F800
2MB £129
NEC SILENT WRITER 95/95FX/97/97FX
2MB £85
OKI LASER 400
2MB £99
OKI 800/820
2MB £109
OKI LASER 830/840/850
2MB POWERCUT! £109
PANASONIC 4420
2MB £109
PANASONIC 5410, 4440
2MB £117
PANASONIC 4450i
2MB POWERCUT! £99
TEXAS MICROLASER PS, MICROWRITER
1MB £69
TOSHIBA PAGELASER 6
1MB £119

HMSO
Public Sector customers can purchase through HMSO by calling 01603 694153.

LASER PRINTER MEMORY - AN EXPLANATION

Increasing memory in your laser printer will enable it to print large, graphics intensive documents. Additional benefits include faster print spooling, faster printing speed and multiple font downloading.

This chart shows the improvement a single megabyte of printer memory can make. "Speed" represents the amount of time required to spool the document into the printer and get the full use of your PC back.



How much memory do you need?

Full page graphics	1MB - 2MB	PostScript with duplexing	4MB
Soft fonts	1MB	4 - 5 PostScript fonts	2MB
PostScript cartridge	1.5MB	8 - 10 PostScript fonts	4MB
		Network printer sharing	4MB

MATCHED MEMORY FOR HP PRINTERS

HEWLETT PACKARD
Authorised reseller

LASERJET II, IID
2MB POWERCUT! £89
4MB £159
LASERJET IIP, III, IIID, IIIP
2MB POWERCUT! £82
4MB £149
LASERJET IIIsi, 4, 4M, 4si, 4MV, 4MP, 4P, 4V
4MB £149
LASERJET 4L
1MB £79
DESKJET 500, 500c, 550
256K POWERCUT! £49
DESKJET 520, 560
256K £39
DESKJET 1200 C/PS/1200
8MB £275
JET DIRECT EX PRINT SERVER £Call
NETSERVER SERIES
32MB Module £1399
DESIGNJET 600/650
4MB £155
PAINTJET XL300 £Call
HP COLOUR LASERJET
4MB Module £149

MATCHED MEMORY FOR HP APOLLO Workstations

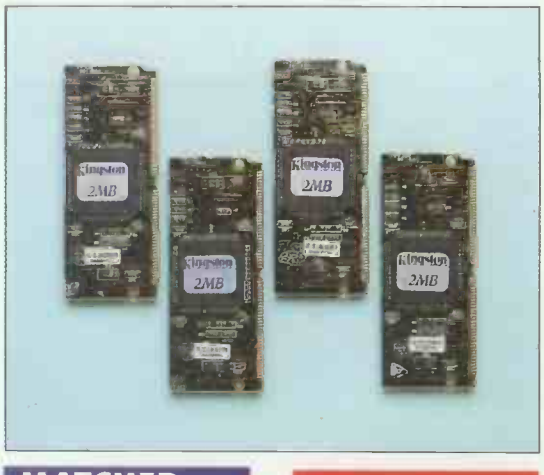
- Call for models not listed here
- All HP Apollo memory is individually tested

APOLLO 9000 807S - 897S
32MB Board with 16MB £1509
32MB Board £2304
APOLLO 3000 917LX - 967LX
16MB Kit £997
32MB Kit £1811
128MB Kit £6265
APOLLO 9000 705, 710
8MB Kit POWERCUT! £532
16MB Kit £968
32MB Kit £2384
ENVIZEX RANGE
16MB Module £699

MATCHED MEMORY FOR DEC Workstations

- Call for models not listed here
- All DEC workstation memory is individually tested

MICROVAX 3100
MODEL 30 & 40
8MB Kit £430
DECSYSTEM 5100
8MB Kit £386
48MB Kit £1986
ALPHASTATION 200/400 SERIES £Call



MATCHED MEMORY FOR IBM RISC Workstations

- Call for models not listed here
- All workstation memory is individually tested

RISC SYSTEM 6000
32MB Kit £1383
64MB Kit £2787
448MB Kit £17,384
POWERSTATION/ POWERSERVER 200
8MB Kit £298
X STATION
6MB Kit £228

MEMORY FOR SILICON GRAPHICS Workstations

POWER SERIES IRIS
32MB Kit £2030
PROFESSIONAL IRIS
4MB £265
INDIGO, 4D/30, 4D/35533
64MB Kit POWERCUT! £1999
CHALLENGE M/ POWER CHALLENGE SERIES £Call

MATCHED MEMORY FOR SUN Workstations

- SPARC tested and approved
- All Sun memory is individually tested
- Workstation experts available

SPARC 1, 3/60, 3/80, 4/40, 4/60, 4/65, 4/75
4MB Kit POWERCUT! £162
16MB Kit £499
SPARC ELC
16MB Kit POWERCUT! £489
SPARC LX
32MB Kit £1199
SPARC 330, 370 & 390
16MB Kit £1294
32MB Kit £1802
SPARCSERVER 630, 670, 690
64MB Kit £2812
SPARC 630MP, 670 & 690
64MB £2812
128MB £5402
SPARCSTATION 10/20
16MB £599

All our Matched Memory Kits come with our famous double guarantee - full lifetime warranty *and* 14 day money back guarantee

BEWARE
Beware of third party, low grade memory. Powermark plc only supply premium upgrades from market leaders with manufacturers' approvals.

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Access the Internet through Powermark's PNet
• Full Internet connection • POP3 Email • Worldwide Web Browsing
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CYRIX FEATURE

THE NEW CYRIX 386 TO 486 PROCESSOR UPGRADE

Cyrix®

Plug in the new Cyrix 386 to 486 Processor Upgrade. It's the fastest, most cost effective way to a 486 computer and it's totally compatible with the world's leading software: DOS, Windows and OS/2 operating systems.

It's easy to install. Just clip on the Cyrix processor and load the cache installation software. It's as simple as that. You're ready to run in minutes.

THE CYRIX MICROPROCESSOR UPGRADE FAMILY

The package consists of one Cx486DRx² Microprocessor, a 386DX removal tool, (SX version is a clip-on chip). installation manual, upgrade cache installation software (on both 3.5" and 5.25" media) and a pin 1 locator arrow (for correctly aligning the upgrade processor in the socket). A Cyrix-green heatsink is also included with 20/40, 25/50 and 33/66 versions.

BSI REGISTERED FIRM — NATIONAL ACCREDITATION OF CERTIFICATION BODIES

Certificate no. FS 26535

UPGRADE DRIVE THRU

See page 3 for details

EVEN LOWER PRICES!

386DX		
DX 16MHz → 486 32MHz	£135	~~£195~~
DX 20MHz → 486 40MHz	£135	~~£235~~
DX 25MHz → 486 50MHz	£155	~~£265~~
DX 33MHz → 486 66MHz	£185	~~£199~~
386SX		
SX 16MHz → 486 32MHz	£135	~~£169~~
SX 20MHz → 486 40MHz	£135	~~£169~~
SX 25MHz → 486 50MHz	£155	~~£185~~

CYRIX DRx²/SRx²

- Single chip upgrade solution for 386 DX and SX personal computers
- Clock doubling technology for increased performance
- 1K on-chip cache
- Very easy to install
- Compatible with DOS, Windows and OS/2
- Free technical support
- Limited lifetime warranty

LIMITED OFFER!

Buy any Cyrix Processor Upgrade from Powermark and claim your FREE Maths Co-Processor from Cyrix.

(Stocks are limited and Maths Co-Processors are shipped from Cyrix)

INTEL OVERDRIVE® FEATURE

intel®

OVERDRIVE

Intel OverDrive® processors enable you to take advantage of advanced technology on your existing upgradable Intel 486 CPU-based system. OverDrive® processors accelerate all applications running under MS-DOS, Windows, OS/2 and UNIX. Simply install the Intel OverDrive® processor into your existing system and watch your applications run at blazing speeds.
Intel OverDrive® processors are available for all Intel 486 CPU-based systems with or without an OverDrive® socket.

LIFETIME WARRANTY ON ALL INTEL OVERDRIVE® PROCESSORS

INTEL DX4 OVERDRIVE®

- For most 16, 20, 25, 33MHz Intel 486 SX or DX CPU-based systems
- Features Intel's "speed tripling" technology
- 16K on-chip cache memory
- On-chip maths co-processor
- The most powerful PC upgrade available

INTEL DX4 POWERCUT! **16MHz → 48MHz**	£169
INTEL DX4 POWERCUT! **20MHz → 60MHz**	£169
INTEL DX4 25MHz → 75MHz	£169
INTEL DX4 POWERCUT! **33MHz → 100MHz**	£209

INTEL DX2 OVERDRIVE®

Give your Intel 486 SX or DX PC 66MHz performance with the Intel DX2® OverDrive® processor

- For any 16, 20, 25 or 33MHz Intel 486 SX or DX CPU-based systems
- Features Intel's "speed doubling" technology
- 8K on-chip cache memory
- On-chip Maths Co-processor
- Opens and runs all your software applications faster on your system

INTEL DX2 25MHz → 50MHz £85

INTEL DX2 33MHz → 66MHz POWERCUT! £119

INTEL PENTIUM® OVERDRIVE®

The Pentium® OverDrive® processor is the newest and fastest member of the Intel OverDrive® processor family. It is the upgrade option for Intel SX2 and DX2® CPU-based systems and is the superior upgrade option for Intel 486SX and DX based systems. It is based on Intel's latest and most sophisticated Pentium® processor technology and features a superscalar architecture, which allows the execution of more than one instruction per clock cycle, 32K on-chip cache (one 16K code cache and one 16K data cache) and a faster floating point unit. It operates at two and a half times the speed of the system bus. For example, when a Pentium OverDrive® processor is installed in a 33MHz Intel 486 DX based system, the integer unit, floating point unit and cache operate at 83MHz while the speed of the external bus remains at 33MHz, thus delivering Pentium® processor class performance.

INTEL P24T 63MHz	£265
INTEL P24T 83MHz	£Call

Technical Sales Order Lines
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(50 lines)

MEMORY & PROCESSORS

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TECHNICAL SALES PEOPLE
Our sales people are the best. They are trained specialists in their chosen field - multimedia, memory of all types, mass storage, networking and communications.

FINANCIAL STABILITY
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LOW PRICES
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FULL MANUFACTURERS' WARRANTIES
All products supplied by Powermark plc carry manufacturers' warranties and of course full Powermark plc guarantees.

TURN THE PAGE FOR MORE

UPGRADE DRIVE THRU
While-you-wait installation service available. See page 3 for details.

PERSONAL CALLERS
Save on delivery charges - there's plenty of parking. Telephone first to check our stock position on the items you want. We're open from 9.00am to 6.00pm Monday to Friday. Saturdays: Sales from 9.30am to 4.00pm, Technical Support and Customer Service from 10.00am to 2.00pm.

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Fax: 0181 905 6233
Email: sales@powermark.com

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MEMORY

Technical Sales Order Lines 0181-951 3355 (50 lines)

SEAGATE FEATURE

Seagate

SCSI DRIVES

SCSI DECATHLON FAMILY			
ST5660N	545MB	12ms	£220
SCSI HAWK-4 FAMILY			
ST15230N	4.3GB	9ms	£1488
SCSI HAWK-2LP FAMILY			
ST31230N	1.05GB	9ms	£399
ST32430N	2.1GB	9ms	£942
BARRACUDA FAMILY			
ST32550N Fast SCSI 2	2.1GB	8ms	£975
ST15150N Fast SCSI 2	4.3GB	8ms	£1711

2.5" FAST ATA NOTEBOOK DRIVES

MARATHON SL FAMILY			
ST9190AG	171MB	16ms	£179
ST9240AG	210MB	16ms	£205
ST9300AG	262MB	16ms	£229
ST9420AG Fast ATA-2	420MB	16ms	£375
MARATHON FAMILY			
ST9385AG	341MB	16ms	£255
ST9550AG	455MB	16ms	£390
ST9655AG	524MB	16ms	£425

FAST ATA DRIVES

MEDALIST FAMILY			
ST31220A	1.08GB	12ms	£299
ST3780A	722MB	12ms	£209
MEDALIST XE FAMILY			
ST3491A	428MB	14ms	£125
ST3660A	545MB	14ms	£151
DECATHLON FAMILY			
ST5850A	854.7MB	11ms	£225

MEDALIST

- Fast ATA-2 interface for transfer rates up to 16.6MB per second
- 256Kb multi-segmented cache buffer

HAWK 2LP

- Fast SCSI-2 interfaces
- 5 year limited warranty
- Fast, Fast Wide and Differential interfaces available
- 5.54ms latency

MEDALIST XE

- Fast ATA interface
- Up to 35.8M bits per second internal transfer rate
- 120Kb multi-segmented read/write cache
- Low power dissipation, 1.7 watt idle with advanced power management
- 300,000 hours MTBF

BARRACUDA

- 7,200RPM spindle speed reduces average latency to 4.17msec
- Available with Fast, Fast Wide, Differential
- Average seek time of 8ms
- Blistering track-to-track seek time of 0.6msec

MARATHON SL

- Fast ATA and Fast ATA-2 interfaces
- Innovative SafeRite technology yields 100 G's operating shock
- 120MB adaptive read/write cache
- ATA compatible power management
- Auto park idle feature - very low idle power

MARATHON

Fast ATA interface

- 120MB adaptive read/write cache
- Innovative SafeRite technology yields 100 G's operating shock
- ATA compatible power management
- Auto park idle feature - very low idle power

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HARD DISK FEATURE

FUJITSU

IDE

M2682		352MB	12ms	£115
M2684	POWERCUT!	532MB	12ms	£135

SCSI

M2682S	353MB	12ms	£129
M2684S	532MB	12ms	£180
M1606SA	1.0GB	10ms	£375

IBM

IDE

Deskstar	1.05GB	9ms	£585

SCSI

Starfire	2.1GB	8ms	£967
Starfire	4.3GB	8ms	£1698
Deskstar	1.05GB	9ms	£585

TOSHIBA

2.5" IDE NOTEBOOK DRIVES

MK1724FC	262MB	12ms	£195
MK2326FC	340MB	12ms	£239
MK2428FC	528MB	12ms	£369
MK2628FC	810MB	12ms	£499

2.5" SCSI NOTEBOOK DRIVES

MK2224FB	213MB	12ms	£279
MK2428FB	520MB	12ms	£499

QUANTUM

IDE

LT365	365MB	12ms	£120
LPS420AT	420MB	12ms	£128
LT540	540MB	10ms	£149
LT730	730MB	10ms	£189

SCSI

LT365S	365MB	12ms	£159
LT540S	540MB	12ms	£175
LT730S	730MB	12ms	£299
LPS1225S	1.2GB	10ms	£599
Empire 1080	1.0GB	9.5ms	£531
Empire 2100	2.1GB	9.5ms	£910
Atlas XP32150 Audio Visual	2.1GB	8ms	£895
Atlas XP34300 Audio Visual	4.3GB	8ms	£1460
Grand Prix XP34301 Audio Visual	4.3GB	8.6ms	£1484

WESTERN DIGITAL

IDE

AC2340		340MB	13ms	£119
AC2420	POWERCUT!	420MB	13ms	£123
AC2540		540MB	13ms	£152
AC2700	POWERCUT!	730MB	10ms	£179
AC31000		1.0GB	10ms	£279

MICROPOLIS

SCSI

3221 Half Height		2.05GB	8.5ms	£848
4221		2.05GB	8.5ms	£865
1936	POWERCUT!	3.02GB	12ms	£1280
3243	POWERCUT!	4.3GB	8.5ms	£1320
1991	POWERCUT!	9.1GB	12ms	£2619

AUDIO VISUAL

3221AV Half Height		2.1GB	8.5ms	£872
4221AV	POWERCUT!	2.05GB	8.5ms	£898
1936AV		3.02GB	12ms	
3243AV	POWERCUT!	4.3GB	12ms	£1388
1991AV		9.1GB	8.5ms	£2679

HARD DISK EXPERTS AVAILABLE FOR SPECIALIST ADVICE

NEW! DISK EXTENDER

Upgrades your BIOS to support new IDE hard disks larger than 520MB.

- Automatically recognises, configures and initializes most hard disk drives
- Works with any BIOS
- Works across most platforms
- Adds support for up to 4 hard disk drives
- Requires one 8-bit slot
- Works better than any software solution

DISK EXTENDER £49

HMSO

Public Sector customers can purchase through HMSO by calling 01603 694153.

TURN THE PAGE FOR MORE

REAL HARD DRIVES

Famous hard drives...

Porlock Hill

Paris-Dakar Rally

The chariot race in Ben Hur

POWER THE NET!

Access the Internet through Powermark's PNet

- Full Internet connection • POP3 Email • Worldwide Web Browsing
- FTP • Telnet • Usenet • Many local points of presence
- On-line or telephone support • Free Internet guide

BANK at Powermark

CONNER HARD DISK FEATURE

CONNER®
The Storage Answer

IDE DRIVES				
CFS210A		270MB	14ms	£99
CFS425A		425MB	14ms	£120
CFS540A	POWERCUT!	545MB	12ms	£129
CP1060A	POWERCUT!	1.06GB	10ms	£289
SCSI DRIVES				
CFA540S		540MB	12ms	£232
CP1080		1.08GB	10ms	£410
CFP2107		2.1GB	9ms	£895
CFP2105		2.1GB	11ms	£828
Caymen (CFP4207)		4.2GB	8ms	£1470

1GB HARD DISKS AND ABOVE FEATURE:

- 5 year warranty
- Embedded servo systems eliminate the need for thermal recalibration and provide consistent data transfer rates
- Hot pluggable for uninterrupted data access in RAID applications
- Low power consumption means less heat and component wear

HARD DISK UPGRADES- AN EXPLANATION

As the latest software requires more and more storage the following upgrade options are available:

IDE TYPE HARD DISKS

- Up to two drives supported
- The ideal solution for stand alone PC's
- Capacities up to 1GB (BIOS limitations can be overcome by Powermark's Disk Manager software)

SCSI TYPE HARD DISKS

- Up to 7 devices supported. Ideal for file servers, power users and where other SCSI devices are being used
- Up to 9GB currently available
- No BIOS limitations
- Internal & external drives available

ALL HARD DISKS INCLUDE A MINIMUM 12 MONTH WARRANTY WITH 2, 3 OR 5 YEARS ON MOST MODELS

HARD DISK EXPERTS AVAILABLE FOR SPECIALIST ADVICE

XYRATEX STORAGE FEATURE

xyratex

DATABLAZER REMOVABLE Z2000 SERIES DRIVE SYSTEMS

When your network is overloaded or there isn't a connection, Xyratex provide the answer. Simply transport your data around on a convenient Datablazer module which can hold up to 810MB.

MODULES

540MB 2.5" MODULE	£429
810MB 2.5" MODULE	£689

HOUSINGS

INTERNAL 1 HOUSING	£79
EXTERNAL 1 HOUSING	£179
EXTERNAL 5 HOUSING	£229
EXTERNAL 1 HOUSING MAC	£229
EXTERNAL 5 HOUSING MAC	£329

XYRATEX 3000 OPTICAL DRIVE

- External 3.5", 230MB optical drive
- IBM 'Top Cat' mechanism (PC Magazine Editor's choice)

SCSI DOS / OS/2	£599
SCSI MAC	£639
PARALLEL	£699

All optical drives come complete with software and a FREE optical cartridge

XYRATEX 5000 OPTICAL DRIVE

- External 5.25", 1.3GB optical drive
- 29ms seek time

SCSI DOS / OS/2	£1699
SCSI MAC	£1739
UNIX	£1799

MOLITE OPTICAL DRIVE

- Very compact enclosure
- External 3.5", 230MB optical drive
- PC Magazine Editor's choice

SCSI DOS / OS/2	£599
SCSI MAC	£639
PARALLEL	£699

MOLITE OPTICAL DRIVE

Technical Sales Order Lines
0181-951 3355
(50 lines)

MASS STORAGE AND BACKUP

HUGE STOCKS
Guaranteed same day despatch on virtually all orders placed even up to 4.00pm.

TECHNICAL SALES PEOPLE
Our sales people are the best. They are trained specialists in their chosen field - multimedia, memory of all types, mass storage, networking and communications.

FINANCIAL STABILITY
Powermark plc has been supplying upgrades for over 4 years and has an annual turnover exceeding £18 million with a healthy balance sheet.

LOW PRICES
We only supply products from leading manufacturers and at low, low prices too.

TECHNICAL SUPPORT
Dedicated after sales technical support teams on line to help with installation.

CORPORATE & PUBLIC SECTOR
We welcome orders from corporate, education and public sector organisations. Just fax or phone your order number.

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All products supplied by Powermark plc carry manufacturers' warranties and of course full Powermark plc guarantees.

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Power Mark®

MEMORY

SYQUEST STORAGE FEATURE

SyQuest®

Technical Sales Order Lines 0181-951 3355 (50 lines)

SYQUEST SQ5200

PORTABLE VERSIONS IDEAL FOR NOTEBOOKS AND PORTABLES

SYQUEST REMOVABLE CARTRIDGE HARD DISK DRIVES

- Work like fixed drives yet provide unlimited capacity
- Superior performance to optical drives and higher reliability than floppy drives
- Perform backup faster than tape
- Provide data security

SYQUEST CARTRIDGES

Capacity	Form	Each	5 Pack
105MB	3.5"	£41	£200
270MB	3.5"	£51	£240
44MB	5.25"	£44	£215
88MB	5.25"	£62	£302
200MB	5.25"	£73	£360

EARLY BIRD Order Bonus See page 33 of this advertisement

DATA CARTRIDGES

	each	10 pack
DC6150	£13	£119
DC6250	£18	£155
DC6525	£19	£169
DC9100Magnus	£31	£295

All QIC tapes are preformatted

QIC	capacity	each	10 pack
DC2120	120-250MB	£13	£125
DC2120XL	350MB	£17	£159
QIC3010	700MB	£20	£185

QIC-Wide	capacity	each	10 pack
5500c	420MB	£19	£169
9000c	850MB	£21	£190

DAT	length	each	10 pack
1.3GB	60m	£9	£79
2GB	90m	£10	£89
4GB	120m	£11	£99
Head Cleaner		£26	

UNSURPASSED WARRANTIES - 2 YEARS ON DRIVES AND 5 YEARS ON DATA CARTRIDGES

Data storage experts available for specialist advice

SYQUEST 3.5" RANGE

With your choice of 105MB or 270MB formatted capacities on each cartridge, these drives let you add as much removable storage as you'll ever need.

SYQUEST REMOVABLE CARTRIDGE HARD DISK DRIVES

	Type	Capacity	Internal	External
SyQuest 3.5"	IDE	105MB	£139	£229
SyQuest 3.5"	SCSI	105MB	£183	£273
SyQuest 3.5"	PARALLEL	105MB	-	£389
SyQuest 3.5"	IDE	270MB	£290	£380
SyQuest 3.5"	SCSI	270MB	£289	£379
SyQuest 3.5"	PARALLEL	270MB	-	£471
SyQuest 5.25"	SCSI	88MB	£190	£280
SyQuest 5.25"	SCSI	200MB	£289	£379

TURN THE PAGE FOR MORE

ADAPTEC SCSI CONTROLLER CARDS

adaptec
I/O. NOW MORE IMPORTANT THAN EVER.™

Industry standard SCSI controllers from Adaptec

	Bare Card	Kit With Software
AHA1505	-	£42
AHA1510	-	£55
AHA1515	-	£66
AHA1522 ISA	-	£119
AHA1542 ISA	£127	£173
AHA1640 MCA	£184	£229
AHA2742T EISA	£229	£261
AHA2940 PCI	£199	-
AHA2842VL/K VLB	-	£199

HP - COLORADO FEATURE

COLORADO® MEMORY SYSTEMS
A division of HEWLETT® PACKARD

COLORADO TRAKKER

- Plug and play - no hardware installation
- A total backup solution - fully assembled systems available in up to 250MB and up to 680MB capacities
- QIC-80 and QIC-3010-MC industry standard recording format
- Can be moved among laptops, notebooks, desktops, and towers alike

PARALLEL PORT TRAKKER 250	£189
PARALLEL PORT TRAKKER 350	£219
PARALLEL PORT TRAKKER 700	£279
TRAKKER CARRY CASE	£37

COLORADO TRAKKER 700

COLORADO JUMBO

- Value for money
- Connects to your floppy controller
- Internal device fits either 3.5" or 5.25" half height drive bays
- Includes software and cables

JUMBO 250	£93
JUMBO 350	£109
JUMBO 700	£169
FAST CONTROLLER CARD	£54
EXTERNAL MOUNTING KIT	£65

HP JETSTORE SERIES

- Very fast DAT drive system
- 2GB, 4GB or 8GB capacity
- PC Magazine Editors's Choice
- 3 year HP on-site warranty for only £140

	Int	Ext	ISA Kit*
HP JetStore 2000	£642	£772	£892
HP JetStore 5000	£735	£865	£1499
HP JetStore 6000	£885	£985	£2039

*ISA Kit includes SCSI controller & full software

COLORADO JUMBO 700

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• FTP • Telnet • Usenet • Many local points of presence
• On-line or telephone support • Free Internet guide

BANK at Powermark

IOMEGA TAPE BACKUP FEATURE

IOMEGA
Makers of Bernoulli

- Complete family offers a solution for every need:
  - Tape250 for hard disks up to 250MB and Tape700 for hard disks up to 680MB
  - 3.5" patented beltless design ensures problem free operation
  - Latest generation software support for DOS and Windows included so no need for upgrades
  - Tape250 has full QIC-80 compatibility also reading QIC-40 and Irwin formats
  - Tape700 has full QIC-3010 compatibility and also reads QIC-80, QIC-40 and Irwin formats
  - Kits include cables, software and 3.5" to 5.25" brackets
  - Internal units fit in any free drive bay without adding extra cards
  - Parallel Port units are plug-and-play external
  - 2 year warranty on all Iomega tape streamers

TAPE250 PARALLEL PORT

TAPE700 INTERNAL

TAPE250 INTERNAL	£86
TAPE250 PARALLEL PORT	£165
QIC & WIDE 420MB INTERNAL	£109
QIC & WIDE 420MB PARALLEL	£199
TAPE700 INTERNAL	£185
TAPE700 PARALLEL PORT	£260
TAPE ACCELERATOR CARD	£49
700MB DATA CARTRIDGE	£14.95

FUTURE DOMAIN FEATURE

FUTURE DOMAIN

SCSI CONTROLLER KITS

- Include cable and driver software

TMC-3260 PCI SCSI Kit	£129
TMC-1660 ISA Kit	£99
TMC-1680 ISA With Floppy Support	£105
MCS-700 MCA Kit	£129
TMC-850 ISA 8-Bit CD ROM SCSI Kit	£33

- Includes Corel SCSI

TMC-1610 MCDI ISA 16-Bit CD ROM SCSI Kit	£59
SCSI 2 GO PCMCIA TYPE II	£199

IDE AT VALUEPAK

- New, enhanced IDE for your ISA bus PC
- Enables you to add up to 4 eIDE devices including hard disks, tape streamers and CD ROM drives
- 32-bit disk and file access - run your eIDE peripherals at maximum data transfer rates
- On-board BIOS (no need for further BIOS software) supports IDE hard disks greater than 528MB
- Includes PowerIDE software - a fully featured I/O manager for eIDE peripherals

IDE AT VALUEPACK £45

MICROSOLUTIONS FEATURE

MicroSolutions

Adding storage devices to your PC has never been easier. The Microsolutions Backpack range plug into any standard parallel printer port. Don't worry if you have a printer plugged in - your printer just connects to a socket on the Backpack.

All Backpacks can be daisy-chained together

HMSO
Public Sector customers can purchase through HMSO by calling 01603 694153.

CD ROM BACKPACK

162550	DUAL SPEED	£275
169990	QUAD SPEED	£295

FLOPPY DRIVE BACKPACKS

5.25"	1.2MB	£125
3.5"	1.44MB	£122

TAPE DRIVE BACKPACKS

QIC80	250MB/340MB	£225
QIC3010	900MB	£365

HARD DISK BACKPACKS

152210	210MB	£285
152420	420MB	£335
152850	850MB	£425
1521.2	1.2GB	£525

Mass storage experts available for specialist advice

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MEMORY

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DELIVERY CHARGES

UK MAINLAND
Next working day courier delivery to your door

SMALL ITEMS
Examples: memory, sound/video cards, CD ROM titles, small software packages

UP TO 3 ITEMS	£6.95 *total*
4 ITEMS OR MORE	£1.95 *for each additional item*

LARGE ITEMS
Examples: CD ROM drives, monitors, multimedia kits, printers, software suites

1ST ITEM	£8.95
EACH ADDITIONAL ITEM	£4.95

Call for rates outside UK mainland

... and here's what some of our customers have said ...

Thank you for your help this morning. It was a pleasure to speak with someone so cheerful first thing in the day.

J Couper-Johnston
Langham Arts, London

TURN THE PAGE FOR MORE

JUKEBOX HITS

48 Cache & Devil Gate Hard Drive
Suzy Quatro

Born In The USR
Bruce Springsteen

CONNER BACKUP FEATURE

CONNER
The Storage Answer

CONNER TAPE-STOR 420MB

EASY-TO-USE, COST EFFECTIVE
The Tape-Stor 420 data protection system (TSM420) provides reliable low-cost per megabyte storage and makes portable and desktop system backup easier than ever.

Kit includes:
- Internal or external tape drive
- Backup Exec software
- Floppy or parallel port interface cable
- User guide
- 420MB data cartridge
- Up to 420MB capacity with data compression and a 9.5MB/minute backup rate
- QIC wide media is fully backward compatible with QIC80 and can read QIC40

TAPE-STOR 420MB INTERNAL £119
TAPE-STOR 420MB EXTERNAL £209

CONNER TAPE-STOR 850MB

- External parallel PortTape Backup or internal IDE system
- Compact, portable external system
- Up to 850MB capacity with data compression and a 9.5MB/minute backup rate
- QIC-wide and QIC-3010 compatibility

TAPE-STOR 850MB PARALLEL £299
TAPE-STOR 850MB INTERNAL £209

WANGDAT AND WANGTEK FEATURE

WangDAT™
A REXON COMPANY

WANGDAT 3200 2GB/4GB 3.5" DAT

- Slim 3.5" half-height DATAClass DAT mechanism
- In-path tape buffer arm for precise tape tension
- 2GB capacity in DDS read/write mode
- DDS-DC Data Compression for 4GB up to 8GB
- 183-732KB/second data transfer rate
- 768 Kbyte cache buffer with full parity
- 30 second average data access time
- SCSI-I or SCSI-II interface (selectable)
- SCSI bus down-loadable drive firmware
- 5MB/second SCSI burst rate
- Built-in self-activated head cleaner
- Automatic Power-Safe tape braking

WANGDAT INTERNAL UNITS

Model 3100	**2GB**	£629
Model 3200	**4GB**	£665
Model 3400	**8GB (DDS-2)**	£775

Add £95 for external versions

WANGTEK
A REXON COMPANY

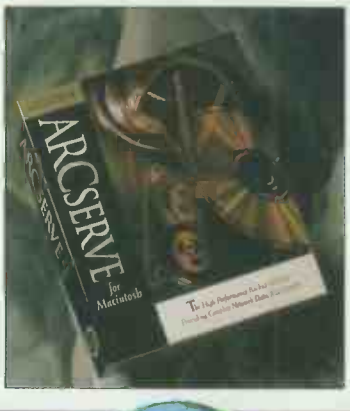
WANGTEK 5150PK

WangTEK's new 5150PK 'Windows' series tape kits offer the industry's best value in performance tape backup for ISA or MCA bus PC's, workstations and Novell networks. With a storage capacity of 500MB using software data compression (250MB native), these new drives deliver the capacity you need plus the features and ease of use that only Sytos Plus software offers.
Sytos Plus for WINDOWS provides a complete backup and restore solution for the WINDOWS environment. Select the files to backup quickly using the point and click File Spec extension buttons. It has true background operation that will let you work while you backup. You can even pre-define the level of system resources dedicated to backup versus your other processing tasks.

- QIC-150 data format/250MB capacity
- ES models include Quick File Access (QFA). EQ models include FlexFormat. Both ES and EQ models reduce seek-to-data and append times to under 2 minutes
- SCSI I Interface (ES model)
- QIC-02 Interface (EQ model)
- 5.25 inch, half-height form factor

5150PK/EQ INTERNAL QIC-02 ISA KIT £319
5150PK/ES INTERNAL SCSI ISA KIT £319
Add £95 for external versions
5100HT 1GB QIC Internal £499
5100HT 1GB QIC External £595

CHEYENNE FEATURE



ARCSERVE FOR NETWARE WINDOWS EDITION

ARCserve Windows edition maintains the same innovative functions as the award-winning ARCserve DOS editlon and adds new functionallty. Whether you have a small single-server or a large multi-server network environment, ARCserve Windows edition will back up all NetWare servers, DOS, Windows, OS/2, with optional modules for UNIX and Macintosh workstations, as well as database servers.

CHEYENNE

ARCsolo
Standalone workstation Backup

DOS	*Windows*	*OS/2*
£85	£95	£139

ARCserve	*DOS*	*Windows*
5 User	£183	£193
10 User	£342	£392
25 User	£519	£609
50 User	£637	£737
100 User	£759	£859
250 User	£839	£1059
500 User	£Call	£Call
1000+ User	£Call	£Call

Upgrades available - call for details

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BANK at Powermark

VERBATIM FEATURE

Verbatim

DISKETTES

3.5" HD 10 Pack	£5.90
3.5" HD Preformatted 20 Pack+2 free	£11.60

Buy any storage device from Powermark and get 10% discount on supporting media. (Only at the time of purchase).

DATA AND DAT CARTRIDGES

Verbatim's tape products meet the demands of a wide range of users. Verbatim offers an unrivalled range of applications. Each tape cartridge comes with a LIFETIME GUARANTEE.

All DC and MC cartridges are PREFORMATTED, saving you hours of wasted time.

	Unit	10 Pack
DC2120 QIC 80	£13	£125
DC2120XL	£17	£159
MC 3000 XL	£20	£185
4mm 90m	£10	£89
4mm 60m	£9	£79
8mm 112m	£11	£99

BLANK CDS

CD-R 74 Min	£19

OPTICAL DISKS

Verbatim dominate the recordable optical media market: offering the widest range of products to suite all applications. The MAC-READY format is now available on 3.5" and 5.25" disks.

3.5" 128MB	£31
3.5" 230MB	£34
5.25" 600MB	£59
5.25" 1.3GB	£68

TRUST SCANNERS FEATURE

SCANNERS

IMAGERY 1200 £309
- A4 scan area
- SCSI interface included
- 16.8 million colours, 256 greyscale levels
- 1200 dpi with software interpolation
- TIFF/PCX/IMG/JPG/EPS
- Wordlinx OCR and iPhoto Plus software for Windows

IMAGERY 2400 POWERCUT! £459
- A4 scan area
- SCSI interface included
- TIFF/ PCX/ IMG/ JPG/ EPS file format
- 16.8 million colours, 256 levels of greyscale
- 2400 dpi with software interpolation
- Wordlinx OCR and Adobe Photoshop LE software for Windows included
- Twain compatible scan driver

Multimedia experts available for specialist advice

Trust®

DIGITIZERS

1812 DIGITIZER £265
- 18 x 12 inch drawing area
- Resolution of 1016 lines per inch
- Templates for AutoCad 10 - 12
- 6 button puck
- Windows 3.1 drivers
- Baud rate of 75 up to 19,200

1212 DIGITIZER £141
- 12 x 12 inch drawing area
- Resolution of 1016 lines per inch
- Templates for AutoCad 10-12, ORCAD and Lotus 1-2-3 R3
- 4 button puck
- Windows 3.1 drivers
- Baud rate of 75 up to 19,200

MICE

AMI MOUSE SERIAL £9
- 3 buttons
- 9 pin serial connector
- 300 dpi resolution
- Compatible with Microsoft and Mouse Systems mode

AMI TRACK SERIAL £19
- Trackball mouse
- 3 buttons
- 9 pin serial connector
- 260 dpi resolution

HP SCANNERS FEATURE

HEWLETT PACKARD
AUTHORISED RESELLER

HP SCANJET 3P
- Mono 300 dpi enhanced to 1200 dpi
- Up to 12 pages per minute
- Includes HP Picture Palace and Calera Wordscan V3.0

HP SCANJET 3P AUTOMATIC DOCUMENT FEEDER	£349
3 YEAR ON-SITE MAINTENANCE	£147
	£89

Call if the scanner you require is not listed here

HP SCANJET IICX
- 400 dpi enhanced to 1600 dpi
- Recognises over 16 mi… colours and 25…
- Includ…

£139

JUST IN! NEW! HP Scanner IIIc only £669 Call for details

Technical Sales Order Lines
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BACKUP & SCANNERS

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Tel: 0181-951 3355
(50 lines)
Fax: 0181 905 6233
Email: sales@powermark.com

VISA MasterCard SWITCH DELTA

Cards are not debited until despatch
VAT at 17.5% will be added to all prices

POWER THE NET! RATES
£12.50 once-only membership
£15 per month subscription
ABSOLUTELY NO OTHER HIDDEN SERVICE CHARGES
Quit at any time without penalties
Call 0181-951-3355 and ask for our PNet specialists
Join for only £9.95 when you buy any modem from Powermark

Power Mark

MEMORY

MULTITECH MODEM FEATURE

MultiTech Systems

MULTITECH MODEMS

Model	V21	V22	V22bis	V32	V32bis	V32terbo	V.34	MNP2-4	V42	V42bis	MNP5	Fax	External	
NEW! MT2834BLK	●	●	●	●	●	●	●	●	●	●	●	●	POWERCUT!	£392
MT1932ZDX	●	●	●	●	●	●		●	●	●	●	●	POWERCUT!	£115
MT1432LTI PCMCIA	●	●	●	●	●			●	●	●	●	●	POWERCUT!	£189
MT1432MK Pocket	●	●	●	●	●			●	●	●	●	●		£330
MT1432BLK	●	●	●	●	●			●	●	●	●	●	POWERCUT!	£314
NEW! MT2834ZDX	●	●	●	●	●	●	●	●	●	●	●	●		£185

MULTIMODEM II MT2834 ZDX

MULTIMODEM II MT1932 ZDXK

- Desktop unit
- Group 3/Class 2 (TR29) fax
- V.17 fax compatible
- PSTN only
- V42 (lap-M) error correction
- V42bis data compression
- MNP to Level 5
- Asynchronous operation
- AT command set (Hayes compatible)
- Free Multiexpress fax and comms software for windows
- 10 year warranty
- Available in 28.8bps (V34)

All modems supplied by Powermark plc are BABT APPROVED

MULTIMODEM II MT1432BLK

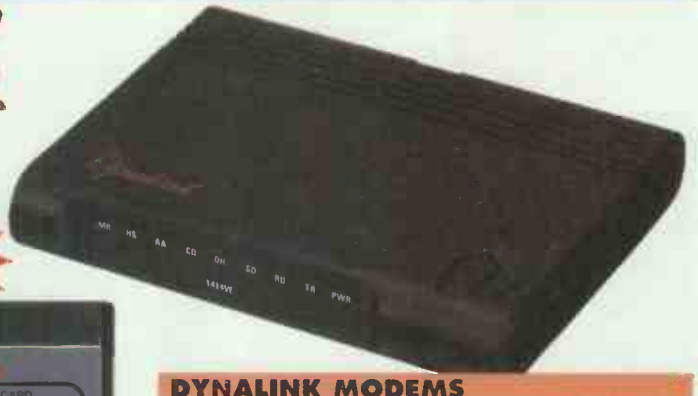
- Desktop unit
- Metal enclosure
- Group 3/Class 2 (TR29) fax
- PSTN and 2W/4W leased line
- Leased line dial-backup with auto-restoral
- Security call-back (30 no.)
- V42 (lap-M) error correction
- V42bis data compression
- MNP to Level 5
- V25bis async/sync
- V54 loop back tests
- Unix UUCP support
- IBM AS/400 support
- AT command set (Hayes compatible)
- Free Multiexpress fax and comms software
- 5 year warranty

MULTIMODEM MT1432LTI

- PCMCIA Type II
- Group 3/v.17 Class 2 (TR29) fax
- PSTN only
- Remote configuration
- V42 (lap-M) error correction
- V42bis data compression
- MNP to Level 5
- Incorporates flash technology
- V54 loop back tests
- Unix UUCP support
- AT command set (Hayes compatible)
- 10 number telephone directory
- Free Multiexpress fax and comms software
- 5 year warranty

DYNALINK MODEM FEATURE

Dynalink



PCMCIA modem only £147!

All modems feature: Bell 103, Bell 212A, CCITT V.21, V.22, V.22bis, V.23, V.32, V.32 bis, V.42, V.42bis, V.27 ter/V.29, V.17, T30/T 4, MNP2-5, 2W leased line, Delrina 4 in 1 software, MNP-10 option, RS232 Y cable, telephone cable

1414 VQE EXTERNAL

- Synchonous mode, 8 LED indicators
- V.25bis dialling option

1414 VQH INTERNAL

- IRQ selectable 3, 4, 5 & 7
- Autosync (option)
- Com 1 - 4 selectable
- 16550 UART

HMSO

Public Sector customers can purchase through HMSO by calling 01603 694153.

1414 VQC PCMCIA

- PCMCIA II compatible
- Computer Shopper 'Best Buy' award Dec '94

DYNALINK MODEMS

Model	V21	V22	V22bis	V32	V32bis	MNP2-4	V42	V42bis	MNP5	HST Cellular	Fax	Internal	External
1414 VQE	●	●	●	●	●	●	●	●	●	●	●	-	£109
1414 VQH	●	●	●	●	●	●	●	●	●	●	●	£115	-
1414 VQP POCKET	●	●	●	●	●	●	●	●	●	●	●	-	£135
1414 VQC PCMCIA	●	●	●	●	●	●	●	●	●	●	●	-	£147

1414 VQP POCKET

- Battery operation
- 4 LED indicators
- 16550 UART
- Computer Shopper 'Best Buy' award Dec '94

COMPUTER SHOPPER

Technical Sales Order Lines

0181-951 3355

(50 lines)

DELIVERY CHARGES

UK MAINLAND

Next working day courier delivery to your door

SMALL ITEMS

Examples: memory, sound/video cards, CD ROM titles, small software packages

UP TO 3 ITEMS	£6.95 *total*
4 ITEMS OR MORE	£1.95 *for each additional item*

LARGE ITEMS

Examples: CD ROM drives, monitors, multimedia kits, printers, software suites

1ST ITEM	£8.95
EACH ADDITIONAL ITEM	£4.95

Call for rates outside UK mainland

"... and here's what some of our customers have said ...
Thank you for your help this morning. It was a pleasure to speak with someone so cheerful first thing in the day.
J Couper-Johnston
Langham Arts, London"

TURN THE PAGE FOR MORE

JUKEBOX HITS

Anything by Level V.42

Teenage CIX
The Undertones

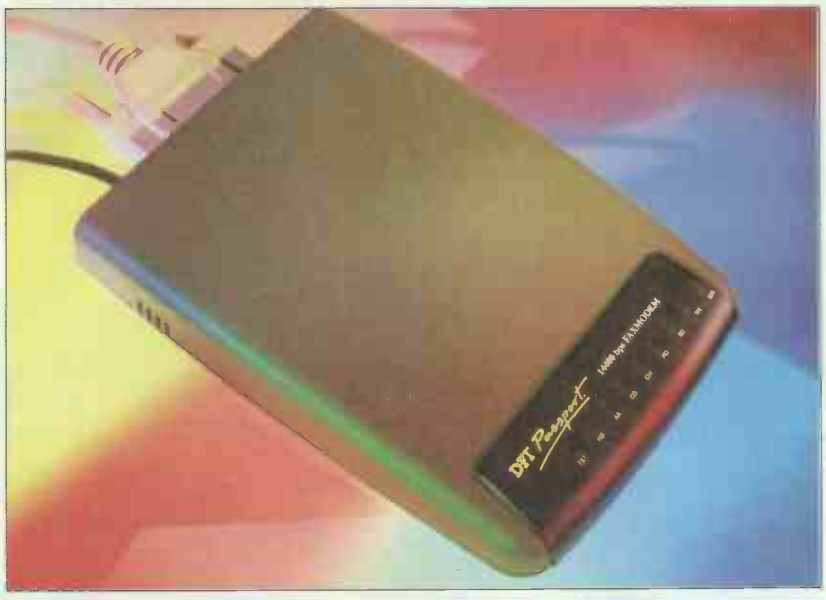
Simon Smith And The Amazing Dancing Bear Drive
Alan Price

POWER THE NET!

Access the Internet through Powermark's PNet
• Full Internet connection • POP3 Email • Worldwide Web Browsing
• FTP • Telnet • Usenet • Many local points of presence
• On-line or telephone support • Free Internet guide

BANK at Powermark

DFI MODEM FEATURE



DFI MODEMS

Model	V21	V22	V22bis	V32	V32bis	V32terbo	V.34	MNP2-4	V42	V42bis	MNP5	HST Cellular	Fax	Internal	External
Passport F1114V	●	●	●	●	●			●	●	●	●		●	£89	£89
Passport F1128V+	●	●	●	●	●	●	●	●	●	●	●		●	£169	£169

POWERCUT!

DFI®

DFI manufactures a comprehensive line of high quality PC components which are the strength behind it's custom-built desktop and notebook PCs.
To supplement this product line, DFI have now moved into the data communications arena, launching the passport range of BABT approved fax modems. This complete package offers you state of the art technology and incorporates everything you need to gain access to the information super highway at a highly competitive price.

F1114V

Features
- Data/Fax speed: 14,400 bps
- V.32, V.32 BIS, V.42, V.42BIS
- MNP level 2-4, 5
- Fax Class 1, 2 & 3
- Call back security
- Full/half duplex and auto fallback

Accessories included
- Serial cable
- Telephone lead
- User's manual
- AC adapter

Software
- Delrina's 4 in 1 Win/DOS Fax Lite and Comit Lite DOS/Win software for data transmission

Access
- Introductory membership to CompuServe

Warranty
- 5 years

F1128V+

Features
- Data/Fax speed: 28,800/14,400 BPS
- V.32, V.32 BIS, V.42, V.42 BIS, V.34
- MNP Level 2-4, 5
- Fax Class 1, 2 & 3
- Call back security
- Full/half duplex and auto fallback

Accessories included
- Serial cable
- Telephone lead
- User's manual
- AC adapter

Software
- Delrina's 4 in 1 Win/DOS Fax Lite and Comit Lite DOS/Win software for data transmission

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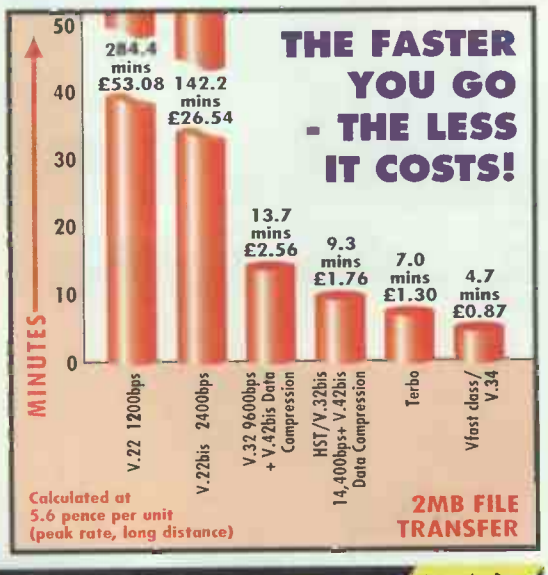
- Introductory membership to CompuServe

Warranty
- 5 years



EARLY BIRD Order Bonus
See page 33 of this advertisement

BSI REGISTERED FIRM
NATIONAL ACCREDITATION OF CERTIFICATION BODIES

Certificate no. FS 26535
BS5750 registered for the supply of computer, printer and workstation memory, processor and other upgrades.

Powermark plc is regularly assessed by the British Standards Institution to ensure compliance with the quality standard.

... and here's what some of our customers have said ...

"A brief note to thank you very much for your help when I phoned yesterday in connection with a memory upgrade for an old Viglen Dossier notebook. I did appreciate very much your assistance and your efficiency.

...Once again, I wish to express my thanks for your assistance. When next I need any other computer items I know where I shall apply - Powermark!"

Dr O'Reilly, Dublin

Technical Sales Order Lines
0181-951 3355
(50 lines)

MODEMS

HUGE STOCKS
Guaranteed same day despatch on virtually all orders placed even up to 4.00pm.

TECHNICAL SALES PEOPLE
Our sales people are the best. They are trained specialists in their chosen field - multimedia, memory of all types, mass storage, networking and communications.

FINANCIAL STABILITY
Powermark plc has been supplying upgrades for over 4 years and has an annual turnover exceeding £18 million with a healthy balance sheet.

LOW PRICES
We only supply products from leading manufacturers and at low, low prices too.

TECHNICAL SUPPORT
Dedicated after sales technical support teams on line to help with installation.

CORPORATE & PUBLIC SECTOR
We welcome orders from corporate, education and public sector organisations. Just fax or phone your order number.

Use the red borders to find these pages easily

FULL MANUFACTURERS' WARRANTIES
All products supplied by Powermark plc carry manufacturers' warranties and of course full Powermark plc guarantees.

TURN THE PAGE FOR MORE

UPGRADE DRIVE THRU
While-you-wait installation service available. See page 3 for details.

PERSONAL CALLERS
Save on delivery charges - there's plenty of parking. Telephone first to check our stock position on the items you want. We're open from 9.00am to 6.00pm Monday to Friday. Saturdays: Sales from 9.30am to 4.00pm, Technical Support and Customer Service from 10.00am to 2.00pm.

Powermark plc
Premier House, 112 Station Rd, Edgware, Middlesex HA8 7AQ
Tel: 0181-951 3355
(50 lines)
Fax: 0181 905 6233
Email: sales@powermark.com

VISA MasterCard SWITCH DELTA

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£15 per month subscription
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Quit at any time without penalties
Call 0181-951-3355 and ask for our PNet specialists
Join for only £9.95 when you buy any modem from Powermark

Power Mark®

MEMORY

U.S. ROBOTICS MODEM FEATURE

US Robotics®
The Intelligent Choice in Data Communications

US ROBOTICS MODEMS

Model	V21	V22	V22bis	V32	V32bis	V32terbo	V.34	MNP2-4	V42	V42bis	MNP5	HST Cellular	Fax	Internal	External
Sportster 14.4 + Fax	●	●	●	●	●	●		●	●	●	●		●	£127	£126
Sportster 28.8 V.34 + Fax	●	●	●	●	●	●		●	●	●	●		●	£199	£189
Sportster 28.8 V.34 Mac + Fax	●	●	●	●	●	●		●	●	●	●		●	POWERCUT! -	£209
Courier Dual V.34 + Fax	●	●	●	●	●	●	●	●	●	●	●	●	●	£265	-
Courier Dual V.34 + Fax	●	●	●	●	●	●	●	●	●	●	●	●	●	POWERCUT! -	£279
Includes FREE PowerPort High Speed Dual Async Serial Card, cable and upgrade to Quicklink Gold (OCR software)															
WorldPort Dual Standard Cellular + Fax	●	●	●	●	●	●		●	●	●	●	●		-	£168
WorldPort PCMCIA	●	●	●	●	●	●		●	●	●	●	●		POWERCUT!	£193
NEW! WorldPort PCMCIA V.34	●	●	●	●	●	●	●	●	●	●	●	●	●	-	£279

PowerPort High Speed Dual Async Serial Card. Recommended for terbo and V.fast modems to prevent bottleneck of data £49 -

COURIER V.34

COURIER

Courier Dual Standard V.34 with V.32bis

V.34 for speeds of up to 28,800bps. With the use of data compression a throughput of up to 115,200bps can be achieved, enabling you to communicate at speeds previously never possible on a dial-up line.

WORLDPORT DUAL STANDARD CELLULAR

WORLDPORT PCMCIA

WorldPort Dual Standard Cellular PCMCIA 2.0 Fax Modem

Compatible with any portable equipped with a PCMCIA type II slot and powered directly by the computer. The ideal solution for anyone who will regularly need to transfer data from their portable computer.

WORLDPORT PCMCIA

WORLDPORT DUAL STANDARD CELLULAR

Small enough to fit in your pocket, whilst providing you with all your data communications needs both in and out of the office, the WorldPort Dual Standard Cellular Fax is the perfect choice for the mobile user.

SPORTSTER 28.8 + FAX

SPORTSTER 28.8 + FAX

The world's best selling modem just got better. With speeds of up to 28,800bps, the Sportster 28.8 + Fax offers proven high performance technology, at an unbeatable price.

Technical Sales Order Lines 0181-951 3355 (50 lines)

BSI REGISTERED FIRM — NATIONAL ACCREDITATION OF CERTIFICATION BODIES

Certificate no. FS 26535
BS5750 registered for the supply of computer, printer and workstation memory, processor and other upgrades.

Powermark plc is regularly assessed by the British Standards Institution to ensure compliance with the quality standard.

HMSO

Public Sector customers can purchase through HMSO by calling 01603 694153.

TURN THE PAGE FOR MORE

PACE FAX MODEM FEATURE

PACE

Now only £215

Voice Fax Modem!

PACE MODEMS

Model	V21	V22	V22bis	V32	V32bis	V32terbo	V.fc	V34	MNP2-4	V42	V42bis	MNP5	Fax	Voice	Internal	External
MobiFax	●	●	●						●	●	●	●	●		-	£75
NEW! MobiFax 144	●	●	●	●	●				●	●	●	●	●		-	£95
MICROLIN fx 32Plus	●	●	●	●	●				●	●	●	●	●		£139	£155
MICROLIN fx 34	●	●	●	●	●	●	●	●	●	●	●	●	●		£249	£249
PCMCIA MICROLIN NB 32Plus	●	●	●	●	●				●	●	●	●	●		-	£195
PCMCIA MICROLIN V.34	●	●	●	●	●	●	●	●	●	●	●	●	●		-	£Call
Linnet 32Plus fx		●	●	●	●				●	●	●	●	●		-	£156
NEW! Message Desk		●	●	●	●				●	●	●	●	●	●	-	£215
NEW! Linnet 34 fx	●	●	●	●	●	●	●	●	●	●	●	●	●		-	£270

MOBIFAX 144

- 14400bps fax and data
- Portable, pocket sized
- Error correcton/data compression software
- Free CompuServe and BBS time
- Free cable included

MESSAGE DESK

- Integrated voice messaging
- Voice, fax and data forwarding
- 14400bps fax and data
- V42/V42bis error correction/data compression
- Free voice, fax and data software

All modems supplied by Powermark plc are BABT APPROVED

LINNET 34 fx

- All data speeds to V34 28800bps
- 115,200bps maximum throughput
- All fax speeds to Group 3 14400bps
- V42/V42bs error correction/data compression
- Free fax and comms software

FAMOUS COMMUNICATORS

The Armada Beacons

Stanley Unwin

Magnus Pike

POWER THE NET!

Access the Internet through Powermark's PNet
• Full Internet connection • POP3 Email • Worldwide Web Browsing
• FTP • Telnet • Usenet • Many local points of presence
• On-line or telephone support • Free Internet guide

BANK at Powermark

LASAT MODEM FEATURE

LASAT

LASAT MODEMS

Model	V21	V22	V22bis	V32	V32bis	V.34	MNP2-4	MNP5	MNP10	Fax	External	
Unique 144	●	●	●	●	●		●	●	●	●	£199	~~£292~~
Unique 144 Lite *(Mains only)*	●	●	●	●	●		●	●	●	●	£119	~~£195~~
Credit 144 PCMCIA	●	●	●	●	●		●	●	●	●	£169	~~£324~~
Safire 288	●	●	●	●	●	●	●	●	●	●	£199	~~£295~~

UNIQUE 144

EARLY BIRD

Order Bonus
See page 33 of this advertisement

- 10 year warranty on LASAT modems
- Quality modems manufactured in Denmark
- All LASAT modems feature MNP10 for cellular use
- Winfax Lite software included with all modems
- All modems are BABT approved and come complete with cable

UNIQUE 144

The LASAT Unique 144 is a V.32 bis desktop fax modem that is also easy to use as a portable.

- NiCad battery
- MNP 10
- Autosync
- Synchronous
- Callback security
- Remote configuration
- Two-wire leased line
- V.25 bis dialling
- Small 3.5" square footprint
- 'Bang & Olufsen' like design

"We were wrong to expect a good looking modem to perform badly. The Unique 144 displayed perfect data performance... and its throughput was excellent."
Computer Shopper, April 1994

UNIQUE 144 LITE

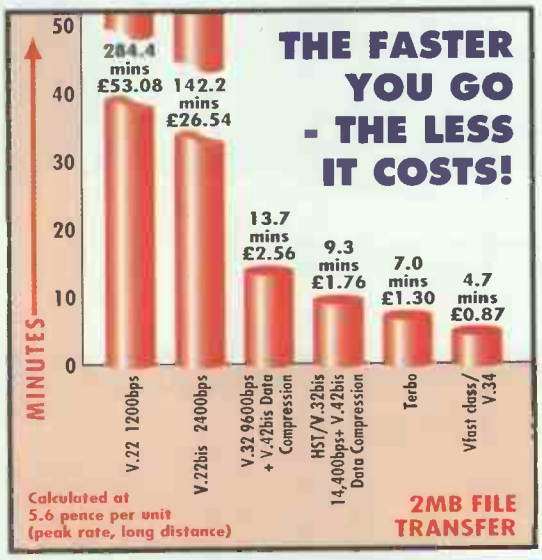
CREDIT 144

The LASAT Credit 144 is a fully featured PCMCIA V.32 bis fax modem. It has a built in high speed serial port emulator to give your notebook the highest possible data throughput capability.

- MNP 10 for cellular use
- Autosync
- Callback security
- Remote configuration
- Two-wire leased line
- V.25 bis dialling
- V.17 - 14,400 bps fax

CALL 0181-951 3355 IF THE UPGRADE YOU REQUIRE IS NOT LISTED HERE

All modems supplied by Powermark plc are BABT APPROVED



TRUST MODEM FEATURE

- 14,400 bps full duplex data
- Includes telephone plug and cable, software and manual
- Trio Datafax (DOS), Datafax (Windows) and DataComm (DOS) software
- 5 year warranty

Trust® TELECOMMUNICATION

TRUST MODEMS

Model	V21	V22	V22bis	V23	V32	V32bis	MNP2-5	V42	V42bis	Fax	Internal	External
AE1414	●	●	●	●	●	●	●	●	●	●	-	£95
AC1414	●	●	●	●	●	●	●	●	●	●	£95	-

Technical Sales Order Lines
0181-951 3355
(50 lines)

MODEMS

HUGE STOCKS
Guaranteed same day despatch on virtually all orders placed even up to 4.00pm.

TECHNICAL SALES PEOPLE
Our sales people are the best. They are trained specialists in their chosen field - multimedia, memory of all types, mass storage, networking and communications.

FINANCIAL STABILITY
Powermark plc has been supplying upgrades for over 4 years and has an annual turnover exceeding £18 million with a healthy balance sheet.

LOW PRICES
We only supply products from leading manufacturers and at low, low prices too.

TECHNICAL SUPPORT
Dedicated after sales technical support teams on line to help with installation.

CORPORATE & PUBLIC SECTOR
We welcome orders from corporate, education and public sector organisations. Just fax or phone your order number.

Use the red border to find these pages easily

FULL MANUFACTURERS' WARRANTIES
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TURN THE PAGE FOR MORE

UPGRADE DRIVE THRU
While-you-wait installation service available. See page 3 for details.

PERSONAL CALLERS
Save on delivery charges - there's plenty of parking. Telephone first to check our stock position on the items you want. We're open from 9.00am to 6.00pm Monday to Friday. Saturdays: Sales from 9.30am to 4.00pm, Technical Support and Customer Service from 10.00am to 2.00pm.

Powermark plc
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(50 lines)
Fax: 0181 905 6233
Email: sales@powermark.com

VISA MasterCard SWITCH DELTA

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VAT at 17.5% will be added to all prices

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RATES £12.50 once-only membership
£15 per month subscription
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Quit at any time without penalties
Call 0181-951-3355 and ask for our PNet specialists
Join for only £9.95 when you buy any modem from Powermark

Power Mark®

MEMORY

Technical Sales Order Lines
0181-951 3355
(50 lines)

> **... and here's what some of our customers have said ...**
> ***I am very impressed with the response to my first order, for a Colorado Tape Streamer. When I gave the order by phone I was told you were out of stock and expecting new supplies early this week. It was thus a pleasant surprise to receive the Tape Streamer on Tuesday. What was even more of a surprise was to receive yesterday your letter dated 27th February 1995, apologising for the expected delay in despatching the order. So you see, your "delayed" delivery of the parcel was actually quicker than the letter by Royal Mail!***
> R A Morgans
> Middlesex

HAYES ESP ACCELERATOR CARDS

- Helps PCs to keep up with fast modems
- Recommended for all 288 and 144 modems
- Can run at speeds up to 921,600bps

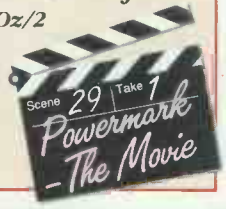
ESP Card - 1 Port £74
ESP Card - 2 Port £108

TURN THE PAGE FOR MORE

MOVIE MEMORIES II

...another chance to read

The Wild Parity
Room at the Laptop
Marathon RAM
The Wizard of Oz/2



HAYES MODEM FEATURE

ACCURA 288

ACCURA+FAX
Low cost fax modems with all of the quality and ease-of-use that comes with the Hayes name.
OPTIMA+FAX
Offers outstanding performance with the ability to compress data twice as much as other fax modems.

OPTIMA 288

Hayes™

HAYES MODEMS

The industry standard

Model	V21	V22	V22bis	V32	V32bis	V32terbo	V34	MNP2-4	V42	V42bis	MNP5	Fax	Internal	External
ACCURA 144 + Fax	●	●	●	●	●			●	●	●	●	●	-	£137
ACCURA 288 + Fax	●	●	●	●	●		●	●	●	●	●	●	-	£172
OPTIMA 144 + Fax	●	●	●	●	●			●	●	●	●	●	-	£249
OPTIMA 144 PCMCIA	●	●	●	●	●			●	●	●	●	●	-	£197
OPTIMA 288	●	●	●	●	●		●	●	●	●	●	●	-	£369
OPTIMA 288 bundle 2 pack with free accelerator cards and upgrade to V.34	●	●	●	●	●		●	●	●	●	●	●	-	£699
ULTRA 96	●	●	●	●				●	●	●	●		-	£Call
ULTRA 144	●	●	●	●	●			●	●	●	●		-	£Call
ULTRA ISDN 64K System Adapter														£795

ESP high speed serial card, 1 port £74, 2 port £108

PSION MODEM FEATURE

PSION DACOM

PSION DACOM MODEMS

Model	V21	V22	V22bis	V32	V32bis	V32terbo	V.fast	V34	MNP2-4	V42	V42bis	MNP5	Fax	External
PCMCIA Gold V32bis	●	●	●	●	●				●	●	●	●	●	£195
PCMCIA Gold V34	●	●	●	●	●	●	●	●	●	●	●	●	●	£299
Meteor 14.4	●	●	●	●	●				●	●	●	●	●	£189
Meteor 28.8	●	●	●	●	●	●	●	●	●	●	●	●	●	£245

All modems supplied by Powermark plc are BABT APPROVED

METEOR RANGE

- Dialback security
- Trans-Send WinDos Lite Fax and Comms software
- 2 year warranty
- Serial cable, power supply and full documentation
- Free technical support via help line or Bulletin Board Service
- MNP10

ZOOM MODEM FEATURE

ZOOM

Personal Computer World: **Editor's Choice Award Dec '93 and June '93**

Windows User: **Best On Test, February 94**

ZOOM MODEMS

Model	V21	V22	V22bis	V23	V32	V32bis	V34	MNP2-5	V42	V42bis	Fax	Internal	External
14.4X	●	●	●	●	●	●		●	●	●	●	-	£95
14.4I	●	●	●	●	●	●		●	●	●	●	£89	-
14.4X MacPak	●	●	●	●	●	●		●	●	●	●	-	£109
28.8X	●	●	●	●	●	●	●	●	●	●	●	-	£169
28.8I	●	●	●	●	●	●	●	●	●	●	●	£149	-
28.8X MacPak	●	●	●	●	●	●	●	●	●	●	●	-	£179

ZOOM 14.4 MODEMS

- Remote configuration and callback security
- High speed 14,400 bps fax and data transmission with V.42bis and MNP 2-5
- Extended status reporting with 15 LED lights (14.4X only)
- 5 year warranty
- Buffered 16550 UART to prevent data overruns (14.4I only)

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Access the Internet through Powermark's PNet
• Full Internet connection • POP3 Email • Worldwide Web Browsing
• FTP • Telnet • Usenet • Many local points of presence
• On-line or telephone support • Free Internet guide

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RACAL MODEM FEATURE

Racal-Datacom

RACAL MAXAM RANGE

RACAL MAXAM MXF1432
The Maxam MXF1432 from Racal-Datacom provides a powerful combination of capabilities and performance for all data, facsimile and IBM host access requirements.

- V.32bis, V.32, V.22bis, V.22, V.23, V.21
- 14400, 9600, 2400, 1200 and 300bit/s
- Send and receive Group 3 fax
- PSTN and leased line operation
- Dial-back and link security
- IBM 3270/5250 communications features
- Local and remote configuration

RACAL MAXAM MXF1432

RACAL MAXAM MODEMS

Model	V21	V22	V22bis	V32	V32bis	MNP2-4	MNP5	Fax	Internal	External
MXF2422	●	●	●			●	●	●	-	£153
MXF9632	●	●	●	●		●	●	●	-	£257
MXF1432	●	●	●	●	●	●	●	●	-	£369

RACAL MAXAM MXF9632

RACAL ISDN RANGE

ISDN: THE NEW NETWORKING TECHNOLOGY

ISDN represents a fundamental change in wide area communications, providing fast reliable switched digital communications and delivering substantial cost savings to those who adopt it. ISDN applications are expanding rapidly, ranging from dial-in host access with short access times and higher speeds to multinational LAN networking.

RACAL DAP4100

- Exploits power of ISDN
- Dial modem replacement
- Digital leased circuit replacement
- Single or dual port, standalone or nest
- User selectable interface V.24, V.35, X21
- AT, V.25Bis & X.30/X.21 autodialling
- 64Kbit/s-2400bit/s with V110 rate adaption
- CMS400 network management
- CLIP, MSN & subaddress support

RACAL DAP4100 SINGLE £649
RACAL DAP4100 DUAL £719

RACAL DAP4500

- Reduces cost of digital leased network resilience
- Automatic high speed back-up & restoral
- Up to 64Kbit/s back-up bandwidth over ISDN
- Single or dual channel, standalone or nest
- Disaster recovery facility
- Time windows minimises ISDN call costs
- User selectable interface V.24, V.35, X21
- CMS400 network management
- CLIP, MSN & subaddress support
- Terminal adapter capability

RACAL DAP4500 SINGLE £1029
RACAL DAP4500 DUAL £1399

HMSO
Public Sector customers can purchase through HMSO by calling 01603 694153.

BSI REGISTERED FIRM
NATIONAL ACCREDITATION OF CERTIFICATION BODIES
Certificate no. FS 26535
BS5750 registered for the supply of computer, printer and workstation memory, processor and other upgrades.
Powermark plc is regularly assessed by the British Standards Institution to ensure compliance with the quality standard.

Technical Sales Order Lines
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(50 lines)

MODEMS

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Our sales people are the best. They are trained specialists in their chosen field - multimedia, memory of all types, mass storage, networking and communications.

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Dedicated technical sales technical support teams on line to help with installation.

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Join for only £9.95 when you buy any modem from Powermark

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MEMORY

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DELIVERY CHARGES

UK MAINLAND
Next working day courier delivery to your door

SMALL ITEMS
Examples: memory, sound/video cards, CD ROM titles, small software packages

UP TO 3 ITEMS	£6.95 *total*
4 ITEMS OR MORE	£1.95 *for each additional item*

LARGE ITEMS
Examples: CD ROM drives, monitors, multimedia kits, printers, software suites

1ST ITEM	£8.95
EACH ADDITIONAL ITEM	£4.95

Call for rates outside UK mainland

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MOVIE MEMORIES

Where Eagle Novells Dare

Any film with Isaac Hayes, Melvin Hayes or Gabby Hayes

RAMbi

ARTISOFT FEATURE

ARTISOFT®

LANTASTIC NETWORK STARTER KIT

LANtastic is the most awarded network in the world (over 106 awards to date), with over 2.5 million users worldwide. Artisoft is the network for small/medium businesses. The LANtastic Starter Kit contains everything you need to connect 2 PC's (hardware, software, cables, manuals, T-pieces) in ONE box. When you need to add a node get an add-on kit.

Installation is exceptionally easy. If you are not fully satisfied there is a 30 day money back guarantee.

Get networked with LANtastic and get the most from your PC investment.

Powerfully, simply, networking

LANTASTIC 2 NODE NETWORK STARTER KIT	£199
LANTASTIC ADD-ON 1 NODE KIT	£106

LANTASTIC FOR OS/2 NETWORK OPERATING SYSTEM

The only network software that works in IBM OS/2 Warp V3.

As the world leader in peer-to-peer networks for DOS and Windows, LANtastic opens the door to sharing files and printers with minimal expense and maximum flexibility.

LANtastic for OS/2 is a 32-bit, multitasking, multithreaded network operating system that supports Named Pipes and HPFS and FAT file systems. With a familiar interface, LANtastic for OS/2 allows you to take full advantage of the power of OS/2. It features tight security and strong management features - full network control at your fingertips and quick installation.

1 USER	£89
5 USER	£370

ALSO AVAILABLE:

LANTASTIC V6 FOR DOS AND WINDOWS	£65
ARTICOM	£75
ARTISAVE	£149

3COM FEATURE

3Com®

Compatible with commonly used operating systems, including Novell Netware, Microsoft LAN Manager, DECnet, DOS, PC-NFS, Banyan Vines and 3+Open.

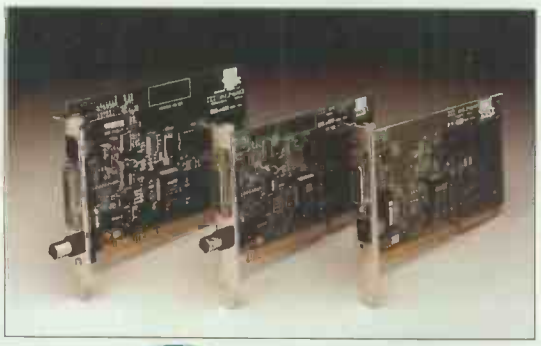
3C503 RANGE
Standard 8-bit or selectable 16-bit card. Shared memory architecture and 8K buffer.

3C507 RANGE
16-bit cards for file servers or high performance workstations, providing shared memory architecture and a 65K buffer.

3C509 RANGE
16-bit high performance, low component cards.

3C529 RANGE
MCA Etherlink III Cards.

3C579 RANGE
32-bit EISA interface using Parallel Tasking Architecture. The adapter uses the same drivers as the EtherLink III and is SNMP manageable when used with Linkwatch.



3C503 RANGE
- Standard 16-bit cards
- Shared memory architecture and 8K buffer

	BNC	RJ45	AUI	Unit	5 Pack
3C503-16	●		●	£115	£535
3C503-16TP		●	●	£115	£535

3C509 RANGE

	BNC	RJ45	AUI	Unit	5 Pack
3C509	●		●	£67	£319
3C509TP		●	●	£70	£319
3C509C	●	●	●	£76	£359

3C529 RANGE
- MCA Etherlink III cards

	BNC	RJ45	AUI	Unit	5 Pack
3C529	●		●	£156	£710
3C529TP		●	●	£156	£710

3C579 RANGE
- 32-bit EISA interface using Parallel Tasking Architecture

	BNC	RJ45	AUI	Unit	5 Pack
3C529	●		●	£149	£699
3C529TP		●	●	£149	£699

3C589 RANGE
- PCMCIA cards

	BNC	RJ45	AUI	Unit	5 Pack
3C589T		●		£139	£669
3C589D	●			£149	£699

TOKEN RING PCMCIA
- AutoLink software
- LEDs for innstallation and trouble shooting

		Unit	5 Pack
3C689	TokenLink III 16/4	£299	£1399

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NOVELL FEATURE

Novell Authorised Reseller

INTRODUCING NOVELL NETWARE 4.1

NetWare 4.1 incorporates all the advantages of previous versions of NetWare, plus gives you new capabilities designed to increase productivity, reduce costs, and simplify installing and maintaining your network. It elevates networking to the next level and lays the foundation for a distributed computing infrastructure.

- Additive licensing - 25 user licence + 10 user licence = 35 user licence
- NDS - NetWare Directory Services
- Offers a single network login for access to all available resources
- Improved memory management and protection whilst utilising both ring 3 and 0
- Enhanced security utilising RSA public/private key cryptography
- Independent network auditing features
- Remote management features
- Automatic file grooming and archiving
- All utilities in GUI format
- Support for over 250 printers per server
- New simplified menu driven installation
- Improved ITX WAN behaviour with enhanced routing of IPX, AppleTalk and IP
- New and enhanced SFT III 4.1 providing NetWare for SAA, NetWare for MAC and NMS support
- Internationalisation via Multi-lingual language modules
- NetWare messaging services, NetWare for Macintosh, NetWare/IP and NetWare for OS/2 supplied in the box

NOVELL NETWARE 4.1 CD

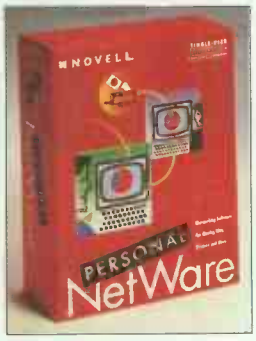
5 USER	POWERCUT!	£465
25 USER	POWERCUT!	£1559
50 USER		£2295
100 USER		£3385
250 USER		£5995

NOVELL NETWARE 3.12

5 USER	£385
10 USER	£905
25 USER	£1349
50 USER	£1825
250 USER	£4575

PERSONAL NETWARE

- Share all your printers, drives (CD ROMs etc), directories and files
- Works in DOS and Windows



PERSONAL NETWARE 5 PACK	£44 £195

XIRCOM FEATURE

Xircom

CREDIT CARD ETHERNET + MODEM II

- Simultaneous Ethernet/803.2 LAN plus 19,200 bps data and 14,400 bps send/receive fax modem operation in one slot
- Modem software configurable to support localised telephone requirements in US and 14 European countries
- Supports advanced PCMCIA features including HotSwap, Suspend/Resume and Integrated Power Management
- Serial port/UART emulation provides increased compatibility with all popular terminal and fax software
- Performance modem communications via Xircom's Modem Application Programming Interface (XMAPI)
- Includes terminal and fax software for Windows
- Support for remote node access applications
- Includes Windows terminal and fax software

CEM2-10BT (TP)	£399
CEM2-10B2 (BNC)	£389
CEM2-10BC (COMBO)	£425

CREDIT CARD TOKEN RING ADAPTER II

- High-performance, memory-saving SmartRing software
- 16 or 4 Mbps software selectable ring speed
- Windows and DOS based installation program automatically configures PC and NOS setup
- Intuitive Windows based user utility for easy adapter management
- Allows 'hot' removal and reinsertion while preserving system status
- Supports both shielded & unshielded twisted pair Token-Ring cabling
- Compatible with the widest range of platforms

PS-CT2-16CTP (TP) £299

POCKET ETHERNET ADAPTER III

- Universal connection for all notebook, laptop and desktop PCs
- Enhanced Parallel Port (EPP) capable
- Requires no internal expansion slots
- No jumpers or configuration switches to set
- Ultra-compact, ergonomic design for maximum portability and one hand installation
- Phantom power cable
- Small, lightweight power supply included

PE3-10B2 (BNC)	£185
PE3-10BT (TP)	£185
PE3-10BC (COMBO)	£209

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MEMORY

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"... and here's what some of our customers have said ...

I would like to use this opportunity to say that I was very impressed with the service. As you know, we are not all computer boffins and need people like you to help in getting our systems working properly. All of you were patient and considerate. I did not have to wait hanging on the phone for long periods, which is so common nowadays with a lot of companies. Once again thanks for all the advice and patience shown. A special thanks to Sharon who had to put up with all my queries on one day.

I hope to do business with you again sometime.

G Davies
London"

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NEW! MEMORY LANE AGAIN

Do you remember this Memory Lane from June 1993...?

... The 'sleekness' of the Sharp MZ-80K
... Fantasia fibre optic revolving table lamps
... Mission Impossible
... Z Cars

SMC NETWORKING FEATURE

SMC®

SMC EtherEZ Adapters

- Easiest Installation into Plug and Play and non-'PnP' computers
- SimulTasking for top performance
- Extensive driver support via SMC SuperDisk
- Diagnostics LEDs
- PC Agent/SNMP for simple network management to the desktop
- 10BASE2, 10BASE-T and Combo versions
- Lifetime warranty
- Comes in a choice of single or five pack options

	Single	*5 Pack*
EtherEZ Adapter BNC	£71	£309
TP	£71	£309
Combo	£78	£339

SMC ETHERCARD ELITE ULTRA

	Single	*6 Pack*
Elite 16 Ultra BNC	£68	£372
Elite 16 Ultra TP	£68	£372
Elite 16 Ultra Combo	£74	£408

24 AND 50 PACKS ALSO AVAILABLE

SMC ETHERPOWER PCI

	Single	*5 Pack*
EtherPower PCI TP	£99	£459
EtherPower PCI Combo	£109	£529

SMC ELITECARD PCMCIA

	Single	*5 Pack*
EliteCard PCMCIA TP	£95	£439
EliteCard Combo	£125	£589

SMC ETHERCARD ELITE 32C ULTRA

	Single	*6 pack*
Elite 32C Ultra Combo	£159	£849

TIGER HUBS

	Number of Ports				
	TP	*BNS*	*AUI*	*FL*	
CX3	0	3	1	0	£219
TP6	6	0	1	0	£159
TP6B	6	1	0	0	£179
TP12	12	1	1	0	£319
CX6	1	6	1	0	£499
FL6	0	1	1	6	£Call

FISKARS UPS FEATURE

FISKARS

LANSAFE III

Power Management Software for Networks

LanSafe III, used in conjunction with a Fiskars UPS, provides a sequenced network shutdown in the event of an extended mains power failure. LanSafe III ensures the integrity of data by instructing the workstations to send their cached data to the hard disk, before sequentially closing down the network.

- Automatic reboot when power returns
- Power events stored in log file for analysis

- Automatic orderly shutdown of entire network in case of power failure

LANSAFE III FOR DOS/ WINDOWS/NETWARE £69
LANSAFE III FOR NOVELL NMS £119
LANSAFE III WINDOWS NT £69
LANSAFE OS/2 £69
LANSAFE III UNIX £69

FAILSAFE III

Power Management Software for Stand-Alone PC's

- For Windows, Windows NT and OS/2
- Self-guided installation
- Automatic orderly shutdown of computer in case of power failure
- Automatic reboot when power returns
- Power events stored in log file for analysis

FAILSAFE III WINDOWS £49
FAILSAFE III WINDOWS NT £49
FAILSAFE OS/2 £49

How much is your data worth?

A power failure could mean its loss!

Not only a day's work, but perhaps a quotation not sent on time or creative work that can never be recreated exactly. Look at this feature - there's a system to protect you, your data and your pocket.

POWERSERVER 10

The PowerServer 10 range of line-interactive Uninterruptible Power Supplies provides a typical computer load with up to 10 minutes of battery back-up time in the event of an extended mains power failure.

Cost-effective UPS for servers, workstations and other LAN applications.

- PC Magazine Editors' choice
- ABM battery management
- On-line battery testing
- Wide input range
- Compatible with LanSafe III power management software
- European approvals (VDE, SEMKO, FIMKI, etc)

Model	*Power Range*	*Watts at Power Factor 0.7*	*Typical Backup Time (Mins)*	
PS10/0.4	400VA	280W	10	£269
PS10/0.6	600VA	420W	10	£309
PS10/1.0	1000VA	700W	10	£479
PS10/1.4	1400VA	980W	10	£599
PS10/1.8	1800VA	1260W	10	£879
PS10/2.2	2200VA	1540W	10	£999

POWERRITE PLUS

	Power Range	*Typical Backup Time*		
PRP/250	250VA	5 Mins	SPECIAL OFFER!	£79
PRP/400	400VA	5 Mins		£125
PRP/600	600VA	5 Mins		£189

- Protects against power problems
- Advanced battery management (ABM) gives 30% longer battery life
- Supported by LanSafe III and FailSafe III power management software (400VA and 600VA models)

PowerRite Plus is a powerful, small-footprint Uninterruptible Power Supply suitable for use with workstations and communication devices. The PowerRite Plus range typically provide 5 minutes of back-up time for computer loads. All models feature a computer communication software option.

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• On-line or telephone support • Free Internet guide

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INTEL NETWORKING FEATURE

INTEL LANDESK MANAGEMENT SUITE V2.0

- Integrated desktop management applications including: software distribution and metering, inventory and remote control, printer management, traffic monitoring, powerful reporting and much more
- Powerful data capture and reporting

LANDESK MANAGER SUITE V2	£349
LANDESK MANAGER V1.51	£675

INTEL NETPORTEXPRESS XL PRINT SERVER

The high performance print server for multi-protocol networks. Supports Novell NetWare. UNIX and Macintosh network printing environments simultaneously. It connects up to three printers anywhere on your LAN, so it's easy to respond to changing users' needs.

- Print throughput of up to 180 KBps
- Simultaneously (multi-protocol) supports up to 3 protocols on up to 3 attached printers
- Software upgradable with Flash memory

	Unit	3 Pack
NETPORT XL BNC/TP	£324	£899
NETPORT XL TOKEN RING	£439	-

...ALSO AVAILABLE

	Unit	3 Pack
NETPORT EL BNC/TP	£259	£749
NETPORT EL TOKEN RING	£388	-

INTEL ETHEREXPRESS PRO

- Superior performance via concurrent processing, large 32k buffer and 32-bit instructions
- One step installation
- 90 day money back guarantee and limited lifetime warranty

ETHEREXPRESS 16

	BNC	RJ45	AUI	Unit	5 Pack
EE16	•		•	£69	£325
EE16-TP		•	•	£69	£325

ETHEREXPRESS FLASH

	BNC	RJ45	AUI	Unit	5 Pack
EF16	•		•	£70	£327
EF16-TP		•	•	£70	£327
EF16C	•	•	•	£80	£385

ETHEREXPRESS FLASH PRO

	BNC	RJ45	AUI	Unit	5 Pack
EFP16	•		•	£79	£349
EFP16-TP		•	•	£79	£349
EPP16C	•	•	•	£89	£379

TRUST NETWORKING FEATURE

TRUST HUBS AND REPEATERS

2 Port Repeater BNC + AUI	£179
6 Port Repeater BNC + AUI	£269
8 Port Smart HUB TP	£109
16 Port Smart HUB TP	£199
3 Port Ethernet Printer Server	£199

TRUST NETWORK ADAPTERS

NE2000 Plus BNC	£25
NE2000 Plus Combo	£29
Boot ROM	£9
Pocket Adapter Combo	£65
PCMCIA Adapter Combo	£109

TRUST UPS

With Monitor connector, spike protection and RFI filter

400 Watt	£135
650 Watt	£179
1200 Watt	£299

NETWORK ACCESSORIES FEATURE

CABLES

	Unit	10 Pack
1.5m Thin Ethernet Cable	£9	£89
5m Thin Ethernet Cable	£11	£95
10m Thin Ethernet Cable	£15	£135
35m Thin Ethernet Cable	£33	£320

	Unit	10 Pack
BNC T-Piece	£3	£26
BNC Terminator	£3	£22
BNC In-Line Coupler	£3	£28

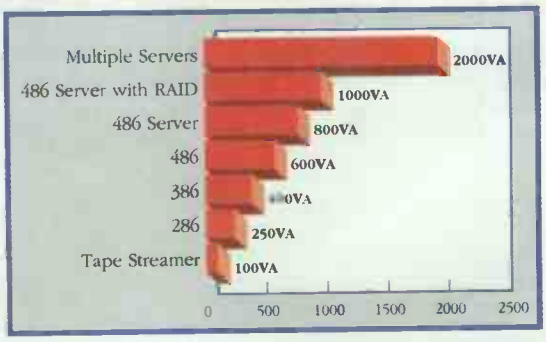
AMERICAN POWER CONVERSION UPS

LINE INTERACTIVE UPS

	Rating (VA)	Av. backup time (mins)	
SU250	250	8	£199
SU400	400	7	£249
SU900	900	7	£499
SU1250	1250	7	£559
SU2000	2000	7	£995

OFF-LINE UPS

	Rating (VA)	Av. backup time (mins)	
CU250	250	7	£89
CU400	400	6	£149
CU600	600	8	£189
CU900	900	7	£319
CU1250	1250	7	£399



Powerchute Netware	£59
Powerchute Windows	£65
Powerchute Unix	£99

UPS units are measured by a VA rating, typical VA requirements are shown above

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VAT at 17.5% will be added to all prices

Power Mark®

MEMORY

Technical Sales Order Lines 0181-951 3355 (50 lines)

BSI REGISTERED FIRM — NATIONAL ACCREDITATION OF CERTIFICATION BODIES

Certificate no. FS 26535
BS5750 registered for the supply of computer, printer and workstation memory, processor and other upgrades.

Powermark plc is regularly assessed by the British Standards Institution to ensure compliance with the quality standard.

HP SupportPack

- Onsite warranty by HP engineers
- Recommended for all HP Laserjets and Deskjets

TURN THE PAGE FOR MORE

LEXMARK PRINTER FEATURE

NEW!

1200 DPI LASER PRINTERS FROM ONLY £1199!

Optra R	£1199
Optra RX	£1899
Optra L	£1799
Optra LX	£2399
Optra LXI	£2899

HP PRINTER FEATURE

HEWLETT PACKARD
Authorised reseller

HP DESKJET 320

- 600 x 300 dpi in black
- Up to 3 pages per minute in black
- 13 scalable Windows fonts

HP DESKJET 320	£169
HP DESKJET 320 WITH CUT SHEET FEEDER	£189
COLOUR KIT UPGRADE	£32
3 YEAR ON-SITE WARRANTY	£39

NEW! HP DESKJET 660C

- 800 x 600 dpi in black
- 14 TrueType fonts

HP DESKJET 660C	£335

NEW! HP DESKJET 1600C

- 800 x 600 dpi in black
- 4MB RAM

HP DESKJET 1600C	£849

HP DESKJET 540

HP DESKJET 850C

- 800 x 600 dpi in black
- Up to 6 pages per minute in black
- 45 TrueType fonts

HP DESKJET 850C	£399

HP DESKJET 1600C

NEW! HP DESKJET 540

- 600 x 300 dpi in black
- Up to 3 pages per minute
- 100 sheet paper handling
- 3 year warranty

HP DESKJET 540	£215
COLOUR KIT UPGRADE	£32

HP LASERJET 4V

- A3 paper handling
- 8 pages per minute in A3, 16 in A4
- Delivery: £27 on this printer

HP LASERJET 4V	£1375
HP LASERJET 4MV	£1995
HP LASERJET 4V 500 SHEET TRAY SYSTEM	£279
3 YEAR ON-SITE WARRANTY	£199

HP DESKJET 660C

NEW! HP LASERJET 5P

- 6 pages per minute
- 26 seconds first page out
- 600 dpi, REt, microfine toner
- 2MB RAM, up to 50MB

HP LASERJET 5P	£599
HP LASERJET 5MP	£719

HP LASERJET 5P

HP COLOUR LASERJET

- Up to 10 pages per minute in black
- Up to 2 pages per minute in colour
- 300 dpi
- 1 year on-site warranty
- Delivery: £32 on this printer

HP COLOUR LASERJET	£4395
IEEE 1284 COMPLIANT PRINTER CABLE	£19
HP COLOUR LASERJET CABINET	£345
250 SHEET REAR FEED UNIT	£315

HP LASERJET 4Si

- 1 pages per minute
- 600 dpi
- Includes 1 year on-site warranty
- Delivery: £27 on this printer

HP LASERJET 4Si	£2065
HP LASERJET 4SiMX	£2935
3 YEAR ON-SITE WARRANTY	£459

HP LASERJET 4L

- 4 pages per minute
- 300 dpi
- 1MB RAM

HP LASERJET 4L	£355
HP LASERJET 4ML	£735
3 YEAR ON-SITE WARRANTY	£95

HP COLOUR LASERJET

HP LASERJET 4 PLUS

- 12 pages per minute
- Up to 600 dpi
- 2MB RAM

HP LASERJET 4 PLUS	£935
HP LASERJET 4M PLUS	£1265
HP DUPLEX UNIT	£499
3 YEAR ON-SITE WARRANTY	£159

PRINTER ACCESSORIES FEATURE

ORIGINAL TONER CARTRIDGES

CANON	
LBP 4/4+	£51
LBP 8III	£52
LBP 8IV	£71
EPSON	
EPL 4100/4300	£65
EPL5200	£87
PANASONIC	
KX-P4410/4430	£28
KX-P4420	£26
KX-P4450	£18
NEC	
NEC 610	£79
NECS60/60P/62P/90/95	£108
HEWLETT PACKARD	
LaserJet II/IID/III/IIID	£47
LaserJet II IIP/IIP+/IIIP	£46
LaserJet II IIISi/4Si/4MX	£77
LaserJet II 4/4+/4M/4M+	£67
LaserJet II 4L/4ML/4P/4MP	£44
LaserJet II4V/4MV	£115

Drums and developers for Panasonic range also available

PRINTER SHARERS

TRUST AUTOSWITCH 2	£13
• Connects 2 computers to 1 printer	
TRUST AUTOSWITCH 4	£27
• Connects 4 computers to 1 printer	
AUTO SWITCHES	
2 PCs to 1 printer	£18
4 PCs to 1 printer	£18
AUTO SWITCHES	
• 256K buffer	
4 PCs to 2 printers	£127

DESKJET CARTRIDGES

HP DESKJET BLACK CARTRIDGE	£16
HP DESKJET COLOUR CARTRIDGE	£19

PRINTER CABLES

	1.5m	3m	10m
PARALLEL	£4	£8	£14
25M - 25M	£4	£9	£15
25M - 36M	£6	£8	£18

POWER THE NET!

Access the Internet through Powermark's PNet
• Full Internet connection • POP3 Email • Worldwide Web Browsing
• FTP • Telnet • Usenet • Many local points of presence
• On-line or telephone support • Free Internet guide

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KYOCERA PRINTER FEATURE

KYOCERA FS-400

A compact 4 pages per minute, low cost personal page printer that also offers full system printer capabilities and savings on print costs due to its cartridge-free design.

The FS-400 has a wealth of features, including 300 dpi resolution, enhanced to 300 x 1200 dpi by Kyocera resolution technology, 13 scalable in-built fonts, and for addition cost savings, Energy Star compliance and draft print mode.

Other features include industry standard LasjerJet III and optional PostScript emulations, single and multi-protocol network connectivity expansion and full compatibility with Windows applications.

KYOCERA FS-400	POWERCUT!	£449
NETWARE-SPECIFIC ETHERNET INTERFACE		£279
TONER KIT		£16
3 YEAR ECOSHIELD ON-SITE WARRANTY		£150

KYOCERA FS-400

KYOCERA FS-1550

The FS-1550 10 pages per minute printer offers substantial savings on running costs compared with competitive printers - where the ongoing cost of consumables can amount to far more than the purchase price.

It is ideal for word processing, database and spreadsheet printing, and with resolution enhancement, graphics. As your requirements grow, ECOSYS paper handling options include extra paper trays, a duplex unit and a sorter/collator.

KYOCERA FS-1550

Other features include industry-standard LaserJet III and optional PostScript emulations, sophisticated networking and IBM connectivity options, and full compatibility with Windows applications.

KYOCERA FS-1550	POWERCUT!	£899
NETWARE-SPECIFIC ETHERNET INTERFACE		£279
TONER KIT		£51
3 YEAR ECOSHIELD ON-SITE WARRANTY		£199

ECOSYS

Printing costs. Stop paying the price.

KYOCERA FS-1500 WITH ACCESSORIES

OKI PRINTER FEATURE

OKI

OL400ex Series 4 ppm Page Printers

Are you interested in LED/laser quality printing from a fast, four page per minute printer that takes up little more space on your desk than an A4 notebook?
If so, you need look no further than the OL400ex series. Both the OL400ex and OL410ex are designed to sit discretely and quietly on any desktop.

OL400ex

OL400ex

The ideal personal printer for use at home, in small businesses and large corporations.

- HP IIP compatible
- Serial and parallel interfaces
- 1MB memory (expandable to 5MB)
- Optional 2nd paper tray and multi-bin feeder
- Works in DOS applications where GDI printers fail
- Offers better print quality and lower running costs than Inkjets
- Small footprint
- 4 pages per minute
- 1 year on-site warranty

OKI OL400ex £279

OL410ex

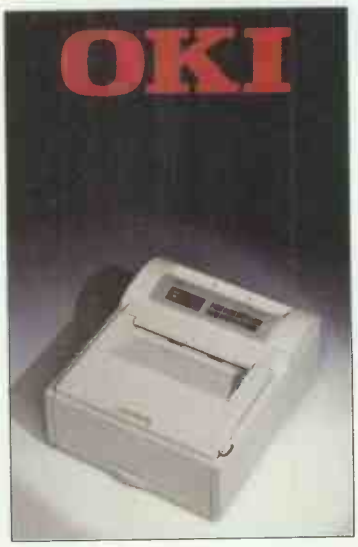
Ideal for business users in both the home and work environment providing high quality text and graphics.

- HP IIP compatible
- 1MB memory (expandable to 5MB)
- Serial and parallel interface with autoswitching
- Optional 2nd paper tray and multi bin feeder
- Fast throughput 4 ppm printer using a RISC processor
- Oki MicroRes 600 effectively gives 600 dpi
- 1 year on-site warranty

OKI OL410ex £379

Also available:

OKI OL810ex 8ppm £559



OL410ex

OKIJET 300C COLOUR INKJET PRINTER

- HP PCL3 Compatible
- 167 cps letter quality 300cps draft
- 300 dpi
- Environmentally friendly
- 140 sheet sheetfeeder
- Feeds labels, envelopes + transparencies
- Quiet operation

OKIJET 300C £275

Technical Sales Order Lines
0181-951 3355
(50 lines)

PRINTERS

HUGE STOCKS
Guaranteed same day despatch an virtually all orders placed even up to 4.00pm.

TECHNICAL SALES PEOPLE
Our sales people are the best. They are trained specialists in their chosen field - multimedia, memory of all types, mass storage, networking and communications.

FINANCIAL STABILITY
Powermark plc has been supplying upgrades for over 4 years and has an annual turnover exceeding £18 million with a healthy balance sheet.

LOW PRICES
We only supply products from leading manufacturers and at low, low prices too.

TECHNICAL SUPPORT
Dedicated after sales technical support teams on line to help with installation.

CORPORATE & PUBLIC SECTOR
We welcome orders from corporate, education and public sector organisations. Just fax or phone your order number.

FULL MANUFACTURERS' WARRANTIES
All products supplied by Powermark plc carry manufacturers' warranties and of course full Powermark plc guarantees.

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PERSONAL CALLERS
Save on delivery charges - there's plenty of parking. Telephone first to check our stock position on the items you want. We're open from 9.00am to 6.00pm Monday to Friday. Saturdays: Sales from 9.30am to 4.00pm, Technical Support and Customer Service from 10.00am to 2.00pm.

Powermark plc
Premier House, 112 Station Rd,
Edgware, Middlesex HA8 7AQ
Tel: 0181-951 3355
(50 lines)
Fax: 0181 905 6233
Email: sales@powermark.com

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Call 0181-951-3355 and ask for our PNet specialists
Join for only £9.95 when you buy any modem from Powermark

Power Mark®

MEMORY

CANON PRINTER FEATURE

Canon

CANON BJC600e

BJC70 PERSONAL BUBBLE JET PRINTER

- Choice of black or white
- Battery or mains (battery pack optional)
- 396 cps draft
- Unique LCD control panel
- Auto emulation switching
- A3 to A4 reduction mode
- 30 page sheet feeder

BJC70 £245

CANON BJ200ex

BJ200ex BUBBLE JET PRINTER

- 360 x 360 dpi with inbuilt 'smoothing' function to give an effective 720 x 360 resolution
- Over 3 ppm
- 100 page sheet feeder
- A3 to A4 reduction mode

BJ200ex £189

BJ30 PERSONAL BUBBLE JET PRINTER

- Includes ink, mains adapter and user manual
- Choice of black or white
- Battery or mains (battery pack optional)
- Weighs only 1.4kg
- 277 cps
- 360 x 360 dpi with inbuilt 'smoothing' function to give an effective 720 x 360 resolution
- Unique LCD control panel
- Auto emulation switching
- A3 to A4 reduction mode
- 30 page sheet feeder

BJ30 £168

BJ230 COMPACT A3 DESKTOP BUBBLE JET PRINTER

- 360 dpi, 248 cps
- Automatic sheet feeder
- Will print on A3 paper (portrait)

BJ230 £249

BJ300 BUBBLE JET PRINTER

- 300 cps, 360 dpi
- Automatic sheet feeder
- 8" print width

BJ300 £367

BJ330 13.6" width £425

BJC600e COLOUR BUBBLE JET PRINTER

- 360 x 360 dpi with inbuilt 'smoothing' function to give an effective 720 x 360 resolution
- 100 page sheet feeder

BJ600e £345

BJC800 A3 COLOUR BUBBLE JET PRINTER

- 600 cps, 360 dpi
- 100 page sheet feeder

BJC800 £1085

LBP1260 LASER PRINTER

- 12ppm
- 600 dpi with 'smoothing' function to give an effective 2400 x 600 resolution
- 12 months on-site warranty
- 3MB RAM upgradable to 19MB

LBP1260 £999

LBP4i LASER PRINTER

- 4ppm
- 300 dpi with inbuilt 'smoothing' function to give an effective 720 x 360 resolution

LBP4i £419

CANON BJC4000

BJC4000 COLOUR BUBBLE JET PRINTER

- 360 x 360 dpi with inbuilt 'smoothing' to give an effective 720 x 360 resolution
- Up to 4ppm in black
- 100 page sheet feeder
- Automatic cleaning

BJ4000 £239

Technical Sales Order Lines 0181-951 3355 (50 lines)

"... and here's what some of our customers have said ...

I would like to use this opportunity to say that I was very impressed with the service. As you know, we are not all computer boffins and need people like you to help in getting our systems working properly. All of you were patient and considerate. I did not have to wait hanging on the phone for long periods, which is so common nowadays with a lot of companies. Once again thanks for all the advice and patience shown. A special thanks to Sharon who had to put up with all my queries on one day.

I hope to do business with you again sometime.

G Davies"

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HMSO

Public Sector customers can purchase through HMSO by calling 01603 694153.

CITIZEN PRINTER FEATURE

CITIZEN COMPUTER PRINTERS

PN60

- The world's smallest laser quality printer
- 360 x 360 dpi with optional colour (ribbon only)
- Two year warranty
- Weighs only 500g

PN60 £219

ABC COLOUR

- 24 pin 80 column colour
- EasyStart software - guides through setting up, connections and loading paper
- Standard built-in automatic sheet feeder for 50 pages
- Two year warranty
- 192 cps draft and 64 cps letter quality

ABC COLOUR £129

NOTEBOOK PRINTER II

- Colour and mono as standard
- 360 x 360 dpi
- Fast letter quality output of 126cps
- Quiet - less than 46dB (A)
- Built-in automatic cut sheet feeder
- Two year warranty

NOTEBOOK PRINTER II £209

Printer experts available for specialist advice

POWER THE NET!

Access the Internet through Powermark's PNet
• Full Internet connection • POP3 Email • Worldwide Web Browsing
• FTP • Telnet • Usenet • Many local points of presence
• On-line or telephone support • Free Internet guide

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BROTHER PRINTER FEATURE

brother

HL-630

The award winning laser packed with features at a budget price!

- 6 pages per minute print speed
- Fast Windows and DOS printing
- Straight paper path
- Network upgradable
- Low cost per copy

HL-630 £349

BROTHER HL-630

BROTHER HL-660

HL-1260

A high class workgroup laser meeting the demands of the busy office.

- 1200 dpi class output
- 12 pages per minute print speed
- PostScript Level 2 & PCL 5e
- Duplex & second bin options
- 12 months on-site warranty included

HL-1260 £949

Low cost on-site support on the HL-630 & HL-660 for only £36!

Call if the printer you require is not listed here

BROTHER HL-1260

HL-660

The low cost 600 dpi all-rounder, Ideal for all of your Windows & DOS applications.

- 600 dpi resolution
- 6 pages per minute print speed
- Fast Windows and DOS printing
- Straight paper path
- Low cost per copy
- Upgradable to Apple, Postscript & Network applications

HL-660 £499

VIDEO TRAINING FEATURE

High quality 50-80 minute videos presented by two experts who talk you through key functions of software, step by step. Screen shots of the tasks in hand provide a clear explanation of how to use your software.

BEGINNERS GUIDES

Windows 3.1
Access 2.0
DOS 6.0
WordPerfect 6.0
WordPerfect for Windows 6.0
Lotus 1-2-3 (any DOS version)
Corel Draw 4.0

ADVANCED GUIDES

Windows 3.1
DOS 6.0
Access 2.0
WordPerfect 6.0
WordPerfect for Windows 6.0
Lotus 1-2-3 V4.0 for Windows
Excel 5.0
Harvard Graphics 3.0
Harvard Graphics for Windows
Corel Draw 4.0

NETWARE GUIDES

Installation Guide to using Netware 4.X
Set-up Guide to using Netware 4.X
Using Netware 4.X Security
Using Netware 4.X Administration Vol 1

INTRODUCTORY GUIDES

Word 6.0 for Windows
Excel 5.0
Harvard Graphics 3.0

Many more titles available!

ALL TITLES AT £19 OR BUY 3 FOR ONLY £49

OTHER TITLES

Using Visual Basic for Access
Hints & Tips to Windows 3.1
Secrets & Timesavers to Word 6.0 for Windows
Desktop Publishing to Word 6.0 for Windows
Hints & Tips to WordPerfect 6.0
Using WordPerfect 6.0 for DTP
Secrets, Hints & Tips for WordPerfect for Windows 6.0
WordPerfect for Windows 6.0 DTP
Excel 5.0 Macros
Formulas & Functions Excel 5.0
Using Visual Basic for Excel
Programming in C++
C Volume 1
C Volume 2
Interrogation to Corel Draw 4.0
Communicating with Internet

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Premier House, 112 Station Rd,
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Tel: 0181-951 3355
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Fax: 0181 905 6233
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£15 per month subscription
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Call 0181-951-3355 and ask for our PNet specialists
Join for only £9.95 when you buy any modem from Powermark

Power Mark®

MEMORY

CD ROM DRIVES, SOUND CARDS AND SPEAKERS FEATURE

Technical Sales Order Lines
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(50 lines)

NAKAMICHI CD ROM DRIVES

NAKAMICHI MBR-7 £285
- 7 stack external device
- Double speed
- 300Kb/sec data transfer rate
- 380ms access time
- Can be used in conjunction with another SCSI CD ROM drive

BSI REGISTERED FIRM — NATIONAL ACCREDITATION OF CERTIFICATION BODIES

Certificate no. FS 26535

TURN THE PAGE FOR MORE

MEMORABLE Ha Ha Ha GAGS

Punchlines to old, old, old favourites

... I'm not surprised at these prices!

... well, he's not very pleased

... I heard you the first time

If you can't remember the stories to these then contact Quentin Quizzy and he'll be happy to oblige.

SONY CD ROM DRIVES

SONY CDU55E £89
- IDE interface
- Double speed

PANASONIC CD ROM DRIVES

562B £84
- Multisession internal drive

CR 503 £169
- SCSI II double speed
- 256K buffer
- 320ms access time

MULTIMEDIA KITS

'95 PANASONIC BUNDLE £239
- SoundBlaster 16 Value
- Panasonic 563 CD ROM drive
- Encarta '95, MS Publisher, Dangerous Creatures, MS Money and MS Golf

AZTECH SOUND GALAXY STELLAR MULTIMEDIA KIT £179

AZTECH EXPLORER PERSONAL SYSTEM £249

AZTECH EXPLORER PERSONAL SYSTEM DELUXE £299

ARGOSY PCMCIA CD ROM DRIVES

- Double speed
- Plug & play compliant
- 307Kb/sec
- Motorised tray
- Complies with PCMCIA 2.1

TOSHIBA CD 952 £299

PIONEER CD ROM DRIVES

PIONEER DR-U104X POWERCUT! £189
- Quad speed, SCSI II
- 614Kb/sec, 190ms access time
- Works horizontally and vertically

PIONEER DRM 604X £859
- 6 disk magazine system
- Quad speed drive

PIONEER DRM 1804X £1499
- 18 disk CD ROM drive

MITSUMI CD ROM DRIVES

FX300 TRIPLE SPEED INTERNAL POWERCUT! £99
- 450Kb/sec data transfer rate
- 250ms access time

FX400 QUAD SPEED INTERNAL IDE POWERCUT! £129
- 600Kb/sec data transfer rate
- 230ms access time
- 128K buffer

HMSO

Public Sector customers can purchase through HMSO by calling 01603 694153.

PLEXTOR CD ROM DRIVES

PLEXTOR 6X CD ROM DRIVE £Call
- 900Kb/sec data transfer rate
- 145ms access time

CD ROM ACCESSORIES

QUALITY DISK CADDY £5
10 PACK £45

CD ROM DRIVE LASER CLEANER £24

CD ROM DISK CLEANER KIT £19
REFILLS FOR ABOVE £7

CD TOWER STORAGE UNIT £19

FREE CD when you buy a CD ROM drive
Titles may vary from time to time.

SOUND BOARD SOFTWARE

CREATIVE VOICE EDITOR £37

VOICE ASSIST £59

MICROSOFT WINDOWS SOUND SYSTEM SOFTWARE £47

MIDISOFT SOUND IMPRESSION FOR WINDOWS £45
- Play, record, edit and mix multiple sound files

MIDISOFT MENTOR £77

VIDEO CARDS

NEW! **TV ENCODER PROFESSIONAL PLUS** £229
- Supports 640 x 480, 800 x 600
- 16.7 million colours
- Plug and Play

REELMAGIC £299
- Watch VideoCD's on your PC
- Built-in 16-bit sound card
- Includes bundled software

REELMAGIC LITE £239

MOVIE MACHINE £249
- 3 modules in 1:
- Live overlay
- TV-Tuner
- Frame Grabber

PC TELE VISION £349

ORCHID VIDIOLA £259
- 30 frames per second
- 3:1 on board compression
- 800 x 600 non interlaced

BEWARE
Beware of major incompatibility between CD ROM drives and sound cards. Powermark's specialists will 'multi-match' for you.

SOUND BOARD HARDWARE

ANALOGUE 'Y' CABLE £11

MIDI ADAPTER CABLE £21

MIDI ADAPTER 5 DELUXE £45

DESK MICROPHONE £11

HEADPHONES £9

'PROFESSIONAL' HEADPHONES £21

ORCHID SCSI CHIP KIT £22

SPEAKERS

Quality speakers supplied as matched pairs

CREATIVE LABS SBS 300 STEREO SPEAKERS £79
- 10 watts
- Magnetically shielded

CREATIVE LABS SBS 37 STEREO SPEAKERS £18
- Magnetically shielded

SCREENBEAT £9
- Amplified with bass control

POWERSOUND MAX SP30 £19
- With power adaptor
- 2 watts per channel
- Shielded, with volume control

ALTEC ACS50 £69

QUICKSHOT SOUNDMATE 3 £15

QUICKSHOT SOUNDMATE 4 £12

ADD UP SS50 SPEAKERS £32
- 8 watts
- Built-in amplifier

LABTEC CS-1000 £59
- 'Under Monitor' unit

ALTEC ACS150 £99
- Powered sub woofer

YAMAHA YST-M10 £59
- 10 watts per channel
- 80Hz - 20KHz frequency response
- Full magnetic shielding
- Built-in power amplifier

CREATIVE LABS PRO-DIGITAL SPEAKERS
POWERCUT! £28
- 4.5 watts per channel
- Includes power adaptor

SOUND BOARDS

- The widest range of Sound Boards
- Multimedia experts available for specialist advice

NEW! **ADAPTEC AUTOEDGE** £169
- 16-bit record and playback
- GM compliant
- SCSI interface
- Wavetable synthesiser
- On-board DSP
- Bundled software

AZTECH SOUND GALAXY PRO16 £65

AZTECH SOUND GALAXY NOVA 16 EXTRA £79

AZTECH SOUND GALAXY WAVERIDER 32+ £105

AUDIOTRIX PRO £199
- Wavetable synthesiser
- 16-bit stereo record and playback
- On-board CD ROM instruments
- ADPCM compression software

SOUNDWAVE 32 £148

GAMEWAVE 32 POWERCUT! £102

GRAVIS ULTRASOUND £99

GRAVIS ULTRASOUND MAX £144
- 16-bit record and playback, 48KHz
- Multi CD ROM interfaces
- Dedicated digital sound processor

PORTABLE SOUND PLUS POWERCUT! £109
- Plugs into parallel port
- 16-bit stereo playback
- Includes speaker unit
- Suitable for MCA systems

WAVJAMMER £249
- 16-bit PCMCIA sound card
- Includes MS Sound System

POWER THE NET!

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- Full Internet connection • POP3 Email • Worldwide Web Browsing
- FTP • Telnet • Usenet • Many local points of presence
- On-line or telephone support • Free Internet guide

BANK at Powermark

TRUST MULTIMEDIA FEATURE

Trust®

SOUND CARDS

SOUND EXPERT DE LUXE WAVE 32 £129
- ICS WaveFront Wavetable synthesizer for natural sound
- 2MB instrument ROM

PCTV HOME VIDEO CARD £159
- Watch television or video in a scalable window

HOME CINEMA MODULE £129
- Add-on to PCTV Card

HOME TELETEXT MODULE £39
- Connects to PCTV

SPEAKERS

DYNAMIC SOUNDWAVE 40 £30
- 15 watt (peak) power

DYNAMIC SOUNDWAVE 30 £39
- 25 watt (peak) power

DYNAMIC SOUNDWAVE 20 £44
- 25 watt (peak) power

DYNAMIC SOUNDWAVE 10 £52
- 80 watt (peak) power

GOLDSTAR CD ROM FEATURE

GoldStar

Technology with the human touch

Goldstar CD-ROM drives are on the leading edge of multimedia excellence. Each one is designed and built to take you into the next generation of personal computing.

Both the dual and quad speed drives feature MPC level 2, Photo CD, multi-session support, CD-i, Video CD, CD-DA and CD-ROM/XZ.

GCD-R420B DUAL SPEED CD ROM DRIVE

- 300Kb/sec
- 250ms access time
- 64Kb buffer
- IDE interface
- Motorised tray loading
- Volume control and headphone jack

GCD-R420B £85

GCD-R540B QUAD SPEED CD ROM DRIVE

- 600Kb/sec
- 220ms access time
- 256Kb buffer
- Enhanced IDE (AT-API) interface
- Motorised tray loading
- Volume control and headphone jack

GCD-R540B £119

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WE'RE OVERSTOCKED! OUR LOSS IS YOUR GAIN!

GEM FX V.22BIS INTERNAL £49
SUPERGEM V.32BIS INTERNAL £99
SUPERGEM V.32BIS POCKET £89

GRAPHICS CARD UPGRADES

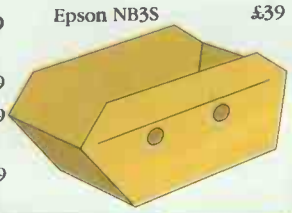
	VRAM 1MB	VRAM 2MB	VRAM 4MB	DRAM 1MB	DRAM 2MB	MCA	VLB	PCI	ISA
ORCHID									
FARENHEIT VA	–	–	–	●	–	–	£109	–	£109
CELCIUS	●	–	–	–	–	–	£139	–	–
CELCIUS 2MB	–	●	–	–	–	–	£182	–	–
KELVIN 64	–	–	–	●	–	–	£99	£99	–
KELVIN 64 2MB	–	–	–	–	●	–	£135	£135	–
NO.9									
GXe 64	–	–	–	●	–	–	–	£185	–
GXe L11	–	●	–	–	–	–	£396	–	£299
GXe L16	–	–	●	–	–	–	£749	–	£749
GXi LITE L21	●	–	–	●	–	–	–	–	£642
GXi-TC+ L39	–	–	●	●	–	–	–	–	£966

All cards are 1280 x 1024 and 16.7 million colours except Orchid Farenheit VA and No.9 GXe 64. Maximum colours are not necessarily at the highest resolution.

THE SKIP

No warranty, no returns and no technical support, however, all products are tested and fully functional.

Toshiba 3401 Internal	£129	4MB DEC 3100/2100	£59
HP 2GB C2490A Drive	£299	1MB Module Canon LBP 4 Plus	£25
Philips 7BM749 14" Mono Monitor	£30	4MB Kit Apple Mac II FX	£59
Archive Python 4324NPT	£299	85MB HDB PS/2 MCA Memory	£49
MS Access Dist Kit	£89	127MB HDB PS/2 MCA Memory	£59
Media Pro Developers Kit	£29	8MB HP9000/705	£79
SX Now 386SX IBM	£49	4MB Module Epson NB3S	£39
Toshiba 4MB Card T3300SL	£59		
8MB NEC Powermate Module 386/25s	£99		
4MB Module NEC SX	£49		
486DX33 VLB Motherboard	£99		



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TECHNICAL SUPPORT
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CORPORATE & PUBLIC SECTOR
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MEMORY

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BSI REGISTERED FIRM — NATIONAL ACCREDITATION OF CERTIFICATION BODIES

Certificate no. FS 26535

BS5750 registered for the supply of computer, printer and workstation memory, processor and other upgrades.

Powermark plc is regularly assessed by the British Standards Institution to ensure compliance with the quality standard.

"... and here's what some of our customers have said ...

"I am pleased to say that the Conner drives are excellent. I would like to thank you for your very good technical help and support...

...having found Powermark in a convenient spot for us and with easy parking (and good technical support!), we shall know where to come next time."

M J Richards, Herts"

TURN THE PAGE FOR MORE

DELIVERY CHARGES SEE PAGE 19

SOUNDBLASTER CARDS

SOUNDBLASTER V.2 DELUXE VALUE EDITION POWERCUT! £24
- Includes Indy 500 and Lemmings

SOUNDBLASTER PRO VALUE EDITION £37

SOUNDBLASTER PRO DELUXE PACK £124
Includes SoundBlaster Pro card, dynamic microphone, amplified speakers, joystick and 1 in/1 out MIDI interface

SOUNDBLASTER 16 VALUE EDITION £59
- 16-bit stereo sampling and playback
- 20 voice enhanced 4-operator stereo FM-synthesiser
- Power amplifier (4 watts per channel) and volume, bass and treble control
- Full software control of fade-in, fade-out, pan, volume, left/right steering and microphone mixing
- Bundled software

NEW! **SOUNDBLASTER 16 VALUE IDE** £64

SOUNDBLASTER 16 MULTICD VALUE EDITION £82

SOUNDBLASTER AWE32

NEW! **SOUNDBLASTER 16 PRO IDE** £89
- With voice recognition software

NEW! **SOUNDBLASTER 16 PRO IDE** £112
- Includes ASP

SOUNDBLASTER 16 VALUE EDITION

MULTIMEDIA OFFICE KIT

SOUNDBLASTER CARDS

SOUNDBLASTER 16 ASP MULTICD VALUE EDITION £110

SOUNDBLASTER 16 ASP SCSI VALUE EDITION £125
- 16-bit real time compression/ decompression in hardware
- 20 voice enhanced 4 operator stereo synthesiser
- Bundled software included
- Includes EZ-SCSI software

ALL CREATIVE LABS PRODUCTS ARE 100% COMPATIBLE AND COME WITH A 2 YEAR GUARANTEE

SOUNDBLASTER AWE 32 POWERCUT! £159
- Next generation SoundBlaster card offering unbelievable sound quality
- Full 16 channels, 128 Instruments, 6 drum kits, 32 voice polyphony
- Microphone included
- Comprehensive software bundle including Creative VoiceAssist, Creative TextAssist, WaveStudio, Creative Sound Panel, Creative Mosaic, Creative Ensemble and more

NEW! **SOUNDBLASTER AWE 32 IDE VALUE** £129
- Includes upgrade socket

SOUNDBLASTER CARDS

NEW! **SOUNDBLASTER AWE 32 IDE** £174
- 16-bit with ASP

WAVEBLASTER II £95
- Programmable Advanced WavEffects generator

MIDIBLASTER £95
- For amateur and professional music composition and presentation
- 16 channels, 128 preset sounds, 33 preset effects, 55 preset drums
- Bundled software included

SOUNDBLASTER SOFTWARE

SOUNDBLASTER DEVELOPERS KIT FOR DOS £48
- Plays and records digitised voice from or to conventional memory and disk with start/stop, synchronisation, voice I/O looping control
- Plays synthesised music in the background and control start, stop, tempo and real-time transposition
- Converts English text strings to digitised speech

MULTIMEDIA KITS

GAMEBLASTER CD 16 POWERCUT! £219
- Includes Creative 563 internal double speed CD ROM drive, SoundBlaster 16, stereo speakers, joystick and comprehensive games bundle

CREATIVE LABS CRACKER PACK 3 £165
- Creative 563 internal double speed drive
- SoundBlaster 16
- Speakers
- Groliers Encyclopaedia, Aldus Photostyler
- Limited stocks

MULTIMEDIA KITS

CD ROM INTERNAL UPGRADE KIT £92

CD ROM UPGRADE KIT £99
- Double speed CD ROM drive
- Aldus Photostyler
- Grolier Multimedia Encyclopaedia
- Cable

SOUNDBLASTER CD 16 POWERCUT! £195
- Includes SoundBlaster Pro 16, double speed multisession internal CD ROM drive, amplified speakers and top selling CD titles

NEW! **DISCOVERY QUAD SPEED KIT** £279

NEW! **GAMEBLASTER AWE 32 KIT** £299

NEW! **CD-16 DISCOVERY EXTERNAL KIT** £319

NEW! **MULTIMEDIA HOME CD QUAD SPEED KIT** £319
- Quad speed IDE drive
- 16-bit ASP sound card
- Speakers
- MS Publisher
- MS Design Pack
- MS Works 3
- MS Encarta '95
- MS Bookshelf '94
- MS Cinemania '95
- MS Ancient Lands
- MS Dangerous Creatures
- MS Musical Instruments
- MS Golf

and more

Amazing value!

SOUNDBLASTER 16 MULTIMEDIA OFFICE KIT POWERCUT! £385
- Includes multisession Internal CD ROM drive, SoundBlaster 16 ASP
- MS Office Professional 4.3 on CD ROM comprising of Word 6.0, Excel 5.0, Powerpoint 4.0, Access 2.0
- MS Encarta, MS Sound System 2.0, Creative Voice Assist, Creative Text Assist, microphone and headphones

NOW WITH SPEAKERS

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- FTP • Telnet • Usenet • Many local points of presence
- On-line or telephone support • Free Internet guide

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CREATIVE LABS FEATURE

VIDEO BOARDS

VIDEOBLASTER MP400 £185
- Displays full motion MPEG video in a s calable window up to full screen
- Overlays colour graphics and text on full-motion video
- Complies with MPEG1 levels and 1 and 2, VideoCD and White Book Video
- DOS and Windows drivers included

EXTERNAL SCSI CONNECTOR £29
- Add-on for SoundBlaster 16 SCSI card

VIDEOBLASTER RT300 £275
- Intel i750PE chip inside
- Real time video capture and compression card

VIDEOBLASTER FS200 £229
- Full screen playback
- Text and graphics overlay
- 30 frames per second
- Capture, freeze, store and manipulate images
- Includes Aldus Photostyler, Aldus Gallery Effects Vol. 1

3DO BLASTER £289
- Full motion video
- Photo realistic graphics, Images and video
- Control 3DO game play with voice, joystick or keyboard
- Requires CR-563 CD ROM drive and SoundBlaster with CD audio connector

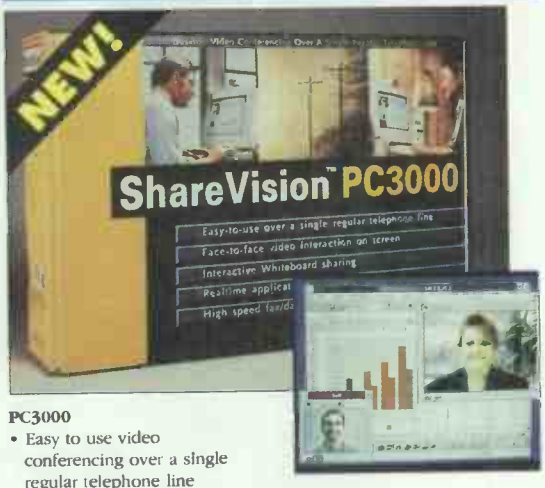
VIDEOBLASTER SE £169
- Displays full-motion, digital video in a moveable, sizeable window

TV CODER INTERNAL £99

TV CODER EXTERNAL £129

All Creative Labs products are 100% compatible and come with a 2 year guarantee

SHAREVISION



PC3000
- Easy to use video conferencing over a single regular telephone line
- Face-to-face video interaction on screen
- Interactive Whiteboard sharing
- Realtime application sharing
- High-speed fax/data modem included

PC300
- Easy to use audio conferencing over a single regular telephone line
- Simultaneous voice and data
- Interactive Whiteboard sharing

NEC CD ROM DRIVE FEATURE

NEC CDR 271 CD ROM DRIVE

- New low cost quad speed drive
- Enhanced, fast IDE interface
- 250ms average access time
- 600Kb/sec transfer rate
- Internal device
- Includes Encarta '95

NEC

NEC CD ROM DRIVES

		Speed	Bare	ISA Kit	Advanced ISA Kit
MULTISPIN 3Xi	INT	TRIPLE	£215	£269	£322
MULTISPIN 3Xp+	PORTABLE	TRIPLE	£249	£309	£359
CDR 271	INT	QUAD	£145	-	-
MULTISPIN 4Xi	INT	QUAD	£255	£299	£359
MULTISPIN 4Xe	EXT	QUAD	£365	£439	£499

12 month warranty on NEC CD ROM drives

TOSHIBA CD ROM DRIVE FEATURE

TOSHIBA PARTNERS

TOSHIBA XM5302B CD ROM DRIVE

- 600 Kb/sec
- 150ms seek time
- White Book Video CD
- CDI, CD-G
- Enhanced IDE

TOSHIBA XM5302B £159

TOSHIBA XM5302B

TOSHIBA 3601B CD ROM DRIVE

- 4.4 speed SCSI drive
- 660Kb/sec transfer rate
- 130ms seek time
- 256Kb buffer
- White Book compliant
- Tray loading

TOSHIBA 3601B INTERNAL £235

TOSHIBA 3601B EXTERNAL £329

HMSO

Public Sector customers can purchase through HMSO by calling 01603 694153.

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MEMORY

TAXAN FEATURE

MONITORS

TAXAN

- Taxan, market leader in display technology were the first manufacturer to introduce an energy efficient monitor compatible with the new EPA Energy Star programme - the adopted 'green' standard for the PC industry
- The Ergovision range not only help save the environment, they save you money too
- All monitors are Macintosh compatible - cable available at extra cost

Personal Computer World HIGHLY COMMENDED

TAXAN ERGOVISION 1080LR

TAXAN ERGOVISION 1080LR
A 20" analogue auto-scanning ultra high resolution colour monitor, compatible with IBM, Compaq, Apple and most other personal computers. It is an excellent solution for high resolution Windows applications.

3 YEAR ON-SITE WARRANTY FROM ONLY £49

	Size	Dot pitch	Resolution at up to:	Frequency	Tube		
400LR	14"	0.28mm	800 x 600	60Hz	Energy Star	POWERCUT!	£189
410LR	14"	0.28mm	1024 x 768	60Hz	Energy Star	POWERCUT!	£199
420LR	14"	0.28mm	1280 x 1024	60Hz	Standard	POWERCUT!	£239
NEW! 580+LR	15"	0.28mm	1280 x 1024	60Hz	FST	POWERCUT!	£287
880LR	17"	0.28mm	1280 x 1024	60Hz	Energy Star, FST	POWERCUT!	£530
885LR	17"	0.26mm	1600 x 1200	65Hz	Energy Star, FST	POWERCUT!	£629
895LR	17"	0.25mm	1600 x 1200	67Hz	Trinitron	POWERCUT!	£849
1080LR	20"	0.28mm	1600 x 1200	65Hz	Energy Star	POWERCUT!	£949
1095LR	20"	0.28mm	1600 x 1200	62Hz	Trinitron	POWERCUT!	£1459
2100LR	21"	0.30mm	1600 x 1200	72Hz	Diamondtron		£1535
NEW! KICV100	9.4"	0.30mm	640 x 480	72Hz	LCD Panel		£2499

TAXAN ERGOVISION 2100LR

TAXAN ERGOVISION 580+LR

TAXAN ERGOVISION 410LR

WINTURBO ACCELERATORS

- True 64-bit graphics and multimedia accelerator
- Powered by ATI 88800 Mach64 graphics engine
- 2MB (upgradable) or 4MB VRAM for higher resolution, more colours and greater performance
- ISA, VLB and PCI versions available
- Up to 16.7 million colours at all resolutions from 640 x 480 to 1280 x 1024 with full graphics acceleration
- Up to 75Hz refresh rate in 1280 x 1024 mode
- Up to 100Hz refresh rate in VGA
- Installation via menu driven software for fast and simple setup

GTS WINTURBO

ISA	2MB VRAM	£249
ISA	4MB VRAM	£399
VLB	2MB VRAM	£249
VLB	4MB VRAM	£399
PCI	2MB VRAM	£249
PCI	4MB VRAM	£399

WINBOOST ACCELERATORS

GTS WINBOOST

ISA	1MB DRAM	£115
ISA	2MB DRAM	£149
VLB	1MB DRAM	£115
VLB	2MB DRAM	£149
PCI	1MB DRAM	£115
PCI	2MB DRAM	£149

MIRO VIDEO FEATURE

miro

TOP TECHNOLOGY FOR MULTIMEDIA, ANIMATION AND DIGITAL VIDEO

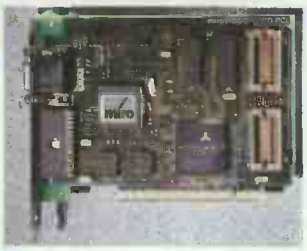
miroVIDEO 20TD live!

Desktop video and Windows Acceleration

- Provides video playback, TV Tune and first class entertainment software for channel selection, photo retouching and AVI post-editing
- Live television on your PC
- Captures full-size single frames and 320 x 240 full-motion video sequences
- Full motion CD video playback

miroVIDEO 12PD

- Video and MPEG playback on full screen in full motion
- Supports DCI
- Plug and Play
- Windows acceleration and TrueColor flicker free



miroVIDEO 20SD TWIN

- Spread your Windows workspace across two monitors
- Two 64 bit graphics processors

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miroVIDEO 20TD live!	£345
1MB UPGRADE FOR 20TD	£49
miroVIDEO 12PD	£129
miroVIDEO DC1 WITH VIDEO STUDIO	£499
miroVIDEO DC1 WITH ADOBE PREMIER	£599
miroVIDEO DC1 pro	£851
miroVIDEO 20PV avi	£375
miroVIDEO MOUSE	£299
miroVIDEO 20SD TWIN	£549

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UFO	£12
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Microcosm	£9
Rebel Assault	£19
Bloodnet	£12
World Atlas V5	£13
Beneath a Steel Sky	£15
Seventh Guest	£12
Compton's Encyclopaedia '95	£18
Aesops Fables	£7
Our Century: Sport	£8
Our Century: Science	£8
Reference Library	£8

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Walk Away Joyce SIMS
Thanks For The Memory Bob Hope

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- On-line or telephone support • Free Internet guide

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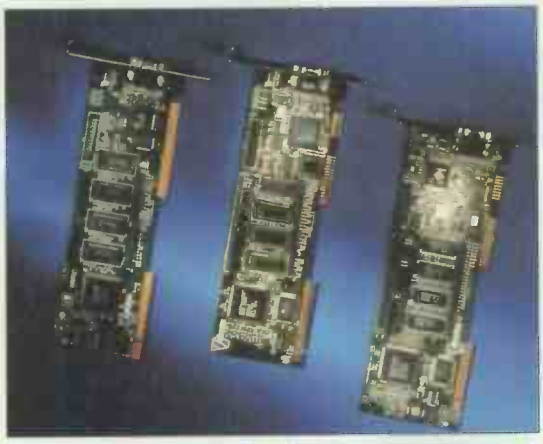
VIDEOLOGIC FEATURE

GRAFIXSTAR

A new generation of leading price/performance 64-bit Windows accelerators... expandable with low-cost multimedia options



GrafixStar 300

- Entry level graphics card
- 64-bit - S3 Trio64
- 85+ million Winmarks
- Up to 1280 x 1024 resolution
- Expandable with VMC multimedia options

Multimedia experts available for specialist advice

GrafixStar 500

- Best all-round graphics card
- 64-bit - S3 Vision868
- 95+ million Winmarks
- Up to 1280 x 1024 resolution
- Expandable with VMC multimedia options
- Built-in AVI acceleration with advanced DCI drivers
- Free Xing software MPEG playback

GrafixStar 700

- Fastest performance
- 64-bit - S3 Vision968
- 110+ million Winmarks
- Up to 1600 x 1200 resolution
- Expandable with VMC multimedia options
- Built-in AVI acceleration DCI drivers
- Free Xing software MPEG playback

GrafixStar 300 VLB/PCI 1MB	£115
GrafixStar 500 VLB/PCI 1MB	£139
GrafixStar 700 VLB/PCI 1MB	£252
GrafixStar 300/500 1MB upgrade	£Call
GrafixStar 300/500/700 VMC Controller	£Call
GrafixStar 700 2MB upgrade & VMC Controller	£Call

VideoLogic

928MOVIE

ISA 1MB

928*MOVIE*	£189
928*MOVIE* with sound	£249
VLB 1MB	
928*MOVIE*	£189
928*MOVIE* with sound	£249
928*MOVIE* with MPEG	£429

"VideoLogic 928Movie is an indispensable asset to any truly usable multimedia system."

PC Magazine, June 1994

MPEG PLAYER

The quality solution for Video CD playback

MPEG PLAYER £229

CAPTIVATOR PRO TV

Sensational quality video and TV

CAPTIVATOR PRO TV	£219
CAPTIVATOR PRO	£189

CAPTIVATOR

Low cost Video for Windows capture card

CAPTIVATOR £164

PCIMOVIE

Super fast graphics for PCI machines

PCI*MOVIE* £329

DIAMOND MULTIMEDIA FEATURE

DIAMOND MULTIMEDIA

Diamond have established themselves as the industry standard for high speed graphics accelerators, combining dependable quality with value and high performance.

SPEEDSTAR 64

- The best price/ performance card for Windows games packages
- DRAM based
- ISA bus

SPEEDSTAR 64 ISA 1MB £105

STEALTH SE

- The best price/performance card for Windows games packages
- DRAM based
- VLB bus

STEALTH SE PCI 1MB £76

STEALTH 64 DRAM

- The world's fastest DRAM graphics accelerator
- DRAM based
- PCI or VLB bus

STEALTH 64 PCI 1MB	£99
STEALTH 64 PCI 2MB	£130
STEALTH 64 VLB 1MB	£99
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STEALTH 64

- The world's fastest 64-bit graphics accelerator
- VRAM based
- PCI or VLB bus

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STEALTH 64 PCI 4MB	£329
STEALTH 64 VLB 2MB	£229
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PC GUARDIAN FEATURE

PC Guardian SECURITY PRODUCTS

A complete range of security devices to safeguard your notebooks, PC's and data.

FLOPPY DRIVE LOCK

Installed in any 3.5" drive in seconds.

MODEL 7350 FLOPPY DRIVE LOCK	£14.95
10 PACK	£139.50

NOTEBOOK PROTECTION

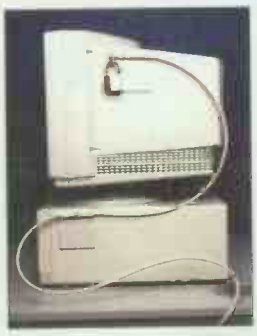
Secures all notebooks with 3.5" drive. Complete with 5' security cable, disk drive lock, two keys and carrying case. Installed and removed in seconds.

MODEL 7350+ NOTEBOOK PROTECTION	£34.95

ENCRYPTION PLUS

Software automatically encrypts/ decrypts data and prevents unauthorised access

ENCRYPTION PLUS	£45



ANTI-THEFT KIT

Secures all PC's, monitors, keyboards and external drives. Each kit contains 3 - 3"x3" Perma Plates (2,000 PSI), 6' security cable, case-hardened padlock and two keys.

MODEL UT36 - ALL PURPOSE ANTI-THEFT KIT	£25.95
10 PACK	£239.50

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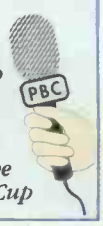

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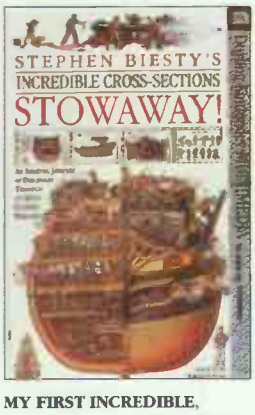

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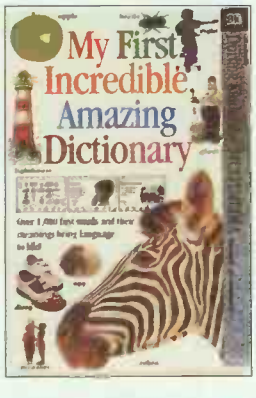

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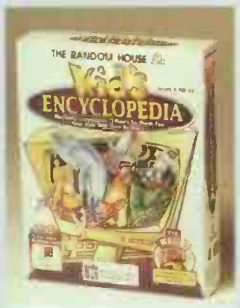

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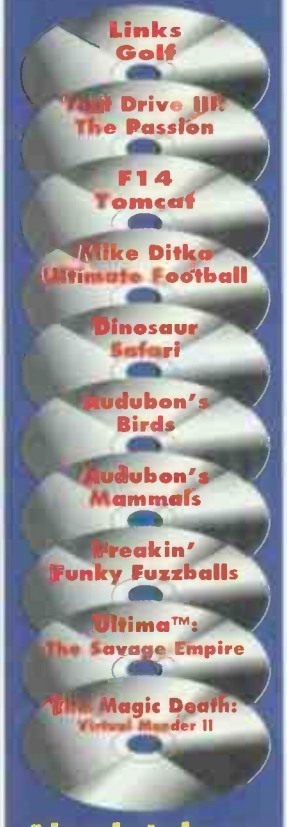

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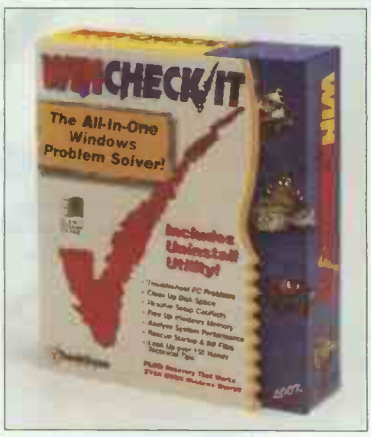

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An easy to use package which gives you back control over who uses your computer

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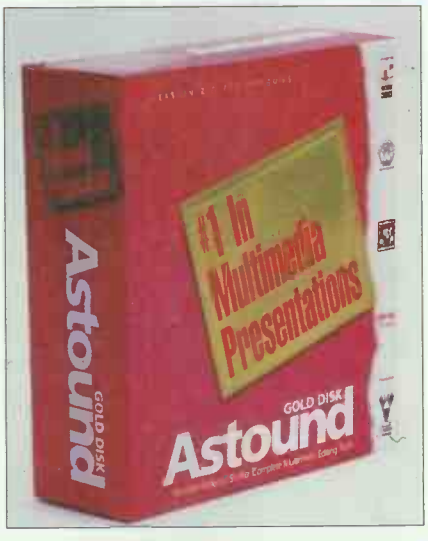

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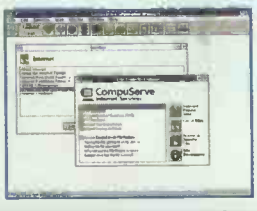

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CCP	Compliance Checking Product
CD	CD ROM
CUP	Competitive Upgrade
DOS	DOS Version
LAN	Local Area Network
MS	Microsoft Product
SL	Site License
UP	Upgrade
Vxx	Version
WIN	Windows Version

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Famous quiz show sayings...

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A do-it-yourself Windows trouble shooter that it is essential for every Windows user, novice or professional.

By using WINProbe you can rapidly and accurately diagnose and correct the source of software and hardware problems, (including sound cards and CD ROMs).

You can learn how to optimise your Windows configuration and get your system operating at peak performance.

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Getting programs into Windows is easy but getting them totally out of Windows can be a real problem for the user.

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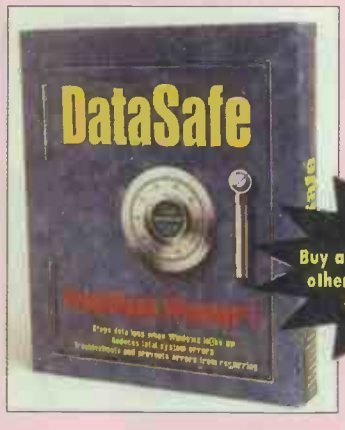

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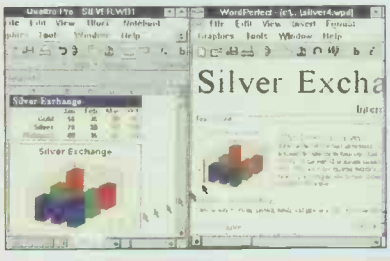

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The Grammatik grammar checker can actually rewrite sentences for you. QuickCorrect corrects spelling, capitalisation and spacing errors as you type. So you don't have to take time to fix typos. And PerfectSense gives you Intelligent, Find and Replace, which changes all forms of one word to the equivalent forms of another, e.g "buy", and "bought" with "purchase", "purchasing" and "purchased".

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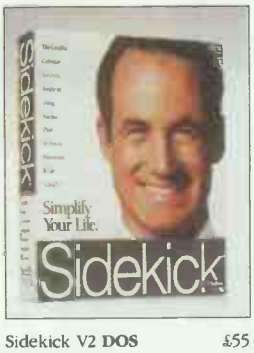

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CCP	Compliance Checking Product
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CUP	Competitive Upgrade
DOS	DOS Version
LAN	Local Area Network
MS	Microsoft Product
SL	Site License
UP	Upgrade
Vxx	Version
WIN	Windows Version

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IBM OS/2 Warp V3 UP	£49
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COREL FEATURE

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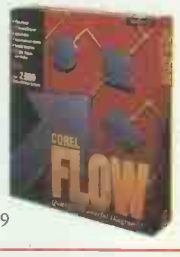

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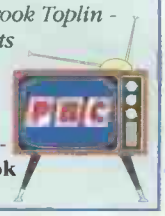

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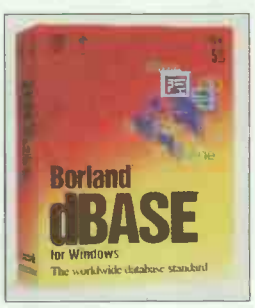

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Very occasionally, Powermark plc may send you information on related products.
Tick here if you do not wish to receive further literature. ☐

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Answers to the quiz:
1. Dr No 2. 1962
3. Geiger Counter

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PROBLEMS?...

A Find the one that does not belong.

1. TRACROS
   TEADS
   LEPAPS
   RESHICER
   BABECAGS

2 HARCI
   NOPEY
   PYPOP
   CUTREBPUT
   LIPUT

B Insert the missing letters.

1

R	V	K	O
N	P	C	

2

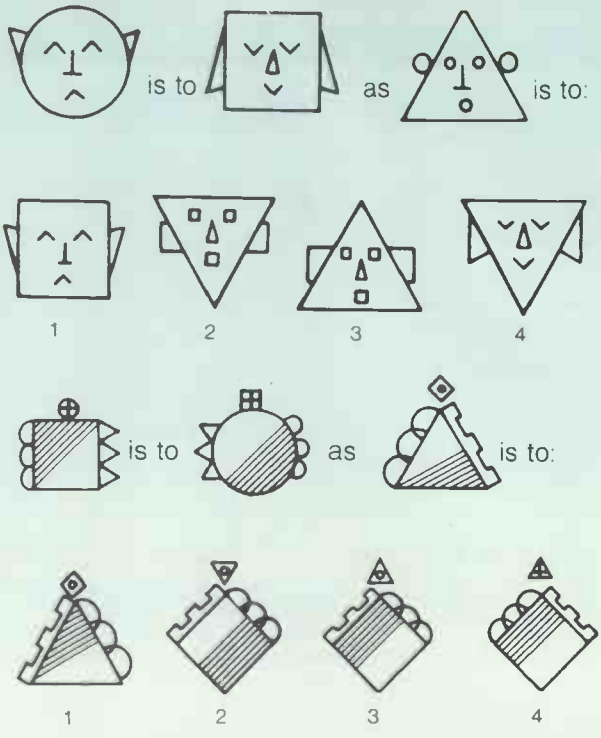
B	F	J	
V	Q	L	

C Add the letter that completes the series.

FL
TH
R
K
P
S
W
ST
(....)

SL
P
BL
CR
D
K
S
W
(....)

D Insert the missing figures.



NO PROBLEMS
JUST ANSWERS

Answers to this months problems

A) CHERRIES (All the other words have A in them: carrots, dates, apples and cabbages.)

B)

1 E (The letters at the bottom precede the letters at the top by 4, 6, 8 and 10 letters in alphabetical order.)

1 N and G (The letters on the top row move forward in alphabetical order, skipping three letters each time. The letters on the bottom linemove in the opposite direction, skipping four letters each time.)

C)

1 ING

2 EEP

D)

1 2 (What is round in the first figure becomes square, what points up, points down.)

2 3 (The bottom shape and the top shape change places, the figure inside the top shape remains, but the shaded and unshaded areas in the bottom shape change places. The decorations on the right and left of the maint igure change places.)

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WINZIP - A brilliant front end for the PKZIP file archiver
WINMAGIC - Extra Windows features you'll wonder how you lived without

VNU has checked the disk at all stages of production for known viruses, but cannot accept liability for loss or damage resulting from the use of the disk or the programs contained. You should ensure that you have adequate back up copies of important programs and data at all times and it is advisable not to try out new programs on a networked PC.

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29 ☐ £50m-£100m 30 ☐ £100m+

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6. What is the principal activity of your organisation? (Please select the category most appropriate to your business. You must tick one box)

31 ☐ Agriculture, forestry & fishing
32 ☐ Energy & water supply
33 ☐ Mining, chemicals, metals & minerals
34 ☐ Metal goods, engineering, electronics & vehicles
35 ☐ Computer manufacturer
36 ☐ Systems OEM
37 ☐ Other manufacturing industries
38 ☐ Construction
39 ☐ Retail, distribution, hotels, catering & repairs
40 ☐ Computer dealer/reseller
41 ☐ Transport & communication
42 ☐ Banking, financial, business services & insurance
43 ☐ Computer services bureau
44 ☐ Software house
45 ☐ Education, health, government & local authorities

323

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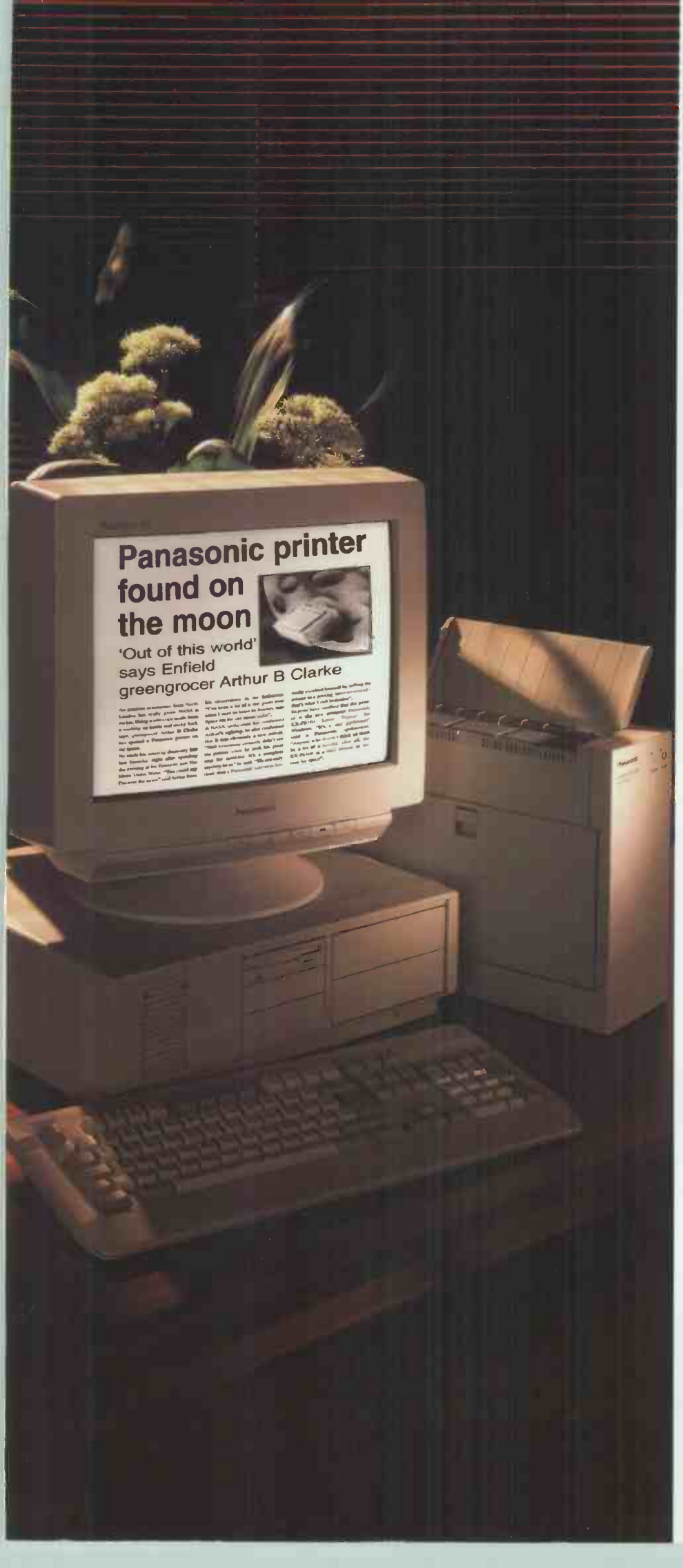
324



Print the truth

Panasonic
Printers

324a

THE NEW PANASONIC KX-P6100 L

The truth of the matter is that most Windows™ compatible laser printers have a mind of their own. So, never mind what you want, it can interfere and print what it wants, whether you like it or not.

The new Panasonic KX-P6100 Laser Printer, however, derives its output directly from Windows™ own GDI (Graphical Device Interface). So the same driver that sends the image to the screen sends that image to the printer. Thereby drastically reducing document processing time and ensuring fast throughput of the first page. Furthermore, the KX-P6100 then goes on to produce an amazing 6 pages per minute.

The printer that produces exactl what you see on the screen...

ASER PRINTER FOR WINDOWS™

You'll also have no problem matching screen fonts to printer fonts. With true WYSIWYP – What You See Is What You Print – exact prints every time whatever the Windows™ application. And with Edge Enhancement Technology™ the printer smooths out rough edges on text and line art producing superb quality output at a maximum resolution of 300x600dpi.

messages on your screen. And the animated 'Show Me' function will guide you through almost any printer problem. Simply Plug and Play.

The natural successor to the very successful, award winning KX-P4400, the KX-P6100 shares the same ultra-compact design and has one of the world's smallest laser printer footprints. Even in the most confined, cluttered

...without a word of a lie.

The Photo Enhancement feature gives photographic images a clarity that has to be seen to be believed.

The actual cost per copy is appreciably less than other printers.

Now add these extra advantages.

The Toner Save Mode reduces print costs by 50% for 'draft' copies.

There's a Waste Toner Recycling system, and operating costs are further reduced by a Power Save Mode which automatically switches to standby if data is not received for 15 minutes.

Another valuable asset is a 'no quibble' One Year On-Site Warranty.

Even with all these advanced features the KX-P6100 is simple to operate.

The bi-directional interface between PC and printer means you can see the printer's status through display

area it sits comfortably alongside your PC. With no internal fan it is virtually silent whilst running and completely silent in standby.

So if you want a printer that prints the truth, the whole truth and nothing but the truth – call free on 0500 40 40 41 anytime – and we will be pleased to send you a print sample and details of your local Panasonic dealer.

You'll be over the moon!

324c

Specifications

Panasonic KX-P6100	
PRINTER SPECIFICATIONS	
PRINT METHOD	Semiconductor Laser and Electrophotography
PRINT SPEED	6ppm (letter size, text mode, all originals 5% image area)
PRINT RESOLUTION	300x300 dpi 600 dpi class using Edge Enhancement Technology (EET™) and Photo Enhancement
EMULATIONS	Windows 3.1 GDI (Graphic Device Interface) and HP PCL 4.5 emulation through Windows
RAM	256 KB (can handle most software as GDI doesn't need extra memory)
MINIMUM SYSTEM REQUIREMENTS	
CPU	386SX/16 MHz, 4 Mb RAM
FREE HARD DISK	Minimum 12.5 Mb (4 Mb for Software and 8.5 Mb for Virtual Memory)
OS	Windows 3.1 or later, MS-DOS 3.3 or later
FONTS	
GDI MODE	14 Windows TrueType™ fonts on PC
PCL MODE	Courier 10 point, 12 pitch: Regular, Bold and Italic Courier 12 point, 10 pitch: Regular, Bold and Italic Line Printer 8.5 point, 16.66 pitch: Regular
INTERFACE	
BI-DIRECTIONAL PARALLEL	Option: KX-PSPC Serial/Parallel Converter
PAPER SPECIFICATIONS	
PAPER SIZE	A4, A5*, B5*, Letter, Legal, Executive, Envelope and Label
PAPER METHOD	Plain Paper 75 to 90 g/m^2 (20 to 24lbs.)
PAPER FEED	One multi-purpose paper tray
CAPACITY	100 sheets, 10 Envelopes, 30 OHP transparencies and 30 Labels
OUTPUT TRAY	Face down: 50 sheets
PRINT FORMAT	Portrait, Landscape and Manual Duplex Printing (Scaling, 2UP/4UP)
OPERATING DATA	
NOISE LEVEL	45 dB (A) (printing mode) 0dB (A) (standby mode)
POWER CONSUMPTION	480 W TYPICAL (printing with Fuser on) 9 W TYPICAL (power saving mode)
ENVIRONMENT	Operating Environment: 10°C to 32.5° (50°F to 90.5°F) 20% to 80% Relative Humidity Storage Environment: 0°C to 35° (32°F to 95°F) 10% to 80% Relative Humidity
DIMENSIONS	
WIDTH x DEPTH x HEIGHT	132 x 378 x 287 mm (5.2" x 14.9" x 11.3")
WEIGHT	approx. 6.5 kg (14.4 lbs.)
CONSUMABLES	
TONER CARTRIDGE**	KX-P457: 2,000 pages average
PROCESS UNIT**	KX-PEP3: 12,000 pages average

* A5/B5 size paper: GDI mode only. ** 5% image area, letter size, text mode, all originals.

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Panasonic
Printers

324 d

The Infobahn is coming – at 10Mbit/sec

Plans are in place for cable companies to set up a national data artery – the fabled Infobahn. It will carry Internet and other data services as well as TV and video.

The companies, who met eight weeks ago to agree a strategy, plan to become the largest national Internet providers. They envisage a system with far more rigorous security to facilitate online shopping, banking, and electronic cash. Details are hard to come by, but at least one cable company has started high-bandwidth Internet trials. TeleWest, part of the huge TCI group, is testing a system in one of its franchise areas in Scotland.

Doug Regan, director of investor relations, could not give specific data speeds but said they were "ten to 100 times faster" than today's modems. (Lancity, a US company, last month announced a £400 cable TV modem capable of sticking 10Mbit/second – as fast as an Ethernet link – onto a radio-frequency carrier). Regan said there was no connection between the Scotland trial and last month's purchase by TCI of a stake in browser developer NetScape. But he said Telewest would have Internet services in place by the end of the year, and perhaps sooner.

The company has franchises in Birmingham, Avon, Tyneside, and several London boroughs as well as in Scotland. London-based Videotron is also experimenting with fast links but was not answering calls on the subject.

Cambridge Cable will have a Web server installed by August, though according to chairman Hugo Davenport, fast line speeds will not follow for some time – not for want of demand. "I reckon that about 25,000 people in this area would use a fast Internet service if they could get one," he said.

Peter Dawe, chairman of pioneer Net service provider Pipex, envisages slower TCP/IP connections for low-volume tasks like text, kicking in higher-speeds for denser files such as video clips.

He said he had been trying to interest cable firms in the Internet for years but they had only just begun to see its potential. "I can understand why. When you are in business you have to concentrate on one thing until you have got it right. You have to look to your knitting. The cable companies had enough on their hands," he said.

Dawe foresaw problems with what he called the "silent cartel" of phone companies, as cheap data services threaten artificially high charges for voice calls, many of which can be carried on a high bandwidth line. **Clive Akass**

Welcome to the 21st century!

This month's *Newsprint* shows the PC world changing as fast as it has ever done – and so variously that no single development can be isolated as the most important. We are witnessing the birth of the technologies that will mediate the 21st century.

The convergence of computing and television, reflected in new PC TVs (see Amstrad story on page 330) and set-top boxes (page 334), is an obvious trend. But there are many exciting things happening:

- NEC announces a 1Gb DRAM chip (page 336) offering the prospect of working memories with capacities greater than today's hard disks.
- Cable companies start to lay out the fabled information superhighway, needed to realise the potential of online services (above).
- JVC announces a new Digital VHS recorder promising cheap data storage an order of magnitude greater than today's (page 331). This could ease the storage bottleneck holding back multimedia development...
- ...not least in electronic publication. Adobe and NetScape show one way to distribute high-quality electronic documents (page 326).
- Online Media and its partners show off technology that can feed video and other high-bandwidth services into households (page 334).
- A Virtual Reality viewer shows what can be done with high bandwidths (page 326).
- A new compression technology packs images still more tightly (right and page 327).
- A new communicator from Amstrad showed the potential of "Text Radio", which will surely develop into a complement of online services (see page 330).

Pointing up the need for changes, net surfers are warned that they are in danger of swamping the lines (page 342). **Clive Akass**

Dallas Museum of Art

Ushering in the new ... *Faustulus showing Romulus and Remus to his wife*, by Nicholas Mignard (1606-68), after 300:1 compression using a new wavelet-based algorithm. Full story page 327

And the rest of the NEWS...

Amour the merrier? 294
How Frenchmen prefer PCs to women but your Brits don't

Win95 latest 334
August ship "not guaranteed"

Race for speed 338
Rush of 120MHz Pentium PCs

Smart move 338
Ministers look at smart cards. And the robot civil servant.

Adios Ami Pro 340
Lotus flagship gets new name

At your surface 342
CompuServe lures surfers

Home sweet MacClone 343
First home Mac clones

Short Stories

Gilbert asks for that old printer

Meet Gilbert the Robot, who is being used to promote a new plan to give schools laser printers. Gestetner is asking companies to send in their old lasers, of any make, which will be reconditioned and given to schools.

In exchange, business will be entitled to a cut-price Lexmark printer. The scheme is inspired by the Business in the Community project, which aims to get companies to combine social responsibility with profit.

To receive an information pack contact the Gestetner Schools Scheme, Burryport Road, Brackmills, Northampton, NN4 7BB. Businesses should ring 01990 143157.

Mouse gets a new dimension

● Creative Labs has announced a 3D mouse and pen which connect with a PC via an infra-red receiver linked to the serial port.

The AeroMouse and AeroPen are available separately for £74.99 or together as the AeroDuet for £99.99, complete with graphics software.

Either device transmits x,y and z co-ordinates for feeding into 3-DI graphical programs.

Creative Labs 01734 344322

PS/2 upgrades

● Hypertec and IBM have joined forces to create upgrade boards for the PS/2 range. The HyperRace 70/80 with an IBM 66MHz Blue Lightning processor costs £299 and the HyperBlue 55, 50/60 and 50MHz boards all cost £199.

Hypertec 01488 686844

Fast compression

● ControlWare has released the CITAM 115K which offers V.42 bis data compression with a 64kbps ISDN connection.

ControlWare 01635 294000

NetScape Acrobatics boost Web publishing

A deal between Adobe and NetScape, respectively runner-up and joint winner of our Most Innovative Software awards (see page 422), could lead to an boom in high-quality publication on the Internet.

The two companies have agreed to integrate the capabilities of Adobe's Acrobat "portable document" software and NetScape's browser.

Acrobat offers advantages over the current generation of HTML, the hypertext markup language used to produce Web pages. HTML has limited formatting capabilities and uses style names which are interpreted differently on different computers — the *viewer* decides what it looks like.

Acrobat's portable document format means the same file can look identical on any computer with a suitable viewer, even on different platforms such as Macs and PCs. Acrobat also has hypertext facilities that could provide the kind of global references familiar from Mosaic.

NetScape is putting security measures into its browsers to facilitate electronic payment – again, a prerequisite for commercial publishing. Its founder James Clark also launched Silicon Graphics, which is offering a 3D Web viewer (above).

He said: "Adobe technology, such as the PostScript language, provided new ways to create richly formatted documents and set new industry standards. By combining NetScape and Adobe technologies we can bring that same quality and creative power to online information."

Acrobat's PDF format could become a *de facto* Web standard; happily, perhaps, it has competition – which may have helped persuade Adobe to put its viewers into the public domain. Microsoft has integrated Web facilities into Word 6 and is pushing its format as a standard. Novell/WordPerfect has Envoy; all give away viewers.

This diversity is healthy rather than confusing: you can simply name different viewers for different types of file, as is done with the various graphics formats. **Clive Akass**

Adobe 0181 606 4000; Novell 0800 177277; Microsoft 01345 002000

Silicon puts 3D on line

Silicon Graphics has developed a 3D viewer which, bandwidth permitting, will bring virtual reality to the Web and other delivery systems. The WebSpace viewer, developed with Template Graphics Software, will allow users to fly through 3D worlds, and explore libraries and museums, or fantasy sites.

It will be available on Windows, NT, PowerMac and Unix machines. By the time you read this, beta versions should be available at http://www.sgi.com. There are details there of how to subscribe to the company's online magazine, Iris, from which this picture is taken.

The viewer supports Virtual Reality Modelling Language (VRML), an open standard which is infinitely scalable: you can enter endless levels of detail.

Capture scans into PDF

Adobe has also released an Acrobat Capture utility which translates scanned documents into portable document format PDF), with formatting and optical character recognition. This allows paper documents to be archived in a searchable form. Scans are preserved so that the original can be compared with the OCR version. Xerox (01895 251133) has announced a similar technology, without the PDF.

Delrina takes the family down Memory Lane

Delrina will launch its first multimedia product for the home market later this year. Echo Lake is an interactive family album that lets you combine stories, photographs and sound clips for storing family memories. It will work with Kodak Photo-CD and will be TWAIN-compatible so that you can scan photographs straight into personal or family diaries.

The package has support for AVI files. Echo Lake will cost £49.95 and is promised for the fourth quarter, just in time for Christmas.

Delrina 0181 207 3163

Sea of possibilities for wavelet compression

Dallas Museum of Art

Detail from *Munich Still Life*, by Michael William Harnett (1882) before and after 300:1 wavelet compression

US researchers are marketing a compression system they claim can pack two feature films onto one CD and enable high-quality videophone calls down an ordinary line, or Disney-quality graphics for games. The HARC-C system was developed at the Houston Advanced Research Centre by Dr Charles Chui and Dr PK Yuen, who gained his doctorate at Britain's Bradford University and was a research fellow at Brunel. Claimed features include:

- A minimum 30:1 compression on still images with no *visible* loss – no-one claims it is lossless. Compression up to 300:1 and even 500:1 with tolerable loss of quality.
- Better performance and quality than JPEG and MPEG for both still and moving pictures.
- Easy real-time compression and decompression, with an even quality on all source images – a big snag of rival fractal compression is the amount of processing necessary. It has also been criticised for working better on some images than others.

HARC-C uses an algorithm based on wavelet analysis, which models an analogue signal as a series of wave packets; on a digitised image, it deals with rates of change at the various locations.

Wavelet compression has already been used before, notably for storing fingerprints. Some patents are owned by Aware Inc., whose chairman Howard Resnikoff was quoted as describing Dr Chui as well respected in the field – though he also warned against possible hype.

Dr Tom Linehan, product manager at HARC's marketing arm, said: "We plan to license the technology to a number of major companies and expect product to come out in early 1996."

Details at http://www.harc.edu, or call 713 363 7922

How Frenchmen prefer PCs to sex but your Englishman has more fun

The image of PC users as social rejects has gone – but computers still have a profound effect on us, according to a Gallup survey conducted for Microsoft.

Even the traditionally amorous Frenchman can have his head turned. Given an extra hour in the day, more than one in five would rather spend time with a PC than in an intimate situation with his lover. Only 11% of Englishmen felt the same way.

But British PC users are more likely to have fun with their PCs than their German counterparts. Seven in ten enjoy using their machines, compared with only 22% of Germans, who take an altogether more pragmatic approach – only 9% of Germans are intimidated by PCs, compared to 26% of Britons.

The elderly are no more likely to be frightened by computers than anyone else, with nearly nine in ten saying they would learn to use one if they were younger.

At the other end of the age spectrum, 75% of Europeans believe children should be encouraged to use a computer, and eight in ten parents and children think computing skills are important in trying to get a job.

- British people spent more on computers than on other home entertainment in 1994, says a GfK Marketing Services survey. Spending was more than £827 million on computers, £644 million on big-screen TVs, £587 million on VCRs and 518 million on audio systems. **Adele Dyer**

Short Stories

Twin Peaks can back up 36Gb

- M4 Data, winner of a 1995 Institute of Electrical Engineers quality award, invested £5 million in the development of its latest £8,000 Twin Peaks M490 tape drive, which can back up data to 2.4Gb cartridges at a rate of 3Mb a second without compression.

A fast SCSI interface with a 4Mb buffer allows burst data rates of up to 10Mb/sec. M4 says it is the smallest IBM 349OE-compatible drive available.

Also available is a 15-cartridge £1,500 autoloader, giving a total capacity of 36Gb, and a Library allowing random access.

M4 Data 01276 62401

Computer control at your fingertips

Apple tried a fingerpad on their notebooks as a substitute for a mouse; now ALPS has brought out this £62 standalone version of the fingerpad in PS/2, serial and Mac versions. It is capable of 400dpi resolution

Dealers: Datrontech 01252 303333; Rotec 01604 763611

Multimedia clips

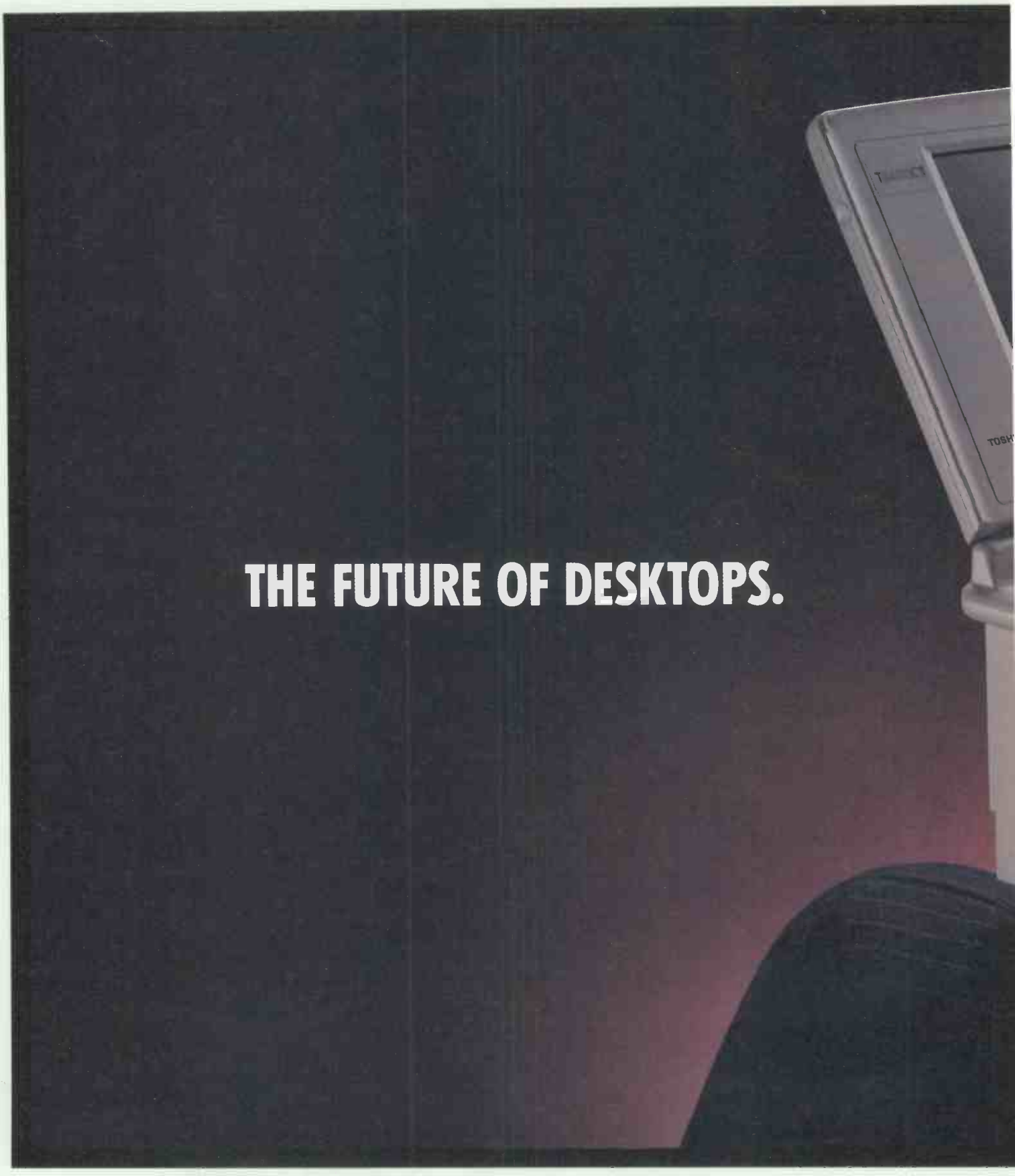
- Softkey has released two packages. PC Paintbrush Multimedia Library contains 50 full colour videos, 1,000 sound files and 1,250 royalty free colour photographs for £39.95, and Key Presenter is a presentation package for £46.95.

Softkey 0181 789 2000

NetTools upgrade

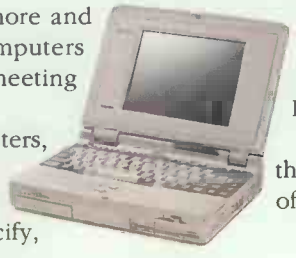
- IPE has upgraded NetTools, the Windows desktop management package. NetTools 5.2 is free to existing NetTools users who have a software support contract.

IPE 0171 436 2244



The PC of the future is a portable. Already more and more executives are turning to portable computers because they are the only ones capable of meeting individual needs - anywhere.

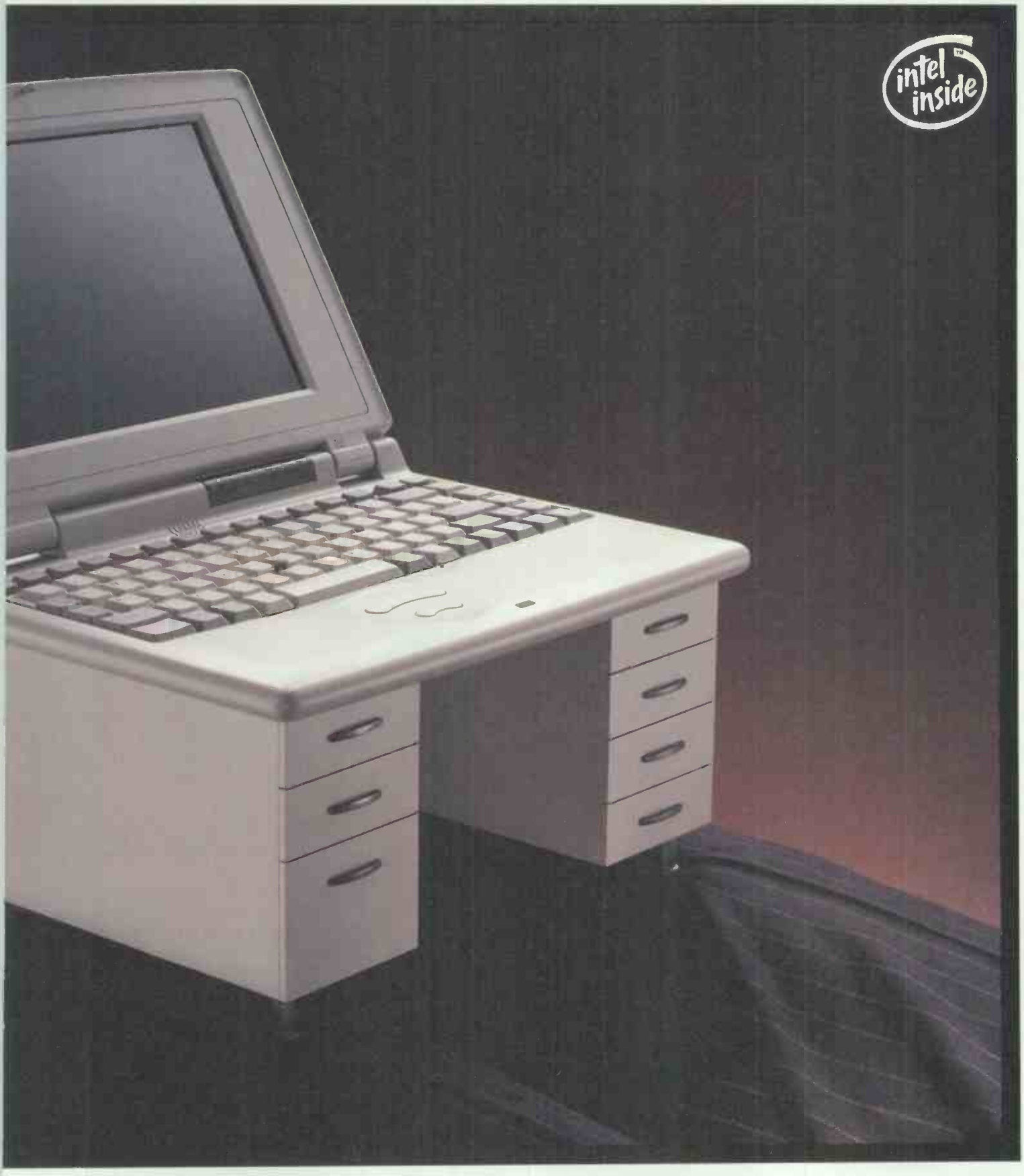
Toshiba, the world leader in portable computers, prides itself on the reliability of its machines. Something that we have achieved by building our systems largely from components we specify, design and manufacture ourselves.



That's why PC Magazine's readers voted Toshiba number one in their recent Service and Reliability awards.

And now Toshiba have built the T2450CT with the latest TFT colour screen technology and a choice of disk sizes, 320Mb or 500Mb.

The series has an integrated sound option to bring



presentations to life and has a SCSI 2 port fitted as standard, enabling easy system expansion. And being a Toshiba, PCMCIA cards allow you to tailor the system to your exact requirements.

All this is packaged in highly ergonomic casing, that includes a wrist rest and built in MousePoint.

If you would like more information about the Toshiba range of portable computers call us on 01932 828 828.

The day of the mobile office is here and it's called Toshiba. Anything else just doesn't compute.

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Short Stories

Brother offers multimedia PC

● Brother has released the Brother Max PC. For £1,249 it comes with 8Mb of RAM, 420Mb hard disk, double speed CD-ROM drive, 16-bit sound card and 1Mb VESA local bus.

As well as MSDOS 6.2, Windows 3.11, Lotus Smartsuite and various other multimedia packages, free introductory connection to CompuServe is included.

Kyodai 01279 416888

Office toolkit

For the office that has everything ... except a stylish toolkit to enable you to fiddle with recalcitrant hardware before calling in the maintenance engineer, Jensen offers this 31-piece collection in a choice of vinyl or Blue Cordura cases – £89 and £93 respectively.

Jensen Tools 01604 787060

Edu-bundle

● NASCR is now bundling two of its educational CD-ROM titles, English and Maths (Number), for £35.95.

NASCR 01742 780370

Low-cost graphics

● PhotoVision Pro, graphics manipulation shareware, is available through the Thompson Partnership for £44.

Thompson Partnership 01889 564601

Clean-up bundle

● Stac and Quarterdeck are bundling their respective disk utilities, Stacker and Cleansweep, for £59. Stac 01344 302900; Quarterdeck 01245 496699

Kanji can-do

● KanjiWORD 3.0, a Japanese word processor, is now available from KT Distribution for £239 or £60 upgrade.

KT Distribution 0171 370 6284

A Videological choice

Videologic has launched a range of "multimedia ready" graphics cards. The three 64-bit GrafixStars, for VL or PCI buses, boast advanced Windows performance, the latest S3 processors and VESA Media channel (VMC) expandability.

The GrafixStar 300, based on an S3 Trio 64, is a budget-priced £115 but offers high resolutions; a snap-on extra improves AVI playback dramatically. An optional daughterboard has a VMC connector for devices such as a TV tuner card or MPEG player.

The 500 and 700 cards offer an S3 Vision 868 and 968 respectively, enhanced AVI as standard and more video RAM. The 500 costs £149; the 700 has an SRP of £275.

Chris Cain

Videologic 01923 260511

Amstrad InfoPad gives an airing to Text Radio

Amstrad last month gave journalists a closer look at the handheld InfoPad Pic700, which looks like its most innovative product since the PCW word processor. It could presage an explosion in the use of "Text Radio" — information broadcast as computer-readable text (see panel below).

The InfoPad, due to ship in the autumn, is the size of a small paperback with a touch-screen covering the upper surface, a serial port for talking to a PC, and a card slot capable of taking a cellular phone link.

Amstrad sensibly provides a screen touchpad so you do not have to rely on handwriting recognition, which was woefully inadequate on the InfoPad's predecessor, the PenPad.

The InfoPad's most interesting feature is its use of a built-in pager. This will receive short messages in the normal way but it will also take information from various providers, including BBC Ceefax. This is transmitted by a secondary provider in 80-character bursts, each of which the pager treats as a separate message; Infopad software strings them all back together.

The company says data from up to 28 sources will be available by the time the device hits the market later this year. Information on tap will include racing results, share prices and headline news. Subscription fees have yet to be decided.

The company is also considering taking on board General Magic's praised graphical interface, as used by Sony, Motorola and Philips, and the associated Telescript language which enables software agents to perform tasks such as traffic watching and database searching.

But product manager Cambell Orr said: "These devices need service providers that support them. We can't see any coming on line in Europe for at least two years."

● Amstrad has followed ICL (see last month's *Newsprint*) in offering a range of PC TVs. The monitor and system box are combined in the new models, aimed at the consumer market. The company says they make no compromises on computing power. The box will be available in various configurations up to Pentium models. Prices have yet to be announced.

Amstrad Direct 0800 338844

Snatching text out of thin air

Wireless text broadcasts have been around for years in the form of Ceefax and Oracle, which exploit spare scraps of the TV signal to put information on screen.

They were for a long time essentially passive services: you couldn't do much with the text except look at it. But they are taking on a whole new dimension with the convergence of TV and PCs. You can get PC add-on cards which capture the text and inject it into a program for viewing or processing, allowing any PC owner to have a personal share-price or racing-results service. Software can scan text headlines for items of interest.

Amstrad's InfoPad uses the Pager system to capture text but dedicated text broadcasts are likely to emerge. Eventually, your morning newspaper may be broadcast to you at night and printed on your home laser.

A US company, PageSat, already offers a service for broadcasting Internet newsgroups at night by satellite. Details at http://www.pagesat.-net/

Clive Akass

New home video recorder can pack 50 CDs of data

Cheap data storage an order of magnitude bigger than that available today is promised by the company that pioneered the VHS video recorder. The Victor Company of Japan, better known as JVC, announced a new Data VHS format for recorders designed primarily for digital TV – but they will also be able to record data from a computer.

JVC claims they will be little more expensive than current home VCRs because they use much the same mechanism – though there is a question over whether more expensive heads will have to be used to get computer-quality recording. A single D-VHS cassette, again costing little more than a standard one, will be able to record 31.7Gb of data – equivalent to nearly 50 CD-ROMs. The use of thin tape will boost this to 44.7Gb.

With compression, the new VCRs will be able to store up to a claimed 49 hours of video at a rate of 14.1Mbps — and record up to six channels simultaneously. Incidentally, they will also be capable of reading existing VHS tape. The flexibility of D-VHS stems from the fact that it deals only with bitstreams: protocols and compression standards are left to whatever application is using it.

This Lego-like model of an industrial process was produced by the Taylor II simulation package, which won a Best of Cebit 95 award. Dutch developer F&H Simulations (+31 1336 6344) says a big selling point is its capacity for dynamic analysis of complex processes

JVC officials were uncertain how the D-VHS recorder would connect to a PC. Indeed, chairman Mr Sayoji Watanabe, launching the product over a video link from Japan, gave the impression that the company had approached the project from the TV standpoint and had not thought through the computer side. One result is that the recorders will be available first in the US, where digital TV already exists. Their importance here is that they enable time-shifting: satellite or video-on-demand transmissions can be recorded at off-peak times, making more efficient use of expensive infrastructure. But, as a JVC official pointed out, they could be used in a similar way for multimedia broadcasting: your morning newspaper, perhaps with moving pictures and sound clips, could be downloaded from a satellite as you sleep.

But the lack of cheap, high-capacity storage, even more than processing power, has been a major bottleneck in the development of multimedia, with its huge sound and image files. Other obvious applications include digital photography, home video editing, and document archives.

JVC 0181 450 3282

● *Why hasn't it been done before? See Barry Fox on page 348.*

Syquest answer to the Zip

Syquest, market leader in fast high-capacity removable storage, plans a new product to answer the challenge of Iomega's £150 Zip drive, which takes low-cost 140Mb disks.

European sales director Pierre Esnau would give no details but said there would be an announcement later this year. "Unlike other companies, we do not announce products before they are ready for the market, " he said.

This was a pointed reference to the fact that the Zip, and Sony's more expensive mini-disk data drive, were announced months before shipping.

Esnau also said scathingly that, unlike Iomega, Syquest had a lot of money to spend on research and development. He believed that users would prefer Syquest's popular SQ3270 3.5in drive, which rivals fast hard disks with its 14.5millisecond access time and takes 270Mb cartridges. More than 100,000 SQ3270 drives, at around twice the price of the Zip, have been sold since their launch last year.

Due this summer from Syquest is an 80Mb card drive designed for notebook PCMCIA slots. The tiny removable cartridges are designed to take the kind of rough handling that floppy disks get.

Syquest 00 49 751 560500 (Germany)

Short Stories

Kodak's DC40 is a snap at £895

● **This is Kodak's new £895 Digital Compact (DC) 40 camera which offers 756 x 504 pixel resolution with 24 colours. It can store up to 48 images, with the aid of compression, before you need to download.**

Kodak 01442 61122

Business that lives with a time bomb

● More than one in three businesses are living with a time bomb, with no idea what they would do in the event of a catastrophic data loss, says storage specialist Palindrome.

Managing director David Harris-Evans says even those who regularly back up data may be at risk, because of the possibility of human error.

He was plugging the lastest release of Prepare! 2.0, a disaster-recovery package which prepares both beginners and experienced users for the worst. The suggested price is £795.

Palindrome 01344 360888

Windmill turns out notebooks

● Windmill has added two models to its notebook range, the Pro 580 and the Pro-Media 830, which is equipped with an audio system and comes with docking station options. Both offer 486 processor options in four speeds up to 100MHz. Prices start at £986 with 250Mb hard disk and 4Mb RAM.

Windmill 0161 799 1878

Cheaper scanners

● Epson has cut the prices of its GT-6500 and GT-9000 flatbed scanners by around 40 percent to £489 and £859 respectively.

Epson 01442 61144

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Short Stories

Shiva offers remote acess

● Shiva is offering to license its remote-access software ShivaPPP, including a dialler, to developers. It can address a variety of Point-to-Point Protocol servers as well as Shiva's own LanRover and NetModem products.

The company claims it is the only 16-bit package of its kind to use Microsoft's remote-access programming interface. The company co-developed a 32-bit version with Microsoft which is incorporated into Windows 95.

Shiva 01753 833007

PCs showcase new Cyrix clone

● At least five vendors are expected to be showing PCs using Cyrix clones at the Spring Comdex.

And Compaq's decision to use NexGen's P5 on some models is expected to push 75MHz Pentium prices to less than $200, with a knock-on effect on the prices of 486 and slow Pentium machines.

Meanwhile, AMD announced that its clone will be up to four months late.

CD recorder

● Tekdata is selling Ricoh's new RS1060C half-height, double-speed, read-write CD drive for £1400.

Tekdata 01782 577677

Coders' show

● The EXE Software Developers' Show will take place at Westminter's Royal Horticultural Halls on 8-9 June. Details on 0171 283 5678.

100MHz laptop

● Europak is selling a 100MHz Pentium-powered notebook for $4,200 with 8Mb of RAM and a removable 250Mb hard drive. Call 010 613 224 6122 for options.

Card links

● Xircom PCMCIA Ethernet adaptors may be bought for as little as £109 following an 18 percent price cut.

Xircom +32 450 08.11

Win95 August launch not guaranteed, says Gates

Windows 95 is "likely" to ship this August – but the date is not guaranteed, Microsoft chairman Bill Gates said last month.

The final decision won't be made until feedback has been assessed from the latest, and presumably final, beta-test version. The decision will be based on quality rather than deadlines, Gates told a Corporate Association of Microcomputer Professionals meeting.

He said Win95 still had a substantial bug list. "There's no single thing; there are lots of little things."

Take-up of the new operating system is expected to be gradual, with many companies adopting a wait-and-see policy. PC vendors even expect to continue selling machines preloaded with Windows 3.x.

Forestry Commission surveyors have taken to using rugged Husky portables for fieldwork

Husky 01926 864600

A new 32-bit version of Microsoft Office will ship at much the same time as Win95. This should have rivals scrambling, *writes Tim Bajarin.*

Each main application in the suite will be designated version 7.0... Word 7.0, Excel 7.0, Access 7.0 etc. There will still be maintenance releases of versions 6.0, but all new suite applications will be based on Windows 95 and above.

Office 95 will also include Schedule +, which has developed into a full personal information manager. A new help engine will answer natural-language questions like: "How do I make two columns?"

It activates a kind of screen movie that walks you through the procedure. Since all of the applications share much of the same code, this makes for excellent integration between applications.

Homes act as 'nursery' for high-bandwidth services

A group of companies in the Cambridge area has launched the second phase of an experiment in the delivery of high-bandwidth online services to the home. Nearly all the technology in the Cambridge Interactive Media Trial was developed locally.

It began last year delivering video-on-demand, home shopping and banking, games, and news services to just ten subscribers on lines supplied by Cambridge Cable. The aim was to provide a "nursery" for such services, to show how and how much they would be used, and to test the technology.

Other companies involved include Online Media (an offshoot of Olivetti-owned Acorn) and its sister company ATM , which makes low-cost products using Asynchronous Transfer Mode (ATM), and SJ Research, which specialises in ATM switching.

Anglia TV, Tesco, and the National Westminster Bank are also involved with experimental services. The latest phase, involving up to 250 homes, was launched last month by Peter Bonfield, chairman of ICL, which is yet another member of the consortium.

An single ICL-built PIM server can serve up to 7,000 homes offering any of 1,000 feature films (compressed into 240Gb) to up to 2000 at one time via a chain of 155Mbit/sec, 25Mbit/sec and 2Mbit/sec switches.

This is the kind of box which is vying with the PC for the home interactive market. It's an STB2, the latest version of Online Media's intelligent set-top box, using a 32-ARM 7500 RISC processor and a VCR-style infra-red control. It supports MPEG1 and MPEG2 video standards and its internal CD-ROM drive supports audio, White Book (for CD video) and Photo CD. The front-view simplicity is deceptive. At the rear of the box are parallel, serial, UHF in and out, joystick, AIM, CVBS, SVHS SCART in and out, and stereo audio ports.

Online Media 01223 518518, SJ Research 01223 41715; ATM 01223 566 919; Cambridge Cable 01223 567223; ICL 0161 223 1301

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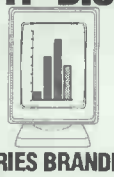

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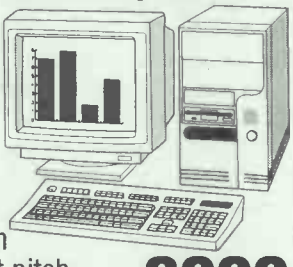

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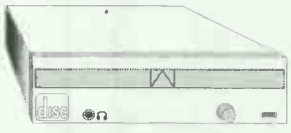

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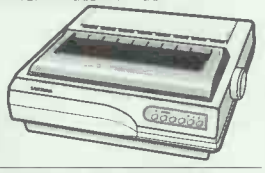

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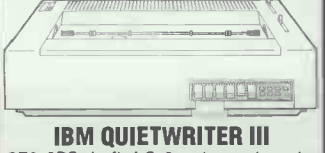

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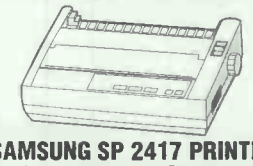

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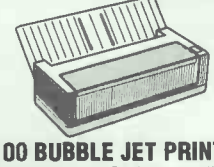

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Short Stories

Chameleon eases Net sign-ups

● Automatic Internet sign-ups are included in the latest version of the Chameleon TCP/IP suite.

Developer NetManage has co-operated with major providers to bypass the notoriously tricky configuration stage.

International sales director Joseph L'Italien said users could be up and running on the Net within five minutes, including registering with a provider, once the UK version is ready some time next month.

Other new features of Chameleon Desktop 4.5 include an offline newsreader, a browser called Websurfer, a personal Web server which allows a local-network user to set up a home page, and sound and graphics players.

Chameleon and the server version, ChameleonNFS, cost £295 and £395 respectively. Netmanage 01483 302333; Leaf (dealer) 01256 707777

Surfing show

● Superhighway, an exhibition at London's Science Museum, looks at how you can surf on the Internet. It closes on 3 September.

Science Museum 0171 938 8080

Purple prose

● File Manager 3 from Purple Software organises the files on your Psion 3 via a Windows PC. It costs £29.95 and £39.95 for the floppy and SSD version.

Purple Software 0171 262 7535

Protected sex

● The Pleasures of Sex can be sampled on a CD which publisher Telstar Electronic Studio says is both "informative"' and "explicit" – and protected by password.

Telstar Electronic Studio 01932 222232

Infra-red typing

● Read Cosine is offering an infra-red keyboard enabling you to use a computer from up to five metres away.

Read Cosine 01929 550727

Thanks for the memory ...1Gbit on a single chip!

Fast memory chips holding an incredible 1Gbit have been developed by NEC – though they will not hit the market until 1998.

But the chips are expected to be as common as today's mainstream memory modules shortly after the turn of the century, consigning today's all-too-common RAM starvation problems to the history books.

So in just five years' time you could be able to hold the complete works of Shakespeare ten times over, or 15 minutes of video, in your PC's memory.

The new D-RAM chips pack 1.1 billion transistors and the same number of capacitors into an area less than that of a thumbnail (936 square millimetres). They use 0.25-micron CMOS technology, and draw 136 milliwatts, about the same as a 4Mb DRAM chip today, transferring data at a rate of 400Mb per second.

The new chips will be available first in only sample quantities and are likely to be snapped up for specialist applications.

Mass production will follow in about the year 2000. NEC's Sue Walder could not even give a hint on prices, though they are likely to start very high and drop sharply over about four years.

Audio PCMCIA cards are among applications being considered by NEC: one of the new chips can hold four hours of CD-quality sound.

Hitachi is also believed to be working on a 1Gbit chip but has made no announcement.

NEC Electronics 01908 691133

Scots mend out-of-kilter displays

Business is flat as far as an East Kilbride start-up company is concerned. Flat panel, that is.

Display Products Technology (013552 39199) claims to be the only firm in Europe specialising in the repair of high-definition liquid-crystal displays. DPT says it can turn repairs around in ten days; previously users had to wait 90 days for flat-panel screens to go to Japan and back.

The Lanarkshire Development Agency (01698 745454) hopes the company's success will draw other enterprises to the area.

Count your pennies faster under DOS

You wouldn't think there was much call for a new DOS-based program, what with the world and his uncle going for graphical interfaces. But it seems the nation's accountants are more concerned with bottom lines than pretty screens: they can't count their pennies fast enough with the PC wasting its time processing all those fancy graphics.

Anyway, that is what Datafile Software seems to believe (or it may have an eye on all those pre-Windows PCs still doing sterling work out there). It has brought out a new £99 accounts package called Compact Accounting, aimed at small businesses. The company claims it does a better job than rivals and is easily customisable by resellers.

"Most of the people we speak to want a DOS product," says Peter Young, of Burnbank Dataconnect, which markets and supports the product. He said Datafile would follow up with a Windows product. Compact Accounting is fully compatible with Datafile's higher-end Professional, Diamond, and Premier accounting packages.

Datafile 0151 709 0929

Vendors rush out 120MHz Pentiums

PC vendors have been falling over themselves to announce models based on the 120MHz Pentium, the fastest PC processor yet to hit the market and the first to use 0.35 micron technology.

Dell is offering an XPSc system for £2,199, with 16Mb RAM, a 540Mb hard drive, and a 64-bit PCI graphics card with 2Mb of memory, CD-ROM and a 156 in monitor.

Apricot says its system, which has a similar specification but a 750Mb drive, will have a similar street price. Viglen's new Genie PCI PS/120 uses the new Triton chipset, with prices starting at £1,899 with 8Mb of RAM and a 420Mb hard disk.

ALR, Acer and Gateway are also offering high-end systems, and Compaq is putting the chip on its ProLiant mission-critical server, with prices starting at £7,015.

Gateway 0800 60 2000; Compaq 0181 332 3000; Viglen 081 758 7000; Acer 01628 533422; Dell 01344 720000; ALR 01635 521922; Apricot 021 717 7171

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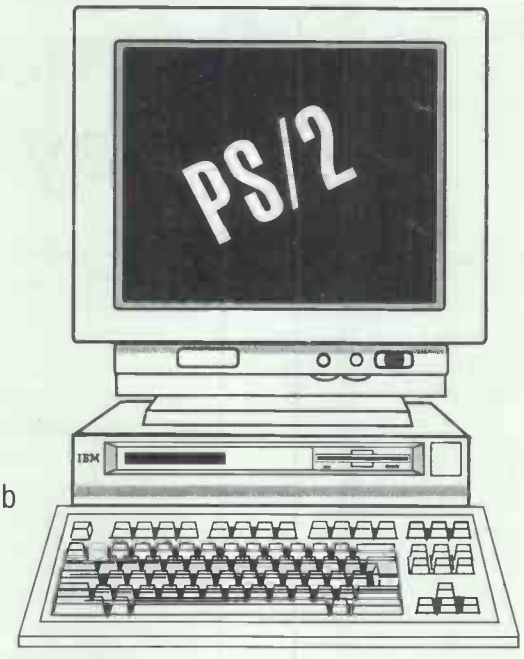
- ❑ DOS 6, Windows 3.1 & IBM Quiet Keyboard



Exclusive Morgan bulk purchase - the IBM PS/2 E includes 4Mb RAM, maximum 16Mb on board, fast 120Mb hard drive and 3.5" floppy drive. The PS/2 E measues just 305mm x 305mm x 63mm and conforms to the Energy Star standard.

Features PCMCIA expandability (4 x type II or 2 x type III slots), 1Mb SVGA/XGA video, 16K cache RAM, parallel, serial and mouse ports.

Includes IBM Quiet Keyboard with TrackPoint integral pointing device, DOS 6, Windows 3.1 and 14" mono VGA or 14" SVGA colour monitor (non IBM monitor).

120Mb DRIVE, 4Mb RAM, 14" MONO VGA, DOS 6/WIN 3.1

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120Mb DRIVE, 4Mb RAM, 14" SVGA COLOUR, DOS 6/WIN 3.1

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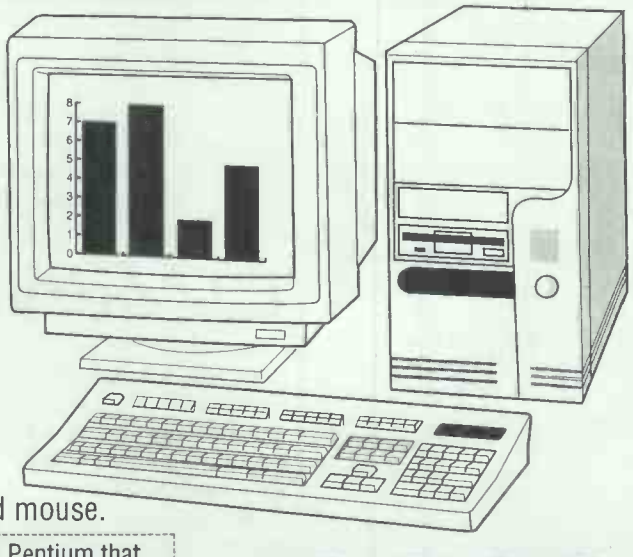
NexGen 586 P90MHz 520Mb/4Mb

SUPER FAST 90MHz SYSTEM - 64 BIT IBM MANUFACTURED CPU

- ❑ Nx 586 90MHz 64 bit processor
- ❑ 520Mb drive, 4Mb RAM (max 192Mb)
- ❑ VESA local bus motherboard
- ❑ 1Mb video - 14" SVGA colour monitor
- ❑ DOS 6, Windows 3.1 and mouse



Latest NexGen processor offers equivalent to Pentium performance at a fraction of the price; full Windows and Novell compatibility.

Features 256K cache and 32K chip Cache, 1Mb Cirrus 5428 video and 14" low radiation SVGA colour monitor - .28 dot pitch and 1024 x 768 resolution.

Includes 102 key UK keyboard, MS-DOS 6, Windows 3.1 and mouse.

"The NexGen Nx586 chip is the first affordable alternative to Intel Corp's Pentium that does not involve sacrificing performance" **PC Magazine (US)**

"Very fast machine ... NexGen's Nx586 processor matches a Pentium for speed and beats it for value" **PC Pro**

"The Nx586 outperforms Pentium on a clock-for-clock basis" **Microprocessor Report**

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Short Stories

R&D offer

● The European Commission is offering to fund telematics in four categories: libraries, language engineering, information engineering and telematics engineering. Send proposals by 15th June to the Telematics Applications Programme Proposals Office, Jean Monnet Building (JMO B4/041), L-2920 Luxembourg (fax 010352 430134079).

Sound modem

● Electronic Frontier is selling Boca Research's combined 14.4kb/sec faxmodem and sound card for £179. The SoundExpression offers SoundBlaster-compatible 16-bit sound, direct connection with most CD-ROM drives and on-screen "speaker-phone" software, as well as the standard voice and fax facilities.

Electronic Frontier 01734 810600

Archi backup

● Smaller Acorn Archimedes networks can now be backed up using the new DataSafe tape system from 1^3 and Perex. It uses QIC 80 format tapes to back up the A3020, A4000, A5000 and RISC PC range, as well as the A4 portable range.

Perex 01734 311033

Medical info

● ExtraMED, published monthly by Informania Ltd, is a CD-ROM containing 220 third-world medical journals. A subscription costs £2,000.

Informania 01730 265398

Instant cards

● Greeting Cards, Etc, from Pagedown (£65 plus £5 p+p), allows you to create customised cards, invitations and postcards and includes a personal information manager.

Pagedown 01551 372603

Flash move

● Fujifilm is to launch a new series of flash memory PC cards in the summer. They will be available in 2Mb, 4Mb, 8Mb and 16Mb capacities.

Fiji Photo Film 0171 586 5900

Smart tickets pave the way for electronic cash

A pilot smart-card fare payment scheme in Sydney takes a step towards the general use of electronic cash.

Cards the size of an ordinary credit card but packing a tiny computer can be used to pay for any form of transport, from taxis to buses, in part of the Australian capital. They can also be used to buy newspapers.

The cards, called Transcards, communicate via a tiny aerial. A passenger pays for a journey simply by carrying a Transcard on and off a public vehicle.

This and similar schemes are being watched closely by the British government's IT agency, the CCTA, which has launched a booklet on how cards might be used by government services.

The booklet, called Smart Cards: Opportunities for Public-Sector Applications, is short on specific proposals but CCTA officials at last month's ISG 95 goverment IT exhibition in Brighton were ruling nothing out. Smart cards may be used to carry medical records, or as benefit claimant cards; more controversially, they may eventually be used for a national identity card scheme.

The CCTA warns that the cards raise some legal issues, such as whether there should be restraints on what information a card can hold and what can be done with it.

The booklet says: "Anonymity and privacy must be preserved. Cardholders will need assurance that they cannot be tracked as they go about their business." The cards could also get the government off a political hook if rail privatisation goes ahead, because they could solve the thorny problem of how a fragmented system can provide through-ticketing.

Card Technologies (Aus) 61 2 332 4955; CCTA 01603 704704

At your service ...the new-look civil servant

This, or something like it, could be the Citizen's Advice Bureau of the future. You may recognise it as an IBM touch terminal used, among other things, to sell sheet music. The CCTA IT agency has adapted it into a prototype information booth that can be placed in libraries and benefits offices to help people gain services to which they are entitled.

The touch screen can be used to access locally held or remote information — it includes a Web browser service. The *PCW* Neo-Luddite Tendency naturally asked what was going to become of all those nice CAB people with their books of rules and cups of tea. Were they to lose their jobs to a computer? Officials showing the prototype at Brighton assured us: "It will free staff to give better help to those who most need it."

* The CCTA is interested in feedback from the public on the use of IT. You can find its Web page at http://www.open.gov.com.

CD server for nets

Two ranges of storage products which connect directly to a network, rather than to a file server or workstation, were announced last month.

Microtest is offering the $3,195 DiscPort Pro, a CD-ROM miniserver with two SCSI ports enabling the connection of up to 14 devices. It can be installed without shutting down a network. It comes with DiscView Pro software, which allows anyone on the network to see and access CD libraries as NetWare volumes or directories. Also on offer is the $1,595 DiscPort Tower, which comes with the same software but incorporates four quad-speed CD drives.

Plasmon has launched a new NetReady range of optical-disc jukeboxes, with management software running under Unix; NetWare users can connect a jukebox as if it were just another server.

KeyLAN (dealer) 01753 790977; Plasmon 01763 262963

Swap a Tosh to save a life

Medical equipment developer GT is offering to part-exchange Toshiba T3200SXC laptops to help save lives. It needs the T3200SXC to monitor heart defibrillators — more up-to-date machines are compatible, but only this model has been through stringent medical tests, taking 2.5 years to complete.

Under the deal, T3200SXC owners get £1,200 towards a new Toshiba, offered at a zero margin price.

GT Ltd 01483 419511

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Resellers please call:
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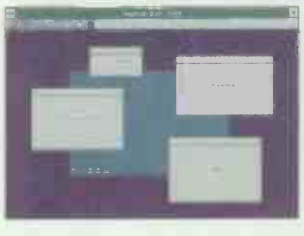

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Datapath reserves the right to make alterations to specifications at any time and acknowledges all trademarks. * Tests carried out on a Pentium P90, Windows 3.11, DOS 6.2, 1280 x 1024 256 colours

Short Stories

3Com buys Sonix in ISDN drive

● California-based networking specialist 3Com has bought British ISDN developer Sonix for £70 million in a move which is seen as a bid by 3Com to buy its way into the burgeoning ISDN market.

Sonix MD Bob Jones will remain head of the company, which will be known as 3Com Sonix. His company had revenues of $25million last year.

3Com has also bought US remote-access specialist Primary Access for $170 million, and announced a strategic alliance with Dell computers.

Cheap cards go the distance

● NetWorth has introduced what it claims is the cheapest way to upgrade from 10Base-T to 100Base-T Ethernet over existing cables, with a combination of net cards, hubs and hub daughterboards.

The cards are switchable, allowing the net manager to use them as 10Base-T cards until the whole net makes the change; the daughterboards overcome the distance limitations between hubs of 100Base-T to allow the same distance (100 metres) as for 10Base-T. **Nick Lawrence**

NetWorth 01734 880235.

Take a discreet letter, 007...

● Hewlett Packard has developed Invisible Ink Enhancement Technology, a high-tech version of lemon juice for those desperate to keep their documents secret. Invisible toner is used when the documents are originally printed; they are then fed into an IEt enabled printer (HP LaserJet and DeskJet models will be compatible) to reveal the text. IEt is expected in the next few months.

Hewlett Packard 01344 360000

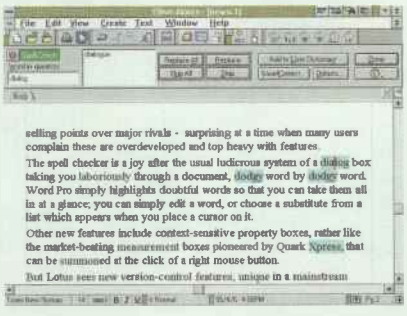
Useful language

● Interact 3.0 is a new £195 "click-and-play" programming language for multimedia business apps.

ErgoSystems (dealer) 0117 973 8816

Adios Ami Pro as Lotus shifts gear up to 32 bits

Lotus has given its flagship Ami Pro word processor a new name, Word Pro, and revamped it into a product with some genuine improvements on major rivals.


selling points over major rivals - surprising at a time when many users complain these are overdeveloped and top heavy with features.

The spell checker is a joy after the usual ludicrous system of a dialog box taking you laboriously through a document, dodge word by dodge word. Word Pro simply highlights doubtful words so that you can take them all in at a glance; you can simply edit a word, or choose a substitute from a list which appears when you place a cursor on it.

Other new features include context-sensitive property boxes, rather like the market-beating measurement boxes pioneered by Quark Xpress, that can be summoned at the click of a right mouse button.

But Lotus sees new version-control features, unique in a mainstream

The spellchecker looks a joy after the usual ludicrous system consisting of a dialogue box which takes you word by word through a document. Word Pro simply highlights doubtful words so that you can take them all in at a glance (see review on page 370).

Other new features include context-sensitive property boxes, rather like the measurement boxes pioneered by Quark XPress, except that they can be summoned at the click of a right mouse button.

Word Pro is the first of a complete new set of 32-bit applications being rolled out for the advent of Windows 95, though a 16-bit version will also be available.

The applications will have a big emphasis on helping teams of people to work together — mercifully, the company avoids the word groupware. Word Pro has sophisticated version control, normally found only in specialist editors. It keeps track of all changes to a document, and even of who has made them, helping teams to co-operate in writing reports and other documents. Senior marketing director Bill Jones said Lotus changed the name because "we wanted something that sounded like a word processor".

Word Pro is currently being beta tested and should be available with the (presumed) launch of Windows 95 this autumn.

Lotus 01784 455445

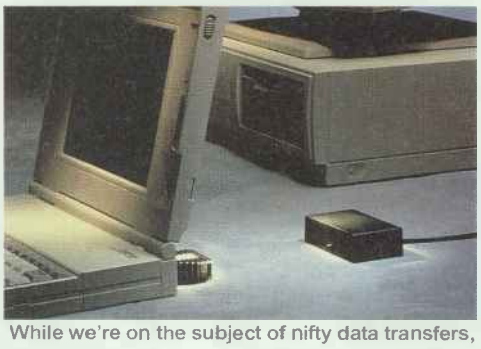
Flash watch downloads data

Timex's new Data Link watch is "one of the most significant IT events of recent times" according to its launch blurb, which is over the top even by the hyperbolic standards of the public-relations industry. But the device *is* based on a nice idea: it downloads appointments, phone numbers, even time corrections and up to five alarm calls, from a PC screen.

You set up the information via a simple Windows-based organiser, developed with Microsoft. This transmits it as on-screen bar codes. Click the watch into communication mode, hold it a few inches from the VDU (a laptop screen won't work), and it reads the codes in seconds.

The software will import comma-separated files so you should not need to re-key existing data. The watch is well built, water resistant to 100 metres, and clearly aimed at a richer class of customer. Whether many will be superior enough to pay £120 is another matter.

Details on 0171 630 8180.



While we're on the subject of nifty data transfers, you too may have wondered why there are so many notebooks with infra-ports and so few IR-equipped PCs for them to talk to. Particularly as just about every TV you get these days has one, and we're told an I-R "eye" costs little to make. Extended Systems (01705 875075), a US company which has recently set up at Southsea, Hants, aims to change all that with this infra-red add-on called Jet-Eye. But at £99, it isn't cheap.

Multimedia guide to Win95

A multimedia tutorial to take users through the Windows 95 learning curve has been launched by British startup, CRT Multimedia, headed by former Microsoft UK executive Mark Edwards. The CD-based tutorial makes good use of graphics and is integrated with the Windows 95 help system so that it can be used as you work. It addresses three skill levels. *Easy Tutor: Learn Windows 95* will appeal to big companies, for whom training will be a major part of the cost of upgrading. It costs £39.95.

CRT Multimedia 0181 743 9900

I'm **Mark Long**. If a presentation isn't **stunning**, I **bin it**! I scan photos, images and text **direct** to **my PC** – super-crisp in **dazzling** colour. Advanced OCR means no retyping. I get **excellent** documents and DTP that'll **blow your mind**! That's why I **like** what my **Epson scanner** does for me.

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Short Stories

Sita Group starts 'alternative Net'

● The Sita group, which claims to have the largest global data network, has announced the creation of a closed Internet Protocol network extending to 500 cities in 100 countries.

Marketing vice-president Norman Terret said it would combine all the global communications benefits of the Internet "with the security, reliability and support associated with a private network".

Prices will depend on access speeds ranging from 9.6kb/sec to 2Mb/sec. The network is targeted first at air transport industries.

Sita 0181 730 1322

US follows UK on cyberporn ban

● *Anyone who knowingly transmits "obscene, lewd, lascivious, filthy or indecent" material over the Internet would be liable to a fine of up to $100,000 under a Bill considered by US senators amid considerable controversy.*

Section 43 of Britain's Telecommunications Act 1984, as amended in 1990, states that "a person who sends by means of a public telecommunication system, a message or other matter that is grossly offensive or of an indecent, obscene or menacing character... shall be guilty of an offence and be liable to a fine".

Scots on Net

● The Glasgow area has its own point of presence (POP), allowing global Internet access for the price of a local call. So has Aberdeen, courtesy of a company called Wintermute, which has installed 28.8kbps modems to ensure fast access

Colloquium 0141 849 9849;
Wintermute 01224 622477

Online mortgages

● Mortgage advice is available on the Internet. Legal and General is offering a guide, mainly for first time buyers. Point to : http://www.cityscape.co.uk/users/dd75

CompuServe pitches its prices to tempt surfers

CompuServe, the world's largest online service, is giving its members a taste of the World Wide Web. It has launched an Internet Club, which offers more time online for a lower price, and is giving away pre-configured Internet software to its members.

Standard membership costing $9.95 (about £6) a month now includes three hours of free Internet access; each extra hour costs $2.95 (£1.80). Heavier users can join the Internet Club which costs an additional $15 per month (£9) and gives 20 hours of Net access, with additional hours costing $1.95 (£1.20).

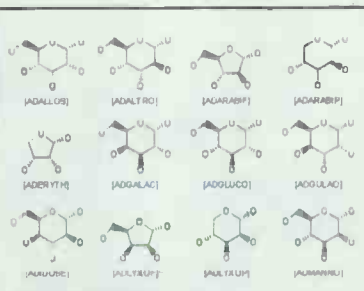
For Internet access only, this still makes CompuServe more expensive than £10-a-month service providers like Demon if you use more than six hours a month (nine hours a month in the case of "premium" providers like CityScape). For the moment, though, CompuServe's Net access is much cheaper than Delphi's, and also more powerful — it allows full graphical access to the Internet via TCP/IP, in contrast to Delphi's text-only access.

CompuServe is giving members NetLauncher, a Web browser which includes Usenet, FTP and Gopher features. Experienced users will also be able to configure and use any public Internet software, though email will still have to go through CompuServe's own system (and possibly incur charges as a result — there is a limit to the amount of free email CompuServe provides). NetLauncher can be downloaded from CompuServe without paying connect charges and may be included in future mailings to members.

CompuServe scores heavily over other UK Internet providers in that it has a broad global network of points of presence — only the IBM Global Network has a similar reach. CompuServe also contains a multitude of other services that access to the Internet alone doesn't provide.

David Brake

CompuServe 0800 289 378



Sweet of them ...

These sugar molecules are some of the sweet delights offered by MDL Information, which is giving away a special version of its ISIS/Draw chemical drawing package free for academic or home use. Point your browser at http://www.mdli.com — but be warned if you have a slow modem: the compressed file is more than 1Mb in size.

Video traffic 'jams Net'

An explosion in the use of video and voice mail is threatening to jam up the Internet. One big Internet provider, Eunet, is so worried that it has warned against using one particular package called CU-SeeMe.

This uses the UDP protocol which has poorer flow control than TCP/IP, as used on the Internet. Even worse, it interferes with Net traffic, Eunet said in a letter to subscribers.

The letter went on: "Applications that need high-volume, real-time traftic have no option but to use UDP. But the result can be, and usually is, devastating for TCP-based traffic.

"When a TCP connection detects a packet loss it immediately backs off. In the presence of high-volume UDP traffic, the ensuing packet loss will cause TCP connections to slow to a crawl."

It adds: "There is simply a massive mismatch between the network control parameters used by CU-SeeMe and TCP. You could say that CU-SeeMe has exceptionally pointed elbows."

Eunet followed the letter with a form for subscribers to seek permission to use "damaging video/voice traffic" on the Internet.

Another source of trouble is voice mail, according to Dr Sophie Wilson, chief scientist at Online Media.

She said: "A lot of people, particularly in America, have discovered that it is cheaper to send voice messages over the Net than to make an international telephone call."

Dr Wilson said the effect on Net traffic was clearly noticeable on email and news postings. "Just look at the time and date they were sent and the time they were received. They can take days to arrive."

First cheap MacClones hit the home market

The first Mac clones for the mainstream market are due to ship this month from Power Computing.

Company president Steve Kahng says they will cost at least 10 percent less than Apple's and give better value. For example, the base Power 80 system uses an 80MHz PowerPC 601 processor and a quad speed drive with 8Mb of RAM, three Nubus slots, high performance built-in video, 2Mb VRAM, built-in Ethernet support, and about $900 worth of bundled software.

The price through direct sales will be $1,999 minus the monitor. A similar product from Apple has a street price of $2,699. A similarly configured 100MHz Power 100 will sell for $2,899. A similar Apple costs $3,600 on the street.

The clones lack the sleek Mac look, and resemble a boxy PC clone. They will ship in volume by July. Tower and PCI versions are on the way.

Radius and DayStar have shown clones aimed at the high-end solutions market.

Pioneer, the other major Mac licensee to date, still has its Power Mac on the drawing board and plans to sell it to "media professionals" in the Japanese market.

Tim Bajarin

Power Computing 001 512 258 1350

Pointing to the future

New online services seem to be starting up by the week, the latest being a multimedia library claiming to be the first to offer stock shots for corporate videos. The Signpost library also offers stills and audio for people putting together multimedia presentations. Co-founder Marina Kris, pictured here with co-founders Joe Probert and Richard Johnson, said: "All the people involved in this are in the business ... animators, designers, video artists. We know what people want." Signpost is accessible by a 14.4kb/sec modem (or faster), though an ISDN connection is better.

Signpost 0171 278 4263

Seven-year hitch on claim

Apple has lost a seven-year battle against Microsoft and Hewlett Packard. The US Supreme Court rejected its claim that Windows and HP's NewWave copied the Mac's look and feel.

Apple lodged the claim in 1968 when it was leading the world in the use of graphical interfaces — ironically invented by Xerox, which failed to file patents.

Top 10 Windows and DOS

	Product	Manufacturer	Last month
1	Cleansweep	Quarterdeck	4
2	MS Office 4.2 U/G	Microsoft	3
3	First Aid for Windows	R M G	2
4	Perfect Office	Novell	10
5	CorelDraw 3 CD	Corel	12
6	QEMM 386	QuarterDeck	5
7	MS Works	Microsoft	7
8	MS Office Pro	Microsoft	1
9	MS Encarta	Microsoft	6
10	WordStar v2	Softkey	11

Top 10 DOS

1	QEMM v7.5	QuarterDeck	1
2	DOS 6.22	Microsoft	2
3	MS Flight Simulator	Microsoft	5
4	Dr Soloman's	S & S	8
5	Pegasus Solo Accounts	Pegasus	7
6	Stacker & QEMM	Stac	3
7	OS/2 Warp v3	IBM	4
8	Turbo C++ V3	Borland	6
9	Gardener's World	Europress	-
10	Dark Forces	Virgin	-

Top 20 Windows

	Product	Manufacturer	Last month
1	Cleansweep	Quarterdeck	4
2	MS Office 4.2 U/G	Microsoft	3
3	First Aid for Windows	R M G	2
4	Perfect Office	Novell	10
5	CorelDraw 3 CD	Corel	12
6	MS Works	Microsoft	7
7	MS Office Pro	Microsoft	1
8	MS Encarta	Microsoft	6
9	WordStar v2	Softkey	11
10	Corel Gallery	Corel	8
11	Delphi	Borland	-
12	Visio v3	Shapeware	18
13	Labels Unlimited	Softkey	19
14	Family Tree Maker	R M G	14
15	Dr Soloman's Antivirus	S&S	-
16	Quickbooks	Intuit	-
17	Perfect Office U/G	Novell	-
18	WincheckIt	S&S	-
19	SideKick v2	Borland	-
20	BodyWorks	Guildsoft	-

Figures, supplied by Software Warehouse, relate to bestsellers for March 1995.

Short Stories

System 7.5 update available

● Apple has released its first interim upgrade of System 7.5, the Mac operating system. Improvements include better handling of memory starvation, faster file sharing, and drag-and-drop support in Launcher.

Apple Guide, the new online help system, is available as PowerPC native and its performance has been enhanced for 680x0 systems. Also revamped is PowerTalk, with a new version of the direct-dial utility.

QuickDraw GX has a number of performance improvements, with rough edges taken off the printing facilities. Update 1.0 is available from eWorld or by ftp from America Online; or call 0181 730 2828 for a CD or floppy version, for which you will be charged a handling fee.

Paired RAM

● Simms International is offering single-module memory upgrades for between 4Mb and 64Mb for Power Macs. Previously upgrades were available only as matched pairs.

The new 164-pin, 64-bit modules, made by Kingston Technology, have identical chips on either side of a board; each side is addressed separately.

SIMMS 0181 870 4020

Sony Jukebox

● Sony's 0SL-2000 5.25in jukebox, which can hold up to 20 1.3Gb magneto-optical disks, is now available for Macs.

Sony 01932 816000

NEWSPRINT Feedback

Email your news and views to clive_akass@pcw.cmail.compuserve.com, or to cakassa on CIX. Please note that we cannot monitor all Usenet groups, so if you see anything we might be interested in, do drop us a line.

We are also interested in good screenshots or other pictures. Any email will be considered for publication unless you request otherwise.

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Why the fighting has to stop

The re-opening of the anti-trust case against Microsoft has had its competitors baying for the company to be split in two — but this will solve nothing. Is there an alternative solution which would benefit the industry as a whole?

ANALYSIS

During the past few weeks, Microsoft-bashing has been in vogue. The floodgates of criticism about Microsoft's practices and role in the business world have been thrust asunder by the recent US court ruling, by Judge Sporkin, that the anti-trust case against the company is being re-opened.

Until then, most industry leaders had been reluctant to make their feelings known about the company. Although many aired their views in private, few were sufficiently incautious to make off-the-record comments to the media. But now that Judge Sporkin is leading the pack with his own views on the way Microsoft conducts its business, many industry leaders are taking careful aim at Bill Gates and his corporation.

Apple's chief executive, Michael Spindler, even went so far as to sue Microsoft regarding an intellectual property issue and openly criticised Gates and company over their refusal to remove Apple's code from their Video for Windows product.

Lotus chief executive, Jim Manzi: most vocal critic of Microsoft

Lotus's chief executive, Jim Manzi, has been the most vocal in his criticism of Microsoft. In a recent article in the *Wall Street Journal*, Manzi railed at Microsoft, asserting that it had forced itself into a position of prominence, and protesting vigorously about how Microsoft's plans to bundle its online network with its new operating system "will further stifle competition in those markets adjacent to other operating systems."

Other Microsoft-bashers lament the company's plans to conquer the software market with controversial products. Those causing the most concern are Microsoft Network and Ali Baba.

This is a CD that contains most of Microsoft's best selling software, encrypted. But Microsoft recently dropped the Ali Baba project, having received complaints from its retailers. Currently, there is no change in Microsoft's plans to bundle its Network product with Windows 95.

What with the re-opening of the anti-trust case and the accompanying rhetoric surrounding Microsoft's alleged anti-competitive business methods, detractors are now calling for the US Justice Department to split the company in two.

Microsoft's competitors would like to see the applications side of Microsoft's business denied access to its operating system division, and believe that thereby a level footing with other applications vendors could be maintained. They would particularly want to ensure that Microsoft did not provide their applications division with exclusive facilities that other software vendors could not also access.

Just how badly this constant squabbling may affect not only Microsoft, but the industry in general, should be a matter of great concern to all. It is worrying that this corporation, which plays a critical role in the market, may end up in some form of protracted anti-trust ruling. This could force the company to become so introverted in its operating methods that it would lose its edge and innovation would be curtailed.

My opinion is that splitting the company will solve nothing. Although I am convinced that Microsoft is a company that produces great software, I would, at the same time, like to remain assured that I can obtain innovative and worthwhile products from other software vendors.

The best way forward would be for the US Justice Department to get Microsoft's agreement to create a firewall between its operating systems group and its applications division. I would like Microsoft to ensure that all software vendors are allowed the same access to the operating system enjoyed by its own applications division. In addition, I would like to see that firewall placed between the consumer and business applications groups, as well as between Microsoft Network and the rest of the business.

The overriding purpose of these firewalls would be to assure an equal footing for Microsoft's competitors by limiting the company's ability to leverage technology to its own advantage. Additionally, Microsoft should not be allowed to bundle its applications (including the Microsoft Network) with its operating system. The corporation should have to compete, as others do, for the right to bundle its products with computers. The decision of what to bundle should be put in the hands of the vendor rather than Microsoft.

Perhaps this solution is too simplistic, and knowing Microsoft, it will try to resist as long as it can. Nevertheless, I believe that the outcome of this current round of Microsoft-bashing, together with Judge Sporkin's call for the re-opening of the anti-trust case, will eventually result in such a solution.

While Microsoft should be able to maintain its ability to create and innovate, it must be made to understand that the playing field needs to be level. Only in this way will others have the opportunity to be creative and innovative. Without this equitable environment, the PC industry may never achieve its full potential.

Tim Bajarin

Irreconcilable differences

"Cost-effective IT is all about the existence of self-sustaining volume markets," according to Mike Lambert, X/Open's chief technology officer. X/Open now owns the Unix brand name and is attempting to sustain the volume market for Unix.

Its strategy is based on COSE, the Common Operating Software Environment announced by Hewlett Packard, IBM, Novell and Sun Microsystems in March 1993 in response to the threat of Microsoft's Windows NT. At the time it was hailed as signalling the end of the Unix wars: it healed the split between the standard Unix System V Release 4.0 and the splinter group behind the Open Software Foundation's attempt to create a rival version of Unix free of AT&T code.

The compromise was that all the main players would support a common set of system calls derived from popular Unix applications. There were 1,170 such APIs (Application Program Interfaces) and the specification became known as Spec 1170. This was given to X/Open, which has just relaunched it as the Single Unix Specification (SUS).

The firms uniting behind COSE also wanted a common "look and feel". This is based on the OSF's successful GUI, Motif, derived from technology supplied by HP and Microsoft. COSE's work in this area has also been taken on board as the X/Open Common Desktop Environment (CDE). Several firms, including IBM and Novell, are implementing it by adopting TED, the TriTeal Enterprise Desktop from TriTeal Corp of California. TED is based on Motif 1.2 and should run current Motif and X Windows applications.

So far, 11 firms have licensed the Unix brand name from X/Open, and are now entitled to describe their operating system as Unix 93. These include AT&T GIS, DEC, Hewlett Packard, IBM, Novell, Santa Cruz Operation, Siemens Nixdorf, and Sun Microsystems. This doesn't mean they comply with Spec 1170. Their code has still to pass the Spec 1170 test suite, after which they will be able to brand their systems as Unix 95.

But calling them all Unix 95 does not mean they will be compatible with one another. It doesn't even mean they'll be capable of running typical Unix programs. It only means they all support the APIs covered in Spec 1170, and will run programs that use these system calls and no others. The value of this remains to be seen.

Spec 1170 usefully assures Unix software houses of the base level of support the operating system will provide. But every version of Unix is and will remain different, because almost all suppliers add unique enhancements, and Spec 1170 doesn't oblige them to take these out. In this sense, SUS promises no more compatibility than we have enjoyed for decades through the use of languages like Basic, Fortran and Cobol. If you write to a standard language using only the commands specified, and if the implementations are consistent, your program should run on any hardware — but those are two very big "ifs".

SUS also opens the door to OSs such as IBM's OS/400 and Open MVS, ICL's Open VME and DEC's VMS Open. All these are well on the way to implementing Spec 1170 and qualifying for the Unix 95 label. The effort makes sense for these firms, since it will make it much easier for software houses to port Unix applications to their proprietary operating systems — and these days, most mini and mainframe software houses are developing for Unix. It will also enable them to bid for giant government and related contracts where "open systems" are mandatory. But it will not provide universal compatibility.

The problem for the Unix industry is that you can either have compatibility or "added value". The industry has clearly chosen the latter, and therefore will never compete with Windows NT's compatibility. NT applications are expected to run out of the box on any Intel PC, and different binaries, probably supplied on the same CD-ROM, run on Mips, DEC Alpha and, soon, PowerPC-based machines. That's what is required to create a volume shrink-wrapped applications market, and without it, the CDE is merely papering over the cracks.

Of course, Unix is still picking up applications originally written for proprietary systems like IBM's AS/400 and DEC's VAX. It is still growing in the mini and mainframe worlds where hundreds of users can be supported using dumb or graphical X terminals, especially where firms are "downsizing" from mainframes. It still has an important role to play in technical computing, from Sun and Silicon Graphics workstations to Cray supercomputers. But the idea of "workstations for all" — hyped by Sun and HP but best embodied by NeXT's now-defunct systems — should be written off for good.

Some major suppliers have spent years talking up Unix as a desktop operating system, and have failed to deliver. Still, what's really funny is not that DEC, Hewlett Packard, IBM, Novell and Sun have proved inadequate to the task but that a young student has done a far better job than all of them put together. If Unix does still have a future on desktop PCs, it is entirely due to Linus Torvald's popular Unix clone, Linux.

Jack Schofield

Despite the development of COSE as an attempt to make Unix a serious rival for Microsoft's Windows NT, its future may still be blighted by compatibility problems.

ANALYSIS

Who's been down to the video store?

JVC has announced a new data VHS format that will be able to record more than 31Gb of data — equivalent to 50 CD-ROMs. How does the promised product compare with previous attempts to store data on ordinary video cassettes?

ANALYSIS

Why hasn't anyone used ordinary video cassettes to store digital data before (see *Newsprint* page 331)? The answer is that they have, many times.

The launch of reliable home video systems in the late seventies coincided with the music industry's move into digital sound recording. A video recorder, designed to capture an analogue bandwidth of several MHz, can also capture a data stream running at several Mbits/sec.

Nippon Columbia (Denon) in Japan and Decca in the UK were the first companies to modify open reel professional video recorders for digital audio taping. Sony then developed a PCM encoder which converted analogue stereo sound into uncompressed PCM for recording on a domestic Betamax video cassette recorder instead of pictures. Panasonic toyed with a similar coder for use with a VHS recorder.

The home video recorder could be the computer data answer

System prices ranged around £1,000 and in the early eighties adventurous recording engineers routinely used a Betamax recorder and PCM encoder to tape sessions, with a conventional analogue recorder running at the same time for safety. Some of Sony's first Video 8 recorders, launched in the eighties, could record compressed digital audio, either in addition to or instead of video pictures.

When CD was launched in 1983, the audio industry needed a common format for carrying digital master recordings from any recording studio to any master disc-cutting plant. They chose the U-Matic industrial video cassette because it was more robust than VHS or Beta.

All the VCR PCM systems work in the same way. They take in the audio data stream, running at around 1.5 Mbit/sec, and package it to fit inside the waveform of a television signal. So data capacity for a three-hour tape is around 2Gb. There have been brief flurries of interest in using the VHS cassette as a computer data store, but there were good reasons why it never caught on.

VHS tape is sold unchecked. There is no formatting. If a coating blemish causes a blip on the television picture, no-one cares. But the same blemish can cause a massive data drop-out.

As the tape ages, and is wound and rewound, it stretches slightly. This distorts the angle of the helical tracks, making them snake. The video heads may no longer trace the tracks accurately. If the recording is of video pictures, they are spoiled by noise. If the recording is data, there are uncorrectable errors. Recording engineers quickly abandoned the use of domestic VCRs as a PCM recording tool when DAT, the dedicated digital audio recorder, and DASH, a stationary head recorder, became available in the eighties.

Decca never adopted U-Matic as a digital music master. The company's engineers refused to accept the error rates. Decca is only now moving from open reel video tape to magneto-optical disc, skipping the VCR generation altogether.

D-VHS relies on higher quality tape (Super VHS grade) which should be far less prone to drop-out blemishes. The bitstream recording mode packages the data for integrity, rather than just treating it as modified video. But the tape may still stretch with use. This is where JVC's Dynamic Drum technology may come to the rescue.

Although not an essential ingredient for D-VHS, JVC acknowledges that Dynamic Drum is likely to be used for the new format. The video head drum is mounted on a platform which tilts under the influence of a servo-controlled motor. This keeps the heads in alignment with the tracks, even when they are very narrow (10 microns instead of the normal 49 microns track width for VHS) and when they snake as a result of tape stretch. For video, Dynamic Drum gives clear, noise-free pictures, even at trick play fast or slow motion speeds. For digital data recording it should mean far less errors.

Philips used a similar system for its ill-fated V2000 home video system. Each head was mounted on a piezo-electric bimorph strip, controlled by servo signals. JVC claims it is easier to move the drum and all the heads together, than servo-control each head separately.

Barry Fox

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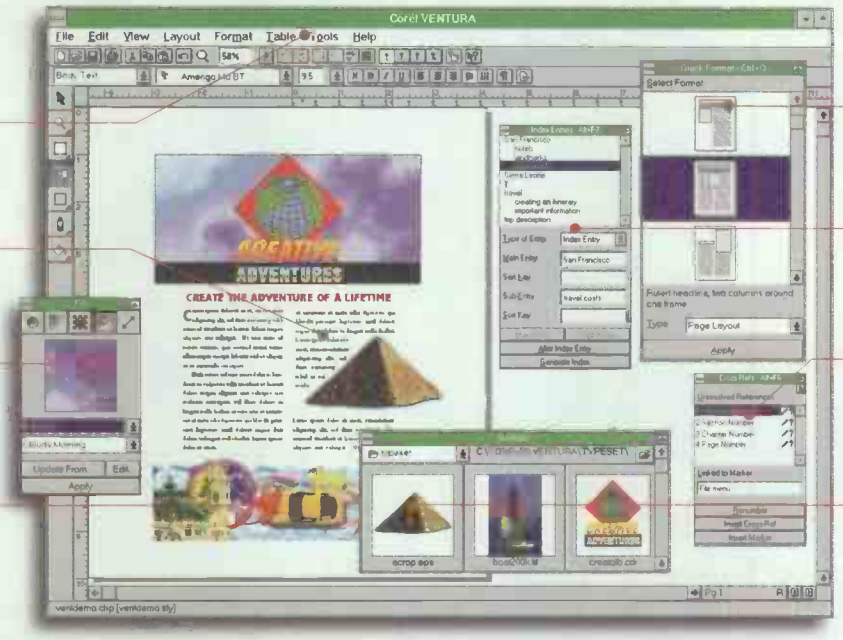

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Sounding off

Michael Hewitt

Last week, I got back to find my aged Olympic beeping plaintively at me, like an ailing chick abandoned in the nest. Its display had suddenly become disturbingly psychedelic, while from somewhere deep within the CPU came an ominous sputtering. Sod it, I thought. In days gone by, I might have tried mouth-to-mouth resuscitation, but not now. I'd had too much grief from this crappy machine to care any more. So I disconnected it for the last time and went down to the newsagent to hunt for a long-overdue replacement.

The usual prayer meeting-sized crowds were hogging the shelves — partly, no doubt, because Razzle, Fiesta *et al* are kept directly above the computer magazines. Taking a deep breath, I squeezed myself in among the anoraks and started browsing.

Linda (42-32-36) was complaining that, although she was a highly qualified businesswoman, mysteriously, men never took her seriously when she came into work dressed in a figure-hugging lycra dress with a plunge neckline that revealed her kestrel tattoo. Simone (34-29-34) was bitching that, compared to older, more mature lovers, young men were always in too much of hurry. Simon Rockman (21-18-16) was also waxing lyrical on the subject of speed. Intel are promising an 83MHz Pentium upgrade any day now, he said. Multiple Megahertz are now the thing, apparently.

Interesting. I'm sure he needs them, but I had to ask myself if I did. To this end, I started making my way through the pages to see what the retailers had to say on the subject.

As far as I could tell, manufacturers these days seem to be saying that anyone who doesn't buy a PC with at least a 486DX processor is a total pussy. In fact, you're a bit suspect even with a high-speed 486. Real men buy Pentiums (Pentia?), or upgrade to them.

There's a certain logic to this, I suppose. In two years' time, Word 8.0 (or whatever) for Windows probably won't run on anything slower than a Pentium with 32Mb RAM. Its minimum installation will no doubt require 120Mb hard disk space. So, I ought to have been seriously looking at buying a Pentium-based machine.

Except in two years' time, Word 9.0 will be on the horizon, and that most probably won't run on anything slower than a high-speed P6. And by that time a P7 will be on the horizon, too. And so on *ad infinitum*.

So in the end, I had a clear choice: spend around £1,200 on a machine with a 486 processor, knowing that it will be obsolete by this Christmas; or spend £2,000 plus on a similarly specced Pentium-based machine, knowing that it will be entering a nursing home by the following Christmas. A toughie. A couple of hours later, I was on the phone to a box shifter. The next day, the boxes duly arrived.

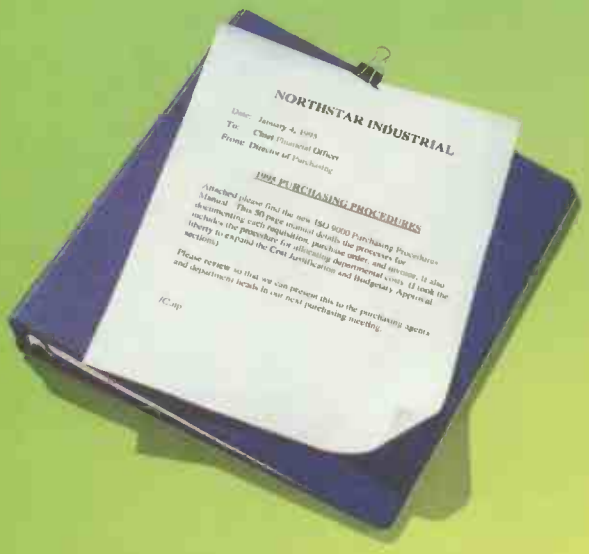
And their contents? I bought a 486 desktop machine. I thought, to hell with this nonsense. I'm not going to play the manufacturers' game any more. I have a perfectly adequate word processor, spreadsheet, and suite of comms programs. They will work very happily on a 486 PC. If new versions of the software won't work on the 486DX, I simply won't use them. Anyhow, with the money I saved, I was able to buy a new laptop, too: a Compaq Concerto.

Despite what the techies among you would no doubt regard as its snail-on-Mogadon performance, as far as I'm concerned, the new machine is an excellent investment. It has three main advantages over the old: it has the capability to handle high-resolution colour graphics; it has a built-in CD-ROM drive plus speakers; and it works. I suppose I went for the "multimedia option" out of curiosity more than anything else. PR companies keep sending me these CD-ROM titles, or I'm forever peeling them off the front of computer magazines, but until now I've never been able to do much with them except use them as beermats. So I spent half a day feeding the things into the PC to see what I'd been missing.

Actually, I never thought I'd be very interested in multimedia. And I was right. Currently, I've got the 1935 Nuremberg Rally marching across a little box at the bottom of my screen. Maybe if I let them goose-step all the way over, they'll eventually declare sovereignty over my hard drive. If I click on another window, it's 1937. The Hindenburg attempts to moor at Lakehurst, New Jersey, but screws up at the last moment. The frenzied "Oh the humanity!" commentary strikes me as something I ought to turn into a WAV file to accompany system crashes.

But apart from that, these silly things — so-called "edutainment" — are just time-wasters. At least, that's my impression so far. A CD-ROM OED or Complete Works of Shakespeare might be worth the asking price, but not the majority of this childish, American-oriented, no-brain stuff like Encarta, Grolier's and Dinosaurs.

Anyhow, because I spent my money wisely, I'm currently able to sit outside in the spring sunshine, typing this column in the comfort of a pub's beer garden. If anyone wants a "PCW Editor's Choice" circa '92 Olympic 486, slightly the worse for wear, mail me for the location of the skip where it's currently residing. PCW



(Sort through a fifty page plan to get to the point.)

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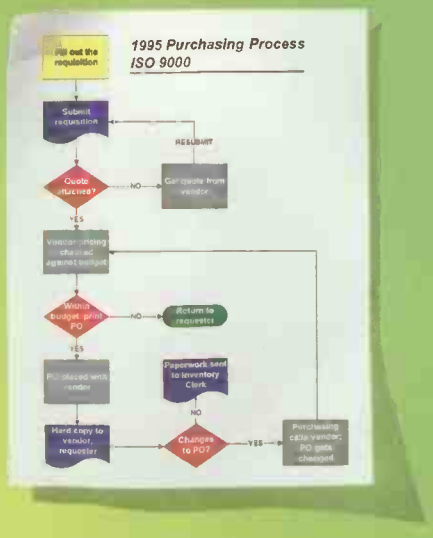

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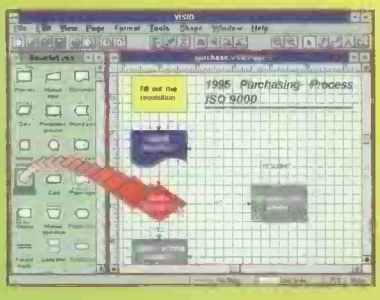

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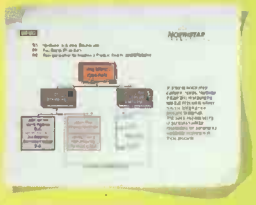

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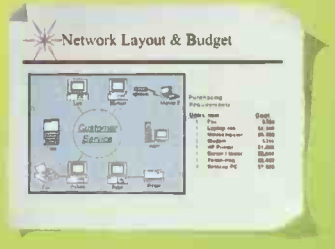

We're not suggesting you give up word processors and spreadsheets. No way. You just shouldn't be limited by them. If you want to conceive and convey ideas in the fastest, simplest way known, you need a third tool in your toolbox. Visio.

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In a guide to World Wide Web sites in April's Cutting Edge section, my fellow-writer David Brake commented: "Sadly, not everyone uses their freedom to publish responsibly..." and went on to describe a site that offered practical advice on activities such as hacking computers, making explosives and hot-wiring cars, while withholding its address. This provoked some angry email from a reader in North London (see this month's Letters) eloquently defending the freedom of the Internet and accusing *PCW* of "jumping on the mass hysteria tabloid bandwagon."

Tim Nott

Homefront

An over-reaction? Certainly, in the matter of shooting the messenger. David's accusation of irresponsibility hardly qualifies him as fascist of the month, and it's arguably not part of a *PCW* writer's brief to promote courses in practical subversion and criminal tips. Nevertheless, the irate emailer has a point.

The whole ethos and integrity of the Internet rests on the premise that it is, in the strict and neutral sense of the word, anarchic — there is no ruling body, elected or otherwise, to tell us what we are permitted to read and write. Undoubtedly, there are those who can't quite grasp this concept, and therefore see the Internet as a Bad Thing. There are others who might see this free exchange of information as a threat, just as the powerful and educated of the middle ages were perturbed at seeing their monopoly on literacy threatened by the advent of printed books.

So let's look in turn at three of the favourite bogeymen of the Net knockers: practical lawbreaking, pornography and political extremism.

If you want to hotwire a car, home-brew bombs or hack into a computer system, then you certainly don't need the Internet to find out how. This sort of information is available through a huge variety of sources including playground gossip, libraries and bookshops. Anyone who really wants to know is going to find out anyway, and any attempt to keep this sort of knowledge restricted is doomed. Even the least imaginative tabloid hack surely can't imagine that keeping bomb-making recipes off the Net is going to put the lid on international terrorism.

Certainly, the writers of this sort of stuff may be behaving in an irresponsible "Hey, look at my collection of dangerous knowledge" way. But, on the other hand, there's an excellent case for making this sort of information public. Why should the devil have all the good tunes? Why shouldn't Joe System-Administrator have access to the tricks of the hackers, or Joan Car-Owner have the know-how to defeat car thieves?

Pornography: now there's a beauty for the more hysterical voices in the media, especially when part of that surefire attention-grabbing phrase is "child pornography". Undoubtedly there are images and texts of this and other quite unspeakable manifestations of non-consensual sex around, though doubtless far fewer than many would have us believe. The real argument here is a subset of the pornography debate, not the Internet one. The "findings" of the tabloid sleaze-hounds are not evidence of the depravity of the Internet any more than the existence of printed porn is evidence of the depravity of contemporary literature or the inherent wickedness of paper. Certainly there are dog-turds dotted on the electronic highways. It is not, however, obligatory to tread in them.

As for political extremism, let's take another scary spectre: that of racism. Some might think it disgraceful, an abuse of free speech, that a racist group can disseminate its nasty ravings to millions of people with such ease, as happens from time to time on the Net. But denial of free speech is one of the worst forms of repression, and when wrapped in the mantle of righteous decency, disgustingly hypocritical. As Voltaire put it: "I disapprove of what you say, but I will defend to the death your right to say it."

In the case of the Internet, racist postings inevitably carry the seeds of their own destruction. The pamphlet and the podium are no longer in the sole province of the bigots and bully-boys. The equality of platform on the Internet means that the spurious so-called "science" of the racial supremacists is exposed to immediate public examination, debate and inevitable demolition. The weapons of reason and ridicule are at last a match for those of rant and intimidation.

Fear of the Internet is about as rational as fear of printing. The whole point is that it's a soap box upon which anyone can have their say. It's not the pervs, cranks and political extremists we should be worried about, but the powers that would control it for their own ends. We have here, for the first time in history, a globally distributed free press. It's not controlled by governmental, religious or commercial interests. Let's keep it that way. Otherwise it's only a matter of time before "Where do you want to go today?" becomes "Where will they let you go today?". PCW

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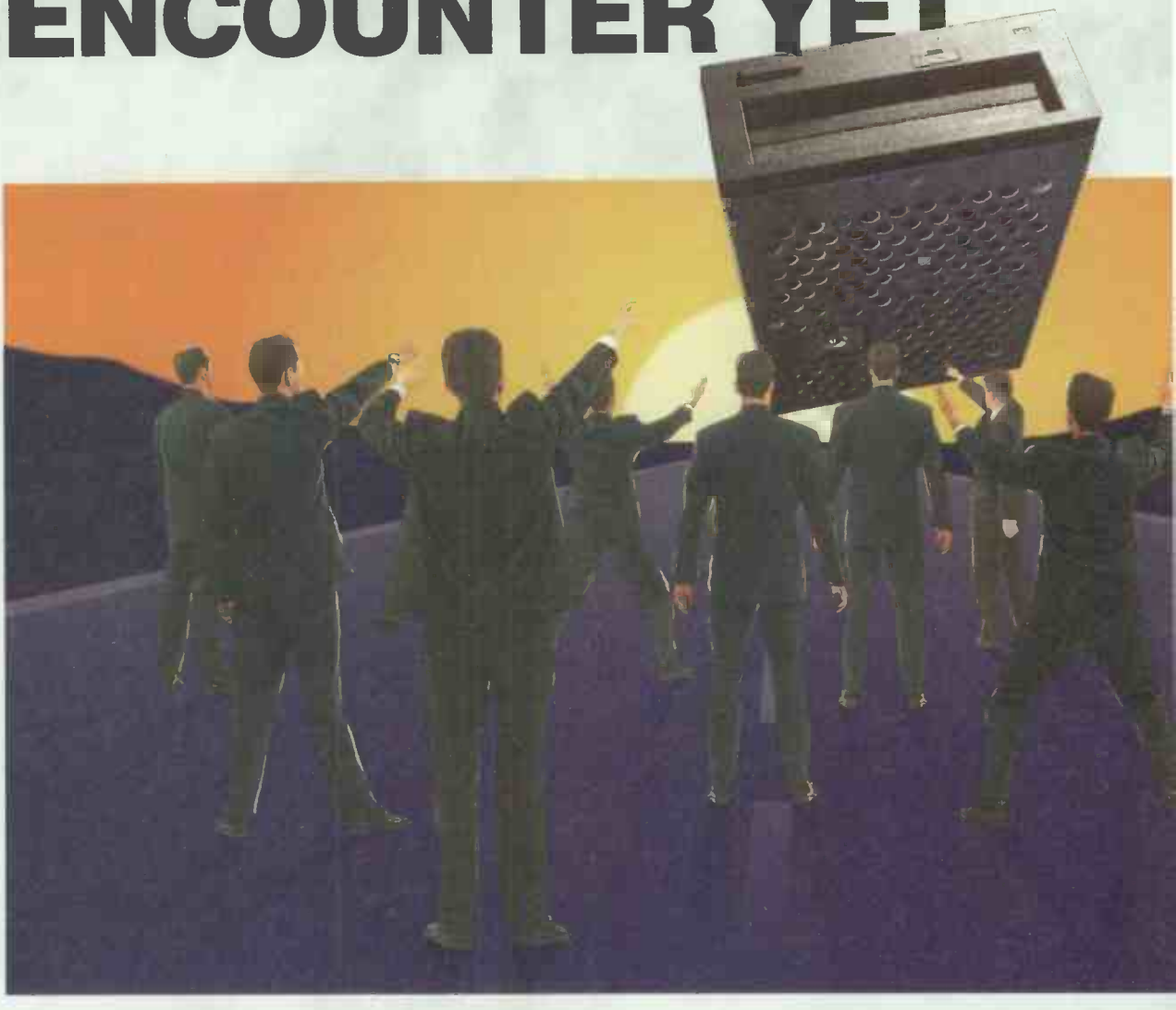

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Straight Talking

Barry Fox

Now that the Office of Fair Trading has dealt with Sega and Nintendo, perhaps it should examine how some computer companies treat their customers. They continue to sell products long after they realise they are bugged. And when customers seek technical advice they are run ragged until the expense in time, phone and fax calls reduces them to submissive silence. Microsoft is a prime culprit, and I cannot find anyone in that company who cares about its shortcomings.

For example, PhoneLink is the company behind the online information service Tel-Me, and it has a good help line. It is currently trying to discover why Windows' Dr Watson always shows an error message when I exit from Tel-Me. Because I have been waiting for four months for Microsoft to answer questions about anomalies shown by both MSD and Dr Watson in Windows 3.11, PhoneLink's job has been made all the more difficult.

When I first tried using fax software with a PC, I found my laser printer gave "out of memory" messages when trying to print a full page of text. Several companies told me that I needed more memory for my printer. But there is an easy, free fix: alter the printer setup to half resolution — the text retains its legibility for most printouts.

In a previous column, I tried to help readers who had bought Toshiba CD-ROM drives and wanted to make them White Book MPEG compatible. Toshiba supplied the names of several dealers who would supposedly supply upgraded software drivers. But one of these wanted to charge £19 for the upgrade software and another would only sell a minimum of five copies. After more nagging, Toshiba assures me that it has arranged with Koch Media to supply upgraded driver software for what it calls the "knockdown price of £10". A cut-down version will be put onto Toshiba's UK and German BBS systems by 1st May. This is good news, but why does it need a pushy hack to coerce Toshiba Europe into doing for customers what should surely be done naturally?

Anyone who buys the CD-ROM version of the Joy of Sex will have no joy unless they already know how to "install" a Windows ROM. All the instruction manuals begin at the point where you already have control icons on the screen. Philips acknowledges that this is a nonsense, and is now reviewing all its software manuals in the light of this.

Pace assures me that it has at last changed the design of its Microlin pocket modem so that the serial socket no longer comes adrift. And, the company tried to tell me how to make it work for travellers using MCI-Tymnet nodes in the USA and Far East. As sold, the modem connects, hand-shakes and then drops the line. Half the trick, says Pace, is to add a circumflex (^) at the end of the dialled number string. This disables the CCITT calling tone which can confuse host modems outside Europe — but unfortunately, the call still fails. After much trial and error I found that you should key in "AT/N0" to disable MNP (Microcom Networking Protocol) and LAPM (Link Access Procedure) error correction, because many US host modems cannot cope with it. Don't the people who make portable modems ever try them abroad?

Likewise, it's tough luck on anyone who tries to use the Psion 3Fax to send email via MCI/Tymnet nodes in the USA — especially so since Psion is just launching the 3Fax over there. The circumflex and "AT/N0" tricks don't work with the 3Fax, even after an ATZ reset. Despite several reminders, Psion has still not come up with a solution.

Try using the PCMCIA modem card, supplied with Toshiba portables, and you will likely find that the Cardware drive software steals so much memory that other programs will not run. Cardsoft software is less greedy but the easy trick, largely undocumented, is to throw out Toshiba's Cardware software, copy the simple Modem driver to the PC, and add the command line "Modem Com 2" to the Autoexec.bat file. If that doesn't work, exclude the modem's coveted chunk of memory by adding: "X=D000-DFFF" to the Memory Manager command line in Config.sys.

It is this kind of obstacle course that makes a nonsense of many predictions about how quickly Joe Public will embrace the Internet. Likewise, the public will only be watching MPEG movies on a PC if market leaders like Sigma Designs start taking the subject of "ease of use" seriously. Sigma's latest upgrade software can end in a real mess because the company has changed the name of the system, and thus the files and directories, from ReelMagic to RealMagic. But that is only half the story; the drivers have changed too and I got the error messages "Interrupt has not been detected" and "MCI error.... use a unique alias." For over a month, Sigma in California cost me a fortune in phone and fax calls, without providing a solution. I eventually found the answer myself, by trial and error.

Here is the bizarre trick: load both old and new versions of the software, ReelMagic 2.01 and RealMagic 2.20 into their appropriate directories. This will leave you with two different software drivers in the Config.sys file, old Rmdev.sys and new Mpgdev.sys file. Delete the reference to the new driver, Mpgdev.sys, which leaves only the old driver, Rmdev.sys, active. I haven't a clue why it works, and I don't much care. Let Sigma sort it out for themselves. PCW

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Nick Beard

Business Matters

Before Health Care International (HCI) went into receivership, we had been in the midst of a tendering exercise for a call-off contract for a large number of PCs. These transient problems prevented its completion. However, since HCI is once again busily building business, it is time to review our PC requirements; the move to a more client/server-based version of our primary information systems requires faster PCs. Although we are pleased with the Digital PCs we have bought to date, we must ensure that we are still getting good value for money. Since our standard specification was defined more than 18 months ago, the PC price-to-performance ratio has changed dramatically. Is this an opportunity for more power for the same money?

This may be great news for an organisation trying to control the cost of information systems, but price-to-performance ratio improvements are rarely arrived at via price reductions. Instead, performance specification seems to be the driving force (around a seemingly fixed price) in the value profile of PCs.

Yet when a PC is already providing adequate performance, money spent on increasing this performance would be better spent elsewhere. There's no point in buying a Pentium if a 486SX does the job satisfactorily. Buy the Pentium when you need it; otherwise, don't bother.

While reviewing the responses to our initial "request for proposal", it became painfully clear to us that many PC manufacturers are failing to meet the needs of organisations like HCI. In the foreseeable future we will want a small boost in performance and an extra 4Mb RAM. Most PC manufacturers want to provide us with plug and play, business audio, pre-connection inspection (PCI) and CD-ROM. But the majority of these features are of no use to us at the moment.

Everyone wanted to provide us with larger hard disks, but why do they think we need bigger disks? At HCI, a PC hard disk is rarely more than a place for the PC operating system and a swap file. Everything else goes onto the fileserver. Even allowing for bloated new operating systems, 170Mb is more than enough once the dross has been removed.

Why should I buy a CD-ROM for every PC? If I need CD-ROM, I can buy a stack of them and plug them directly into the network. And what use is plug and play in a PC that will only have a single network card installed? In the unlikely event of an additional card being required, our technical support staff ought to be able to handle it.

It is not wrong to offer these features — there are many situations in which a bigger disk is essential. And although the argument for PCI is quite clear, this feature is not always required. Multimedia-equipped PCs can be excellent teaching aids and clearly have their place in other specialist functions. It is at home, away from the LAN, or where technical support skills are hard to find, that the majority of these features really count. The option of *not* having to pay for something you don't need is just as important as access to new features.

I applaud the ability of manufacturers to continually lower the cost of producing a certain model of PC. But this is of little benefit to PC buyers if, as soon as a PC price drops to, say, £700, it is replaced in the catalogue by a higher specification machine costing £800. It could be argued that these changes are necessary to maintain profitability and to fund continued research into new devices, architectures and so on. Really? Look at printers: manufacturers are able to translate technological advancements into real cost reductions — a skill many PC makers appear to have lost. Worse, some recent reports suggest that even as component costs fall, the average cost of a PC is actually rising.

Manufacturers continue to sell high-quality, no-frills PCs of the kind we want, at least for the present. But for how much longer? There seems to be a trend towards abandoning efforts to obtain a competitive advantage by providing low-cost reliability, and instead, PCs are now loaded with frills and features.

But on a more positive note, at least Compaq appears to be paying attention to what is needed from a business PC. It recently announced a new range that will alert network administrators to an impending system failure — a feature genuinely worth paying for.

There might come a time when a new application, core to HCI's operation, will need widespread use of some of the features mentioned above. But until then, the business doesn't need them and I don't want to have to pay for them. PCW

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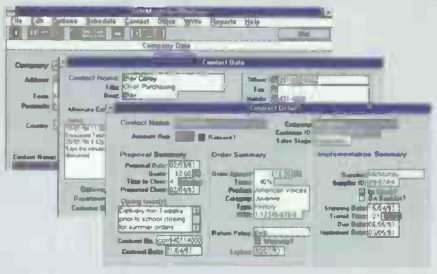

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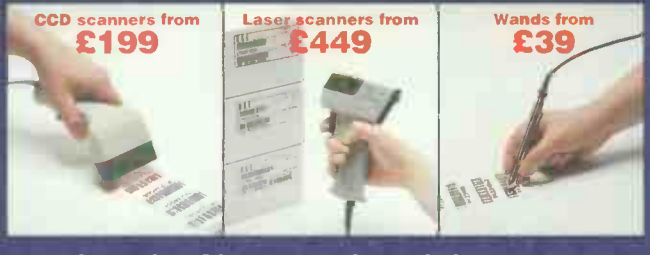

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Nice package, shame about the service

One cannot help admiring the rise of Corel Corporation and its flagship, CorelDraw, but the market domination of CorelDraw has allowed its maker to become arrogant. I have recently upgraded to CorelDraw 5.0, and even though I thought I was being cautious in waiting until the second release (5.0E2) I have been proved wrong.

This version still has some major bugs which cause it to generate General Protection Faults regularly. I have documented over 30 GPFs in the very short time I have been using it, most of which seem to be associated with the use of guidelines. Worse still, Corel 5.0 decided not to save the auto-backup files in my chosen directory, and until I managed to find these I was tearing my hair out.

Every tester of CorelDraw 5.0 has remarked on its buggy history but most have refrained from giving their own experiences. End-users would like it spelt out, and a few choice words in a respected publication such as yours might make Corel hold back a little before releasing new versions of what is otherwise an excellent product. If Corel continues with this policy and strictly implements its new pay-for-support system, many users will desert it.

Maybe if Corel cut out most of the superfluous software for the suite and sold Draw on its own, in a stable and bug-free form, for the same price, it could offer free support and satisfy most users.

HG Harris
Nottingham

Back in the knife draw

Please reassure me that the puerile snipings of Messrs. Easterbrook and Beard (Letters, May '95) are not to become a regular feature of your otherwise august magazine. I believe there is a newsgroup on the Internet where such strange practices may be carried out, presumably to the ultimate satisfaction of both, but let's keep personalities out of the letters page — what can it possibly achieve?

Chris Parsons
100444,1717@compuserve.com

PCW *The last thing we want to do is fill up our letters pages with puerile snipings. In this instance we decided that the letter and the reply were sufficiently entertaining, particularly for regular readers of Business Matters, to merit an airing.*

Could jobs slip through the Net?

I read Wendy M Grossman's interesting article on the attitude of the major political parties to the Internet and information-superhighway (PCW Online Focus, May '95). Unfortunately it only backs up the findings of my own research. On the whole, the parties know that the Net exists and are in favour of it, but don't really understand it. In particular, no party seems to have any policy or thoughts on the effect of the mass-unemployment that Net companies could generate (hello Cerberus, goodbye high-street music shops). How many more unemployed can the country stand? I'm a great fan of the Net but I wonder if our economy can survive it.

Simon Humby
simon@siii.demon.co.uk

More PCMCIA , please

I read with interest the news piece on page 295 of May's *PCW* about PCMCIA cards — in particular, the reference to fast DMA access.

I recently bought a New Media WAVjammer sound card. While it's great for playing chimes and the occasional poorly implemented Windows game, it's useless for serious games, most of which run only under DOS — not the fault of New Media, but of the PCMCIA specification. Even those programs with 4GW DOS extenders and recognising Windows Sound System, still ask for the DMA channel.

As someone who does not fully understand PCMCIA, what are the implications? Will I have to buy a new card, new PC drivers, or what? With the increasing sales of high-power notebooks, PCMCIA will become more and more important.

Dr John Wafford
100113,3713@compuserve.com

PCW *We're preparing a feature on PCMCIA and PCMCIA products which is scheduled to appear in our August issue.*

Group test request

PCW is always doing group tests of modems, printers, and what have you. Isn't it about time someone did a group test of Internet providers? They're springing up like weeds all over the place, and newbies like me have no way of knowing which service is best for them.

I forked out £120 for a year's subscription to a provider who shall remain nameless: it was money down the drain, since most times when I ring them the lines are all engaged, and when I finally do get through, the equipment is so overloaded that it is impossible to download any news from the newsgroups.

Stephen J King
sjk2@student.open.ac.uk

The key to the problem

I recently bought Intuit's Quicken for Windows version 4.0 from my local PC World. When I came to install the software I noticed some small-print on the packaging stating that it was limited to 25 uses before a registration key needed to be entered.

I'm not really against this sort of software protection, but it does seem to be a "try after you buy" method of selling.

It was after installation that my main problems began. On the disk envelope were instructions to call a Freefone number immediately for a registration key that could be entered into Quicken to override the 25-use limit. It stated that this number would be manned daily from 6.00am to midnight. I placed my call at 5.45pm and got a message to phone back during office hours of 9.30am to 5.30pm.

I moderate and sysop the Quicken conference on CIX, and it soon became apparent that some stores had started selling Quicken v4.0 before the planned release date of 4th April 1995, and that Intuit had not yet set up its 18-hour registration line. This left a lot of users with no way of registering their software.

On Sunday 26th March a message was left on CIX indicating that the registration line had now been set up, and Intuit was giving out registration keys. I phoned, only to be told that I could not register until I'd reached the 25-use limit, as this was the only time Quicken would give out its serial number. I tried opening and closing Quicken 25 times, but this did not seem to work.

The CIX user who had obtained his registration key placed another message stating that he could find no way of entering the key into the software. After further enquiries, Intuit stated that the registration code had "not been included" in the final release software, and thus, many users had been on a wild goose chase.

There have been many messages on CIX criticising the way Intuit has handled the release of Quicken v4.0. It seems you get a different explanation depending on who you speak to at Intuit.

I would like to hear what Intuit has to say about this.

Richard Kenyon
rkenyon@cix.compulink.co.uk

HP sauce

With reference to May's Straight Talking, I've spent the last three months trying to get an HP Colorado Trakker Tape Streamer to run. I've tried it on two different machines, replaced my I/O board and the Trakker, received another version of the software, and I still cannot get it to work. I just get: "Error 194 — unable to detect tape controller at given I/O address".

All along, HP has implied that the problem is at my end, so it has come as a revelation to discover this may not be the case. HP stopped communicating with me last month, no doubt in the hope that I will go away. I will fax a copy of the article to their tech support centre demanding an explanation. Meanwhile, I'd be grateful if you could find out if Barry Fox has been able to get this sorted. It's driving me mad!

Kieron McGrath
100111,3412@compuserve.com

Local hero

This is a postscript to my previous letter which appeared in last April's *PCW*, concerning problems I had experienced while trying to install a Panasonic CR563 CD-ROM drive to my Packard Bell 486SX via a Prosonic 16 sound card. Creative said that the card and drive were incompatible and I was beginning to believe they were right. But we were proved wrong; a local shop in West Wickham, Kent, installed the equipment within an hour, without reference to additional hardware and for a labour charge of just £20. I now have the luxury of using a CD-ROM drive which for so long (five months) had eluded me. Long live local tradespeople.

David Embling
Kent

A battery of problems

According to my supplier, batteries for the Toshiba 4600 portable have been unavailable for some months. No guarantee has been made as to when I can have a battery replacement.

Toshiba customer complaints can only offer apologies and mutterings about real-time manufacturing causing this problem. But NiCad batteries have a well known life expectancy. Toshiba sells expensive machines to customers who expect service and reliability. A portable without a battery is no longer portable and can't be used for the purpose it was designed for.

The lifetime of a portable is two to three years, and the loss of the use of the machine for the length of time that I have been without batteries is a large chunk of that lifetime. Toshiba should have a duty to supply replacement parts and what are effectively consumables for their machines. You probably know all about this: however, Toshiba deserves criticism for such treatment of its customers.

T.A.Clarke@city.ac.uk

Toshiba replies: *We completely understand the nature of the difficulty that this can (and in this case, obviously has) caused. There is no fundamental problem with the supply of these batteries, although there has been a temporary stock shortage which will be rectified in the next couple of weeks. Toshiba's policy is to continue to supply options and spares for PCs for seven years after discontinuation — indeed, we are still supplying batteries for T1100+ machines sold in 1985. Toshiba apologises for the inconvenience caused by the temporary unavailability of these items.*

Murray McKerlie
Product Manager
Toshiba Information Systems (UK) Ltd

Hackers wanted

Over the past few years there has been a considerable amount of controversy in the media concerning hackers. As a psychologist I am keen to hear the other side of the story. Although I do not condone any malicious or illegal behaviour, it is important to have both parties express their views. I would therefore like anyone who regards — or has ever regarded — themself as a hacker to complete a standard questionnaire. If they send me their name and postal address I will put a form in the post to them. I stress that this is done in the strictest of confidence.

Dr Derek Scott
Interactive Systems Centre
University of Ulster
Londonderry BT48 7JL

Subject to availability

I read with interest April's quad-speed CD-ROM drives group test, and in particular the review of NEC's CDR-271 (NEC 4X IDE), on the strength of which I ordered one for myself.

What annoys me is that you test or review items which aren't yet available in this country, but don't say so. According to NEC, the CDR-271 isn't going to be available in the UK until "the end of April/beginning of May", yet two of the largest computer magazines in the country have reviewed it without mentioning its (then) lack of availability.

Suppliers are advertising (in magazines) the NEC CDR-271 (QUAD X) but when questioned I got the reply that NEC had let them down, though it did not matter as they (NEC) were paying for the advert. When I spoke to Sales at NEC about what was happening, I was told that it was the "marketing strategy" to advertise well in advance of the items being available.

Anyone with a suspicious mind would think that NEC, with no goods to deliver, were trying to grab a slice of the cheaper quad-speed CD-ROM drive market before its competitors, who could deliver at the time, got in.

I enjoy reading *PCW* group tests, but it would be good if you could include information on when an item is likely to be available as this could sway a decision on what to buy.

Bill Emery
Gloucester

Freedom fighting

I was amazed at your [David Brake's] seemingly throwaway comment in April's net.surf column.

You say: "Sadly, not everyone uses their freedom to publish responsibly," and go on to refer to a WWW site detailing how to break into computer systems, make explosives, steal cars etc. All very upright and moralistic, and no doubt it has earned you brownie points with your management and publishers. But it makes me despair.

You proffer that we should all use our new-found freedoms and powers that the IT revolution has produced to publish responsibly. This is all very well, but who defines "responsibly"? Historically it has always been the people in power who wish to remain in power. This definition tends to coincide (rather conveniently) with views and opinions which are identical to those of the people in power and hence they tend to achieve their prime objectives.

Sticking with history for the moment, the problem was always how to find a way of bypassing all the defences put in place by the rich and powerful (usually somewhat backward in their use of new technology) and get one's message heard. It has been pointed out that the last time this happened was with the advent of a wonderful new technology, namely, the printing press. It became easier for others to spread their opinions and the power of the Church collapsed. It has also been said that the Internet is nothing more than the equivalent of an electronic printing press.

I keep hoping that your remark has been added merely to provoke a response. For the last 12 to 18 months I have read as much hype about the Internet as anybody — the last bastion of truly free speech, controlled anarchy, non-convoluted information pathways, filter-free information etc. All (and much more) have been quoted in reference to the Internet.

Why shouldn't everyone know about the intricacies of breaking into computer systems? Why should only governments know about how to make explosives and spy on people? And why should only thieves know how to hotwire and steal cars? Everybody should know this information, not just a privileged few. Apart from the practical reasons, such as effecting counter measures, information-sharing such as this was the very foundation on which the Internet was based. Stuff like this has been around for years and anyone with half a brain can find it. Your politically correct, middle-class views are going to influence nobody.

The knee-capping of the Internet has already started; what pisses me off is that it should come from the computing and IT corner. It is very sad that a magazine such as yours has jumped on the mass hysteria tabloid bandwagon. Keep it up and no doubt the Internet will be to free information interchange as Windows/DOS is to useful operating systems.

Neil Francis
neil_f@cityscape.co.uk.

David Brake replies: *As the ubiquitous Usenet tagline has it, my opinions are my own. Your letter is one of the clearest and most extreme expressions I've seen yet of the "Internet culture". There's much in that culture I support, but that doesn't mean I support it wholeheartedly and unreservedly.*

I said that telling people how to rob or kill others most efficiently is irresponsible. You ask: "Who defines responsibility?". Well, implicitly what I was saying was "making this sort of information easily available is irresponsible, in my opinion", but I honestly believe most people in the UK share this view. And yes, I believe that the community does have the right to disapprove of things. Substitute child pornography for bomb-making information. Would you still say that making it widely available is a responsible action?

You can't have it both ways. You imply that the Internet is, and should remain, "the last bastion of free speech". But you go on to say that "stuff like this has been around for years and anyone with half a brain can find it", thereby implying that the Internet, in fact, isn't by any means a "last bastion", and that there's plenty of free speech on such topics as bomb-making elsewhere. (As it happens, I know that books containing bomb-making instructions aren't legal in the UK, on the grounds that they are inciting or potentially inciting criminal acts.)

Leaving aside the moral argument, pragmatic considerations should lead Internet users to discourage some of the less responsible material. You say: "The knee-capping of the Internet has already started, what pisses me off is that it should come from the computing and IT corner." Well, the reason it comes from us first is that we are the first people to recognise its potential and its dangers. Just wait until the public, and more particularly the tabloid press and rent-a-quote MPs, wake up to what is available on the Internet.

I don't think the answer is to try to censor the Internet. I might if I thought it was possible, but I don't think it can be done without effectively shutting down access to the Internet completely. This doesn't mean I'm happy at all the implications of the free flow of information. Freedom of speech is good, but it is certainly not the highest good, and its exercise does occasionally lead to problems.

[• See this month's Homefront (page 353) for more on this subject.]

Hindsight

June 1979

"While some of the flamboyant figures of the small computer world appear and disappear across the scene in nanoseconds, Roland Perry is hard at work building a solid image of dependability for Sintrom."

Update

Things are quiet on the Sintrom front, but Roland Perry is alive and kicking. His latest incarnation is as Director of Business Development at UK Online.

June 1985

Atari launches the 520ST based on the "ultra-powerful" 68000 processor (16-bit, 8MHz). With 512kb of memory, a single 500kb floppy disk drive and its all-important MIDI interface, it cost £699.99. Our reviewer, Peter Bright, was "surprised that the MIDI interface is comparatively rare as a standard fitment on home micros".

Update

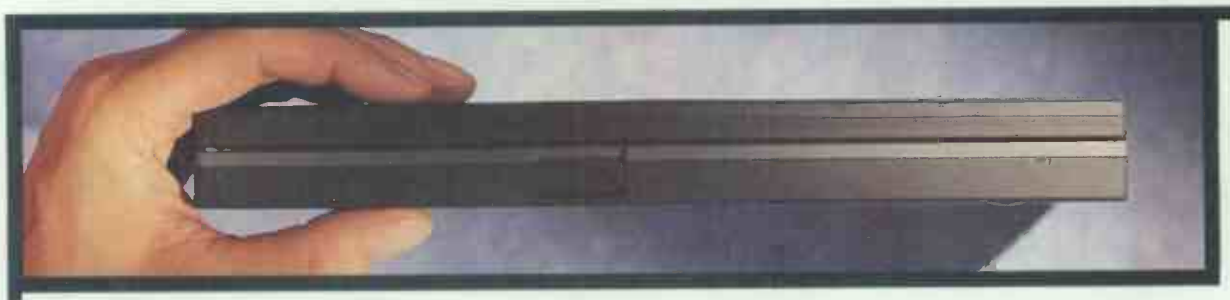
Although the ST is no longer being produced, it's still being used by some professional recording studios thanks to its MIDI interface.

June 1990

NEC launches the first colour LCD portable. The Prospeed CSX weighed a nightmarish 8.3kg and listed at US $8,499. "As NEC freely admits, the colour screen on the CSX is not very good."

Update

Colour notebooks are now standard and weigh as little as 2kg.



Small

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The problem is, most notebook computers aren't all that small. And the ones that are small aren't remotely powerful. Which is why

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PCW6/95

yet

erful.

the new Digital HiNote Ultra borders on the miraculous. It gives you an Intel 486 processor as fast as 75 MHz. It gives you a 340 MB hard drive and up to 24 MB RAM. It gives you a full-sized screen, a full-sized, ergonomically sculpted keyboard, and an elegant little wedge of a floppy drive that nestles underneath, out of your way. It even gives you a 6 hour lithium ion battery. All in a package that is, amazingly, only 26mm thick and under 2 kg in weight. So the only thing it doesn't give you is a backache.

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First impressions

VNU European Labs

VNU Labs tests cover every kind of hardware and software including PC hardware, printers, network products, modems and software applications. The tests are continually developed and enhanced to reflect hardware and software developments.

Our tests closely simulate real-world use. For example, the suite of PC hardware benchtests uses complete versions of industry-standard applications like Microsoft Excel and Word for Windows, WordPerfect 6.0 (DOS and Windows), Lotus 1-2-3 version 3.4 (DOS) and FoxPro (Windows and DOS).

Application tests are the backbone of all the VNU Labs system evaluations but it's nearly impossible to pin an application result to a specific machine component. Only system-level tests (also known as low-level tests) can reliably tell the difference. VNU Labs' system-level test suite is called Euromark. The tests, which are mainly Windows-based, quickly size up a hard disk, sound card, motherboard, display adaptor and printer, and give individual and overall figures.

- To make them easy to read at a glance, all the graphs in *PCW* are now drawn so that the bigger the bar, the better the result. Normally we'll also include the original data we worked from: for example, the time in minutes and seconds to print a page in a comparative test of printers.
- See next month's issue for an update on recent developments in VNU Labs.

Contents

366 Compaq DeskPro 575, Model 420 4/4
368 3D Interior Designer
369 Quicken 4.0 for Windows
370 Word Pro Beta
372 Micropolis AV Gold Series Capricorn 3243AV 4Gb Hard Disk
374 Visual FoxPro 3.0 Beta
376 Psion 3a 2Mb
376 FreeStyle for Macintosh
378 Acorn RISC PC 486 co-processor
383 Paint Shop Pro 3.0
383 VVL PC Card Camera
386 Circle Elements
387 CD-Speed
394 Setup Advisor

HARDWARE

Compaq DeskPro 575, Model 420 4/4

Endowed with user-friendly "intelligent manageability", decent speed and superb build quality, Compaq's latest is a PC to be reckoned with. Nick Lawrence sings its praises.

Compaq's desktop strategy is taking a new turn. In the past the ProLinea range was for lower-specification uses, and the DeskPro range was faster and better equipped. Now Compaq has turned the emphasis from speed — equivalent machines from the ranges will now perform similarly — to manageability and the total cost of ownership. The technology specifications of ProLineas and DeskPros are now so much the same that a single technology brief on PCI, graphics controllers and hard drive performance covers both.

The three-pronged approach to what Compaq calls "intelligent manageability" consists of Asset Control and Fault Management. Many of these ideas come from Compaq's experience in the server market, and they are all designed to add value to the equipment by reducing downtime, network hassles and demands on the network administrator's time.

The asset control involves the PC having a large inventory of every aspect of its hardware. A far cry from the terrible msd.exe, this monitors every aspect of your system from the make, model and serial number of your hard disk, to the system board revision level of your PC. With Windows 3.1 or 3.11, the Compaq Diagnostics for Windows Management

tool will give you this information locally, or you can get it across a network using LAN WorkStation, SMS, Monitrix, LANDesk Manager 2.0, BrightWorks, LAN Inventory, NetCensus 2.5, LANExam, LAN Directory or Norton Admin for Networks for Windows 2.0.

Fault management comes on at bootup or on demand from a user. It entails checking the temperature of the machine and telling the user to take corrective action, fault detection on the hard disk (the aim is to notify 72 hours before something goes wrong) and so on. Over Windows 95 the system will be able to send a message to the network administrator, but it is not possible to do this without the SNMP support that Windows 95 will offer. Since the diagnostic routines can accurately identify all the information about failed or failing item, it should be possible to replace it with the minimum of fuss. The Telesafe firmware that enables the hardware fault detection mechanisms was developed in conjunction with Seagate, Conner and Quantum, and will be available to other hardware manufacturers.

The whole intelligent manageability concept is an extension of the DMI (Desktop Management Information) created by the Desktop Management Task Force, of which Compaq is a member (and part of the steering committee). This encompasses local fault management, but not remote, so this has to be part of a non-standard agreement between Compaq and the LAN software vendor mentioned above.

With this whole new strategy in mind, booting up the review machine created some tension to see if these promises held true. Indeed they did: as soon as the computer was turned on and DOS started, an introductory program took over and asked only which language I spoke. Then it went away and installed completely fresh versions of DOS and Windows, and installed all the specialist Compaq software, pausing only to ask for name and company name while installing Windows. The whole process took about 20 minutes, and there's something highly satisfying about knowing that a whole disk-full of software has been created while you watch.

The Compaq Control Centre worked excellently, doing everything you could want, from installing a network (it automatically starts up the necessary external programs and generally goes out of its way to be helpful) to analysing the configuration of your computer. It's much better than previous attempts at a welcoming introduction to a PC, quite simply because it is extremely useful without being patronising and retains its usefulness long after the new user has found their way around Windows.

The hardware was also excellent. Equipped with a Pentium 75MHz, 8Mb RAM, a 420Mb hard disk, two ISA slots, two ISA/PCI slots, two spare 5.25in drive bays, a 15in monitor and a 256kb cache, it's on a fairly even playing field with other high-end machines. It also excels in what others fail to provide: a Plug and Play Flash BIOS, a Compaq QVision 1280/P on-board graphics chip with 1Mb VRAM, on-board PC-Net network chip with a telephone cable connector, and a transceiver to translate thick Ethernet to thin Ethernet. Even the PCI architecture is a Triflex, one of the best.

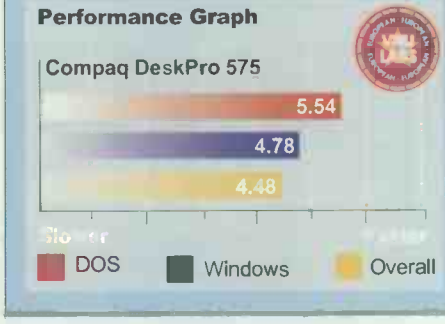
● *The new Compaq DeskPro 575 — not particularly cheap, but exceptionally capable*

What's more, it's beautifully designed. From the moment you open the case, the clean internal design hits you straight away. The motherboard pops out with nothing to obscure it, four of the six SIMM slots are empty, there are no cards in any of the slots and there are no wires or cables obstructing anything.

It's difficult to review this machine without making it sound like a hagiography, but I could not help but be struck by everything about it. Perhaps the only sticking point is the price: at £1,735 for the computer and £380 for the monitor, it's not cheap. However, it's good value compared to the equivalent ProLinea, which is only £210 cheaper, and fantastic value when you consider the amount of time a system administrator could spend dealing with a lesser machine.

Labs Report

Performance Graph



As speedy as we expected, this excellent performer came through particularly well on the memory- and hard disk-intensive applications.

PCW Verdict

The new DeskPro range isn't for the home, but if you're the kind of user who throws everything at your machine and expects it to stand up, this really is the only range worth looking at.

Price £2115 as reviewed
Contact Compaq 0181 332 3000
Fax 0181 332 3145

SOFTWARE

3D Interior Designer

Changing a room's layout by physically moving the furniture around can lead to family squabbles, exhaustion, endless recriminations and a bad back. James Taylor looks at a welcome alternative.

Now the month of May is upon us, many of you may be considering spring-cleaning, decorating, extension-building and even moving house — all of which is liable to lead, eventually, to furniture arranging. But few people are gifted with the ability to get it right first time, or to visualise what it will look like, and this is where 3D Interior Designer comes in.

This ingenious and inexpensive program lets you design, edit, display and print layouts, from rooms to complete houses (or offices). You work in plan, and when you've finished, the program draws you a simple 3D representation of your design on screen. Naturally, you can include furniture, provided it's in the symbol library supplied, and choose your décor in terms of room and furnishing colours. Now you can see, before you spend your money, whether that puce and green sofa will go with the orange chair coverings in the Blue Room.

You tackle your design in three stages. First, you define your room's boundaries, setting out its shape and dimensions plus the height of the walls — there's an optional grid you can use. The software handles irregular shapes, provided they're made up of straight lines. You don't worry about doors or windows yet, since they come with the furniture, but you can choose wall and floor colours. With a compatible printer, you can print out your room design in various scales. You can also ask the program to calculate wall and floor areas for estimating carpet, wallpaper and paint quantities. Because each stage is handled by a separate module, you have to save your room design before moving to the next stage or designing other rooms.

Next, you incorporate your room into a plan. Only rooms which have been included in plans can be furnished. Plans can include one room or, by placing all the rooms in the correct position, the whole house. If you're designing a new house, you can try different layout since you can save each plan separately.

Rooms can be joined together in the Plan Editor to make a whole house

Furniture positioning and colour scheme can be judged as a whole

After this, you furnish your rooms one by one. Furniture is selected from the symbol libraries and positioned and coloured as required. In Europress' philosophy, doors and windows are furniture and can be selected and positioned on the walls in the same way. You get a good range of architectural designs, which you can re-dimension to suit. You get an equally good range of furniture too, although unfortunately you can't change their dimensions — if you want a desk, for example, it has to be 180 x 100 x 73cm. (The design of the furniture, incidentally, tends towards MFI.) The libraries also include radiators and stairs, folding chairs, grand piano, hat stand, dishwasher, wall lamps, bidet and grandfather clock. Much of this can also be used in office layouts (except possibly the bidet).

If necessary, furniture can be rotated in plan to suit the layout. If you scrape a wall while doing this you get an irritated message asking you to move the piece first, even though you may need to rotate it before moving it into place. On the other hand, you are allowed to pile furniture on top of other furniture without complaint. After placing the furniture, it can be coloured, moved, copied or deleted. At this stage, you can display isometric illustrations of any room, viewed from one of four corner viewpoints, though with less than perfect perspective. You get full-colour with an SVGA card and shades of blue with a VGA card.

The 3D picture you view is copied as a PCX file to the program's directory, from where it can be imported into a suitable graphics-handling program for further refinement.

With my setup, I had a few slight problems. For example, Windows' own Paintbrush program wouldn't show colour. Also, there are options for printing out both plans and 3D views (solid and wire) but they didn't work with my DeskJet 520. Check these points before buying if they're important to you — this may not be a professional tool, but if features are advertised they ought to work.

For what it's worth, the software is apparently endorsed by Granada Television. It needs a minimum 286 processor and VGA screen and runs from DOS or Windows.

PCW Verdict

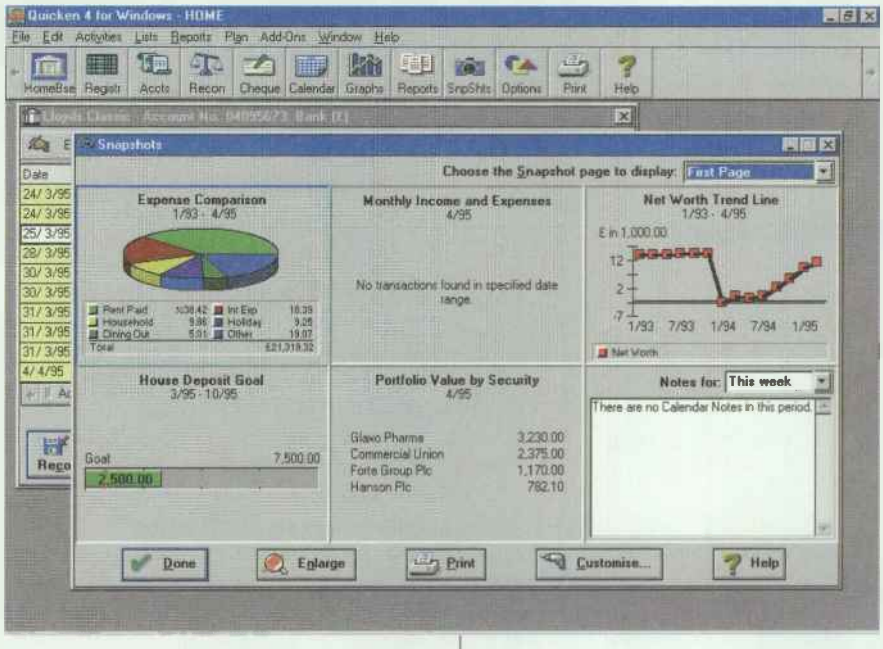
A fun program which is useful too, letting you design the home of your dreams without professional fees.

Price £19.99
Contact Europress Software
(01625) 859333. Fax (01625) 879962

SOFTWARE

Quicken 4.0 for Windows

Following the many recent changes in the personal finance software market, Paul Begg looks at the latest upgrade of bestseller Quicken.



Quicken 4.0 for Windows — this is hardly a dramatic upgrade from the last version, but it's still an excellent package

Because in the past, home and small business software has been such a growth area in personal computing, there are now several packages available which make it possible for even the most innumerate person to take complete control of their finances. Although three of these products have been slugging it out for market share during the past few years, there now seems to have been a cease-fire. But the field has now become complicated: Sage's Moneywise is still with us, but hasn't recently been upgraded; Intuit (Quicken's company) is currently in the throes of being taken over by Microsoft; and Microsoft has sold its own Money package to Novell, whose recent acquisition of WordPerfect included a Quicken bundling deal.

The Quicken 4.0 upgrade contains nothing which would either compel you to go out and buy it or persuade you to switch from another package. It's an upgrade for existing users only. It contains features you could live without, but which are certainly nice to have. In other words, Quicken 4.0 is a goody-bag of user wishes.

Having said this, new users will find Quicken 4.0's simple, graphical, step-by-step guide to setting up your accounts a great introduction to the program.

First though, Quicken now comes in three flavours. You can get plain Quicken, a home package called the Deluxe Home Pack which contains Quicken 4.0, Quicken Home Inventory and QuickTax Planner 96, and the Deluxe Business Pack, which is the same as the home pack except the home inventory module is replaced by QuickInvoice. (Both Home Inventory and QuickInvoice have been discontinued as standalone packages, by the way.)

The various versions of Quicken have tried to make data entry quick and easy. Version 4.0 is no different. There have been lots of small enhancements to the Accounts Register. A mouse click on the new Account Selection bar and you can move between all your bank accounts instantly. and transferring money between accounts can now be performed very simply by using a form.

You can switch date and number columns and memo and category columns, recategorise multiple transactions at one time, enter a date simply by clicking the Calendar button in the Date column and enter an amount by clicking the Calculator button in the Payment or Deposit column.

The major improvements are the introduction of new and improved tools for better finance management. These fall into two related but different categories: budgeting and forecasting.

Budgeting is where you assign a certain amount of money to a specific category — for example, let's say £100 per week for the family food bill. Quicken can be used to take the guesswork out of budgeting and give stability to and control over variable outgoings. Its Budget window has been improved and you can now drag and drop budget and group categories into supercategories, collapse and expand categories and supercategories and display your budget in Category or Supercategory view.

The forecasting features are genuinely useful, although at first glance the concept of financial goal setting seems very designer-suites-and-Perrier-water. Let's say you fancy a winter holiday in the sun, but need to economise here and there if you're to afford it. With Quicken's forecasting tools you can estimate future expenditures with known outgoings, look at where economies can be made, look at how savings can be juggled, see what incomings you are likely to have. You can fiddle about with all sorts of variables and permutations, seeing what would happen given this or that eventuality.

Another new feature is the Savings Goal status bar. Once you've set money aside for your winter holiday (or whatever), the Savings Goal status bar shows your progress without actually moving money into a real savings account.

If you set aside £x per month for a holiday, that money always shows up on your bank statement, so your bank total is in fact misleading because it is showing committed money. You have to subtract that committed money every time you want to know whether you have enough to afford some treat or other. Quicken's Saving Goal hides it — making it unavailable for spending — and thus gives an accurate representation of exactly how much you have to spend on other things. Quicken also lets you keep tabs on how near you are to achieving your goal or goals.

The only other addition of note is the

Snapshot feature. Many users have requested a way of being able to simultaneously display graphs, reports, calendar notes, and so on. The Snapshot feature does this and also displays budget and savings goals and supercategory budget goals.

A whole range of small enhancements have been made to *Quicken's* various modules. If you have shares and investments you can now track tax-exempt securities, tax credits and multi-currency investments. You can define a financial year instead of a calendar year and create reports, graphs and budgets based on that year. You can preview reports prior to printing, use the Profit and Loss Comparison business report to compare profit and loss for month to date vs year to date, or year to date vs last year to date, memorise and recall graphs (another much requested user want). And the artistically minded can display cheques onscreen with a variety of backgrounds.

Overall, Quicken 4.0 is a basic upgrade. Some might argue that it's unexciting. I would agree, but Quicken was an almost perfectly thought out and designed piece of software at the outset — which is why it has dominated the market and quickly seen off all competition — and little beyond fine tuning can be done to improve it without a corresponding reduction of ease-of-use.

The next stage for Quicken will be to make it thoroughly pocket-portable so you can note expenditure as it's expended — and that's on the horizon, so watch this space. Meanwhile, Quicken 4.0 is thoroughly recommended.

PCW Verdict

A basic upgrade, but thoroughly recommended.

Price £49.95 Quicken 4.0, £69.95 for Business or Home Deluxe Packs (inc VAT)
Contact Intuit 0800 585058
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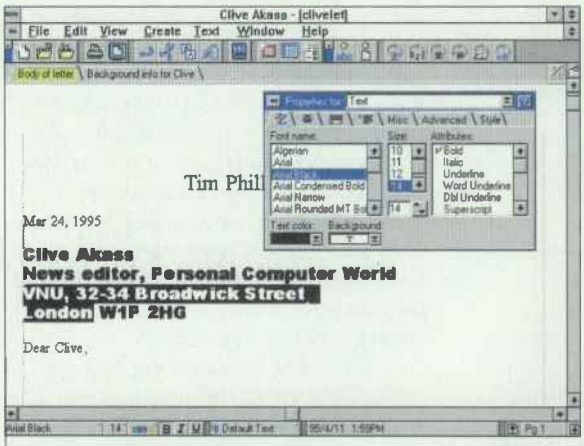
SOFTWARE

Word Pro beta

Confusingly titled it may be, but this new upgrade to Lotus's Ami Pro could give Microsoft and WordPerfect a real headache. Tim Phillips reports.



Word Pro Beta — taking Ami Pro back into the big league

Ami Pro 3.0 may have been more than a match for Word 2.0 in 1992, but as time has passed, Lotus has been left in the slow lane by Word and WordPerfect. However, if the promise of the beta release of Ami Pro's new version is realised, it will be back in the lead for functionality.

Although you can't help thinking of it as Ami Pro 4.0, Lotus has decided to rename the product Word Pro. Although much improved, this is still distinctively Ami Pro, so the name change is guaranteed to cause some confusion. Nevertheless, Ami 4.0, son of Ami or Word Pro, has 1,500 improvements to boast of, and for frustrated SmartSuite users it will prove worth the wait.

Our review copy was a 16-bit version — Lotus is keen to keep its Windows 95 32-bit features a secret for fear of copycats.

The improvements fall into three rough categories: "working together" utilities similar to those incorporated in 1-2-3 Release 5; upgraded feature sets to match the neat new tricks offered by Word 6.0; and Lotus's own usability enhancements.

The "working together" enhancements are unlikely to make much difference to you unless you are working on collaborative documents in a networked environment, but are potentially extremely powerful.

Word processors have been allowing users to make a set of revisions to a document which can then be reviewed and accepted or rejected by another user for half a decade. The functions are basic, and in my experience not widely used.

Word Pro's Version control is a completely different order of functionality. On the File menu there are three new entries: TeamReview, TeamConsolidate and Versions. TeamReview lets you set up a list of users to see the document and make changes. Consolidate lets you review these changes and make one whole document from them by clicking buttons to accept and reject edits; Versions makes an audit trail.

And there's more to it than that: for certain applications this will be an excellent method of working, especially the options to route the document through email automatically. Others will value the CommentNotes more — sophisticated yellow sticky notes — and a neat electronic highlighter pen.

Me-too improvements cover all the main advantages of Word for Windows: there's an Autocorrect feature, and enhanced How-to Help. This can usefully be queried in full sentences, with Help trying to understand what you're looking for. In the beta, this was still hit-and-miss, though we understand Lotus is refining it.

Users in a mixed environment will also be pleased to hear that both the WordPerfect and Word 6.0 filters work well, taking in documents including frames and multiple fonts with no obvious problems.

With the burgeoning feature sets that Windows 3.0 produced, word processor users have a usability hill to climb. Lotus has been creative in using context-sensitive menus: only relevant features are presented at any time. Others aren't greyed-out — they disappear. This can be disorientating at first, when you visit a menu to find it changed, but the absence of feature overload outweighs the problem. The menu between Create and Window changes according to where you are. Usually, it offers text formatting, but in an image it offers graphics tools.

For long documents two new tools will save a lot of editing time: the first is the ability to create "Divisions" in a

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document — basically a set of easy-to-use tabs which you label for different parts of a document. The other eye-catching feature is the spellchecker, which highlights all the words it is going to query and lets you pick the ones you want to change — a *huge* improvement on sequential spellchecking.

Having cleaned up features like the templating, and added context-sensitivity to the SmartIcon bar too, Word Pro is definitely worth the upgrade for all users. The new features genuinely make what has always been an idiosyncratic and occasionally annoying word processor a lot smoother and more productive.

PCW Verdict

A must-have upgrade for existing users, and more of a challenge to Microsoft than ever.

Price N/A
Contact Lotus 01784 455445
Fax 01784 469342

HARDWARE

Micropolis AV Gold Series Capricorn 3243AV 4Gb hard disk

Super-DJ Gordon Laing was itching to record pro-quality audio onto his PC, but his hard disk simply wasn't up to it — until he discovered the excellent Capricorn from Micropolis.

Several months ago I had the pleasure of fulfilling one of my personal-computer ambitions — to successfully record audio of professional quality to my PC's hard disk. This mystical art of D2D ended up requiring a number of products, both hardware and software, which were described, tested, and generally played around with in last December's and January's issues of *PCW*. Yes, it was a Christmas dream come true.

Two key areas had to be addressed: a quality means by which audio could be captured by a PC; and, quite simply, the fastest I/O I could get my hands on.

The audio quality of a typical 16-bit sound card is good, but not quite up to pro standard. There's also the infuriating realisation that much of your original material has already been digitised by a decent hi-fi ADC (Analogue to Digital Convertor), and you'll have to convert it back to analogue just so your sound card can redigitise it.

In reality, you'll need a card with digital audio in and out sockets. Digital Audio Labs' CardD, distributed in the UK by Digital Music, offers just that (and no more) for £485. It may sound expensive but is the only digital audio I/O card that will do the job until companies like Creative Labs decide to fix SPDIF sockets on AWE-32s.

But now on to the disk I/O. CD-quality audio supplies a constant data stream of 150kb/sec, or around 10.5Mb/min of stereo. Four-track doubles this to over 20Mb/min. Clearly a large-capacity hard disk is one part of the story, but consider

You want pro-quality D2D? You got it

the editing process. If you have a five-minute four-track recording, you're looking at a 100Mb file and one hell of a long wait if your I/O is delivering 1Mb/sec. And as if that isn't bad enough, most normal hard disks pause to recalibrate, introducing undesirable jitters in D2D recordings of audio and video.

Enter Micropolis, one of the first companies to recognise the exploding multimedia market and release a range of high-performance SCSI hard disks to cope with the demands of the digital AV as far back as 1993. Using thermal calibration-less operation and advanced cache management, Micropolis succeeded in delivering jitter-free performance from its AV drives. Better yet were the typical sustained data transfer rates of around 4Mb/sec.

The latest AV SCSI drives from Micropolis are labelled the AV Gold series and are available in 2Gb, 4Gb and 9Gb capacities, list-priced respectively at £1,050, £1,550 and £2,600. All three drives come fitted in an external, expandable module system, used in all recent Micropolis drives. The cunning and good-looking cases allow for additional drives to be neatly stacked should one not prove enough. Here we looked at the mid-range Capricorn 3243AV 4Gb model.

We used three SCSI interfaces: an Adaptec 1510 ISA card representing the bottom of the range at £50, an Adaptec 2840 PCI card representing almost the top of the range at £230, and NCR PCI built onto a £200 motherboard. All three configurations featured Pentium 90s, and were tested using the SAW (Software Audio Workshop) hard disk utility and a 10Mb WAV file.

The ISA 1510 card managed a mere 1.3Mb/sec for both read and write. Switching to the SCSI-2 PCI interfaces raised this to a massive 7Mb/sec for writing and 4.5Mb for reading. Putting these results into perspective, a typical 540Mb IDE drive supplies just over 1Mb/sec writing and up to 2Mb reading.

If you want amazing hard-disk performance from SCSI-2, look no further than the Micropolis AV Gold series, although to make the most out of it you'll need some kind of local-bus SCSI-2 interface. May we heartily recommend an Adaptec 2940 over a PCI bus — brilliant. And it's not processor-dependent; we measured the same results on a 486DX board, using the same I/O described above.

You may also be interested in an earlier Micropolis 1.7Gb AV drive, still available on the street for around £695 and boasting just under 4Mb/sec over a SCSI-2 PCI bus.

PCW Verdict

So long as you've got a quick SCSI-2 interface such as an Adaptec 2940 PCI card, then you can look forward to superb hard-disk performance from the Micropolis AV Gold series.

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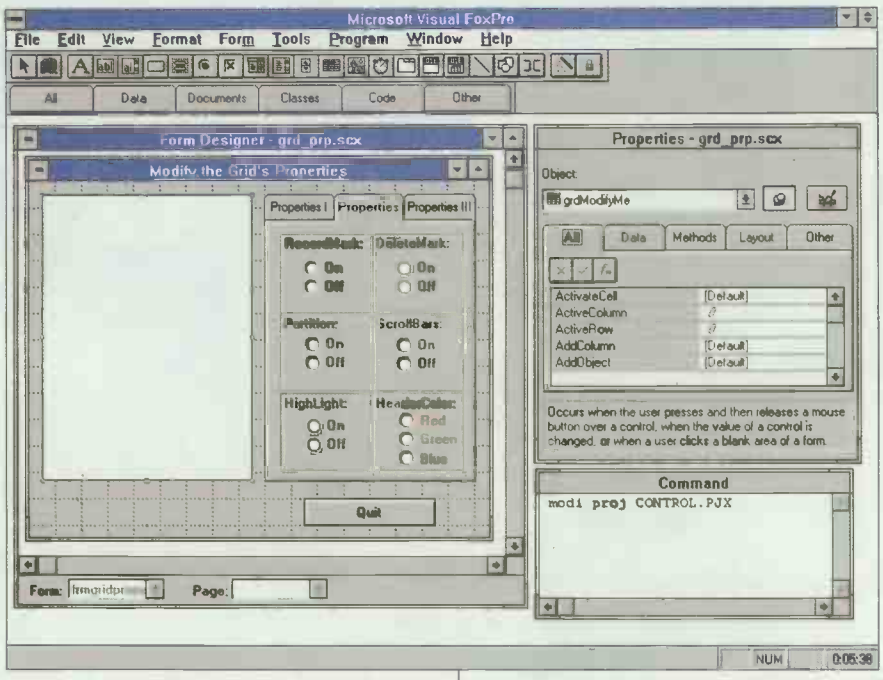
SOFTWARE

Visual FoxPro 3.0 beta

In one fell swoop, FoxPro has been endowed with 32-bitness, object-orientation and OLE 2.0. Tim Anderson investigates the latest beta version.



Visual FoxPro 3.0 has the makings of a superb developer's database

FoxPro 2.5 for Windows has always been an awkward fit in the Microsoft product line. A formidable data cruncher, FoxPro comfortably handles huge data tables. But despite its fine database performance, it has suffered in the past from a non-standard Windows interface and the difficulty of programming its clunky "Foundation Read" (a way of pressing xBase into supporting an event-driven environment).

FoxPro 3.0, however, is a profoundly changed product. Microsoft has provided this latest version of FoxPro with a brand new event model, completely new interface-building tools, object-oriented language extensions, support for OLE custom controls (OCXs), OLE in-place editing and client support for OLE automation.

Currently built with Microsoft Visual C++ rather than Watcom C++, FoxPro 3.0 is a Win32 application which runs under Windows 3.1 with Win 32 extensions. It will also run as a native 32-bit program under Windows NT 3.5 or the forthcoming Windows 95. The extent of the changes will leave hardened FoxPro developers disoriented. But it will lay to rest the accusations levelled against FoxPro, since its first Windows release, of being "merely a DOS port".

Visual FoxPro is treated by Microsoft as a developer product, and despite the inclusion of a new range of Wizards, the new version will not appeal to novices. There will be standard and professional versions available, as in previous releases. The professional package will provide a runtime dll and the ability to create executables which can be distributed.

Visual FoxPro provides a set of tools for creating easy-to-use applications and is extensible, by means of a library construction kit which gives C programmers access to the FoxPro API. No firm announcements have been made about versions for other platforms, but expect to see a Macintosh edition and probably one more update of the DOS product.

The dbf format remains an international standard despite the fact that it should really be obsolete. The simplicity of dbf brings speed benefits but at the expense of omitting important features such as referential integrity, security and table level validation. FoxPro's solution is a new database container in which many of these omissions have been rectified. It includes server-type features like triggers and stored procedures. The dbf header has been altered to prevent tables being opened outside their container unless they have been specified as free tables. Short of abandoning the dbf altogether, the result is a good compromise and makes it easier to develop sound database applications. A spin-off benefit is that a FoxPro database now appears to the programmer as resembling a server database, easing the task of upsizing where a database system is migrated to a client/server installation. An Upsizing Wizard is provided, to assist the process — Microsoft is hoping to establish Visual FoxPro as a significant client/server tool.

Visual FoxPro is an impressive product from both a conceptual and physical viewpoint, and compatibility with earlier versions is promised. The package requires a minimum of 8Mb on Win32, but judging from the beta version is most comfortable running on Windows NT or Windows 95 with twice that amount of memory. There is some anxiety that FoxPro's renowned speed will be compromised by its many new features. It pushes 16-bit Windows to the limit, and should be seen primarily as a product for 32-bit Windows.

Visual FoxPro also places heavy demands on developers, who will have to learn a new event model, a new concept of data management, and a new programming paradigm. The xBase community tends to be conservative, and some won't make the change. Those who do will find a highly sophisticated package which has the makings of a superb developer's database.

Visual FoxPro has leap-frogged the rival dBase for Windows in all but friendliness to end-users, although Borland is promising a true dBase compiler which may redress the balance. If Microsoft can deliver the right performance and reliability, Visual FoxPro will win a great many new friends.

PCW*Verdict*

A superb product, marred by its size and heavy system demands. For developers only.

Price N/A
Contact Microsoft 01734 270000
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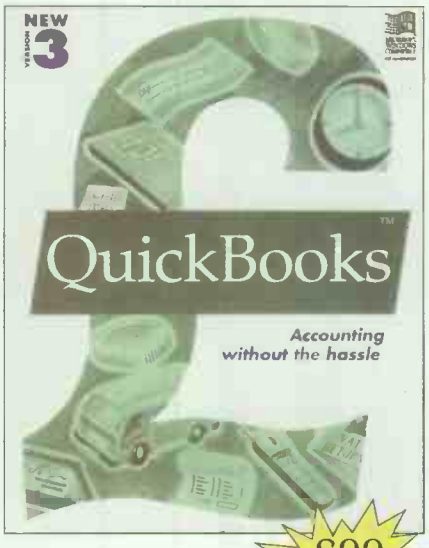

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HARDWARE

Psion 3a 2Mb

The latest incarnation of the celebrated Psion is no great improvement on the last, but David Brake still thinks it's *the* pocket computer to go for.

Like two other illustrious members of the *PCW* team (SImon Rockman and Chris Cain) I run my life on my Psion Series 3a, and as far as I'm concerned it is one of the most useful applications of miniaturised computer power available. It's small enough to take anywhere and powerful enough to do almost anything you'd reasonably expect a pocket computer to do.

For those who aren't familiar with the Series 3a, it includes a powerful diary, a word processor, a simple but fast database and a spreadsheet — in other words, a basic office suite. It has a high-resolution screen capable of displaying 17 lines of 80 characters (though many would find the resulting characters too small at that resolution) and a small but functional keyboard.

Having seen the tremendous improvement of the Series 3a over the Series 3, I went to Psion's headquarters with high hopes, but I'm afraid that the two new models in Psion's Series 3a family were something of a let-down. They are the 1 and 2Mb Series 3a, and once you know this, you know most of the benefits these new models have to offer.

While medium to heavy users of the old Psion Series 3a and Series 3 would normally have to purchase a RAM or Flash plug-in pack, the memory capacities of the new machines should make

The Psion 3a 2Mb — nothing very new, but still the best pocket PC in town

this unnecessary if users have a desktop computer to back their data up to. Those who are using their Series 3a as their only computer should definitely invest in a backup Flash pack. The Psions rarely crash and shouldn't run out of battery power if handled carefully, but you should always be prepared for the worst — after only a few weeks' use, your organiser will already hold a lot of vital information.

One or 2Mb RAM in which to load applications and store data doesn't seem like much, but few Psion apps require more than a few tens of kilobytes when running because most of the important functions are in the OS in ROM. Data formats for storage are also very frugal — in my own case, ten games and utilities, plus more than a hundred smallish text files and a database of more than 1000 contact names fit comfortably into 1.3Mb.

Unfortunately, due to limitations in the operating system which it would be difficult to work around, only half a megabyte of memory can be used at any one time by all the currently-running applications. As a result, despite the improved storage, applications will not be much more ambitious than they are now since the underlying OS, available program space and processor speed haven't increased.

None of the applications from the original Series 3a have been enhanced in the new models, but they now come with a spellchecker and thesaurus. They also contain a game, Patience. It is very well-presented and is a useful addition to the application set.

Some users have complained that recent changes in Psion's choice of keyboard supplier have made the feel "softer" and that it is now more difficult to type on the new machines without ddouble-keying. I didn't find this, although the "3" key on my review unit did stick during testing.

They won't set the world alight, but the new Series 3a models are still welcome. For my money, the best thing about the new models is that the old ones are being retained. They are still the best pocket computers available, and the introduction of the new models at only slightly higher a price than the old will keep the whole range within many people's reach.

PCW Verdict

Not as dramatic an improvement as I'd hoped for, but still the best pocket in town.

Price 3a 1Mb £339.95, 3a 2Mb £399.95
Contact Psion 0171 258 7368
Fax 0171 258 7242

SOFTWARE

FreeStyle for Macintosh

And now for something completely different — a sequencer which thinks like a musician and not a computer. Ian Waugh feels the beat.

As most sequencers get updated they acquire more and more functions which can make them increasingly difficult to control, especially for someone who is new to sequencing or for the musician who is more at home with bands than computers. Mark of the Unicorn's FreeStyle has no tracks. Yes, that's right. It also does its best to shield you from the likes of MIDI channels and program change numbers. Instead, it uses musician-friendly concepts such as Ensembles, Players, Takes, Arrangements, Sections and Songs.

The catch? Well, there's a certain amount of setting up to do before you start making music, although some of this is fairly automatic. If you connect your equipment to your Mac prior to installation, FreeStyle will scan it and create a device list. It has a list of over 250 devices and you can add others, too.

Once the setup is complete you can start making music. The first step is to select an Ensemble, which is a collection of Players. There are 14 Ensembles ready to go including Rock Band, String Quartet, Big Band, Synth Ensemble, Orchestra and Jazz Combo.

The Players in the Rock Band, for

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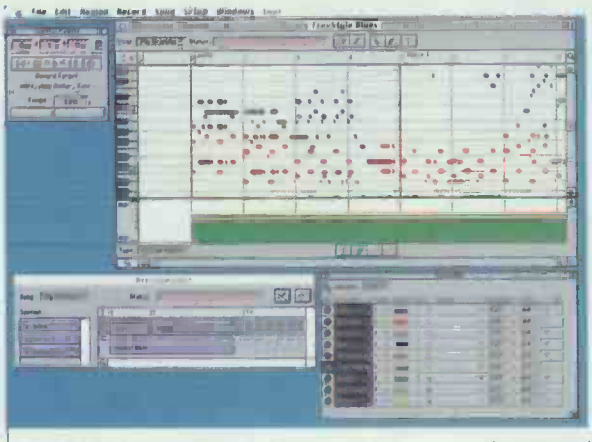

FreeStyle for Mac — the sequencer for musicians who hate sequencers

example, include Guitar, Piano, Organ, Bass, Horns and Drums. Each Player uses a sound from one of your sound modules which has been assigned during the setup routine. You can change the assignments and add and remove Players if you wish, and create Ensembles of your own.

Next you record a Section. This will usually be something like an intro, verse or chorus but it could be as short as a single bar or as long as the whole song.

So, you select a Player and record a Take. To put you in the mood, the metronome doesn't simply click, it plays a short drum riff — there are over 30 to choose from. This is a great idea; I know several musicians who start every session by recording a drum track.

The drum pattern will loop, waiting for you to start playing. And what if you play some pickup notes? FreeStyle is really clever because it records these, too, and if you select the Smooth Record option, it plays the pickups on playback.

So you've done a Take but you don't like it. No problem — simply record another. And another. FreeStyle remembers each one and you pick the best when you're putting the song together.

You select and record the other Players in the same way and then record the other Sections of your song.

When you're finished you may have half a dozen Sections, which you link together in the Arrange window. This is a little like pattern-based recording, as used by many sequencers, but the difference here is that each Section is a complete entity carrying information about the Players, rather than just note and MIDI event data.

To free you further from the distractions of the computer, you can control FreeStyle almost entirely from your MIDI keyboard using special note cluster combinations.

In spite of the multi-take facility, there may be times when you need to get in there and edit the music directly. You can flip between a Grid Editor and a Score Editor, and editing is accomplished by clicking and dragging. You can print out the score in notation format in its entirety or as individual parts. The parts of transposing instruments are automatically transposed but the program doesn't support music symbols.

You can insert notes in step-time and call up a Controller Editor. There is a Quantise function but no partial quantisation, although there is a swing function.

FreeStyle has a few omissions. There is no event editor, it doesn't directly support SysEx, and it will only load Standard MIDI files in Format 1. Many companies only produce them in Format 0.

The program will ignore program changes in the middle of a track and all tempo instructions apart from the first one. The first is due to the way it organises the data, but the second is inexcusable.

These niggles apart, Freestyle is well designed and supported by an excellent manual and a video which takes you through the process of building a song.

PCW Verdict

A sequencer for the musician rather than the computer user — powerful and user-friendly, with excellent documentation. Highly recommended.

Price £179 inc VAT
Contact Klemm Music Technology 01462 733310. Fax 01462 733390

HARDWARE

Acorn RISC PC 486 co-processor

Costing roughly one-fifth as much as Apple's PC-emulation system, Acorn's new RISC co-processor was either going to prove very clever indeed, or a complete dud. Ian Burley was relieved to be able to give it the thumbs up.

Requests like, So can I run this Windows application? or How about a game of Doom? have been bad news for owners of most Acorn computers — until now. Acorn has had the same problem as Apple and Atari's ST and Commodore's Amiga, the lack of "PC-cred". No matter how wonderful their exotic proprietary operating systems have been, none have managed to hold back the tide of DOS and, more importantly, Microsoft Windows, not to mention OS/2. Acorn and Apple have used their non-Intel x86 horsepower to software-emulate lower versions of said processor family, with varying degrees of success. Now, both have produced add-on hardware incorporating real Intel 486-compatible number-crunchers. Acorn's is for its year-old flagship model, the RISC PC — complete with IBM DOS 6.1 but not Windows — and costs a princely £99, while Apple's is for the PowerMac 6100 only and costs roughly five times as much. So is Acorn's solution very clever, or just no good?

PC enthusiasts love Acorn computers, but Acorn's bread and butter comes from the education market where there has been considerable pressure in recent years for schools loyal to Acorn to switch to PC-compatibles. It's remarkable that Acorn has clung on to its domination of the primary-school sector, where it still has over 50 percent of the market, but three years ago the company prudently accepted that it had to address the issue of PC compatibility head on. Stopping short of building a PC clone, Acorn designed the RISC PC to accept an optional co-processor alongside the native ARM, the RISC chip Acorn designed itself and has nurtured since the early eighties.

Both the ARM and any second co-processor reside on their own separate compact daughtercards and plug in side

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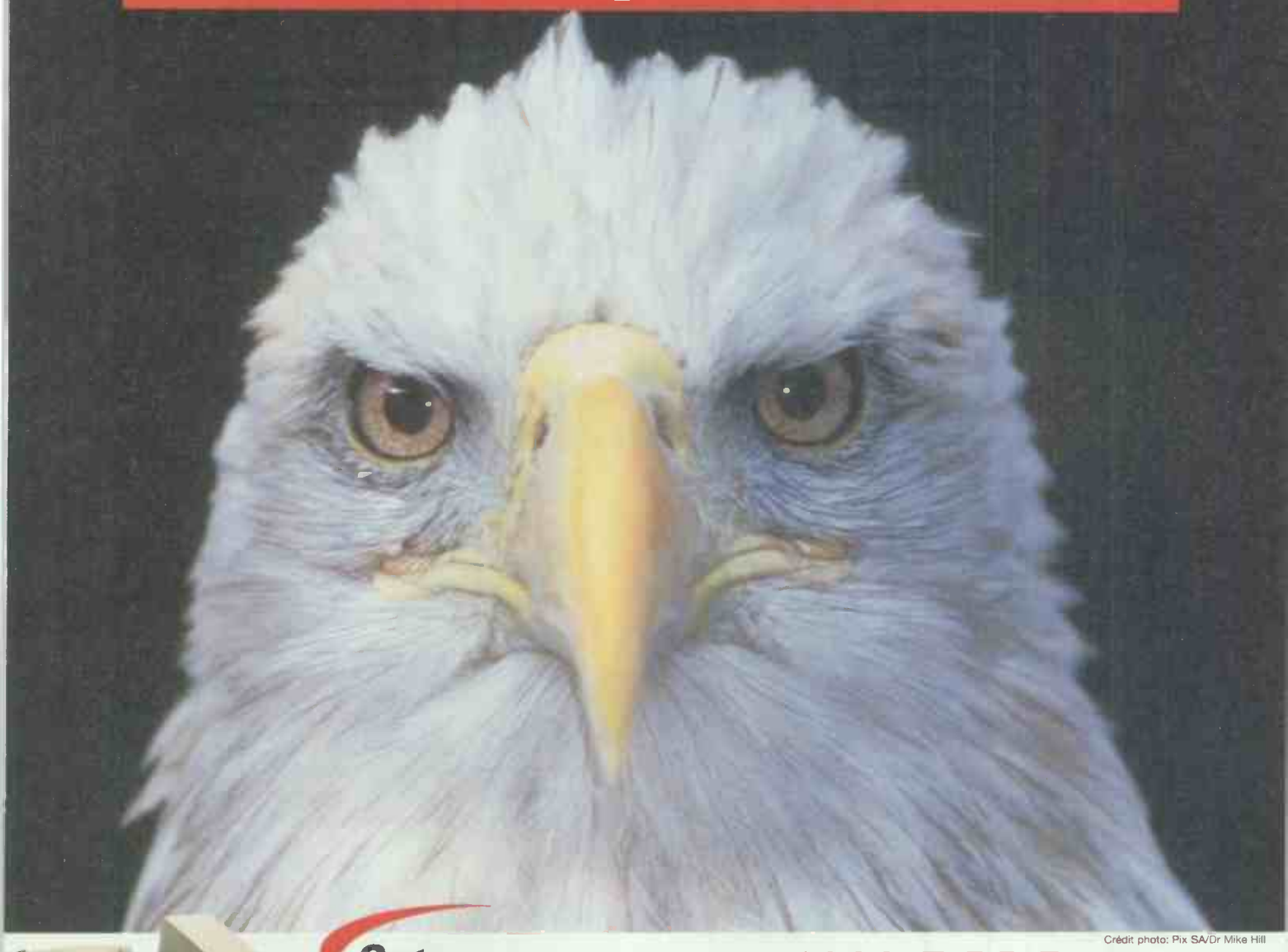

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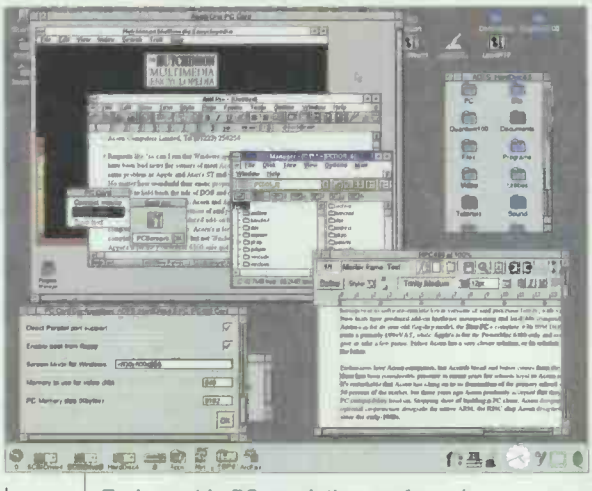
by side and vertically into IDC connectors on the main system board. Installation is a cinch — it takes about 15 seconds to twist two snap fittings at the rear of the all-polycarbonate case, lift the lid, slot the card in and replace the lid. It takes longer to remove a monitor from the top of the box. It makes no difference even if the maximum of eight expansion cards is fitted, accessibility is that good.

To keep costs to a minimum, for the first issue of the card, Acorn has chosen a 40MHz Texas Instruments TI486SXLV part, though this is clocked down to 33MHz. The little card also has 128kb second-level cache and a custom ASIC co-developed by Acorn, Future Technologies in Scotland and long-time Acorn developer of PC-compatible hardware solutions, Aleph One. The secret of the 486 card's low cost is that there's no on-card system memory or I/O devices besides host system peripheral access through Acorn's dual-processor 32-bit Open Bus. Acorn, or more accurately, IBM Blue Micro in Italy, is also making a fair number of these cards — 10,000 in the first production run. Estimates suggest this will be enough for 40 percent of the installed base of RISC PCs and Acorn expects to sell out of every single one made.

For three years, Aleph One has sold a PC-hardware expansion card for Acorn users which plugs into the Acorn Archimedes' proprietary 16-bit "podule" (peripheral module) expansion slot. Acorn's podule system has a lot to commend it, although its 16-bit bus has no DMA, isn't very fast and is far from optimal for CPU/memory access.

Aleph One's hard work wasn't entirely wasted however when the RISC PC was being designed. Key elements of the Aleph One PC Card's software were retained and adapted for the new 486 co-processor. Unlike the old Aleph One PC Cards, the new 486 module has access to a fast 32-bit system bus with direct memory access. In fact, the 486 card masters the bus when it's in use. Like the Aleph One card, the new one shares disk and I/O resources like the serial and parallel ports.The old and frustrating limit of 32Mb PC disk partitions has now been cured, enabling partitions to be as large as a RISC OS drive. Running Windows for WorkGroups you can use 32-bit file access, but not 32-bit disk access



Truly usable PC emulation on Acorn's Archimedes — at last

settings. Disk performance is well within the bounds expected by PC users. The October 1994 beta release of Windows 95 has been successfully tested on a 486 RISC PC.

When you use the card it looks and responds like a real PC. In fact, I'd even challenge a regular PC user to be able to tell if they were using a real PC or not, especially under Windows where the graphics accelerator implementation works very well. Eventual graphics support should range to the 800 x 600 24-bit colour or 1600 x 1200 resolution limits enjoyed by RISC OS applications in a fully equipped RISC PC. There are also tools to enable Ethernet network connections, and I can report that it works very well on my small Windows for Workgroups LAN. Acorn has just released a sound card which provides SoundBlaster compatibility, and a third-party company has already shown an ISA expansion card box.

So the RISC PC 486 is a good, workable 486 PC. But run a few benchmarks and you quickly realise all is not as well as you might expect. The card is a 33MHz 486SX but it performs more like a 25MHz 486SX in a real PC. The primary reason for this is the way RISC PC memory is arranged. On the RISC PC main board there are just two 72-pin SIMM slots, but unlike a conventional PC design, any capacity SIMM you care to choose can be fitted into either slot, say 4Mb in one and 16Mb in the other. On top of this you can add up to 2Mb VRAM which sits in a separate proprietary SIMM slot. All this memory is pooled as a single resource and allocated by the operating system as required, even the VRAM. PCs use interleaved memory which requires matched sets of SIMMs, usually in multiples of two or four. PC RAM is optimised for x86 processors, while RISC PC RAM isn't. The latter works well with 8-bit or 32-bit operations, but an x86 processor does a lot of 16-bit memory operations.

Luckily for Acorn, the inefficiencies of its PC-related architecture don't severely compromise the 486 card as a usable solution for most RISC PC users. There are those who would have preferred a DX chip with its integral maths co-processor, especially as you can't add a separate maths chip to the existing card. Others will be disappointed that a 33MHz 486SX is soldered in rather than socketed — swapping puny 486SXs for beefier DX2, DX4 and even P24T Pentiums will have to wait for the MkII card, which probably won't ship before the end of this year. The fact is that the limitations of the architecture make the use of faster 486s less useful. A revised custom ASIC in the MkII card will alleviate some of these problems through write-buffering and revised cacheing strategies. At least Acorn has publicly stated that it won't wash its hands of the project, as some had feared, now that the cooking 486SX version is out. Acorn is already working with its partners on the next iteration of the 486 card.

PCW *Verdict*

The RISC PC 486 card isn't very exciting in absolute PC terms, but it's a crucial survival tool for Acorn. Anyway, how can you really criticise an add-on 486 facility which costs just £99?

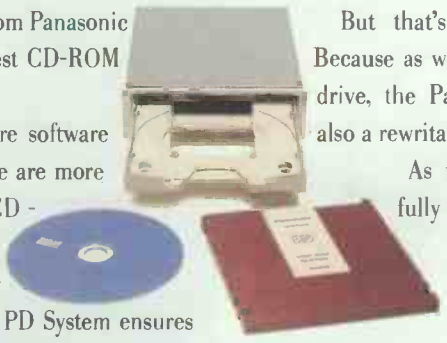
Price £99
Contact Acorn Computers
01223 254254. Fax 01223 254262

The new 4x speed CD-ROM drive. (Continued overleaf.)

The new PD System from Panasonic gives you one of the fastest CD-ROM drives available.

And as more and more software is distributed on CD, there are more and more reasons why a CD - ROM drive is essential.

Reading CDs at four times standard speed, the PD System ensures you get the full benefit from the increasing choice of multimedia software - with video, sound, graphics and animation.



But that's only half the story. Because as well as being a CD-ROM drive, the Panasonic PD System is also a rewritable optical disk drive.

As well as CD-ROMs, the fully motorised loading tray is designed to accept rewritable optical disks too. Offering a massive 650MB of memory, these optical disks can be written to and rewritten as many times as you like.

And because the disks are removable, large amounts of data can be stored without filling up your hard disk.

So for little more than the price of a CD-ROM drive, the new Panasonic PD System gives you the best of both worlds, in one piece of half-height hardware.

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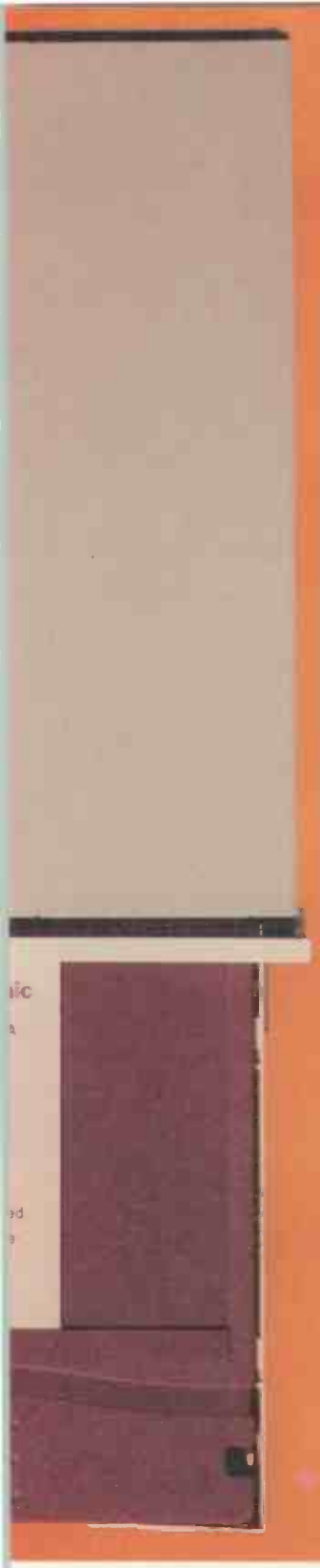

The new low cost 650MB optical disk drive. (Continued overleaf.)

The new PD System from Panasonic is more than an optical disk drive. But for less than the cost of an optical disk drive.

And as demand grows for more and more storage capacity, there are more and more reasons why this kind of drive is essential.

Loading an optical disk into the PD System provides a massive 650MB of memory that you can write to and re-write as many times as you like. You can directly overwrite each sector, each file or the entire 650MB disk in one pass.

The disks are not only high performance and user friendly, but also removable, so large amounts of data can be stored without filling up your hard disk.

But that's only half the story. Because as well as being an optical disk drive, the PD System is also a 4x speed CD-ROM drive.

As well as optical disks, the fully motorised loading tray also accepts CD-ROM disks, which the PD System reads at four times standard speed. So you get the full benefit from the increasing choice of multimedia software - with video, sound, graphics and animation.

In fact, for less than the price of an optical disk drive, the new Panasonic PD System gives you the best of both worlds, in one piece of half-height hardware.

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SOFTWARE

Paint Shop Pro 3.0

Just when your faith in shareware was beginning to flag, along comes a photo-retouching package which is downright brilliant. Nick Lawrence gets painting.

PSP 3.0 — well equipped, easy to use, and only £49.95 for the full version

Shareware software is characterised by hit-and-miss utilities and applications, with most being useful for five minutes until you find enough bugs, or few enough features, to stop you using them before the "reasonable period of usage" is up and you have to fork out for the registered version. But every so often a genuinely useful piece of software comes along which merits serious consideration. Paint Shop Pro is one.

Now in its third incarnation, this graphics manipulation package has always had a strong following among those who need medium-weight capabilities without the high specs of Corel PhotoPaint and others in that league. Version 3.0 not only follows that lead, from its sophisticated user interface with movable palettes right down to the significantly increased file formats supported, but extends the package's capabilities into photo retouching.

From the moment the package is installed there are clear cosmetic differences. The drab icon of v2.0 has been replaced with a more lively one, and as soon as the program launches, the toolbar and floating palettes pop up in the style of PageMaker and other graphics packages. The whole thing looks much more professional than previous versions, and best of all, none of the functionality seems to have been lost.

PSP 3.0 now supports third-party plug-ins such as Kai's Power Tools, and all filters and most deformations can be applied to a selected area. To add to this, the Paste function now allows sections of one picture to be placed in another. There are serious photo-retouching tools, such as a clone brush, a push brush, sharpen and smooth brushes, an eye dropper and a magic wand to select similar areas for manipulation.

The painting tools are another addition. This set comprises eight different brushes, a user-defined brush, a fill tool, undo brush, colour replacer brush, filled and hollow rectangle and oval tools, a line tool with variable width and a text tool.

There's now also an image browser which lets you see thumbnail images of pictures and search directories visually instead of having to remember filenames. This is a very useful standalone program, and tallies well with PSP 3.0's enhanced support for file formats. It can now handle 31, 12 of which are only available with v3.0. The new ones include CorelDraw, AutoCad, and Photoshop 2.5 RGB.

There are far too many new features to go through in a First Impression review. Suffice it to say that this package would do very well as a commercially sold program. To be able to get hold of a shareware version for free, and then purchase the full version for only £49.95 (or £19.95 for upgrades from v2.0) is nothing short of incredible in these days of bloated, buggy software that you can't test until you've shelled out a couple of hundred pounds for it. Paint Shop Pro 3.0 is very highly recommended.

PCW*Verdict*

A great shareware package which feels like a high-end commercial one.

Price £49.95 for full version
Contact Digital Workshop 01295 258335
Fax 01295 254590

HARDWARE

VVL PC Card Camera

For certain situations this digital photography system could come into its own, but Clive Akass thinks that many people will be better off going for a standalone device.

VVL offered a desktop version of this camera system a couple of years back. The lack of realtime viewing (images took some seconds to appear) made framing and focusing difficult, and the definition was such that it was best used in a fixed-focus application requiring instant pictures, perhaps for identity cards.

The new version, in which a mouse-sized camera plugs into a PCMCIA card, allows the camera to be used with a notebook PC and is therefore portable. But the original limitations remain, and indeed are more significant on the move, so sales are likely to be limited to niche markets.

Despite the fact that PC cards (as they should now be called) are supposed to be plug and play, I had irksome installation problems. I first tried the card on a ThinkPad running IBM's latest DOS 7.0, using first its state-of-the-art card software and then the cardware supplied by VVL; both produced memory conflicts.

I finally got the system working by using the VVL software on a new Sharp PC 8660, after disabling the notebook's installed cardware. This is not acceptable: it defeats the object of having a standard, and users should not be expected to reject generic cardware in favour of a proprietory module that may not work with other cards.

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● *VVL's PC Card Camera — "niche"*

VVL told us that this would not be a problem for most of its customers, who build systems round the cards and leave them permanently in place. The company also complained that the PCMCIA had been slow to release details of the latest version of its standard.

VVL's original system came with a version of PhotoFinish which not only captured the image but allowed you to touch it up. The card version comes only with a simple image-capture utility. This worked painfully slowly, apparently due to a residual memory problem which I gave up tying to resolve. Just as irritating was the fact that I could not re-orient the image to suit the camera position.

This is not a serious limitation, considering the availability of cheap image manipulation software, and the system provides good 340 x 240 pixel 256-greyscale images once installed — ample, say, for estate agents to take shots of property.

VVL is working on the cardware, and has a list of machines which have been tested as compatible. If you need a system of this kind, check out the situation with VVL, and if at all possible, try before you buy or get your dealer to install the device.

Nevertheless, at £600 this system has to be set against Kodak's new £895 DCS40 standalone colour digital camera with a definition of 795 x 500 pixels, or Apple's £500 QuickTake camera which is available with Windows software.

The one thing the VVL system has over a standalone camera, though, is that it is under the direct control of a computer, which will be useful for some types of field work.

PCW Verdict

A niche application. If you just want a digital camera, watch for the new standalones coming out.

Price £600
Contact VVL 0131 539 7111
Fax 0131 539 7141

SOFTWARE

Circle Elements

Got a sound card? Make the most of it with the Circle Elements software and samples which let you create your very own disco inferno. Steven Helstrip takes it from the top.

Circle Elements can be described as a sample-based sequencer since it lets you take audio samples and produce musical arrangements from them. The package isn't just for musicians — anybody can use it to piece together a decent tune. All you need is an ear for what sounds good. You'll also need a 486 with at least 8Mb RAM, or an equally specified Mac, say a 68040 running at 33MHz, as the program is heavily processor intensive.

The package comes on two CD-ROMs, each containing the Circle software and over 1,000 samples in both wav and aif formats. The first CD, Intergalactic, has samples of analogue synthesisers, percussion and guitar loops and myriad synthesised effects (to go through them all in any detail would take forever.)

The second CD, Planet Earth, contains orchestral material including string and brass sections, atmospheres (jungle, restaurant, etc), gospel choirs and still more guitar and drum loops.

The idea is to build up arrangements using pre-recorded samples, or elements. The main work area has 12 segments in which to load elements and there are two tracks to work with. The elements are arranged in folders according to their tempo. For example, there are four drum directories: 100bpm, 120bpm and 140bpm. Within the guitar directory, musical keys are also indexed.

I started off by selecting a drum pattern to work with at 120bpm. This was loaded into a segment on track one. I then chose a bassline and loaded it onto track two. It is important to choose elements with the same tempo, otherwise the result will be messy. Most elements are one bar in length which effectively means each segment represents one bar. There is no play button, only a Loop

● *Even Eric Bristow could piece together a decent tune with an interface this intuitive*

button which, you guessed it, loops the selected segments.

Once you're happy with the two tracks, you can either copy them to the next segment to repeat them, or choose other elements, say another bassline. Once you have built up an eight-bar sequence the Mix button mixes the tracks to track one, freeing up track two for additional elements. You can now add a guitar riff, brass section or vocal. Again, once you're happy with the arrangement you can mix down to track one and add another part, and so on. It would have been nice to see four tracks to work with, as once you've committed to mixing down, there's no going back to alter levels and arrangement.

The package only works with mono samples and there's no control for panning instruments (controlling the position across a stereo field). It doesn't take long to build up a complex arrangement and because all samples are 44.1kHz 16-bit, the sound quality is high. Also, all the elements on each CD have been recorded at 22.05kHz which will improve performance on slower machines; it also ensures the software will work with older sound cards not capable of playing 44.1kHz files.

The elements have been compiled from several professional sample libraries and cover a wide range of musical styles, although dance music does have prevalence. If your interest in music spans to collecting samples, Circle Elements is worth buying just for that. £49 for the two CDs is a snip when you consider how many samples are included, any number of which can be used in multimedia applications or even downloaded to sound cards including the AWE-32 and Turtle Beach's Tropez.

The software, if a little basic, does allow you to work quickly and can be used by just about anyone who can work a mouse. Once your musical composition is complete, you can save your Circle as a single sample for output to tape, or CD should you be lucky enough to have access to a CD writer.

Circle Elements contains an interactive music encyclopedia with audio snippets of various instruments

PCW *Verdict*

Circle Elements is fun and easy to use, and anybody can produce some fabulous results. A must for every sound-card owner.

Price Each CD £29.95; both CDs £49.95
Contact Time + Space 01566 785400
Fax 01566 785777

SOFTWARE

CD-Speed

Have you ever wished your CD-ROM drive worked as fast as your hard disk? Data Becker says CD-Speed could turn your sluggish ROM into a nifty sportster. Paul Begg took a spin to find out.

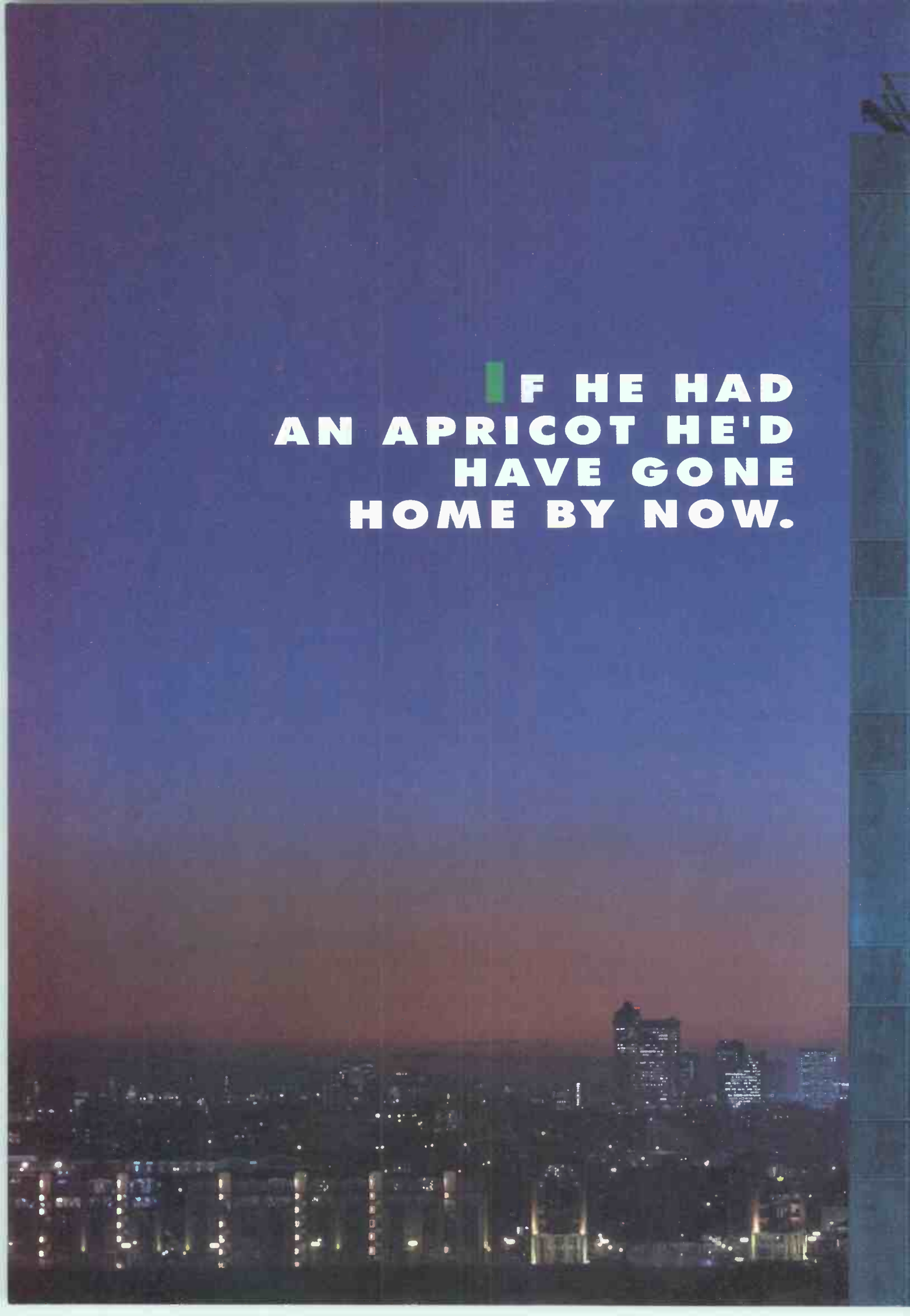
The trouble with computers used to be that they tended not to do anything until you typed something in. You needed to type words before a word processor had any value, and similarly, you have to put data into a database or spreads into a spre... well, you get the idea. What few computer programs did was to come with data already on them. There were a couple of dictionaries and quotation databases, but not much else.

CD-ROM changed all that. Now you can buy whole encyclopedias on a little disc, galleries of clipart, a foundry of fonts, movie guides, and even the complete works of Shakespeare. In this respect CD-ROM is probably the best thing that has ever happened to computers — but unfortunately, CD-ROM drives aren't very fast. Even double- and triple-speed drives can seem to take for...e...ver, especially when compared to fast hard disks.

This is where CD-Speed comes to the rescue. A DOS and Windows CD-ROM accelerator with the built-in SpeedCache, CD-Speed, it is claimed, will boost the access speed of any CD-ROM drive several times over. In fact, up to 600 percent.

This is a remarkable claim and one that cries out to be put to the test, but if it works, *how* does it work?

Put simply, it changes your CD-ROM drive's access and memory management. If you use Windows 3.1 you have the benefit of 32-bit memory management, which means you don't need SMARTDRV for anything except cacheing your CD-ROM drive — and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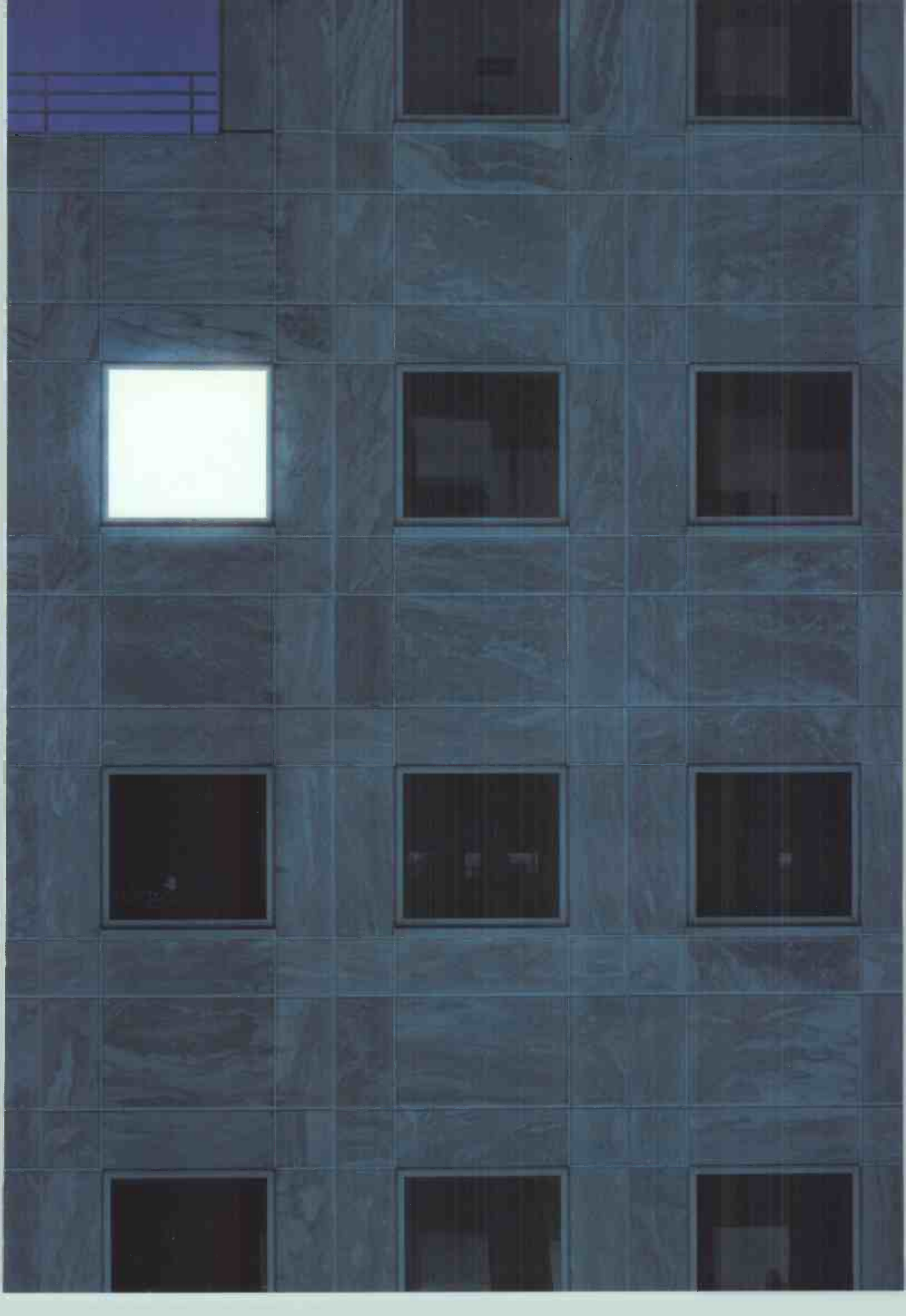

APRICOT'S XEN WOR ON TIME

Look through the advertisements in this magazine and you might well wonder whether PC manufacturers have forgotten what computers are all about.

You get list after list of abstract specifications, but little or no hint about system performance in the real world.

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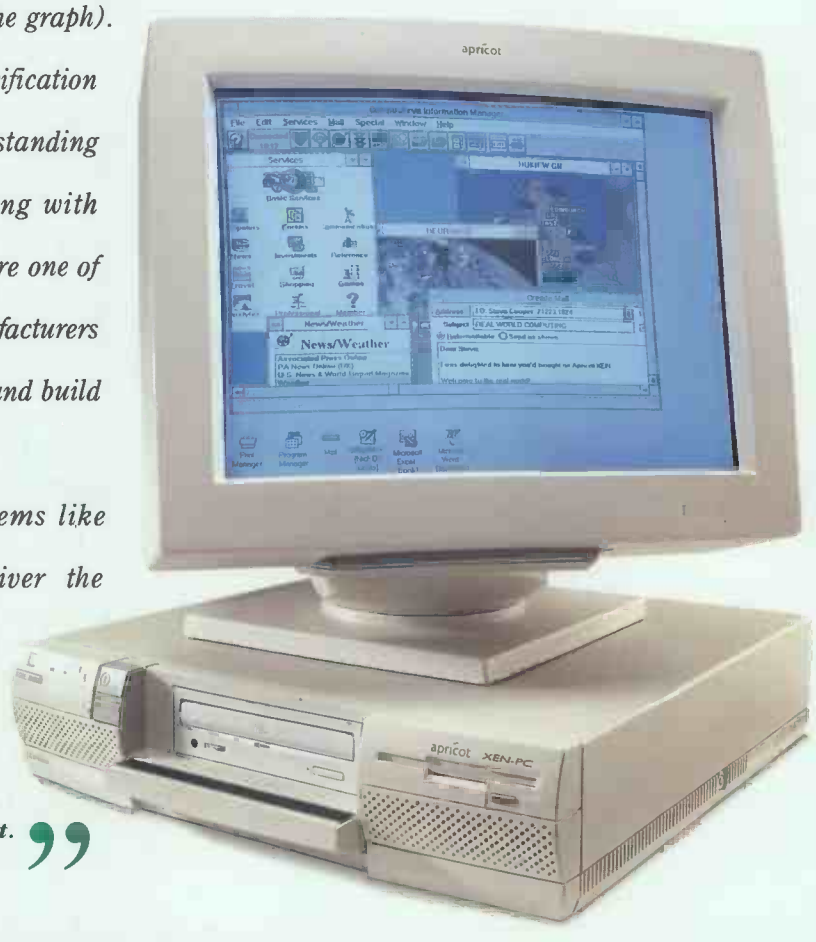

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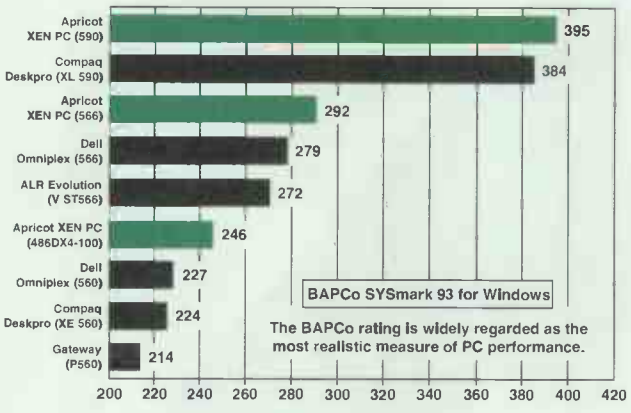

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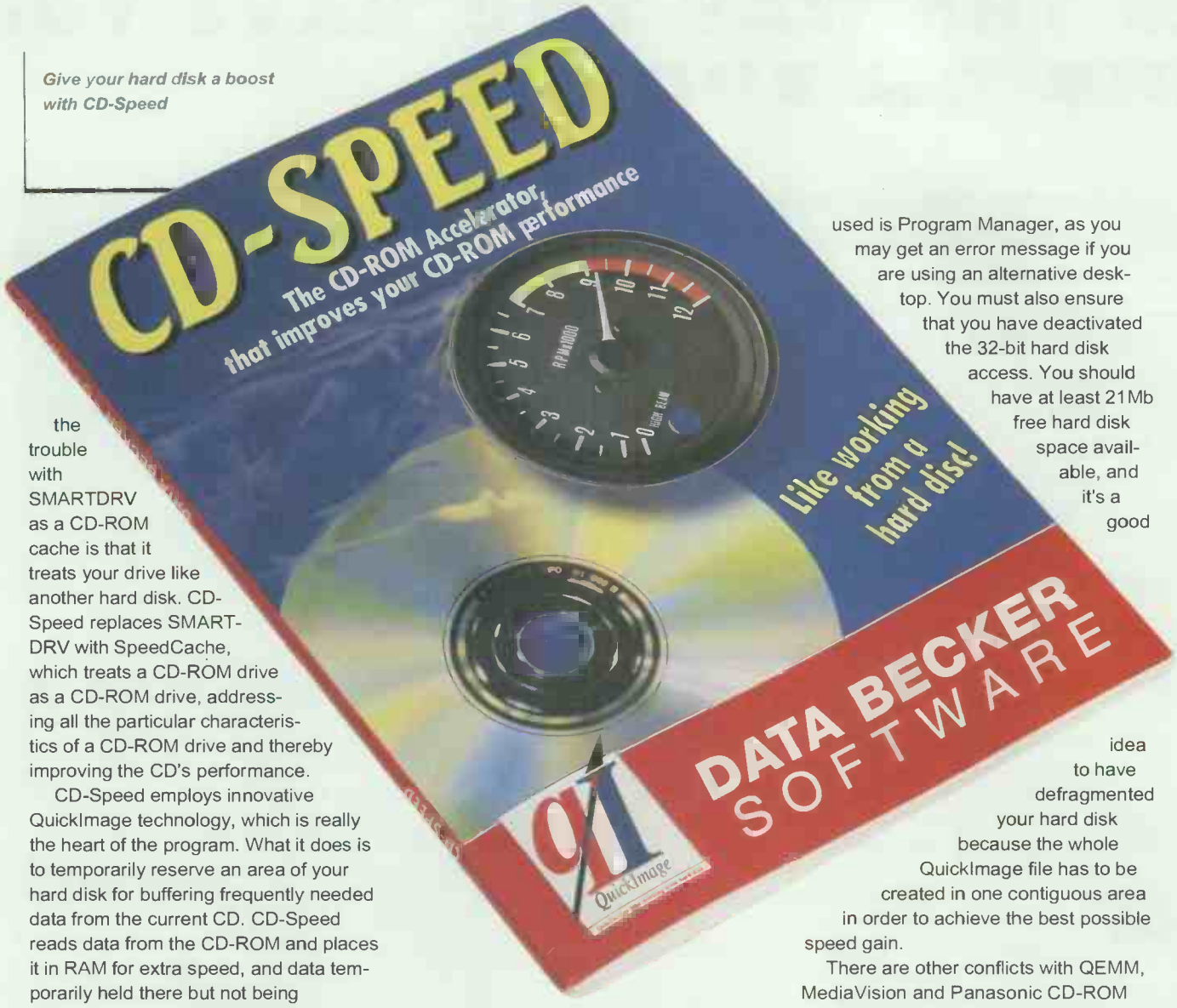

the trouble with SMARTDRV as a CD-ROM cache is that it treats your drive like another hard disk. CD-Speed replaces SMARTDRV with SpeedCache, which treats a CD-ROM drive as a CD-ROM drive, addressing all the particular characteristics of a CD-ROM drive and thereby improving the CD's performance.

CD-Speed employs innovative QuickImage technology, which is really the heart of the program. What it does is to temporarily reserve an area of your hard disk for buffering frequently needed data from the current CD. CD-Speed reads data from the CD-ROM and places it in RAM for extra speed, and data temporarily held there but not being accessed constantly is transferred by CD-Speed to a QuickImage file on the hard disk. This means that whenever the data is retrieved again, CD-Speed turns to the hard disk instead of the CD. Because it is now employing the hard disk, the speed of access is increased.

In other words, it copies frequently used data from the CD-ROM to a reserved area of hard disk and temporarily stores it there, accessing it whenever it's needed, and deleting it when you remove the CD-ROM from the drive or when the computer is shut down. This is a bit of a cheat, but speeds up CD-ROM access times considerably.

To see whether CD-Speed has made any difference to your system, a Test program is included, although this only runs under Windows. The Test reads three types of data: bitmap files, database files and executables. There's a window which shows the data throughput of your CD-ROM with and without CD-Speed. The comparison is presented as a bar chart. The animated graphics beneath this show which of the three data types is currently being tested. The colour of the bars also indicates the acceleration being achieved.

You should be warned, however, that there's a whole list of things that hinder an easy installation of CD-Speed. It will only run on a 386DX or higher processor (it appears to run on a 386SX but doesn't have enough capacity to handle the data throughput demanded for improved performance). You need MSDOS 6.0 or later and a minimum of 4Mb RAM (8Mb is recommended). It has to be installed on a physical uncompressed drive (in other words, it cannot be compressed on a drive compressed with DoubleSpace or Stacker). It will run under DOS only, but needs Windows 3.1 or later if you want to take advantage of Test utilities. Under Windows you should ensure that the shell used is Program Manager, as you may get an error message if you are using an alternative desktop. You must also ensure that you have deactivated the 32-bit hard disk access. You should have at least 21Mb free hard disk space available, and it's a good idea to have defragmented your hard disk because the whole QuickImage file has to be created in one contiguous area in order to achieve the best possible speed gain.

There are other conflicts with QEMM, MediaVision and Panasonic CD-ROM drives, memory-hungry games, and so on. I had enormous trouble loading CD-Speed on my machine and a pressing deadline prevented me from persevering. I turned to a friend's machine and... well, David has aeons of experience with computers and probably knows more about what makes them tick than most people. He tried CD-Speed too. We had to defrag a hard drive that DOS defrag said didn't need defragmenting, and after what seemed an unbelievable length of time — but can't actually have been much more than 50 years — David said: "Bugger this. Let's go down the pub."

PCW Verdict

If you don't hit any installation problems, this could be a good buy. Otherwise, watch your blood pressure.

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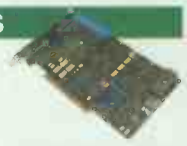

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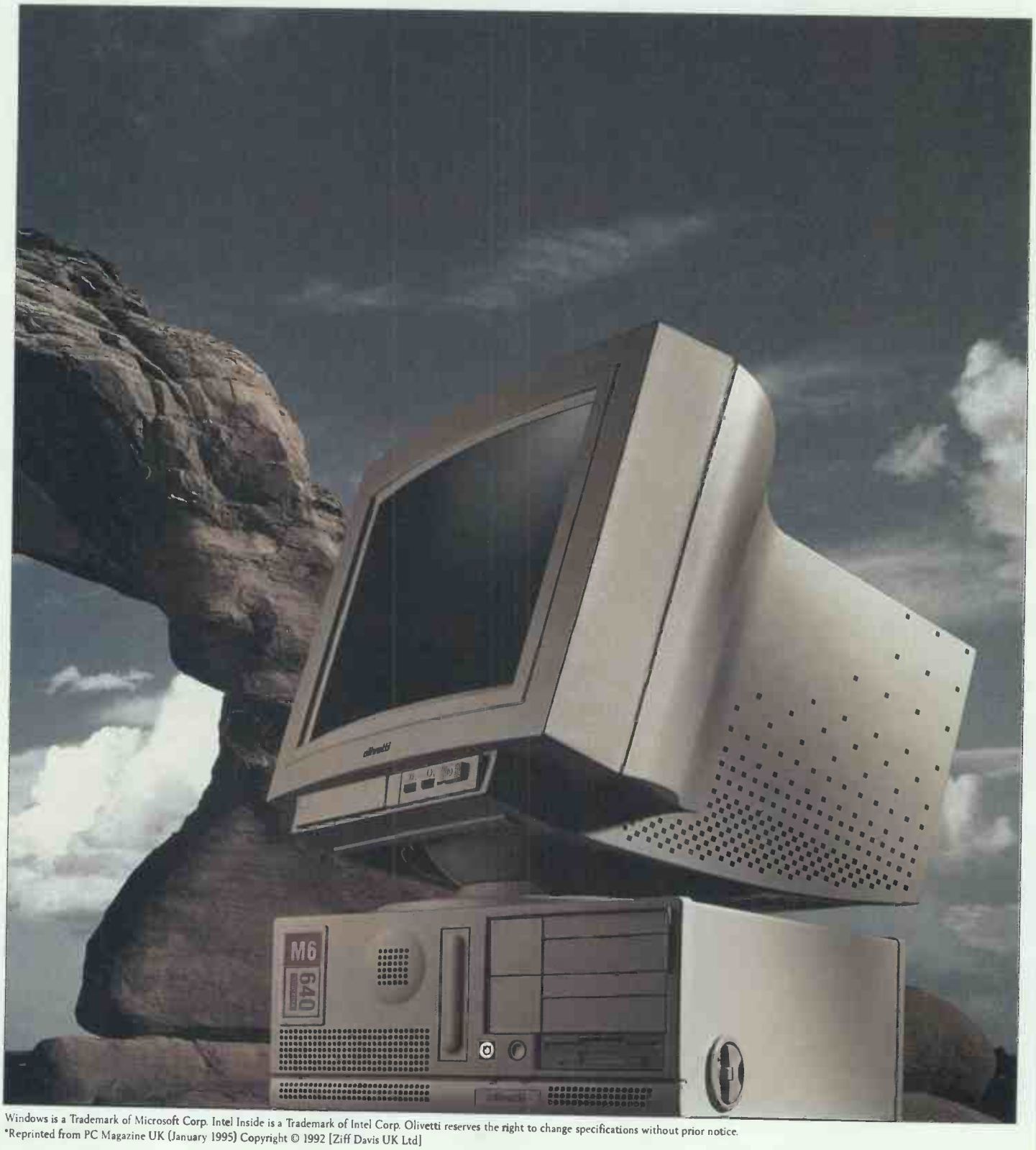

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PCW3

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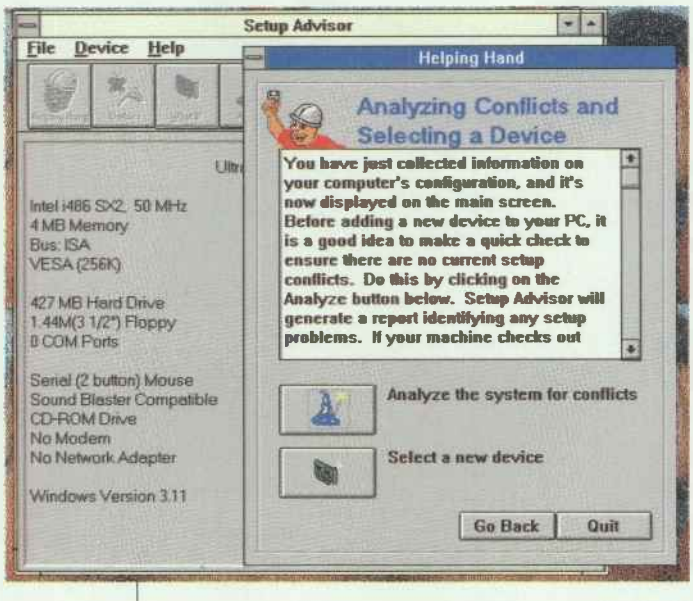
SOFTWARE

Setup Advisor

Most peripherals are capable of causing grief when you try to configure them, and will carry on doing so until Plug & Play becomes a reality. Tim Frost was pleased to find a good alternative troubleshooter.

Until Plug & Play becomes a universal and working reality, there will always be problems getting new peripherals to talk to your PC. In the meantime, S&S is offering Setup Advisor as an interim solution to getting rid of those configuration blues.

Advisor works in two stages. First, it analyses the computer's current usage of interrupts and the like. Then it gives you the chance to see whether the settings for the new card are likely to cause problems and to experiment with alternatives, all before you take the lid off the machine.



Avoiding those configuration blues

If you've read in recent issues of *PCW* about the effort required to get several MPEG cards to work, one of the complaints was that no-one provides software that could accurately itemise the settings already in use. These settings fall into four groups: the IRQs (interrupt request lines), which temporarily halt the computer's processing to hand over control to the peripheral device; the direct memory access channels (DMAs) which are used by some peripherals to talk directly to the computer's memory, bypassing the CPU; the input/output address, which tells the computer the location of the peripheral's I/O port; and the location of the memory addresses or ROM locations which the new card and its software may be utilising. Although the number of IRQs, DMAs, I/Os, and memory locations are fairly limited, multiply them all together and you have thousands of combinations, most of them seemingly capable of causing grief.

There's Microsoft's MSD diagnostics program that comes with DOS to check settings, but this has two failings. It tells you a lot about what you don't want to know in places you can't find, and a little about what you do need to know before slotting in a new card. More importantly, when it comes to IRQs, what MSD tells you ain't necessarily true. MSD will identify the ports being used and report back the "standard" IRQ settings rather than the IRQ settings that the ports have been set to.

Advisor does all this more accurately and succinctly than MSD by taking two shots at the job. Working under a neat Windows front-end, this DOS checking program does a first analysis in much in the same way as MSD, getting a broad outline of the computer's profile. Then a second "advanced" information collect pulls in the real detail by forcing a dialogue with each of the channels and reporting back what it finds.

This can itself lead to conflicts, and the system may hang up during the advanced data collect. But when rebooting, Advisor has stored where the problem area is so that it can be excluded, to let the analysis of the rest of the system continue.

Where MSD tells you which settings it thinks are in use by what, Advisor's report works the other way around and tells you which settings are still free for your next card. Then you can go on to the next stage of inserting the new card's settings into a what-if scenario.

The What-If button throws up a menu of some 150 peripherals including network, graphics, sound board, fax-modem and I/O boards. Although there are a lot of fairly recent cards in the list, by its very nature it is not going to be up to date or comprehensive enough to cover all the cards you are likely to be using in your computer. So, there are generic settings for the different types of cards that can be used, or you can simply type in the DMA, IRQ, I/O and memory address options of your new card — the default settings and the alternatives — and get Advisor to tell you which ones are likely to cause problems.

The What-If report will either tell you that everything should work fine, or advise which alternative settings should be used to avoid conflicts. This is done fairly clearly and problem areas are shown in red in the report, so you can't miss them. Then it's just a matter of configuring your new card to the proposed settings and it should work first time.

Advisor is considerably better than MSD in finding problems and getting at them before they happen. However, despite Helping Hand, an active help which guides you through the process, Advisor feels as though it needs to take one more step towards user-friendliness. For example, it would be useful to show which cards are using what settings, something which, oddly, is missing from the main report. DMA settings are not actually tested; instead, standard settings are displayed for you to work around.

But for those who never screw the case down on their PC because there is always something going in or out of the machine, Advisor will either help eliminate conflicts or at least give you a better-than-evens chance of solving them.

PCW Verdict

For the dedicated changer of PC cards, it's a good chance of avoiding the worst of the configuration conflicts — and it's cheap.

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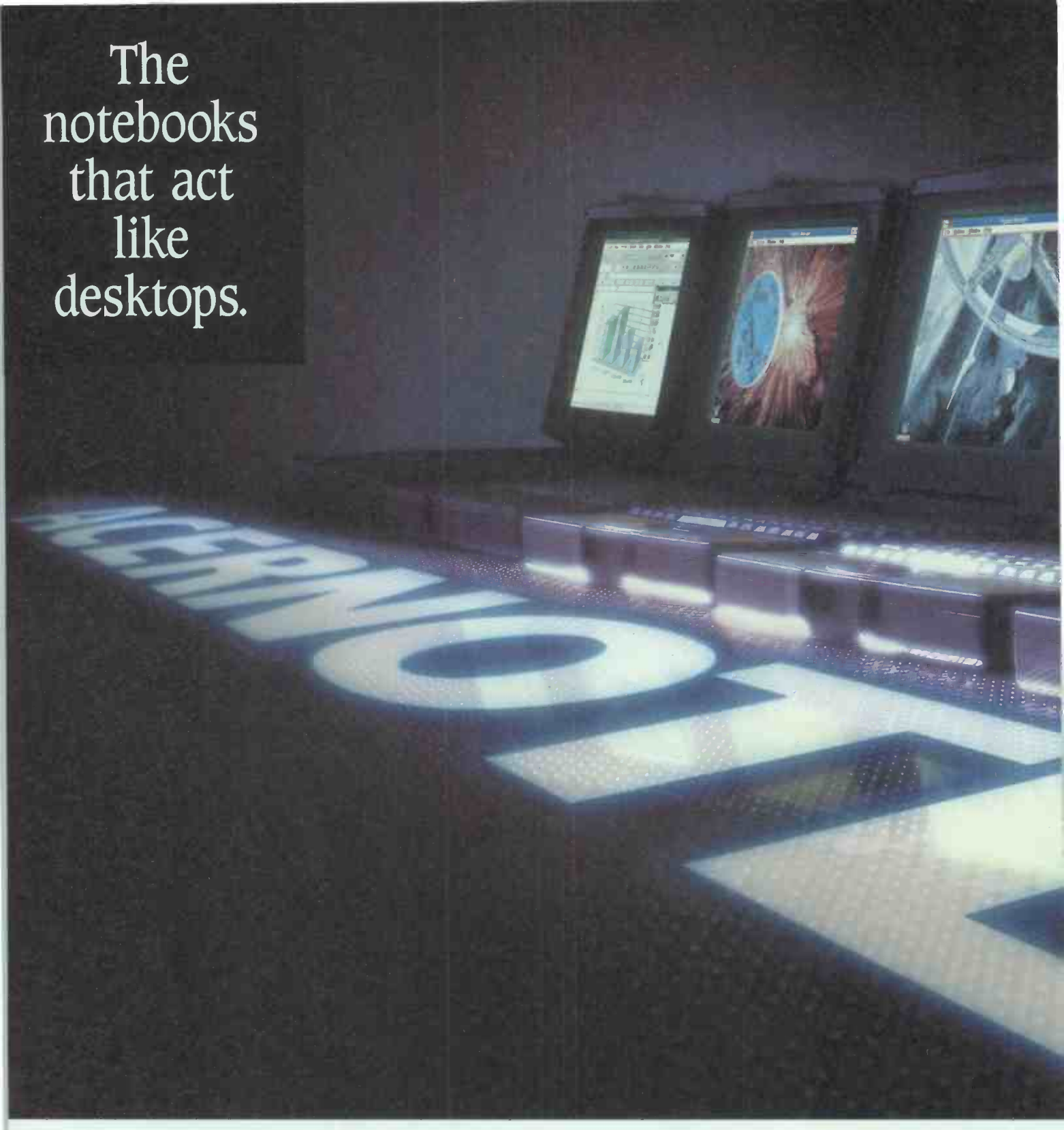

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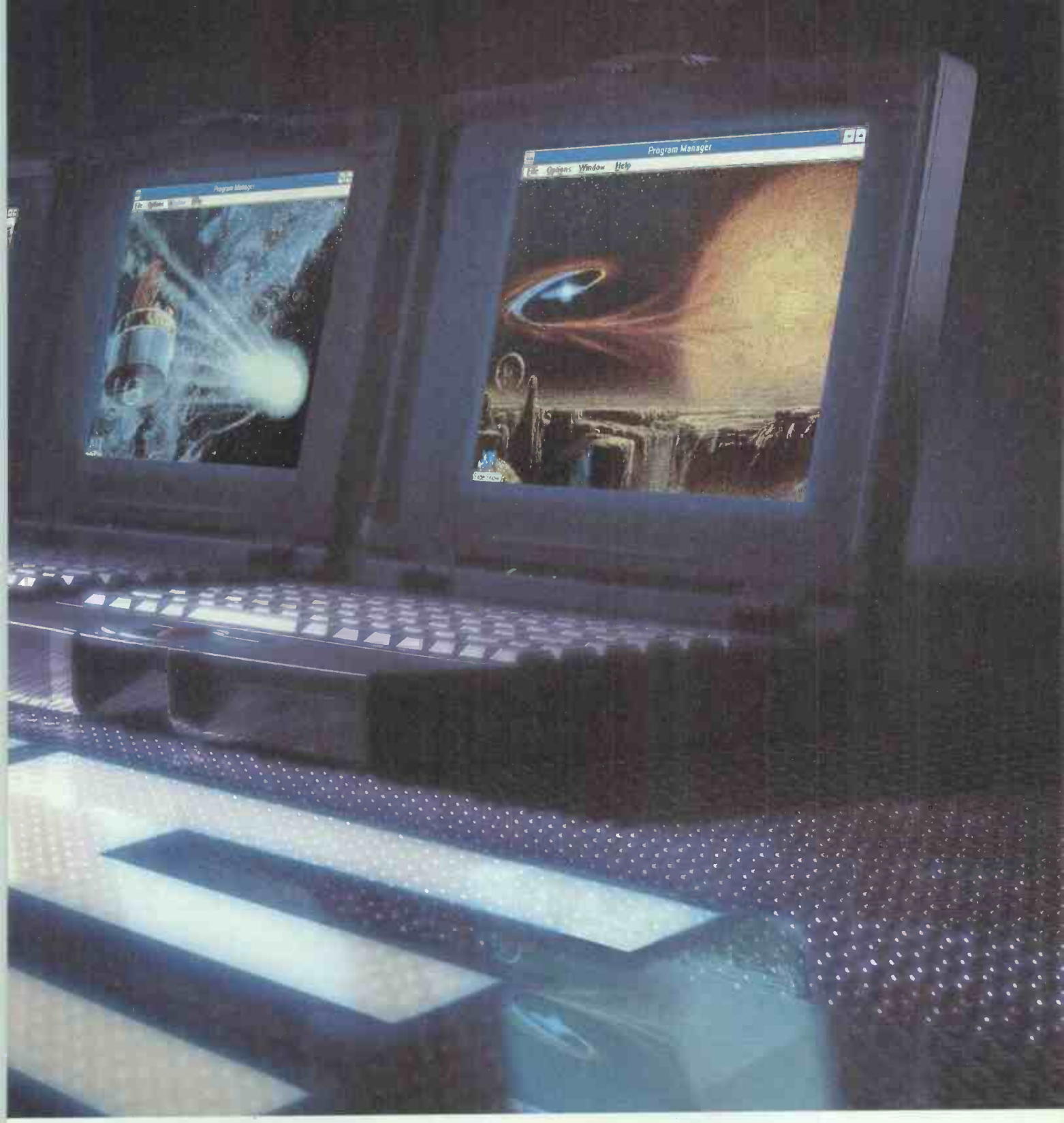

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Hardware

HP ScanJet IIc

3 YEARS TEST

A flatbed scanner had seemed well out of Nick Stanton's financial reach — but then he won a ScanJet and it changed his computing life. He continues to use it regularly and still finds it delightful.

Three years ago I was fortunate enough to win a ScanJet IIc flatbed scanner from Hewlett Packard (UK). I was just an average computer user at the time and although I had always wanted a "serious" scanner, they had always been well out of my price range. In fact, I was just about to make do with a mono hand-scanner. But ever since the day the ScanJet was delivered, my use of the computer has changed dramatically. I now explore the world of graphics.

The IIc is a 400dpi, 24-bit colour scanner (resolution is better when using interpolation). It can take paper sizes as large as foolscap, has a SCSI interface, and unlike many other models of that period performs the scan in a single pass rather than three, making it very fast to use.

The machine came bundled with PhotoPaint software for image manipulation and some trial OCR (optical character recognition) software from Caere. It supports Twain as a server which allows Twain-compatible client software to scan images directly without having to go through an intermediate capture program. It also utilises HP AccuPage, a valuable technique which allows OCR to handle coloured paper, which might otherwise fool it. Although it is possible to add a bulk sheet feeder to automate OCR of multi-page documents, I have not tried this.

So what has it been like to use, during the past three years? In a word, delightful. I use it regularly to scan in artwork, text and diagrams for technical documents and advertising posters. It has been invaluable in the preparation of newsletters because using the OmniPage professional package, it can read text much faster than I can type it. Copy for these newsletters originates in many styles and typefaces: from moderately clear typewritten, to laser printed, to dot-matrix; the system handles them all quickly and easily.

The IIc has only recently been upgraded by HP, which in a world of rapid change is testament to its great original design. The new model is very similar in many respects but also allows colour slides to be easily scanned.

The only minor criticism I have is that the SCSI card included is not suitable for other SCSI devices such as CDs and disks. Although this may have been acceptable in 1992, these days SCSI is a valuable interface for many types of peripherals.

Although back in 1992 I would not even have considered spending over £1,200 to buy a ScanJet, I can honestly say that during the past three years it has demonstrated every penny of its worth to me.

Onto a winner: the ScanJet IIc has demonstrated its worth considerably over a three-year period

PCW Verdict

A well made and extremely useful device.

Price The ScanJet IIc was replaced by the IIcx which costs £930. This, in turn, has now been replaced by the model IIIc at £839. [Look out for a review soon.]

Contact Hewlett Packard 01344 360000

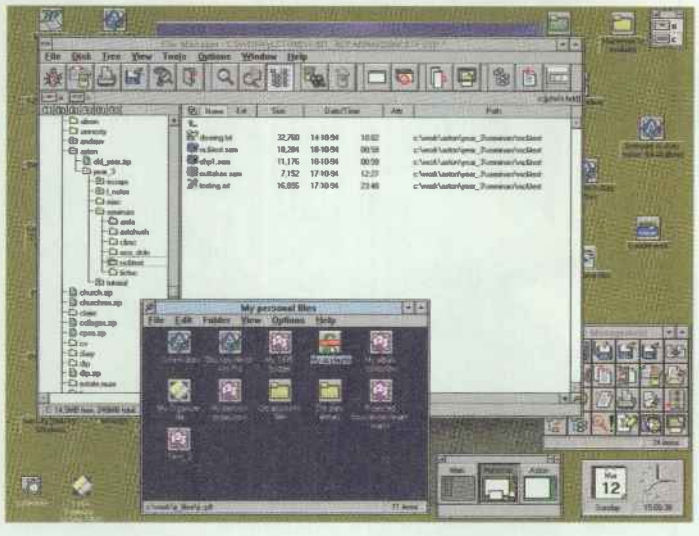
Software

PC Tools for Windows 2.0

1 YEAR TEST

John Robinson finds that the ease with which he can manage his work using this software greatly outweighs any losses in system performance.

Get organised!



With PC Tools you can redesign Windows for the way you work

When I took delivery of my PC last July, I also bought PC Tools for Windows 2.0 because I find Program Manager's restrictions so infuriating. Since then, I've regularly used the majority of utilities included with this package.

All the utilities in this new version have an easy-to-use interface, with customisable toolbars and menus, balloon help, tabbed dialogue boxes and pop-up menus. The virus scanner and backup software are not only similar to Microsoft's but also provide additional features. The optimisation and defragmentation utility works happily under Windows, and for those awful moments when your PC refuses to work at all, PC Tools can build an emergency disk, including a DiskFix utility which has saved my life on more than one occasion.

One of the highlights of the package is the File Manager replacement. It resembles an attractive version of Microsoft's File Manager, with a big, colourful toolbar and file items which display their associated application's icon rather than a generic version. The File Manager replacement treats archive files as if they were subdirectories and this makes it easy to gain access to their contents, even within applications. A pop-up menu, which attaches itself to file dialogue boxes, shows a subset of the file management functions.

The integrated File Viewer reads a good range of up-to-date file formats. Although it will only read the first page of a multi-page worksheet and doesn't seem to understand ATM fonts very well, it does read the underlying text and can search and copy selections to the Clipboard. The Viewer also enables file conversion to generic formats like RTF and CSV.

The most useful and unmistakable feature of PC Tools is its Desktop. Being able to drag and drop files and folders allows me to keep track of my work with ease. The ability to define multiple desktops and offices (collections of desktops) and move between them is a great bonus. In addition to my main desktop I've set up "study" and "personal" versions, each with the appropriate files and folders in place. Folder contents can be set up either for manual operation, or to automatically contain all files matching a certain file mask and/or location. This can include the subdirectories of the specified path, but all the selected files in that path go into one folder and this can be confusing if the path contains either several files of the same name in different locations, or a very large number of files. An option to automatically create folders within folders would be much appreciated. An irritating feature of the Desktop is that although it will reopen programs and folders from the previous session, only one will be reopened if a program has more than one file in memory. Personally though, I find I mostly want to continue from where I left off anyway, so opening the odd file is less hassle than starting the program.

Switching between all these desktops and open applications could be confusing, but several helpful solutions have been provided. MultiDesk shows a scaled-down image of all active desktops and will allow an active program, file or folder to be dragged between desktops. Alternatively, there is the replacement Task Manager which will allow a job to be transferred to a chosen desktop — but for some reason, Word 6.0 refuses to allow this. Additionally, the need to move programs manually can be negated by tagging them so they follow the user from one desktop to another. I find that tagging only a few programs such as SideKick, Scheduler (another handy utility from the PC Tools suite) and the Drive Manager, covers about 90 percent of my task-switching needs.

Naturally, there is a price to pay for using PC Tools for Windows to its full extent because all the very attractive icons in the software use up GDI resources. Although Ami Pro and Lotus 1-2-3 coexist happily, the combination of Word with the full PC Tools suite hit my system hard. In the end, I suppose I could always unload some of the utilities from my Startup group, but I think the gains from an increase in the ease of use outweigh any losses.

At least until Windows 95 arrives, the features provided by PC Tools are well worth having: it provides a decent set of utilities and a much easier way to organise your working environment, at a very reasonable price.

PCW Verdict

A must until the arrival of Windows 95.

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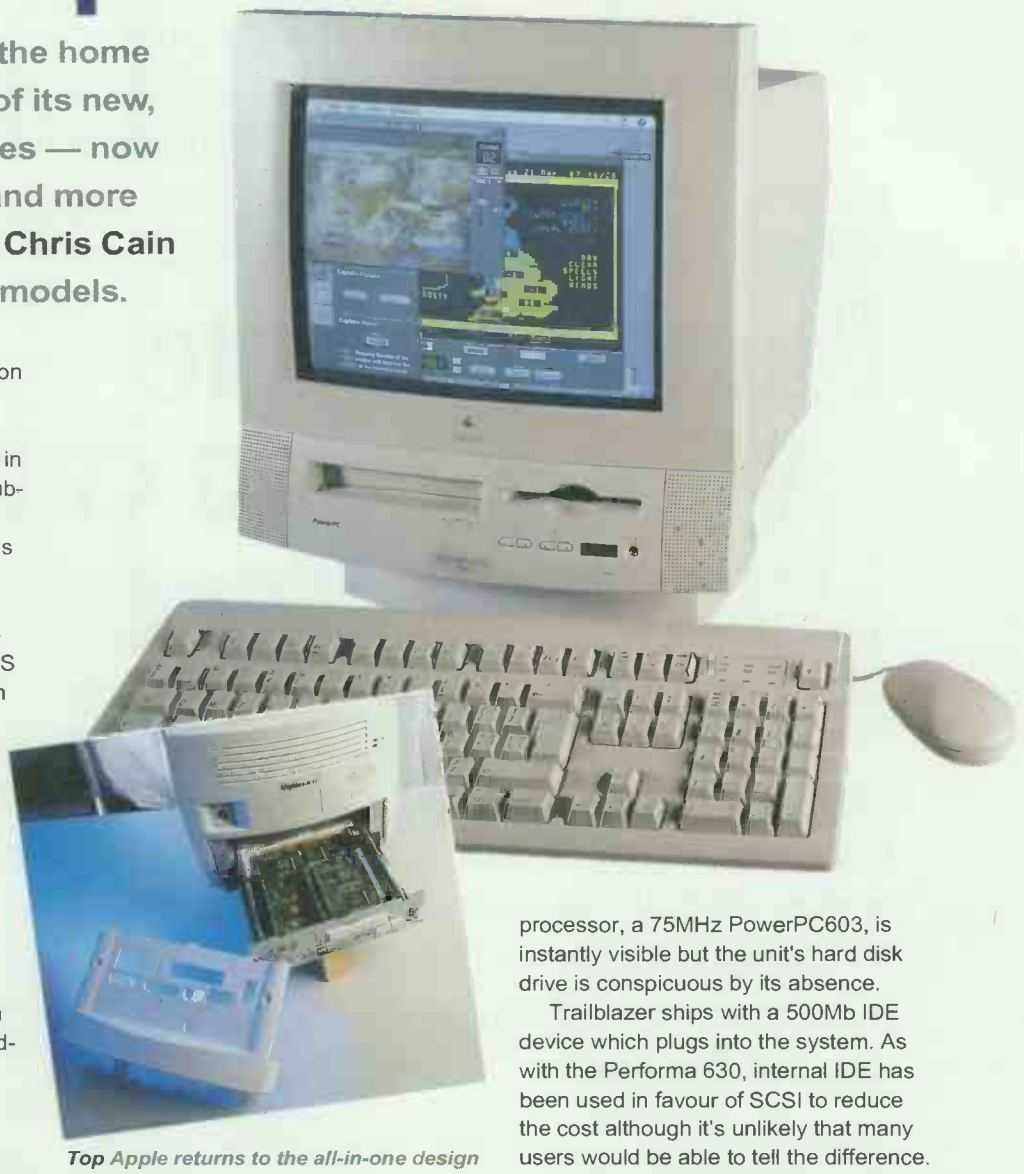
Replete performance

Can Apple at last crack the home market with the launch of its new, upgraded Performa series — now faster, better specified and more affordable than before? Chris Cain reviews the three latest models.



When Apple first made the transition from CISC to RISC a year ago, few people could have predicted the success of the PowerMacintosh. Sales in traditional Mac markets, such as the publishing industry, were assured but the price and performance of these systems has taken the company into uncharted territory. The PowerPC is gradually becoming recognised as a real alternative to Intel's Pentium, and the new DOS compatibility card for the 6100 offers an almost ideal solution for those who must work cross-platform.

Despite these achievements Apple is still experiencing trouble in capturing a healthy share of the home market, especially in the UK. The Performa series has always been viewed as second class, and the fact that all current models are still 68K-based doesn't help. But this month could witness a change with the launch of a new range of Performas; two affordable PowerPC-based machines and a DOS compatible unit.

Performa 5200

Top of the range amongst the new entries is the Performa 5200, codenamed Trailblazer, which represents a return to the tidy all-in-one design. The machine is bigger than its predecessors and at first glance bears a striking resemblance to Compaq's Presario. The overall look is attractive and the machine wouldn't look out of place in the home, but it's nowhere near as cute as the old Mac Plus or Colour Classic.

Apart from a 15in Hitachi FST screen and a pair of stereo speakers, the only notable features at the front are a 1.44Mb floppy and CD-ROM drive. In an effort to provide a hedge against the future, Apple has sensibly opted for a quad-speed CD unit. The rear of the unit features ports for Ethernet, stereo sound in and out, serial, printer and external SCSI devices but there is no external monitor port and this limits the machine to a standard screen.

Top Apple returns to the all-in-one design with Trailblazer
Bottom The new system is easy to upgrade

The keyboard supplied with Trailblazer is a recent design with a surprisingly PC-like feel to it. Introduced with the Performa 630 it's not quite as comfortable or elegant as previous models, but it does have function keys and the all-important power switch. Unfortunately, Apple doesn't offer the option of the highly desirable adjustable keyboard.

Getting inside the new system is remarkably easy — a few adjustments, a tug of the handle and the motherboard slides smoothly out of the back. The main processor, a 75MHz PowerPC603, is instantly visible but the unit's hard disk drive is conspicuous by its absence.

Trailblazer ships with a 500Mb IDE device which plugs into the system. As with the Performa 630, internal IDE has been used in favour of SCSI to reduce the cost although it's unlikely that many users would be able to tell the difference.

To improve overall speed and allow the newly designed processor to perform properly with older Mac applications, 256kb of secondary cache is fitted as standard. Without this, the PowerPC603 has a problem running the 68K emulation (later cured with the revised 603e version). Both the 603 and its brother (603e) are low-power units — a fact evidenced by the lack of a bulky heat sink, as used in the 601.

Along with various Apple ASICs, other notable features on the well laid out motherboard include an '040 Processor Direct Slot (PDS), 4Mb ROM SIMM and 8Mb of RAM expandable to 72Mb. A comms slot on the lefthand side is fitted with an Ethernet card. On the review model, a video slot on the right was filled with a TV tuner. This slot is empty on the

The 630 DOS Compatible could be a godsend for anyone working cross-platform. The inside is messy but very well made

standard machine.

Trailblazer's built-in video controller uses 1Mb of VRAM and can provide displays of 640 x 480 pixels at 67Hz and 832 x 624 pixels at 75Hz on the integrated monitor. In theory, 1Mb can give 1024 x 768 pixels in 256 colours. It's a shame that with a single monitor restriction you'll never get to see this resolution in action. Apple has also shot itself in the foot in the audio department, by employing an 8-bit Digital to Analogue Convertor (DAC). No-one with multimedia in mind wants less than 16-bit CD-quality audio — even the average home user who supposedly can't tell the difference.

All new Performas are available in two bundles: Normal, which gives you the machine with System 7.5, At Ease interface software, PC Exchange and Claris Works; and a Plus bundle that includes the optional TV tuner and many more CD-based titles. Exactly which titles these will be is undecided at the moment, but should have been announced by the time you read this.

Performa 5100

Next in the range is the 5100, codenamed Crusader, which is slightly cheaper and supplied in the same case as the Performa 630. Crusader contains the same technology as the all-in-one Trailblazer but supports an external monitor and is supplied with the 15in Performa Plus stereo model.

This screen copes with the same resolutions as the Hitachi FST display, but there is now the option of replacing it for a better model. The same PC-style keyboard is shipped with Crusader, and it's available with the same bundled options.

Performa 630 DOS Compatible

The third model in Apple's new entry level line-up is a 66MHz '040 machine supplied in a Performa 630 case. This is rather surprising, as the company is committed to moving ahead with RISC, but 68K technology does allow it to maintain certain price levels.

Despite the hype, an '040 is still a powerful and extremely useful processor suitable for just about every application. Beatrice (as this model is known throughout Apple) stands out as being DOS-compatible. Using technology and experience gained from producing the DOS plug-in card for the PowerMacintosh 6100, Apple has engineered a 486DX2 PC into the same system.

As with other Performas, the machine is supplied with a 15in monitor and the new Apple keyboard, but annoyingly the CD unit is only double-speed.

Opening the lid reveals a cluttered, multi-layered motherboard, but the overall design is as neat as in other Macs. Thanks to its rather large heat sink, the 486 chip is instantly visible, and the neater looking Motorola silicon sits opposite. Positioned next to these is a Sound Blaster-compatible daughterboard for the PC side which provides 11-voice FM synthesis and stereo music capabilities. The technology is based around Creative Labs' revision 1.5 hardware, so the DAC is limited to 8-bit resolution (as with the Mac sound chip on the motherboard).

The RAM in Beatrice is arranged in three sections: there is 4Mb on the Mac motherboard, 4Mb on the PC section, and another 4Mb in the Mac SIMM slots, totalling 12Mb as standard. The memory can be shared between the PC and Mac systems, and the whole machine can handle up to 72Mb in total.

In terms of video, the Mac side of things is the same as for the other models here with 1Mb of VRAM. The PC part offers a 512kb SVGA subsystem. An optional Ethernet network card for the PC can provide IPX, TCP/IP and ODI network services.

Once Beatrice is up and running, switching between the two systems is a simple matter of double-clicking on the PC Setup icon. The display switches or fades into the familiar C> prompt and you can then use the same keyboard, screen and mouse for DOS and Windows operations. You can even share clipboard information between the platforms. The DX2 makes sure everything moves at a good speed and the whole affair is surprisingly usable.

The only noticeable problem with compatibility is that although it currently doesn't work with OS/2 Warp, it does with Doom.

Conclusion & Prices

Has Apple done it at last? Based on what we've seen, and if dealers can get their prices right, there is every chance of Performas performing at last in the high street. Both PowerPC models are fast and well specified, and, with bundled monitor and keyboard, are a real match for the current entry-level Pentium systems. The DOS-compatible Beatrice model is the most intriguing, and it will be interesting to note the sales figures at the end of the year.

Although Apple remained tight-lipped when we asked them whether or not we would be seeing a PowerPC version, the company did admit that this would be an attractive proposition.

Currently predicted SRPs are £1,799 for a top-specification Performa 5200/500/CD/TV, £1,699 for the separate 5100 version. Paying an extra £100 for an all-in-one design that limits your choice of monitor may not seem sensible, but Apple is convinced that the styling will win many people over. The Performa 630 DOS Compatible has an SRP of £1,699.

PCW Contacts

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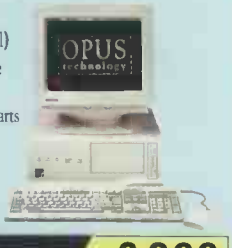

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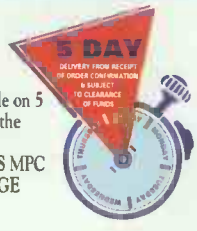

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Practical PC December 1994
Prestige MPC P60

PRACTICAL PC

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Computer Shopper March 1995.
OPUS Prestige MPC P60

COMPUTER SHOPPER

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intel inside pentium

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- Dual Speed , Multi-session CD ROM
- 16 Bit Sound Card
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- MS Windows 3.11
- LOGITECH Mouse (Serial)
- Desktop Case Style
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- Desktop Case Style
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PCW/06/95

MONEY TALKS

Five go mad with

It's that time of year again — when our very own Famous Five head out on their bicycles to find the best complete PC system they can get for £1,500. As always, there's a great deal of variety in their choices, which range from portables to alternative platforms. So sit back, quaff lashings of ginger beer, and decide which of our spending sprees you would go with.

PCW **Bicycle** Photography by John *Millar* ● **Bicycle** loaned from ***FREEWHEEL*** Covent Garden, London
PCW **Product** Photography by David *Whyte* and Bruce *Mackie*

For the third year running, we gave five of our writers £1,500 and sent them out in search of a complete PC system. Armed with little more than a worn-out bicycle and a wad of tenners, off they went. Two of our buyers headed for retail outlets while the others turned to *PCW* to hunt down the bargains.

Unless your funds are unlimited, £1,500 is a typical budget for a PC, printer and some software. If you aren't VAT-registered, though, you'll need to find another £250 to pay the taxman. Where two years ago this would have bought you a 486SX with 4Mb RAM and a copy of WordStar, you can now comfortably buy a DX2/66 with 8Mb RAM, Microsoft Office and plenty of extras. In many cases, adding a CD-ROM drive and sound card will add only £100 or so. But although the price of PCs has halved over the past two years, there has been little movement in printer prices.

If you've bought such a system before, you will

£1,500

know there's an awful lot of kit to choose from. But you must consider not only what to buy, but who to buy it from. Your local branch of Dixons may be convenient but you"ll probably save a few pounds if you buy direct from the manufacturer, or by mail order. Then again, it can be unwise to buy from a little known company which might not be around in six months to fix any problems you may have.

It's never easy choosing the right system, and no one choice is right for everyone. Our selections here show this, as they vary from portable PC systems to full-blown multimedia desktops — and that's before considering alternative platforms.

Clive Akass

An astonishing 60 percent of businesses in Britian do not use a single computer, according to an estimate being bandied about last year. Most of these would be small operations, such as sidestreet shops or self-employed skill sellers, but just about all would benefit from computerisation and I made my choice with them in mind.

In particular I considered the needs of someone such as a jobbing carpenter or plumber, who spends a lot of time away from a small office or home base... someone who needs, perhaps, a portable that transforms into a desktop system back at base.

I went for businesslike accessories rather than multimedia gizmos such as sound cards, and for good deals rather than for performance stars, because almost any 486 PC has ample power for basic business use.

Also, I chose a portable with a mono screen; this is because the extra cost of even the cheapest built-in VGA portable colour would be more than an entry-level exterior SuperVGA colour monitor, which most mono machines will support. So you can use a proper high-definition colour monitor in the office, at a cost of using mono on the road.

I scoured the adverts in *PCW* for a solid notebook with a useful software bundle and found myself spoiled for choice. Eventually, I plumped for a Brother Trekker, with a fastish 50MHz 486SLC2 processor and a 250Mb hard disk. This is a sturdy, light machine though you should pick one of the other many low-cost models available if you want a PCMCIA slot.

The Brother is bundled, for just £808, with a suite of Lotus products that cover nearly all small-business needs: the Ami Pro 3.0 word processor, the 1-2-3 spreadsheet, a package of clipart called SmartPics, and Organizer, which takes care of contacts and appointments.

Brother also offers a basic SVGA colour monitor for £168, which is a fair price and I chose it if only to stick to one main supplier.

The next major item is a printer. My first choice was a Mannesmann Tally 9104 T-Win GDI laser printer available from Morgans for £199, which is very cheap for a robust office laser, albeit for one that can be used only with Windows. But Simon Rockman turned out to have beaten me to the draw; not wishing to duplicate his choice, I picked an Epson Stylus 800+ inkjet. My colleague Eleanor Turton-Hill liked this model so much when she reviewed it that she bought one, so there can be no higher recommendation. Print quality is high and (almost as important) there is a good paper-feed system. It can be bought from several dealers for £168 or less.

No trackball I have ever used is a patch on a standard mouse for heavy-duty work, so for office use I opted for a Microsoft Home mouse, which can be bought from Watford Electronics for £27 complete with a games pack. My budget unfortunately does not run to an exterior keyboard, which can be bought for as little as £25.

Any business these days needs fax facilities; Watford offers an 14.4kbps Aries faxmodem with Delrina Winfax Lite and comms software for just £89. This will of course also provide access to email and other Internet attractions, though you will need to sign up with a service provider.

The problem with most faxmodems is that you have to leave your PC on to receive incoming faxes. One answer is to scour small-ads for an old sit-up-and-beg DOS computer that you can leave, with the monitor switched off, permanently listening for incoming faxes.

Also, though a faxmodem will allow you to fax anything you can print (actually, it is a printer as far as your software is concerned), you cannot fax paper images. Again, depending on your priorities, you might choose to buy a £106 Logitech Easytouch handheld scanner that attaches to the parallel port to digitise paper images for sending.

But my notional small business does not anticipate heavy fax traffic, so I did without the old PC and scanner in favour of upgrading the Brother's RAM from 4Mb, the minimum recommended for Windows, to a more sensible 8Mb. This costs £150.

This extra RAM is useful particularly for graphics-intensive tasks, and I imagine that our carpenter will want to draw up plans to impress clients. Visio 3.0, at £89, is good for this. It is based on the idea of "smart shapes", one advantage of which is that you can re-use drawings. For instance, you can draw a standard set of shelves and then fill in the dimensions as required; Visio will reproduce the shelves to scale, complete with corrected dimension lines. Be warned that this degree of customisation takes some effort to set up, but Visio can be used usefully even by novices.

All of this will leave you with just £1 change out of £1500, excluding VAT. Enough to buy yourself a drink before you set about the considerable task of setting your system up to do what you want.

PCW Shopping List

Product	Price
Brother Trekker	£808
RAM	£150
Epson Stylus	£168
Aries 14.4	£89
Monitor	£168
MS mouse	£27
Visio	£89
Total	**£1499**

PCW Contacts

Brother 01923 218878
Kyodai 01279 416888
Morgan 0171 244 2115
Watford Electronics 01582 745555

Gordon Laing

Each year we run this feature I try to persuade you that Apple Macintosh is the platform to go for. Many years ago, Macs were fabulously friendly but equally expensive. Today, the ease of use remains, but price/performance levels have dropped to those of clone PCs.

Early concerns about cross-platform compatibilities are no longer an issue, and to be honest, never really were. Macs can read PC formatted floppies with a special extension, now included as

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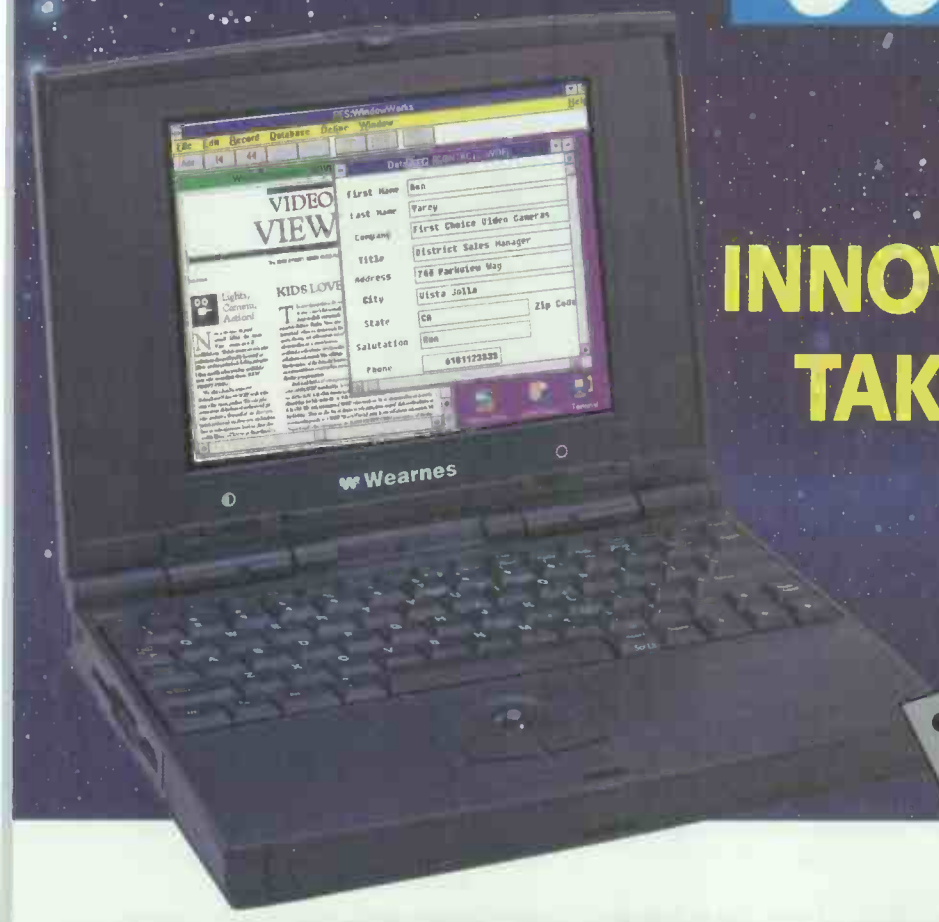

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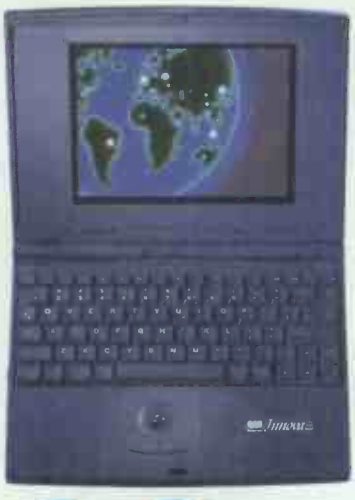

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part of the current OS, System 7.5. With the exception of a few obscure DOS accounts packages, you can get virtually all the same software for the Macintosh that you can for the PC — and for the same price. And yes, a document written on Word 6.0 for Windows can be opened without difficulty in Word 6.0 for Macintosh.

Recent PC configurations have seen sound cards being fitted as standard: sound has always been standard on Macs, with recent models offering 16-bit quality in and out. SCSI is the standard bus on all models. Networking has always been offered on Macs too, with all models featuring serial LocalTalk and, more recently, EtherTalk (Ethernet with the AppleTalk protocol). It's also very easy to set up Mac networks, and cross-platform networks are possible too: at *PCW* we have Macs and PCs Ethernetted together on a bridged server running Novell NetWare 3.1.

At the Windows show this year, Microsoft was demonstrating Windows 95, still in unfinished beta form with an expected release at the end of this year. Assuming it will work first time, we'll at last have long filenames, no more 640kb legacy of DOS, and a proper bootable GUI OS from Microsoft. You want it now? You want a proven personal computer OS that has been working this way since 1984? You want Macintosh, that's all there is to it. Now let's see what £1,500 will get you at the time of writing, end of March 1995.

After that spiel, it proved a little tricky to come up with a system available now, which would still be around when you read this in May 1995. My ultimate advice? Thoroughly peruse the adverts in the latest *MacUser*, paying particular attention to mail-order companies such as Computer Warehouse, Jigsaw, Callhaven and MacWarehouse. Virtually every fortnight there is a new special offer which will only last a few weeks.

I was going to recommend the special-offer PowerMac 7100/66DL, a 66MHz PowerPC machine similar in speed to a Pentium 66, with 8Mb RAM, 350Mb drive, three NuBus slots, 14in Trinitron monitor, keyboard and mouse for a bargain £1,049; but then I was told they'd probably be sold out by May.

A slightly less special deal was for a PowerMac 6100/60, a 60MHz PowerPC machine similar in speed to a Pentium 60MHz, with 8Mb RAM, 250Mb drive, same monitor and keyboard for around the same price.

The advantage is that the 6100 is currently the only Macintosh that can be fitted with the superb DOS compatibility box. Around £400 gets you a card with a genuine Intel 486 DX2/66 processor, 8Mb RAM, additional video memory and cunning circuitry allowing you to share all the hardware facilities of the 6100. These include the same mouse, keyboard, clipboard, video, partitions on the drive, Ethernet port, sound (which emulates SoundBlaster 16), CD-ROM drive, and any other peripherals. A user-defined hotkey switches between platforms. In use the PC is quick, and absolutely complete — it will run Windows in enhanced mode and, most importantly, will work with Doom. I tried fdisk, chkdisk, defrag and the rest: it all works, because it's a PC. The DOS box, perhaps with a Pentium, may become available for other Mac models. But, and it's that but again, the good 6100 deals may not be available in May.

It's difficult to know what will be available, so I'll instead briefly go over the different processors now. The older and cheaper Macs use one of the Motorola 68000 family; some Macs with the 68030 are still on sale, but most current models use the 68040, running at 25/50MHz or 33/66MHz, similar in performance to a 486DX2/50 and 486DX2/66 respectively. The PowerPC chip, used in the PowerMacs, is a fast RISC processor, currently used by Apple in four speeds: 66MHz, 80MHz, 100MHz and 110MHz; these are similar to or slightly faster than Pentiums with equivalent speeds, particularly with so-called native software written specifically for the chip.

I would ultimately recommend a PowerMac, and you will be able to buy a complete system for less than £1,500 by the time you read this, but I don't know what it will be. Apple will have released an all-in-one PowerMac by May, with a 15in monitor and built-in quad-speed CD-ROM drive, for around £1,500. I can't stretch to that, but it and other new launches will drive down the price of current models. In the meantime, I'll go for the 7100/66DL package mentioned earlier for £1,049 as a typical Apple offer.

I'll buy native Claris Works 3.0 for £94 and a Hewlett Packard DeskWriter 320

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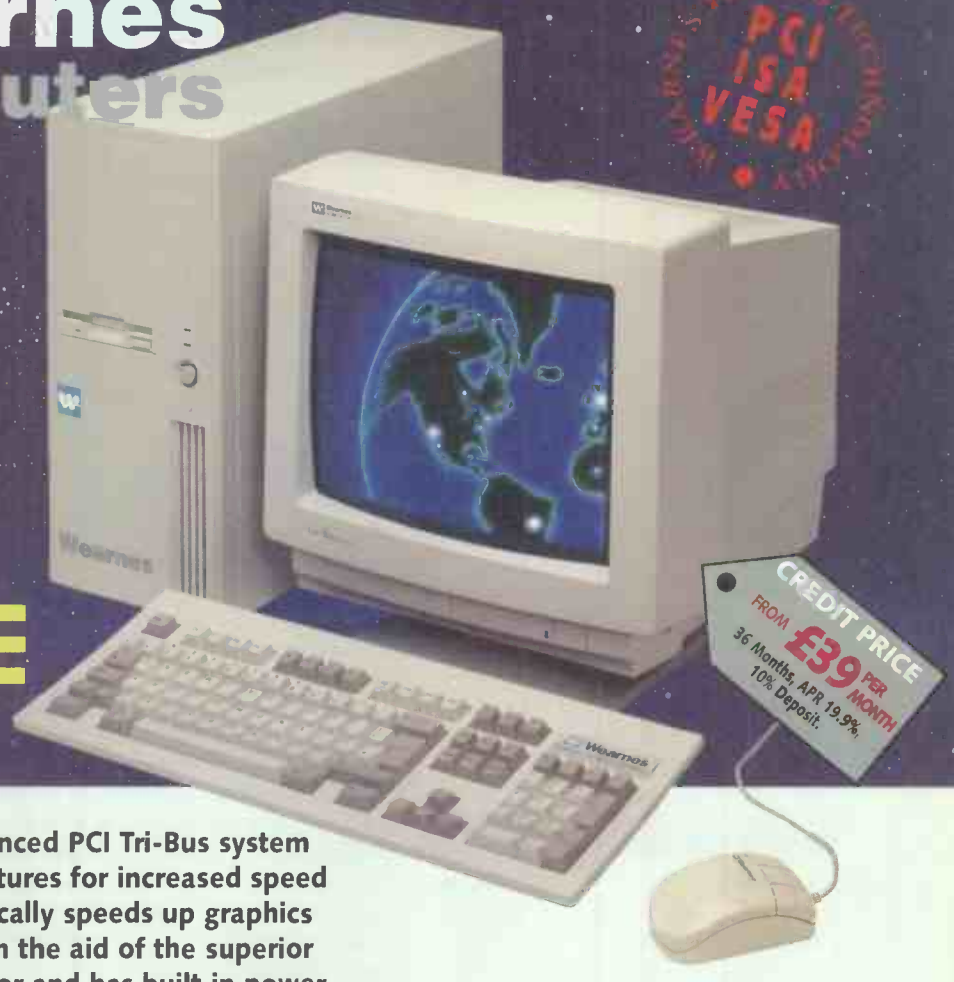

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for £167. The 320 is tiny but fully-featured, and offers excellent quality and colour upgradability.

This leaves £190. PowerMacs are pretty memory-hungry, but I have plans for most of my cash, so I'll buy the extremely effective RAM doubler for £55. Around £130 should buy an Apple internal double- or even external unbranded triple-speed CD-ROM drive, which leaves a fiver to toast yourself on buying the superior platform. May I recommend a bottle of Tulloch Hunter River 1988 Shiraz Cabernet Sauvignon from Oddbins? — those Australians really know how to make wine. (Sadly, Oddbins had sold out of this vinous wonder at presstime, so in the picture you can see me clutching a bottle of Penfolds 1993 Semillon Chardonnay — not too heavy, and probably a little more palatable in these warm spring days.)

PCW *Shopping List*

Product	Price
Apple PowerMac system	£1049
HP DeskWriter 320	£167
CD-ROM drive of choice	£130
Claris Works 3.0	£94
RAM Doubler	£55
Nice bottle of wine	£5
Total	**£1,500**

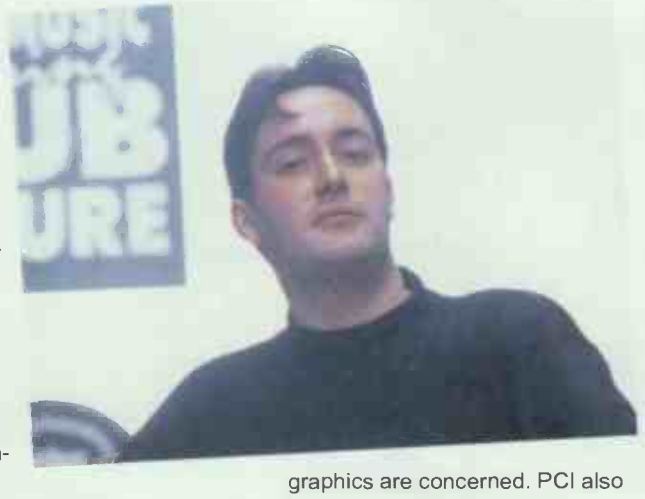
PCW *Contacts*

Computer Warehouse 0171 724 4104
MacWarehouse 0800 181332
Jigsaw 0115 942 2990
Callhaven 0800 242444

Steven Helstrip

Had I been asked to go out and buy a system that best suits my needs, chances are I would have returned to the office with a 90MHz Pentium, 16Mb RAM and a hard drive in excess of 2Gb. The 21in Trinitron monitor and Microsoft Office suite would have to have been delivered by courier though, since our bicycle had only a modest basket.

Sadly, with only £1,500 to spend, the Pentium system was far out of reach. The fifteen hundred pounds also had to buy me some basic software (a word processor, spreadsheet and database), and something to print my documents with. My initial thought was to build my own PC. This way I could assemble something to my exact specification and hopefully save a few pounds along the way.



I first turned to *MicroMart* to track down suppliers of motherboards and the many other bits needed to build my system. It wasn't long, however, before I realised that building a PC from scratch is far more expensive than buying from one of the larger mail order companies. As the larger suppliers buy components in huge quantities, they can usually offer hefty discounts on complete systems.

So, having abandoned the idea of building my own PC, I picked up a trusty copy of *PCW*. Among the pages of adverts I came across Evesham Micros, who sell just about everything from Ethernet cable by the metre to complete office systems. I have dealt with Evesham in the past and was impressed by their machines and service, so I gave them a call to discuss my options.

I had already decided that anything less than a DX2/66 with 8Mb wasn't worth considering since Microsoft Office wouldn't run happily. My interest in multimedia meant a sound card, preferably 16-bit, and a CD-ROM drive was also a must — if only to play the occasional game of Descent. A PCI bus was an important consideration since it has become the standard, especially where disk and graphics are concerned. PCI also offers plug and play hardware which means there will be no need to work out interrupts and address settings when installing further hardware in the future: an MPEG card, for example

After a day or two weighing up the options, I decided to go for the Popular Media "95. My first thousand quid bought me a PCI-based system with a DX2/66 processor, 4Mb RAM, 528Mb hard disk and multimedia kit. I was a tad unhappy with just 4Mb so a further £120 brought it up to 8Mb; enough to run any business application.

The motherboard has built-in IDE looking after both the hard drive and the CD-ROM — a double-speed Panasonic CR-571. The sound card is a standard SoundBlaster 16 Value Edition and doesn't have the feature connector for upgrading to WaveTable synthesis, which might be a problem. It does, however, offer compatibility with just about every

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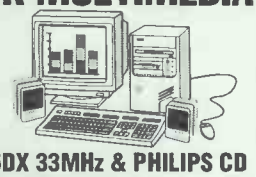
HP III (PCL 5), 1Mb RAM, 300 dpi, 26 Bitmap fonts, parallel and RS232. **ON-SITE. RRP £999** **£450**

DTK MULTIMEDIA



486DX 33MHz & PHILIPS CD
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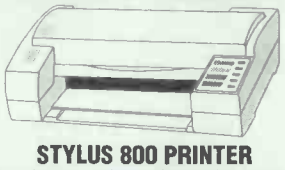

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300 dpi res, enhanced graphics mode, sheetfeeder, 8K print buffer, scalable fonts. Parallel port. **£150**

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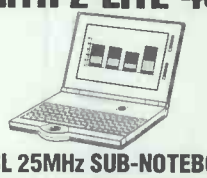

i486SL 25MHz SUB-NOTEBOOK
170Mb drive, 4Mb RAM, NiMH battery. External 1.44Mb . . . **£49**
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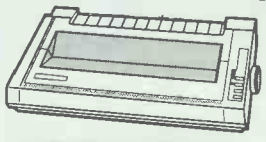
132 COL + NLQ



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- 14" VGA colour monitor
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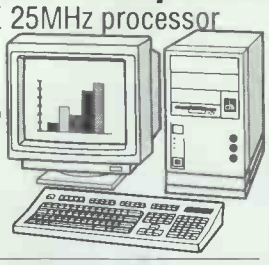

15PPM LASER

SEIKOSHA OP115 PRINTER
300 dpi, 1Mb RAM and 5 fonts. HP II, IBM & Epson modes. 250 sheet bin, parallel/RS232. **£599**

PHILIPS CDD 462

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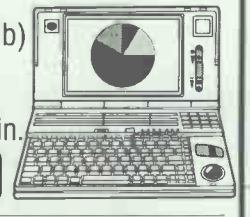

DTK DX2 66MHz

DUAL SPEED CD & 16 BIT CARD
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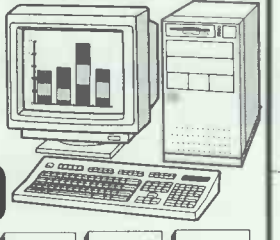

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EXCEL 4 - Best selling spreadsheet package.
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Full manuals/disks - US version software.

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10ppm speed, 8 scalable and 14 Bitmap fonts, 300 dpi res, 1.5Mb RAM, parallel and RS232. **£499**

NEC GDI LASER

SUPERSCRIPT 610 PRINTER
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AMBRA 486SX 25MHz 170Mb
4Mb RAM, hi-res LCD VGA, ext 3.5" 1.44Mb, mains or battery, DOS 6.2 & Windows 3.1. **£699**

SHARP UX-135

AUTOSWITCH PERSONAL FAX
Fax switch, 50 auto dials, 10 sheet auto doc feed, answerphone hook-up. **INC ON-SITE** **£250**

MS WORKS 3

CD ROM VERSION
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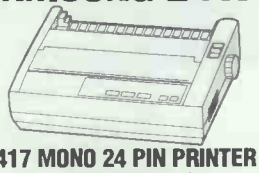
SAMSUNG 2417



2417 MONO 24 PIN PRINTER
80 column width, Epson & IBM emulations, 8K buffer, tractor & friction , parallel interface. **£125**

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VISIONEER

piece of software and will play back and record samples at 44.1kHz stereo, or CD-quality.

Graphics are provided by a 1Mb Diamond Stealth PCI graphics card which will manage 24-bit true colour at 640 x 480, or 256 colours at 1024 x 768. It occupies one of three PCI slots. There are four 16-bit ISA slots left free, and a 5.25in drive bay that will come in handy should I decide to fit a Syquest drive or other storage device.

The only part of the system I wasn't too sure about was the 14in monitor. So, for £100 more I upgraded to a 15in unit: not quite the 21in Trinitron but adequate to display 1024 x 768 at 72Hz non-interlaced. This left me with £281 to buy the software and printer.

As I'd bought the system and multimedia upgrade kit, Evesham were prepared to bundle Lotus Multimedia Office for a modest 50 quid. Lotus Office is probably the next best thing to Microsoft Office and includes Ami Pro 3.1, Approach and 1-2-3.

Choosing a printer is often as difficult as buying a PC: there are just as many of them and they vary equally in price and performance. With only £231 left, a laser is out of the question, but there are plenty of inkjets to choose from that offer "near-laser quality". For a single user, an inkjet is probably more suitable anyway, especially for low-volume printing.

After considering the options, I was left with a choice between HP's DeskWriter 540 for £215, or the DeskJet 320 with colour kit for £189 from Technomatic. The DeskJet 320 appealed more since it's designed as a portable printer and can also run from a battery. Although I'm not likely to do much printing, the next time I take a trip on the Piccadilly Line with a notebook it might come in useful. This leaves me with £42, which covers the cost of Descent at £39.99.

PCW *Shopping List*

Product	Price
Evesham Popular	£999
8Mb upgrade	£120
15in monitor upgrade	£100
Lotus Multimedia Suite	£50
HP DeskJet 320	£189
Descent	£39.99
Total	**£1497.99**

PCW *Contacts*

Evesham Micros 01368 765500.
Fax 01368 765354
Technomatic 0181 205 9558.
Fax 0181 205 0190
Interplay 01235 821666

Simon Rockman

Kentish cream rather than London red may be the wrong colour, but the best place to decide which computer to buy is the number 55 bus. I'd decided on how I was going to spend my £1,500, chosen the supplier, and had almost finished. Then I caught the bus that runs past Morgan Computers in New Oxford Street.

When we did the "what to buy for £1,500" feature last year I chose a Mac bundle, but the year before I bought a 4Mb 486SX from Morgans. This year it's back to Morgans because of the limited budget. I bought a machine for myself a couple of weeks ago — a PowerMac, which cost about as much as the whole team's £1,500 allocation combined.

The machine in Morgans window proved to be suitably impressive. For £999 you get a NexGen P90 with a 560Mb hard disk and 4Mb RAM. This actually runs at 83MHz and in the VNU Labs tests it performed like an 83MHz Pentium without floating-point. Inside, the chip is very much more clever than a Pentium, but what matters is how well it works. We've had a similar machine (same motherboard, different name on the box) in the *PCW* office for a while and it has been a bit temperamental: in particular we've had problems running Win32s; but then, we've had problems with a lot of machines and Win32s (even early betas of Windows 95, or Chicago as it was then, were more stable) and machines in the *PCW* office have an atypically hard life, with lots of cards being swapped in and out, and software being installed and deleted.

The second bargain in Morgans window was a laser printer. Time was when the whole £1,500 would just buy a laser: two years ago I blew £499 on a printer. Today, Morgans have a Mannesmann Tally GDI printer for £199. When we reviewed the MT 9104 T-WIN we said that at £389 it was a good buy, but we had some reservations about the horsepower needed to drive it. The NexGen is clearly up to the job. All GDI printers rely on Windows and there is some doubt about their performance with Windows

95. It seems particularly dodgy to buy an end-of-line GDI printer which might or might not be supported by future versions of Windows.

Fortunately, there is a solution. The MT9104 has a PostScript option. This costs £17.50 and needs the £29.90 RAM upgrade. It won't run as fast as the native GDI mode but it is money well spent for some peace of mind. An HP driver is included to provide DOS compatibility. The toner costs £8.50, so my £199 printer actually costs £254.90, leaving me with £246.10.

The secret to making a PC go fast isn't to buy the best CPU, it's to balance the system, and more RAM is always a good thing. 4Mb is just not enough; 8Mb is enough to scrape by.

Earlier this year I had to review some hardware. It needed more memory than I had in my machine and I needed an upgrade urgently. This was on a Saturday morning and I had a busy weekend ahead. Proximity was more important than price so I jumped in the car and headed for PowerMark in my local high street. A 4Mb SIMM does just about fit in the boot of my car. Getting the upgrade took less time than I'd spent earlier in the morning fiddling with autoexec.bat and config.sys to try and free up more memory. But it didn't work. My motherboard didn't like the timings of that make of SIMM. I didn't know this, though, and assumed it was a duff chip. PowerMark's tech support calmed me down and asked me to return it. Another trip to the high street and they tested the SIMM and found it to be okay, but swapped it for a different make anyway. The new chip was inside my machine and working within a couple of hours of my deciding I needed it. A similar operation through the post and I'd have been lucky to have achieved the same thing in a week.

At £125 a 4Mb SIMM works wonders: time to travel in the direction of Edgware High Street again, to pick up a printer cable — can't go wrong for £2.50 and I'll save on postage. Lack of hassle is a good reason to buy the software at PowerMark; either there, or at MicroAnvika in Tottenham Court Road where parking in the West End is twenty quid a day (that's almost another megabyte). Time to count the pennies again. £118.60. Hmm... I'd really like a copy of Microsoft Office: what would go down particularly well would be an old copy — Word 2.0 runs much faster than 6.0. The extra features — at least, those of them you use — are neat but not special enough to justify the ponderous pace of the functions or the system resources it gobbles up. But it isn't available; a latest version of Office costs £294 which breaks my bank, so I'll have to resort to Works. Other places may be cheaper than PowerMark but not by much, and I'll save the postage. The solution is to cough up £89.

And with £29.60 left I've got more than enough money for another trip on the 55. It's not a high-speed bus, nor does it have a conductor. The driver does both jobs. I suppose he's a semiconductor.

PCW *Shopping List*

Product	Price
Morgan NexGen P90	£999
Mannesmann Tally 9104	£254.90
RAM upgrade	£125
Printer lead	£2.50
Microsoft Works	£89
Total	**£1469.50**

PCW *Contacts*

Morgan Computers 0171 244 2115. Fax 0171 436 6285
PowerMark 0181 951 335. Fax 0181 905 6233

Ben Tisdall

The last time I went mad with £1,500 was July '93. Back then, DX2/66MHz was just about the state of the art, and for the budget I had to settle for an 486SX/25MHz with Microsoft Works and Quicken for Windows. I bought direct that time, but this time decided to see what I could find in the retail outlets. First stop was Dixons on Oxford Street. Dixons have of course been selling computers for years but until recently have been infamous for their technologically-challenged salespeople. I was pleasantly surprised when the Dixons salesman steered me away from the superficial glitz of the Compaq Presario 520, with a nice ergonomic case and built-in faxmodem but a moribund SX2/50 processor, to a DX2/66 multimedia Packard Bell. The Packard Bell (£1,499 inc VAT) didn't have a faxmodem but the salesman was quick to point out that he'd bought his on Tottenham Court Road for £120 and was now on the Internet, and I could do the same. I was briefly tempted by the Packard, but when the salesman explained there was no brochure as the machines were being replaced shortly by a completely new range, I decided to look elsewhere.

Tottenham Court Road is a microcosm of London. Dozens of electrical goods shops and shops selling dodgy videos at one end give way to Habitat, Heals and sofa shops at the other. At the electrical end of the street a branch of Tandy is the lone multiple, and the order of the day is fierce competition between masses of small shops. I started by arming myself with the prerequisite for any successful deal-making on Tottenham Court Road — a large wad (see photo). Almost

invariably, the stores on Tottenham Court Road will do a deal for cash, and I didn't bother to ask if VAT was being neatly sidestepped or whether it was the charges the credit card companies impose that account for the miraculous 10 percent drop in price as soon as the word cash is mentioned.

First stop was Silicon Computers, who rejoice in the slogan "We don't sell cheap computers, we sell computers cheap". Well, its computers looked pretty cheap to me, particularly the nasty-looking 14in monitors with big "American Systems" badges stuck onto them. One machine's inclusive price of £875 had some superficial allure until I looked at what it would cost to round out the basic spec with extra memory and more and better software. West One Business Centre a couple of doors down looked a better bet, but if I was going to buy from a company I couldn't be sure would be around in a year's time (when the machine breaks down perhaps) I'd prefer the peace of mind of a branded product. West One's no-name mini-towers just didn't cut it.

I tried a few more stores without finding anything too clever before stumbling across MicroWorld about a third of the way down the strip on the right. Just arrived at MicroWorld was the AST Advantage Adventure 6066d. It passed the brand-name test, even if the model name sounds more like a tent than a fast PC. AST isn't quite the force in the PC market that it was a couple of years ago but still turns out quality kit. For £1,299 including VAT the Advantage would be mine complete with 8Mb RAM, 14.4kb/sec faxmodem, 540Mb hard disk, quad-speed CD-ROM, sound card and 14in monitor.

MicroWorld were a bit light on detail about what was inside the box (like what make the faxmodem was) and whether I could upgrade to 12Mb RAM or whether I needed to make the jump all the way to 16Mb. I also asked about swapping the 14in monitor for a 15in and was told that they couldn't do it and "one extra inch wouldn't make much difference anyway". Thanks a lot, I thought.

The promise of cash knocked £99 off the price, which left me enough in hand to go for HP's 540 inkjet printer. MicroWorld could do it for £250 inc VAT which is only a shade more than the cheapest I could find in *PCW* once you've added on VAT and carriage, but I'd want the colour kit as well which bungs another £39 on the price. The Advantage comes with AST Works, a friendly PC front-end aimed at gently introducing you to your PC, plus Microsoft Works, Encarta, Golf, Cinemania and Quicken. For all its faults I'm too attached to Microsoft Office to be parted from it lightly. MicroWorld says it can do Office on a CD for a barely credible £199 inc VAT.

I've still got £60 left. Then I remember about the faxmodem. What's the point of the modem bit if I'm not online? The price of the Advantage includes a month of CompuServe membership. I look up CompuServe's latest prices and realise that my remaining sixty sovs will get me onto CompuServe and the Internet for the best part of six months.

PCW Shopping List

Product	Price
AST Advantage	£1021.00
HP 540	£212.77
HP colour kit	£33.20
Microsoft Office	£169.36
CompuServe membership: apx £64; standard $9.95 a month including three free hours of Internet access; additional hours $2.50 an hour; extended services are $4.80 an hour.	
TOTAL	**£1,500.33**

PCW *Contacts*

MicroWorld 0171 436 1408

CompuServe 01734 391064

Wrapping up

Which one of our intrepid team came up with the best deal for £1,500? At first it's tempting just to opt for the bundle with lashings of powerful hardware, but a speed demon doesn't always make for the best buy. A balanced system with good software to suit your requirements is a far more sensible choice when you're on a tight budget.

All our team had this in mind when they set out to buy a system, and the various distribution channels yielded different results: for example, Clive Akass built his choice around a small-business person whose life could benefit from being computerised. The Brother notebook he bought direct provided a perfect solution for these people, with good speed, excellent bundled applications and portability. But this isn't going to be ideal for everyone. Simon Rockman went retail for a powerful NexGen P90 and GDI laser printer but didn't come away with as good a software solution.

As usual, Gordon Laing's Mac choice is a sensible alternative to the PC-compatible. Unfortunately, by the time you read this, the particular deal he found may no longer be available. On a more positive note, the new Performa PowerMacs reviewed on page 402 should be out around then and are certainly worth a look. Check the dealer prices for a bargain bundle.

Finally, Ben and Steve both came in with excellent DX2/66 solutions. Each PC included 8Mb RAM, a 16-bit sound card and a CD-ROM drive, and Ben also walked away with a 14.4kb/sec faxmodem. When it came to the crunch, however, the AST proved the better buy, with a future-looking quad-speed CD-ROM drive and better business applications.

All these deals are attractive and prove that you can get a good, complete system for £1,500, but the overall winner has got to be the AST bundle. It includes a well specified machine, colour inkjet printer, software for all occasions and access to the information superhighway. Definitely the best all-round solution, Ben. Enid would be proud of you.

Chris Cain

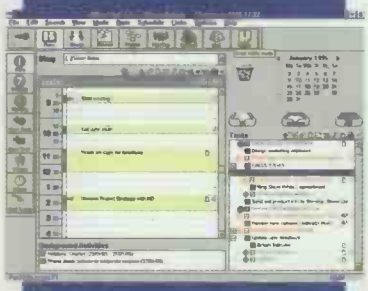
Reader Survey Prize Draw

As an incentive to complete and send in your Reader Survey, Western Systems has kindly given us a speedy Pentium PC to give away. Every form that is returned will be entered into the draw. Your replies will be analysed and your views considered, helping us to improve the magazine.

The system up for grabs is a full multimedia PC based on a 60MHz Pentium and a PCI motherboard. It's kitted out with 8Mb RAM (upgradable to 128Mb), a massive 540Mb hard drive and 256kb external cache. A double-speed CD-ROM drive and 16-bit sound card ensure accessibility to the widest range of software, and it comes with a good selection of its own, including Microsoft Works, New Grolier Encyclopedia, 20th Century Video Almanac and Macromedia Action. Video is supplied by a Cirrus Logic PCI card with 1Mb VRAM to offer resolutions up to 1024 x 768 in 256 colours. The 14in monitor will also handle this resolution in non-interlaced mode to provide flicker-free viewing. Future upgrades will be a doddle since PCI integrates plug and play hardware: no need to work out complicated IRQ settings and address settings — PCI takes care of all that. To stand a chance of winning this fabulous system, simply complete and return the survey opposite.

The most productive software you can give your workgroup costs only £50(+VAT) a head

Who's doing what and when?



Keep the whole workgroup organised and in the picture with flexible, easy-to-use Diaries for individuals and resources. Use configurable Group Diary Views for instant snapshots of activity across part or all of the team.

Officetalk™ is the first ever Windows™ package to combine all the organisational tools needed by every member of a workgroup.

Fast and easy-to-use, OfficeTalk contains everything an individual requires to do his or her job more productively. And at the same time, it has a central core of functions that allows the whole team to share information, and to communicate with maximum efficiency.

In short, OfficeTalk exploits the full organisational potential of a workgroup's PC network.

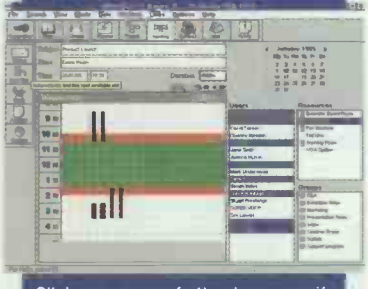
The only fully-integrated solution

Your workgroup may already use some of OfficeTalk's functions, either in office software bundles or as specialised individual applications.

But where OfficeTalk scores is for its unique integration of those functions. Users can move seamlessly from one activity to another, making logical links between different types of information.

For instance, when a project has been created, tasks can be assigned to the

Organise meetings in 30 seconds



Click on names of attendees, specify a proposed time and place – and let OfficeTalk do the rest. If people are busy, it works out the first available slot. Then it E-Mails invitations and your agenda directly to them.

Diaries and Task Lists of the people concerned. Conversely, as soon as the individual marks each task as completed, the whole project plan automatically updates.

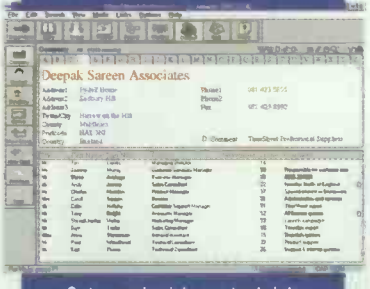
Individuals at every level welcome OfficeTalk because it clearly helps them do their jobs more effectively. And team leaders and managers appreciate their new found ability to oversee the group's workload and progress

Incorporating 10 major functions

OfficeTalk has a depth of functionality that belies its affordable price of just £50(+VAT) per user.

- *Diaries* with daily, weekly or monthly views, time-slots down to 5 minutes and configurable *Group Views*
- Drag-and-drop *Task Lists* with priorities, deadlines, durations and notes
- Public and private *Planners* to schedule long-term and background activities
- *Meeting Management* to check availability of people and resources, and place bookings in Diaries

Keep tabs on workgroup contacts



Get everybody's contact data properly organised and shared across the whole office. Configure contact groups for maximum efficiency, 'record' conversations, attach documents, create follow-ups, export mail-merge files to WP.

- Comprehensive *Contact Management* with configurable groupings, records of conversations and search facilities
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- *Pop-Up Notifications* for instant messaging
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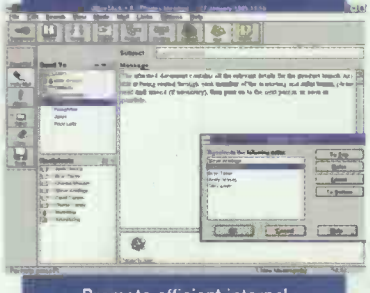
Also included are Import/Export of CSV and MPX files, Off-Line Working capability for using on the move, and SpellWrite enabled for OfficeTalk.

Get the whole office talking



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The 1995

Welcome to the fifth annual PCW Awards. This year, for the first time, we have opened the nominations to you, the readers.

It's all very well having us argue in the office as to what we consider is the best thing since sliced bread, but the people who really know are yourselves. Using these products every day in a variety of environments separates the good from the bad, and you, the real users, are in an ideal position to comment on the contenders. And comment you did: we had an overwhelming (unprecedented, unheard of, never before seen etc.) response to our Reader Survey and have spent the last few months hard at work, counting the thousands of nominations and ensuring no foul play occurred.

We have streamlined our categories from last year, bundling several previous awards into one new one. Best Peripheral has replaced the separate Best Graphics Card, Monitor, Sound Card and CD-ROM drive, although we have kept Best Printer and Best Budget Printer.

Best Art and Best DTP have been superseded by Best Creative Software, which additionally includes the rapidly expanding multimedia authoring market. With so many word processors and spreadsheets being sold together, we decided to bundle them into a single award for Best Suite.

New categories this year include Best CD-ROM, Best Online Service and Best Business Software Application.

PCW Awards

Most Innovative Software and Most Innovative Hardware are still here, reflecting the state of the art in computing and technology. We've also left in Best Game and Best Utility, the latter in particular celebrating the unsung heroes of everyday work. Products are just one part of this year's awards. Where you buy your equipment, how much after-sales support is offered, and the long term reliability of the products themselves, are essential considerations, resulting in a new award category. We have celebrated the good guys of the computer industry with six new awards: Best Software Dealer, Best Hardware Dealer, Best Telephone Support, Best After Sales Service, Most Reliable PC and Best Direct PC Dealer. So all you dealers and manufacturers out there take note, because all of these awards come directly from the readers of Personal Computer World.

Most Innovative Hardware

1 PCI Bus
2 Fast Movie Machine Pro
2 IBM VoiceType Dictation Adaptor

When we were discussing possible winners for this category, we all agreed PCI was the most influential and innovative hardware to mature through 1994. By the end of the year, most PC manufacturers had already moved to PCI with 486 and Pentium systems. A wealth of graphics cards, disk controllers and network adaptors also appeared.

The PCI standard isn't just for the PC, though. DEC is using PCI in its Alpha systems and Apple has promised two PCI-based Macs by the end of the summer. Over 35 manufacturers will have products ready for the launch.

Other than providing better performance than VL (up to 134Mb/sec) PCI makes the installation of cards easier by offering plug and play hardware, so there's no need to spend hours working out interrupt settings and breaking fingernails on jumpers in the process.

Although no one company owns the PCI standard, Intel was responsible for much of the research and development and is this year's winner for Most Innovative Hardware.

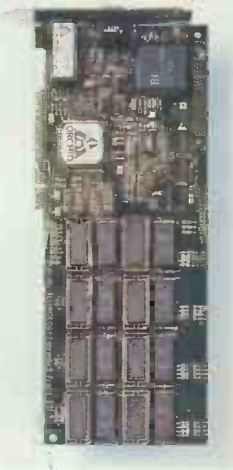
There has been a massive surge of interest in digital video this last year and an abundance of new products to cater for it. Of all the cards and accessories we've seen, Fast Electronics' Movie machine Pro with M-JPEG was the only one that didn't disappoint and is the first runner-up in this category.

The card faithfully captures video at full PAL resolution (768 x 576) at 25 frames per second with virtually no errors. The card has some excellent software for multimedia applications, including Adobe Premier, and is equally competent for editing full motion video for output back to tape.

In addition to a myriad of special effects, the board has a built-in television tuner which means you'll never have to miss another episode of Brookside again. But on a more serious note, the card was the first sensibly priced product to bring high-quality digital video in reach of the masses.

The second runner-up for innovative hardware is IBM with its VoiceType Dictation Adaptor. The package is a speech-to-text dictation system which not only works well, but lets you navigate through Windows and OS/2 applications with hands off.

The hardware is either an ISA, MCA or a PCMCIA DSP card. The combination of hardware and software allows you to build up a unique vocabulary, making it suitable for doctors, solicitors and, of course, the physically handicapped.



Orchid's Fahrenheit 64 PCI card

Readers Awards 1995

For the very first time, PCW has opened its fifth annual awards nominations to you, the readers. During the past few months we have processed the huge response from our reader survey, concluding with the results presented in this feature. As explained in the introduction, we have several new awards,

● *Gateway: in the frame for four of our Reader Awards*

including a category celebrating great service and reliability. X-product for Windows may the greatest application or peripheral in the world at the time of purchase, but it's no good if you have to buy it from an uncooperative dealer which offers no support when the product falls over.

With that in mind, may we present the 1995 Readers Awards for Best Software Dealer, Best Hardware Dealer, Best Telephone Support, Best After Sales Service, Most Reliable PC and Best Direct PC Dealer. And remember, all the results, not only on this page, but throughout this awards feature, have been voted by you, the readers.

HOW YOU VOTED

Best Software Dealer
1 Software Warehouse
2 Technomatic
3 Watford Electronics

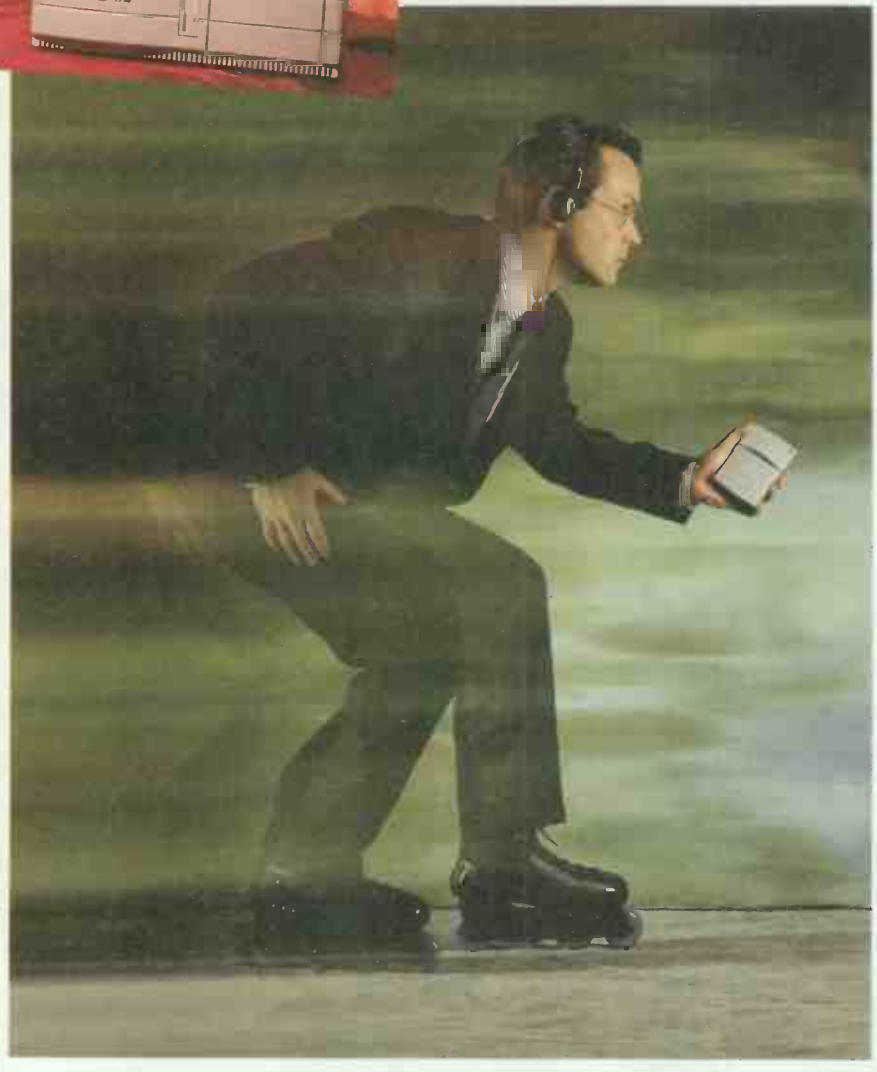
Best Hardware Dealer
1 Evesham Micros
2 Gateway
3 Simply Computers

Best Telephone Support
1 IBM
2 Evesham Micros
3 Gateway

Best After Sales Service
1 Gateway
2 Dan
3 Evesham Micros

Most Reliable PC
1 Compaq
2 Dan
3 Dell

Best Direct PC Dealer
1 Gateway
2 Dell
3 Dan



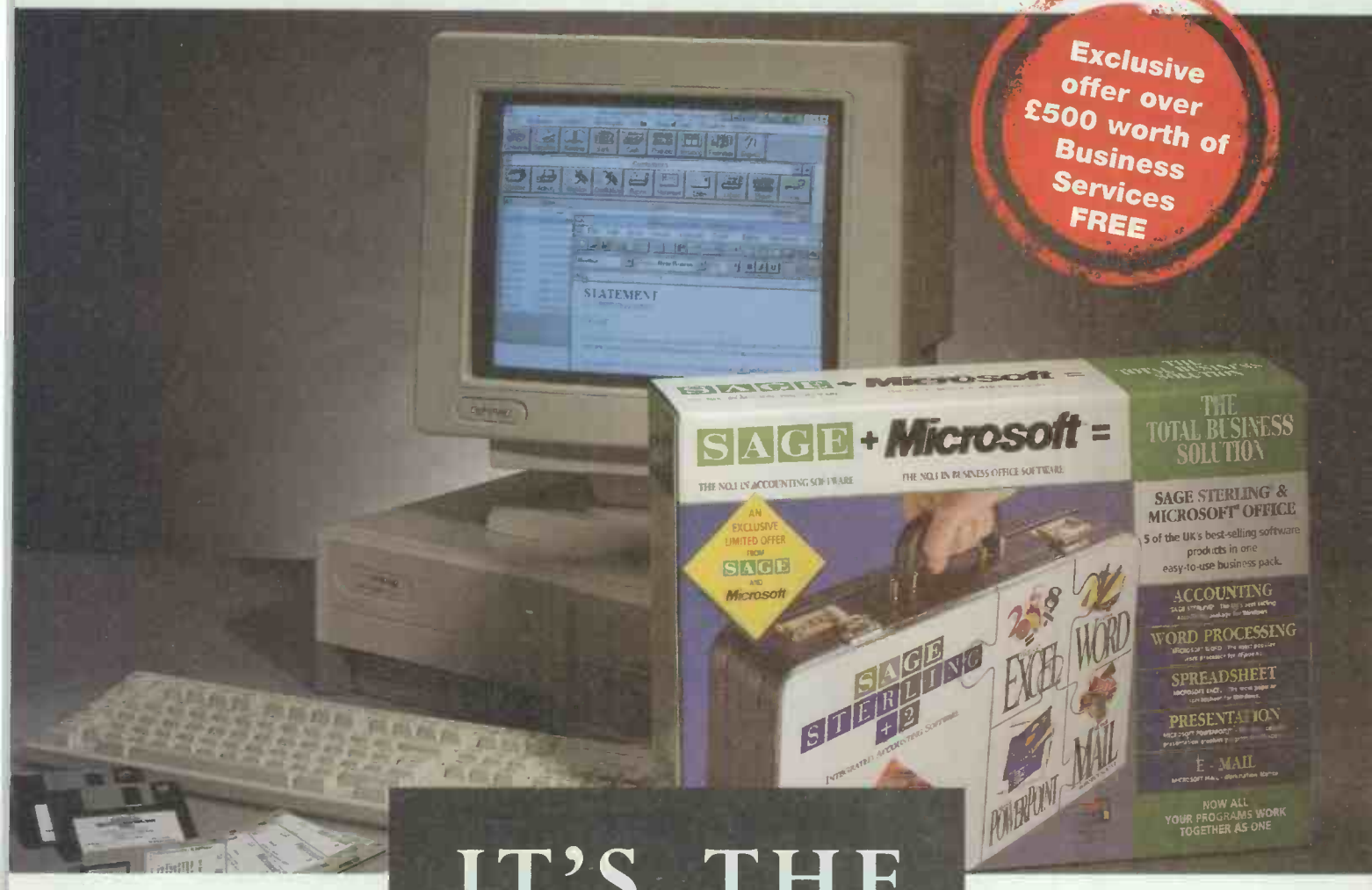
PCW 1995 Awards Nominations: Winners

Five Sony MDH-10 MD portable drives worth £499 each, and five Sony Walkmans, were up for grabs as part of the reader awards in the February issue of PCW.

MD Data drives can store the equivalent of 100 floppies on a single 2.5in magneto optical disk. Unlike CD-R drives, MD drives can rewrite disks up to one million times yet they weigh just 350g. The drives come with a SCSI-2 interface and are powered by a rechargeable Lithium-ion battery pack or an AC adaptor. You also get a pair of headphones, allowing the drives to be used as personal stereos.

The five lucky winners, all of whom receive an MD portable drive, are: J Tomlinson, Newbury, Berkshire; Richard Mason, Birmingham; Gary Seward, Nottingham; Mr R Stone, Bristol; and Mark Brockbank, Barrow in Furness, Cumbria.

Sony Walkmans go to five runners-up: Martin Evan, Bristol; Michael Browne, Tunbridge Wells; K Fung, Twickenham; Jean-Pierre Bolet, Leeds; and M Godfrey, Coventry.



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Best PC System

1 Apple PowerMac 6100/66

2 Gateway P5-90

3 Dan Premium 66/MM

The Gateway P5-90: not a winner this time, but a well-deserved runner-up

The Best PC System Award has always proved one of the most difficult for us to judge. Not only does everyone have their own favourite products, but the importance of features on offer differs greatly from person to person. Reader input played a major part in deciding the results, which weren't as clear cut as we had expected. After much debate the judges managed to get down to one winner and two, highly commended, runners-up.

In reverse order, third place was awarded to Dan Technology for the outstanding Premium 66/MM. The Editor's Choice in this month's PC group test, it performed extremely well in the VNU Labs and was one of the best designed and tidiest PCs we've ever seen.

The 486DX2-based Premium comes as standard with 8Mb RAM, a Diamond Stealth 64 VRAM graphics card, Creative Labs' SoundBlaster 16 and a Panasonic double-speed CD-ROM drive for good multimedia performance. The motherboard boasts ISA, VESA and PCI slots for plenty of expansion options, and an 850Mb hard drive means you're unlikely to run out of storage space for quite some time.

Other noteworthy features include a rather nice 15in CTX monitor and bundled big-name software titles like Microsoft Encarta, Works, Money and Lotus Organiser. With the Premium package you can get down to business or try out the latest in edutainment the moment you've finished setting up the hardware. This is exactly what customers want from their PCs.

At £1,487 the Premium 66/MM isn't the cheapest system around, but when you take all of these components into account it's undoubtedly good value.

Taking second place, Gateway's P5-90 is the other runner-up. Reviewed in last January's issue it's a great all-round performer, boasting speed, full multimedia capabilities and rock solid support. Gateway came out particularly well in our Reader Survey, and has been doing a roaring trade in the UK ever since it arrived in October 1993.

As well as a 90MHz Pentium, 16Mb RAM and a 10ms 1Gb hard disk with PCI controller, the P5-90 has a 2Mb 64-bit ATI graphics card allowing for high bit-depth support at resolutions up to 1024 x 768 pixels. The combination makes the machine positively fly under Windows and ideal for running the bundled Microsoft Office suite.

Gateway's sound system is also impressive. Rather than providing a simple SoundBlaster clone like other manufacturers, the company opted for an Ensoniq SoundScape board with 2Mb of clear instrument samples and powered speakers. This gives almost professional quality General MIDI music and sound effects, just the ticket to improve presentations, multimedia references products and games. The final icing on the Gateway cake is a quad speed CD-ROM.

The winner of the Best PC System Award for 1995 is Apple's PowerMac 6100/66. PowerMacs have always been particularly desirable, and this model lets existing Mac users move from CISC to new RISC technology with the minimum of fuss. At its heart is a 66MHz PowerPC 601, a fast RISC processor with incredible floating-point performance. The chip is ideal for handling complex calculations, 3D animation and multimedia applications. Apple has used the speed to provide software emulation of Motorola 68LC040, so you can run old and new native applications simultaneously.

A typical setup comes with 8Mb RAM, 350Mb hard disk and double-speed CD-ROM drive. The keyboard and display are normally purchased separately, but most dealers offer a number of ready-to-roll bundles. Other standard features include local-bus 24-bit colour graphics, 16-bit stereo sound, built-in Ethernet networking and plug and play. Mac floppy drives can read, write and format PC disks as well as their own.

Perhaps the most noteworthy feature of the 6100 is that Apple has an optional plug-in PC card that lets you use Mac, DOS and Windows software on the same machine. The card provides a 66MHz 486DX2 with 8Mb RAM, SoundBlaster 16 and SVGA graphics. When in use the hard disk, memory, keyboard, screen and clipboard are all shared between the two platforms, and systems can be switched on the fly via a hotkey. It's this kind of innovation and a commitment to the future that puts Apple in first place.

So there you have it. The 6100/66 is our Best PC System of the year, closely followed by excellent offerings from Gateway and Dan.

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PCW-34 5/9

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Real colour printers

Best Notebook

1 Toshiba T3600CT 2 IBM 755CD 2 TI TravelMate 4000

When considering the hundreds of notebooks currently available, the problem of making up a shortlist of the best represents a daunting task. However, the list finally dwindled to a handful of major candidates including Toshiba and Dell. The inclusion of Dell on this list must be good news for the company which had previously abandoned the notebook market in July 1993: the Dell Lattitude represents a welcome re-entry.

The winner is Toshiba and IBM. It is ironic that many of the qualities which make the Toshiba so good are the result of collaboration with IBM. The screens are produced by IDT, a company jointly owned by IBM and Toshiba, and the Trackpoint joystick pointing device was a Lexmark project. The 770Mb hard disk in the Toshiba Pentium notebook is also made by IBM. Despite the IBM cleverness, it is really Toshiba which is the winner.

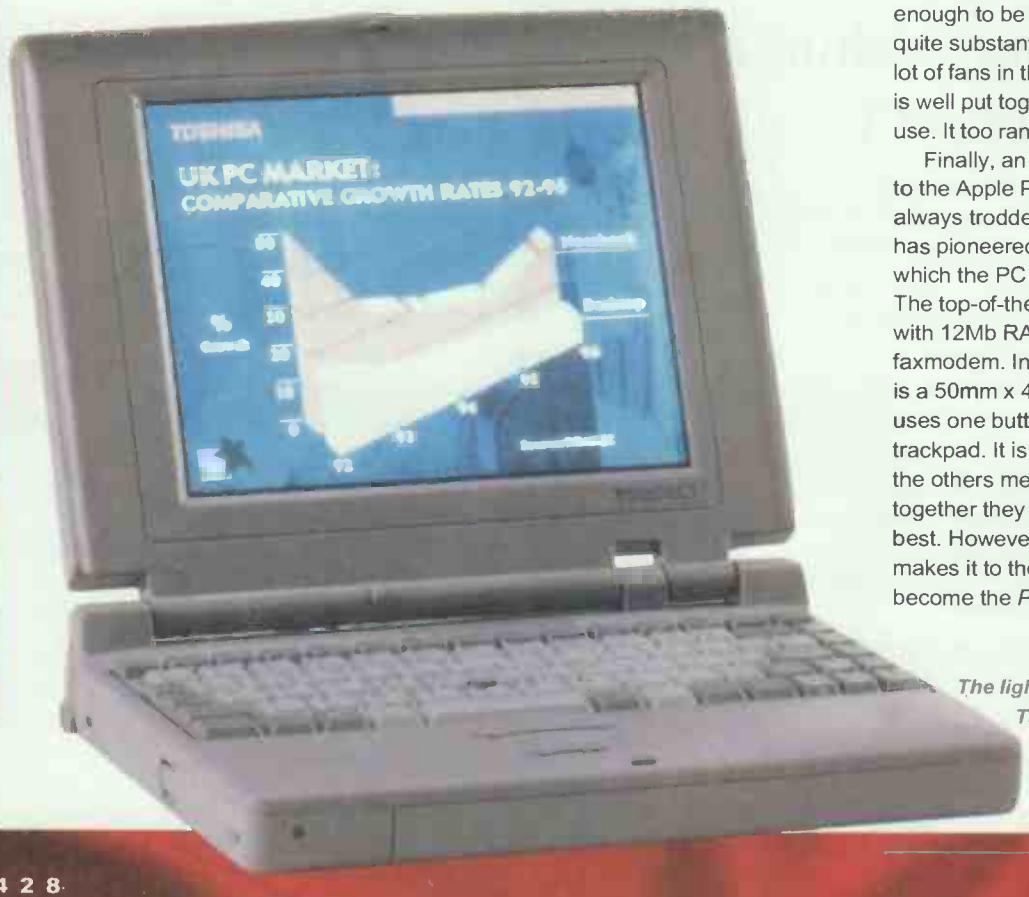
The ultra-light T3600 is one Toshiba machine which is particularly lustworthy. Toshiba doesn't like it if you refer to the T3600 as a subnotebook; there is the feeling that the name may give an impression of inferiority. But of all the machines which have passed through the *PCW* office, this is the one which everyone most wishes would remain in their safekeeping. There is no point in having a portable computer unless it is truly portable; a computer you have to leave at home won't get the work done. Happily, the T3600CT is light enough to be thrown into a bag, just in case.

If you have a machine which is going to be a constant companion, it is important that it is comfortable to use and that it keeps working. The tiny Tosh manages this with a TFT screen and a lithium ion battery. A reliable four hours' life is pretty good going and you know exactly how much power remains because the Maxtime manager utility gives a pretty accurate indication of how much juice is left. The suspend mode is excellent as you can treat the machine as though it is always on.

All in all, this year, there were some close rivals. The IBM 701 "butterfly" notebook with its incredible pop-out keyboard arrived too late for consideration but would have put up a good fight for first position. Instead, another IBM made it into the runners-up section; the 755CD is a notebook which has everything, except a floppy drive. It has a massive hard disk (810Mb). The great screen, trackpoint device and CD drive which slides out from the front, make this a machine which many *PCW* staff members would choose for their own. The 755CD also has full video capture and external replay. The keyboard is excellent and lifts to allow drives, RAM and memory to be dropped in. It runs quickly but is a little quirky — PCDOS isn't exactly the same as MSDOS. Although the level of power offered by the 755CD is expensive, it is nevertheless one of the most desirable notebooks we've seen.

Our second runner-up is the Texas Instruments TravelMate 4000. It's a fine contender, with a good-quality keyboard and trackpoint device. RAM expansion is simple and there is even a MIDI connector. If you want a CD on the move but are not prepared to sacrifice a floppy then the TI TravelMate's docking station is a good compromise; it's small enough to be carried but nevertheless quite substantial. The TravelMate won a lot of fans in the *PCW* office because it is well put together and very nice to use. It too ran the Toshiba a close race.

Finally, an honourable mention goes to the Apple Power Books. Apple has always trodden a separate path and so has pioneered a lot of technologies with which the PC is only just catching up. The top-of-the-range 540c is supplied with 12Mb RAM and a 14400 faxmodem. Instead of a trackball, there is a 50mm x 40mm trackpad. Apple only uses one button and that is below the trackpad. It is a great machine, as are the others mentioned here, and together they represent the best of the best. However, it is the Toshiba that just makes it to the top of the heap to become the *PCW* portable of the year.



The lightweight Toshiba T3600CT

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Best Printer

1 Hewlett Packard 4SiMX

2 Epson Stylus Colour

2 Lexmark Optra R

It's no good putting in a lot of hard work if you've nothing to show for it at the end. While some projects are designed to be either heard, or seen on-screen, most of us rely on a printer for output. The problem is that there's an incredible variety — colour or black and white using a huge array of technologies, portable to fridge-freezer size, and prices ranging from sub-£100 to the level of a second mortgage.

During the past year we've seen print quality improve by leaps and bounds, and prices drop steadily. Perhaps more interesting is the level of improvement seen with certain technologies: colour inkjets in particular have shot forward, reaching the point where decent-quality paper will produce superb results.

The colour inkjet we were most impressed with during the past year, and a runner-up this year, is Epson's 720dpi Stylus Colour. We haven't published a review of it yet, but are waiting for our July colour printers group test where it will come up against several hot new models. We can't tell you about all of those yet, so for now the Epson, costing around £330 on the street, wins the day. An honourable mention should go to the new Hewlett Packard DeskJet 850C, coming to a reviews page near you soon.

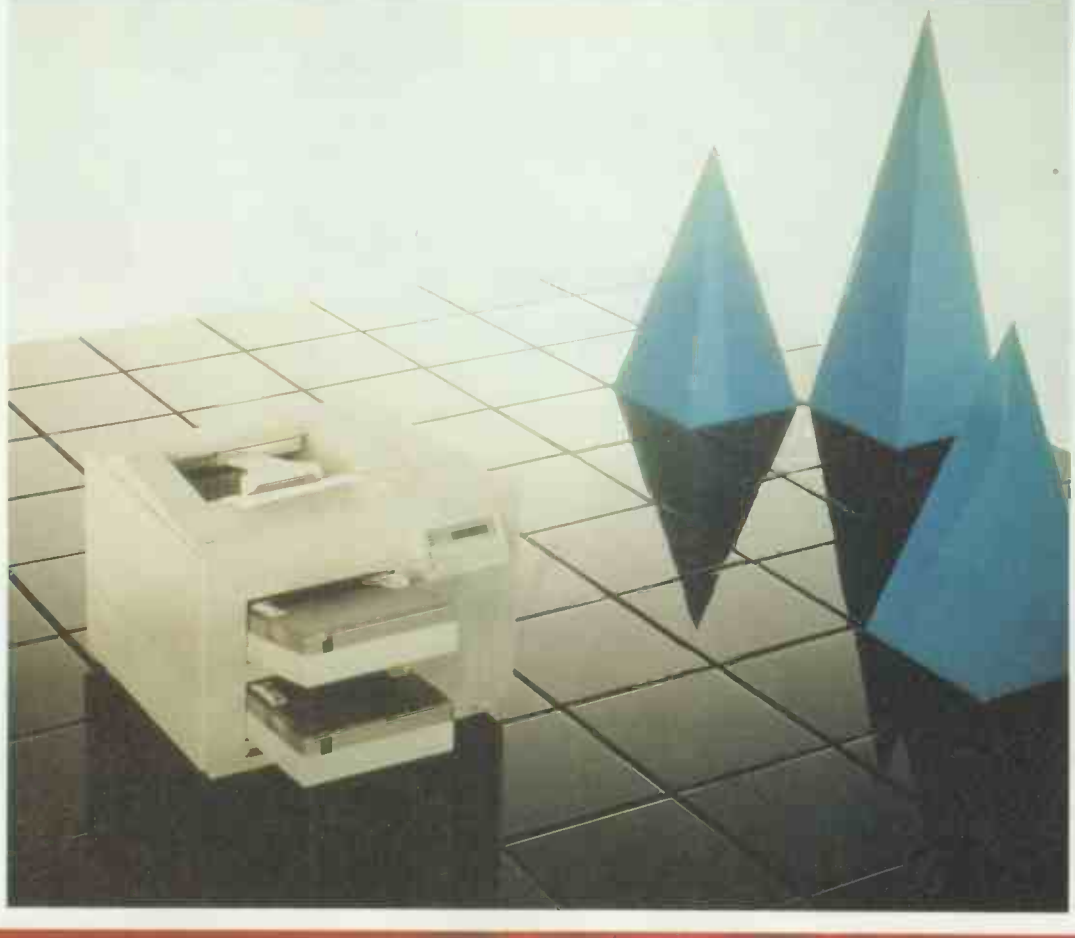
Over the years we've seen 300dpi laser printers reach truly affordable levels, allowing proper 600dpi lasers to take over the higher-end. While 600dpi laser printers offer superb print quality, they're not up to camera-ready image setters, which work between 1200 and 2400dpi.

Fear not, for enter our second runner-up, the Lexmark Optra R, the first laser printer we've reviewed to offer true 1200dpi resolution. You'll need to use paper of a higher grade than ordinary photocopier stock, but can look forward to stunning results. An Optra R with a usable amount of RAM will set you back between £1,500 and £2,000.

However, the printer that most impressed us overall this year has been available in other versions for some time. Take the wonderful 600dpi engine of a Hewlett Packard LaserJet IV, soup it up to 16ppm, add dual bins offering a total paper capacity of 1000 sheets, fit Ethernet and PostScript Level 2 to accompany the standard PCL 5e emulation, chuck in power-saving modes, and you've got the perfect office workhorse: the HP LaserJet 4SiMX at around £3,000.

We know this, because we bought one for the *PCW* office and have been hammering it solid for the best part of a year without any trouble. Indeed, all it gets are complimentary remarks which, coming from us hardened hacks, is really quite something.

Above *Epson Stylus Colour*
Below *HP LaserJet 4SiMX*



DISCOVER THE SOUND SENSATION

Monday 23 January 1995

"Entertainment, MIDI and Business Audio, with beautiful, crystal-clear sounds? It must be the new SoundWave 32 Pro from Orchid" cried Henry. "Using Orchid's latest PRO ROMs, which combine wavetable and algorithmic synthesis, natural sounds like pianos and horns sound incredibly real, while sound effects keep their depth and vibrance."

Friday 27 January 1995

"Did you know you can now have sampling capabilities with a GameWave sound card?" I asked the Doctor. "That's right" he replied, "and now, you can not only record with Orchid's GameWave 32 Plus, but you also get the sensational sounds provided with their latest PRO ROMs."

Sunday 29 January 1995

It seems too good to be true - all the astounding features of a SoundWave 32+ SCSI bundled with the amazing Toshiba XM5201B triple-speed CD-ROM Drive. But then you realise that all this is included in Orchid's SoundWave SCSI Kit, as well as MIDIsoft's MIDI sequencer and MIDI cable. Such a diversity of features must surely be a gift from the Gods.

SOUNDWAVE 32 PRO

- Compatible with leading audio standards
- Latest PRO ROMs
- 20Mhz DSP technology
- Bundled Software
- SCSI option available

GAMEWAVE 32 PLUS

- Compatible with leading audio standards
- Latest PRO ROMs
- 20Mhz DSP technology

SOUNDWAVE SCSI KIT

- SoundWave 32+ SCSI
- Toshiba XM5201B Triple-speed CD-ROM Drive
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- MIDI cable

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PC Magazine, December 1994

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"Very fast machine...NexGen's Nx586 [processor] matches a Pentium for speed and beats it for value."
PC Pro

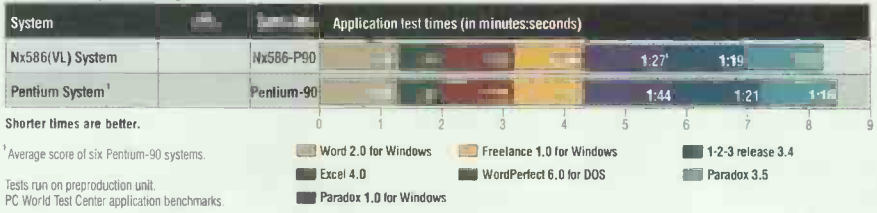
"The NexGen Nx586 chip is the first affordable alternative to Intel Corp.'s Pentium that does not involve sacrificing performance."
PC Magazine (US) December 1994

"...the Nx586 [processor] appears able to handle any software the Pentium can run – PC World's tests turned up no software compatibility problems."
PC World (US)

"The Nx586 [processor] outperforms Pentium on a clock-for-clock basis."
Microprocessor Report (US)

NexGen Chip Challenges Pentium Performance

PC WORLD, November 1994



Average score of six Pentium-90 systems.

Tests run on preproduction unit.
PC World Test Center application benchmarks.

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Best Budget Printer

1 HP DeskJet 320
2 HP DeskJet 560c
2 Brother HL-630

Over the past year, the competition at the budget end of the printer market has become fierce. The introduction of GDI technology has brought the price of laser printers down to as little as £250 by using an innovative printing method whereby rasterisation takes place in the host PC rather than in the printer itself.

Before lasers became affordable desktop devices, inkjets were solidly placed in the personal printer market; but the recent drop in laser prices has caused a great deal of speculation about the future of the inkjet. Some people have decided that its days are numbered, but our last group test in December 1994 concluded that there's still a lot of life left in inkjet technology.

This is because inkjets can still do things that lasers can't. A budget inkjet printer can produce surprisingly good colour output, and can be made small enough to be truly portable. All these inkjet characteristics are exemplified in HP's Deskjet 320 which wins our Best Budget Printer award. Although it is not the fastest of inkjets, it is the ultimate solution to your portable and desktop needs. The basic printer weighs 1.96kg (4.3lbs) and comes in the form of a small, black box which must be fed manually with paper. An optional automatic sheet feeder turns this basic portable model into a desktop device, fitting around the print engine and forming a "V" shape from the base. You can get it to produce colour output simply by inserting a colour cartridge and changing the mode on the driver.

HP's DeskJet 560c has also become one of the most popular inkjet printers on the market and gains the *PCW* runner-up award. The 560c produced exceptionally good-quality output in our tests and you can pick one up for as little as £315.

In the budget laser arena, the one that sticks out from the crowd this year is the Brother HL-630, which uses GDI technology to best effect and also wins a *PCW* runner-up award. The HL-630 manages to get around many of the problems associated with GDI while utilising the technology for high-speed printing under Windows.

One of the annoyances of GDI is that it's optimised for Windows but not for other platforms. The Brother HL-630 isn't GDI in this Windows-restricted sense but instead offers fast GDI speeds under Windows, without sacrificing DOS or Macintosh compatibility. It also comes with a driver which is not just bi-directional, but also incorporates compression and memory management techniques, enabling very large files to be printed using a very small amount of memory.

HP DeskJet 320

Best Peripheral

1 NEC 4X IDE quad-speed CD-ROM drive
2 US Robotics Sportster 28800 2 Creative Labs AWE-32

So, you've bought your PC, you've got it set up, but something's still missing — that super peripheral that will totally enhance your system, bring it bang up to date and postpone the need to start all over again from scratch. Does such a device exist? We believe so, as the award for Best Peripheral is announced.

Printers are covered elsewhere, and we decided not to start recommending monitors since most complete systems, by definition, already come with one. A superior monitor, however, is a worthy consideration for your upgrading budget, and interested consumers should look no further than *PCW*'s last suitable group test, in the February 1995 issue. But now down to the business in hand.

Information Superhighway, Infobahn and the Internet are all buzzwords for the media's current favourite obsession. Want to get wired, connected, cyber-communicating to all these equally clued up Net-denizens around the world? You need some kind of service provider such as CompuServe or Demon, and the all-important device which allows your computer to talk down a telephone line: a modem.

Why hang around with a slow 14,400 modem when you can afford twice the speed? With this in mind, one runner-up for Best Peripheral is the US Robotics Sportster 28800 V.34 faxmodem, available for around £189 in internal or external versions.

Multimedia may have been overtaken by the Internet for hype, but it's still the thing to have. Multimedia peripheral upgrades consist of a sound card and CD-ROM drive, and many excellent bundles are around from the likes of Creative Labs and Western Systems. But we've decided to consider the devices separately.

Our second runner-up goes to Creative Labs' top-of-the-range sound card, the AWE-32, at around £170. Based on the SoundBlaster 16, it offers General MIDI, GS and Roland's MT32 with its 1Mb WaveTable synth. Backwards compatibility with SoundBlaster and AdLib makes it one of the most versatile and supported cards around. The AWE-32 can also download samples to onboard RAM. 512kb is offered as standard, upgradable to 28Mb via two SIMM slots.

Recently, the price of quad-speed CD-ROM drives has been reduced to a level where they're fast becoming the next standard. While SCSI drives still offer the best performance and flexibility, IDE drives have caught on at the budget end. Note that you may need a new IDE interface to support an IDE CD-ROM drive, but these are available for around £10 and are often bundled with the drive.

Award for Best Peripheral goes to all the cheap quad-speed CD-ROM drives out there, although the one we've chosen to represent the crowd is the winner of April's CD-ROM drive group test and the first on the block: NEC's 4X IDE, available on the street for less than £150.

NEC 4X IDE

Personal Computer World

EDITOR'S CHOICE

Best Sound Card
Sound Galaxy WaveRider 32+
April 1995

Feel The Power of Multimedia.

If you want to feel the maximum impact and get the most power out of your multimedia, there's only one way to go. With the high-performance, high-technology products from the force in multimedia excitement, Aztech.

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1994 Multimedia World Readers' Choice Finalist

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Most Innovative Software

1 NCSA's Mosaic 1 NetScape
2 Acrobat 2.0 2 OS/2 Warp

Our winner in this category is a prime example of that much devalued word "synergy". Little in Mosaic was new in itself. Hyperlinks were familiar from Windows Help screens. The World Wide Web, on which the links could literally be global, was already up and running using an obscure specification drawn up by Englishman Tim Berners-Lee.

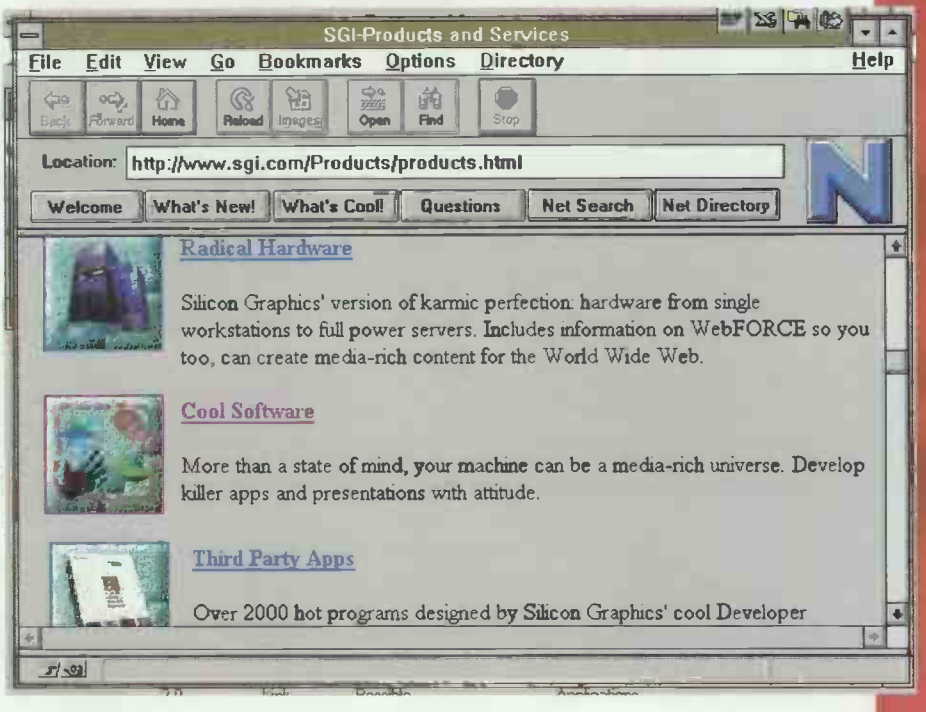
Undergraduates at the National Centre from Supercomputing Applications (NCSA) at Illinois University added a graphical front-end, plus calls to existing programs for tasks such as viewing picture or video files. The result was much more than the sum of its parts, a completely new genre of software: the browser.

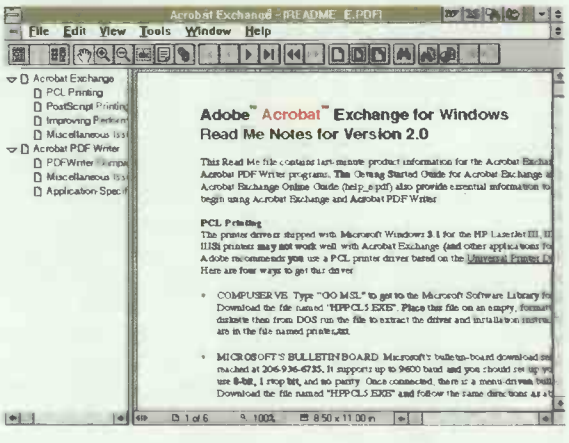
Mosaic insulated users from the complexities of the Internet, opening it up to almost anyone capable of using a mouse and a keyboard. Incidentally, Mosaic also offered a new way of navigating a PC. Moreover, it was a new publishing medium.

The first Mosaic, flaky and bodged together as it was, had an estimated 500,000 users within four months of going into the public domain. Commercial versions were rushed to market; of these, we have chosen NetScape as a joint winner because it is the best to date (although there are good reports of NCSA's latest Mosaic 2.0.0 beta) and because developer NetScape Communications employs many of the original Mosaic designers.

Mosaic is so simple in concept that its power is already taken for granted. It could be killed by its own success as its facilities are absorbed into operating systems, and even into word processors such as WordPerfect and Word 6.0.

But it has its limitations, not least that it depends on the limited formatting facilities of HyperText Markup Language (HTML), which is why there is a certain sameness about Web documents. There is no lack of alternatives here, with several products competing for acceptance as standard document formats.





Above *NetScape*
Left *Acrobat*

Our first runner-up, Adobe's Acrobat 2.0, has been to the fore in this area, and the latest news (see this month's Newsprint) is that its facilities are to be integrated into NetScape. This will facilitate high-quality publishing across the Net and could make Acrobat's Portable Document Format (PDF) a *de facto* Web standard. Also, Acrobat 2.0's local hypertext facilities are to be extended to the entire Web.

Acrobat's roots lie in one of the great ironies of the evolution of telecoms: the fact that fax took off before email, though the latter is both easier to implement and more useful (being raw information, as opposed to an image of information).

No-one would argue that email is pretty, however. Acrobat gives you the best of both worlds, allowing you to swap richly formatted documents, yet extract text or figures easily for use in word processors or spreadsheets.

PDF is based on Adobe's well-tried PostScript page-description language and doesn't depend on installed fonts, so that what you see on one machine

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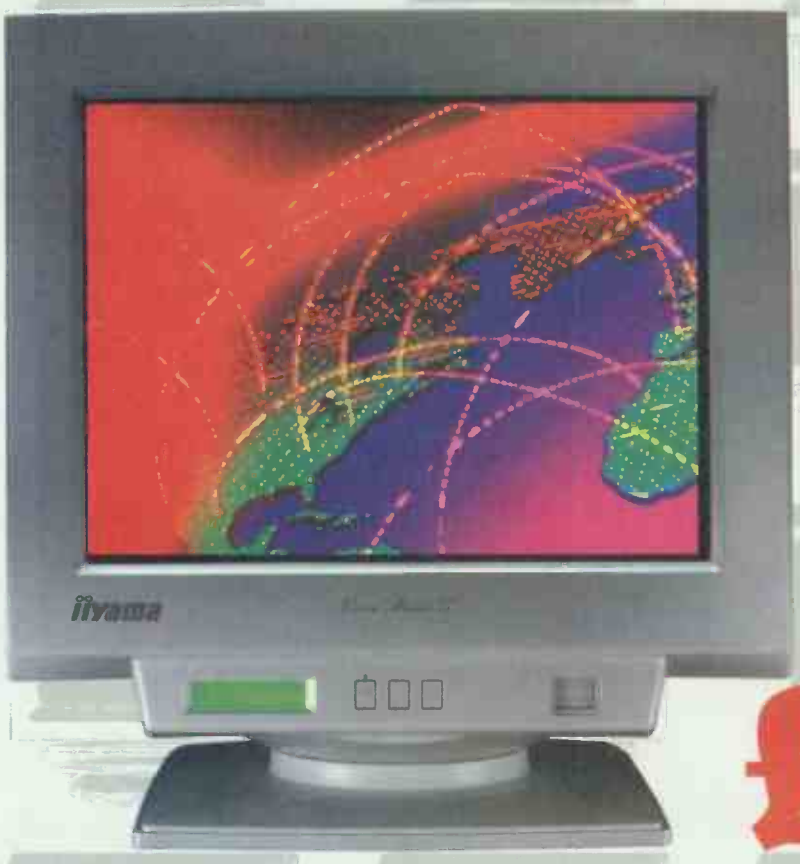

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will be what you get on another — even in the case of alien platforms like a Mac and a PC.

Adobe has sensibly decided to put the Acrobat viewer into the public domain, so anyone is free to view PDF files. The full Acrobat package also acts as a document manager, with extensive search facilities, though the more expensive Acrobat Pro package is advisable if you are dealing with files with a very high graphics content.

It also includes a programming interface and support (in the Windows version) for DDE and OLE, to help developers and users integrate the product with other applications.

Non-event of the past year was of course Windows 95, now slated for an autumn release after a delay of about a year. This gave our second runner-up, OS/2 Warp, a clear run at market.

It has a chequered history. The first version was symptomatic of a general malaise at IBM, emerging at a time when the company was losing out on all fronts: its mainframe business reeling from rising desktop power, and its second-generation PC architecture failing to grab the market. But like Windows, which only took off with version 3.0, OS/2 matured with each release. With Warp it turned into a stable mainstream operating system capable of using a Windows machine better than Windows 3.x under DOS.

It offers all major features promised by the delayed Windows 95: fast 32-bit operation, pre-emptive multitasking, multi-threaded program execution, built-in multimedia support, built-in Internet support, and, crucially, a linear address space which does away with the old 640kb DOS limit.

It also runs Windows and migrates existing Windows setups, making installation very simple. OS/2 Warp deserves recognition just for providing Microsoft's operating software with some quality competition, which can only be good for users. But technologically speaking, this is no mere pacemaker for Windows 95. OS/2 Warp got there first, and wins our accolade in its own right.

Best Business Software

1 QuickBooks 2.0

2 Lotus 1-2-3 Release 5.0

2 Microsoft Powerpoint 4.0

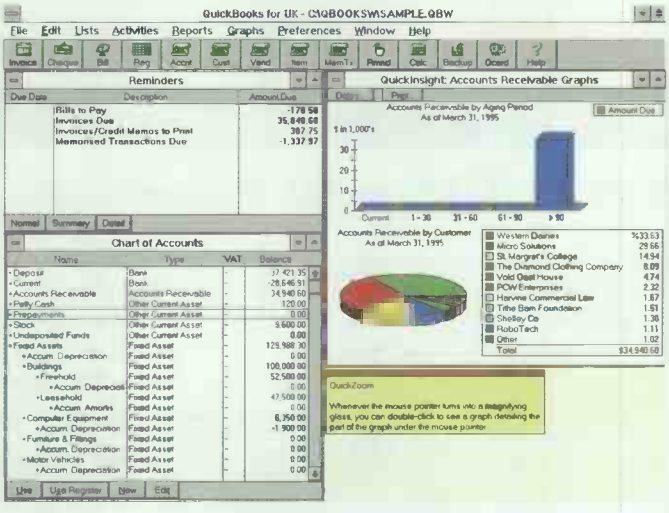
QuickBooks from Intuit/Microsoft offers a full business ledgers upgrade path from Quicken. It includes nominal, purchase and sales ledgers, invoicing, full VAT accounting, and is multi-company.

Aimed at non-accountants, the manuals are detailed and clear, and there is also an extremely comprehensive and well presented online tutorial. The Getting Started manual includes a chapter headed "All the accounting you need to know".

QuickBooks offers a choice of 19 charts of accounts for different industries, and invoice formats are provided for services, professional or products. It displays a Reminder window to indicate transactions to be completed that day and Qcards pop up as you work to give explanations and tips.

QuickBooks contains a wealth of powerful and useful features. It has full drill-down facilities, including double clicking on bars or segments in the graphics. The user can record costs against a customer, which can be later recharged, including a mark-up.

The reporting features are simple and intuitive, and are helped by a set of excellent graphs. QuickBooks includes fifty pre-set reports, and QuickReport buttons are used to give immediate details of transactions. As well as being the ideal tool for recording transactions, QuickBooks is a powerful aid to managing the business.



QuickBooks 2.0

Lotus 1-2-3 Release 5.0 has done well to beat off Microsoft Excel and Novell's Quattro Pro in the highly competitive spreadsheet market. 1-2-3 is very easy to use, with tabbed workbooks, SmartIcons, interactive status bar, Smartmaster sheets and range fill by example. It even retains its familiar DOS keyboard shortcuts.

A unique facility is that cells can be linked to graphical mapping, which plots data on geographical maps. Version Manager retains details of changes to maintain an audit trail or set up scenarios, and there's a back-solver. 1-2-3 supports ODBC for access to databases. Release 5.0 is a useful precursor to Lotus's Team Computing concept which it will introduce in the Windows 95 version.

Microsoft Powerpoint took presentation software to new levels of usability with its "What do you want to do today?" approach. New users are taken through the steps of creating a presentation, including a choice of ready-made presentations which the user then customises. Powerpoint has been designed to incorporate much of Word and Excel's way of working to make it easier to use.

There are a large range of effects and 1,000 colour clipart images to enhance presentations. Hidden slides can be created to make presentations more flexible. There's no doubt that Powerpoint 4.0 has improved the quality of business communications.

Best Creative Software

1 Photoshop 3.0
2 Director
2 Procyon Pro

Best Creative Software is a new category, covering the many and varied art packages that have hit the desktop in recent years. It takes into account multimedia authoring packages too, and video editing and music software. It came as no surprise to anybody at *PCW* when Photoshop, winner of last year's Best Art Application was again voted tops.

Adobe Photoshop is probably the best known and most respected photo retouching application. Just about every bureau, design studio and publishing house has a copy or two. The release of Photoshop 3.0 earlier this year introduced a Layer control and a Transparent facility. The most welcome feature, though, is its speed — it's very quick indeed. Filters boost performance of three to four times from version 2.5 on all platforms.

As with most high-end applications, the need for a highly specced system is a must. Adobe encourages 16-32Mb RAM to be installed, which might scare less-demanding users away. Paintshop Pro, which will run in as little as 4Mb, was also considered for this award with the release of version 3.0, but was just pipped at the post.

For the serious multimedia developer, we all agreed MacroMedia Director has the edge for best authoring package and is the first runner-up in this category. Although it's hardly intuitive and easy to learn, it has stacks of powerful features.

It lets you create animations in real-time by drawing the movement of an object directly onto the screen. It's well suited for short movies and can handle any amount of graphics, sound and video. For non-programmers, Director is easier to get going with than something like Microsoft Viewer, and has the great advantage of being cross-platform.

As the quality of sound cards nears that of professional synthesisers, the temptation to dabble with on-board sounds begins to run pretty high. To access the sounds you need a MIDI controller, say a MIDI keyboard, and a sequencer to let you record and edit your performances.

There has been an explosion of budget sequencers over the past year — not everyone wants or needs all the features found in high-end applications such as Cubase. The package we were most impressed with was Goldstar's Procyon Pro, which has a wealth of features, is easy to use and reasonably priced, earning it runner-up in Best Creative Software.

Best Suite

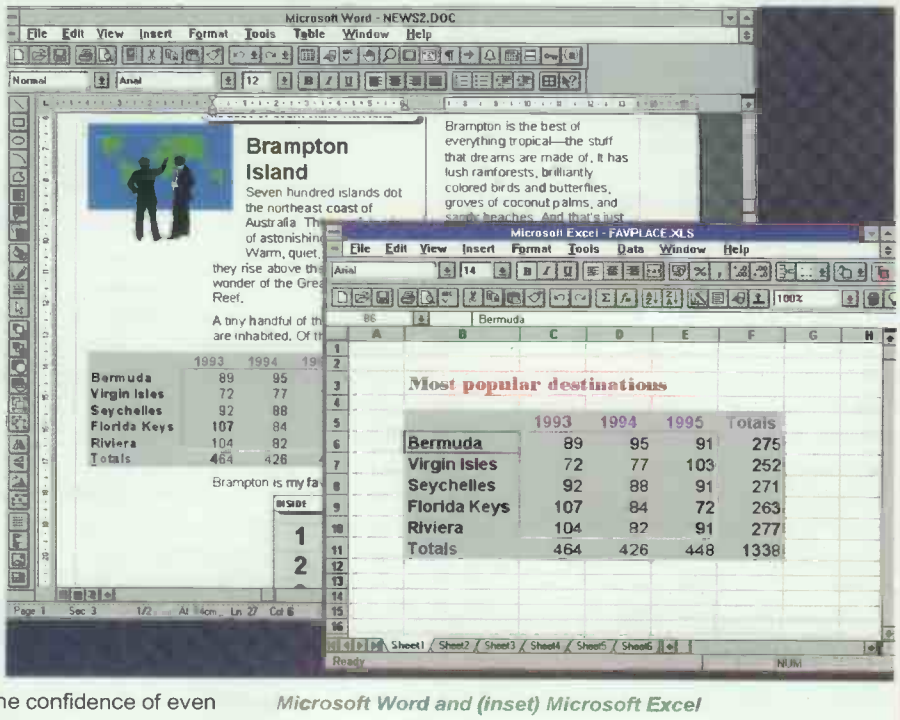
1 Microsoft Office 4.0 2 Novell Office 2 CorelDraw

In terms of state-of-the-art features, elegance and consistency of interface, Microsoft remains the undoubted leader. Its core products, Word 6.0, Excel 5.0 and Powerpoint 4.0, are all stars in their own right — and deservedly so.

Word's capabilities have gone from strength to strength, with "Intellisense" offering smart quotes, automatic formatting, and corrections as you type. Excel now boasts tabbed sheets within a workbook, enabling three-dimensional use of functions and ranges. Both offer drag and drop editing facilities, and Powerpoint's range of wizards, templates and other aids makes it easy for even the most artistically inept to construct an impressive presentation. The Professional version includes the illustrious Access database, and both have a generous sprinkling of extras including WordArt, electronic mail, clip-art management and charting. Overseeing the whole is the Microsoft Office manager (MOM) which provides a button bar shell for the entire suite. Consistency is of a high level with near-identical menu layouts, button functions and overall feel.

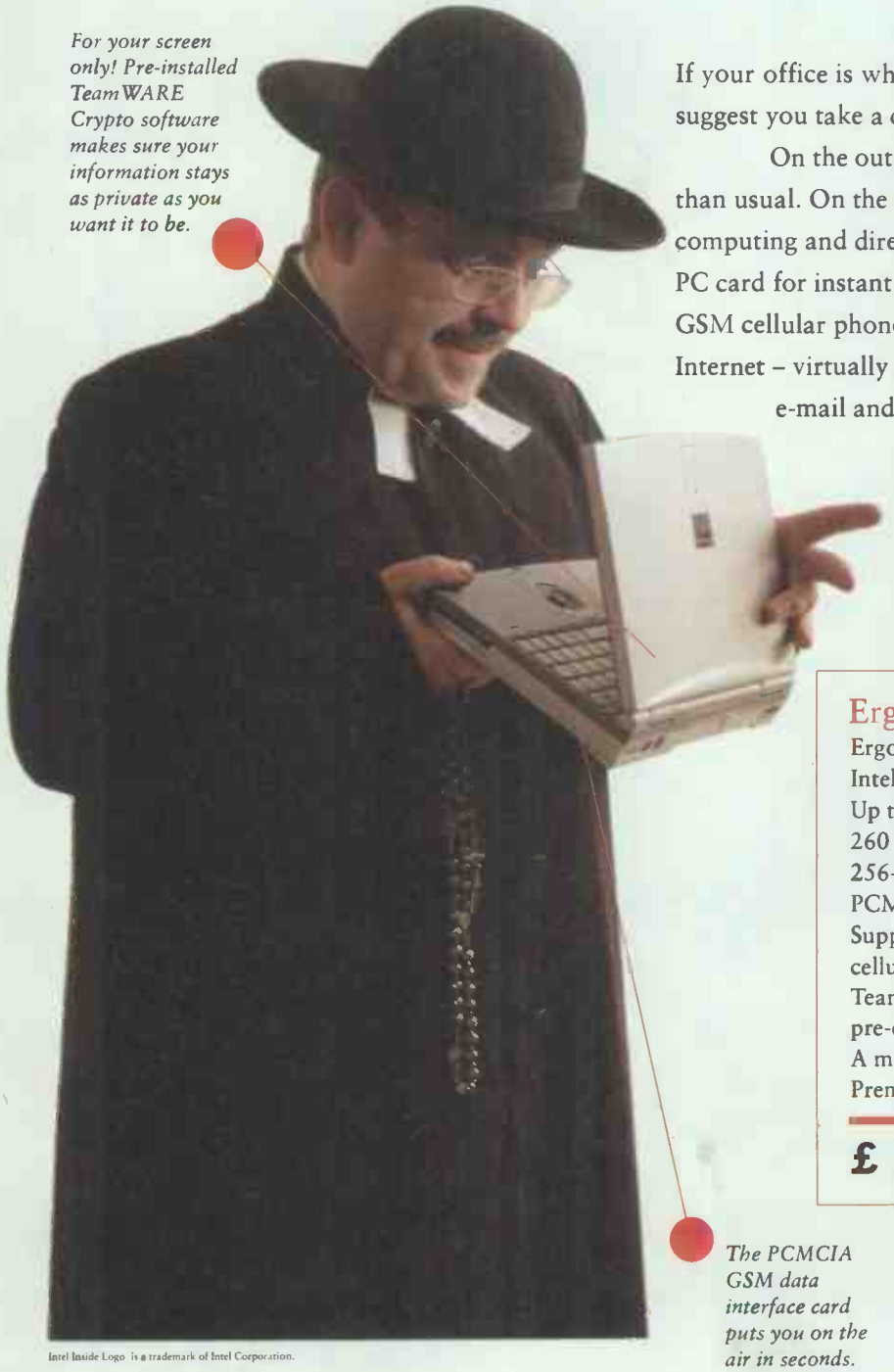
Wizards, Tooltips, Cuecards and other aids help to make a set of highly complex applications a pleasure to use, and combined with the tutorials boosts the confidence of even the greenest newcomer. Integration is excellent and OLE2 allows drag and drop actions between modules and in-place editing of embedded objects.

Despite its leadership, Microsoft cannot afford to be complacent. Although Visual Basic for Applications is now the official macro language of Excel, Word is still stuck with



Microsoft Word and (inset) Microsoft Excel

A hot line to head office.



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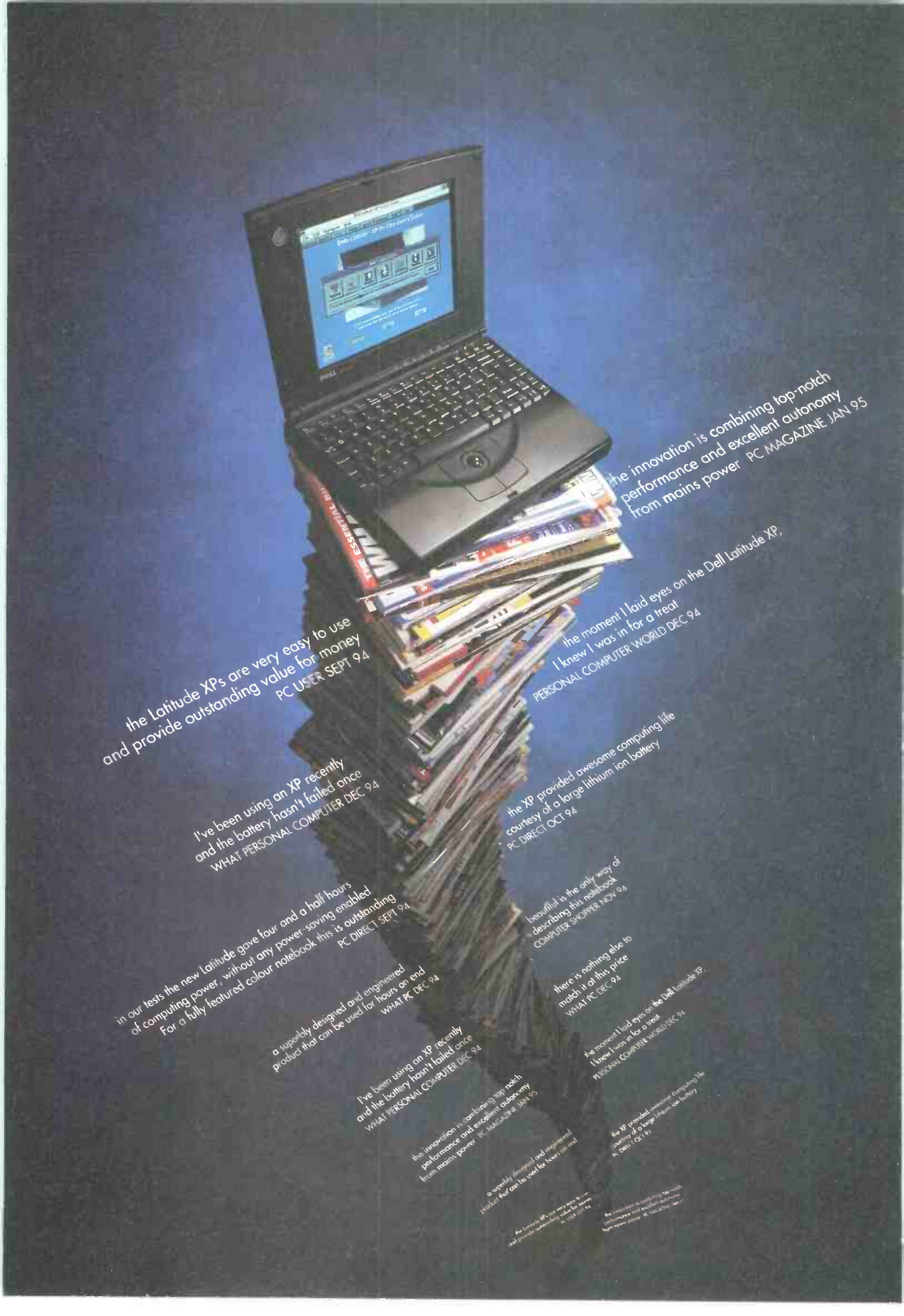
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WordBasic. The panacea of a universal cross-application programming environment is still keenly.awaited. The current implementation of OLE is still painfully slow and the limitations of Windows 3.1 resources severely hamper performance when several modules are running. In fairness though, these drawbacks apply equally to the runners-up in this category of the awards. The sheer might of these applications has outstripped the capabilities of the operating system but the delivery of Windows 95 should see both products overcome these limitations. Despite the drawbacks however, Microsoft Office makes the best job of fine-tuning the balance between power and ease of use.

Novell Office, a joint runner-up, is trying hard to close the gap. The first version of this, Borland Office, was a rather uneasy marriage with the WordPerfect corporation handling the word processing, and Borland's Quattro Pro and Paradox chipping in with spreadsheet and database features. Integration and consistency were largely cosmetic and somewhat half-hearted. Nevertheless, in certain areas such as file handling, tables, and graphics (in WordPerfect 6.0) it positively outshone Microsoft.

The acquisition of WordPerfect and Quattro Pro by Novell has changed all this. The new bundle, Perfect Office, now follows the Microsoft and Lotus norms of having word processing, spreadsheeting and presentation graphics as its core components with the Paradox database as an optional extra in the Professional version. WordPerfect itself has been given an update release and its PerfectSense software now beats Microsoft's Intellisense in offering word-form replacement. For example, search and replace the word "purchase" with "buy" and it will also replace all instances of the word "purchasing" or "purchased" with "buying" or "bought". Extras include the InfoCentral PIM, the Envoy document viewer and GroupWise mail as well as the Desktop Application Director — DAD to Microsoft's MOM — and in the Professional version, the Novell Appware visual development application. Integration and interface consistency is now much tighter and PerfectOffice currently represents a far more serious challenge to Microsoft's supremacy.

The other joint runner-up, CorelDraw, illustrates that suites aren't just for suits. Corel has always been acknowledged as the best illustration software available and probably the only graphics application to make Mac owners yearn for a PC. Despite its tradition of bugged new versions which are generally corrected with a maintenance release, the product remains a favourite. Not only has the drawing module become more powerful over the years, but the complementary programs have grown from the role of mere accessory to that of fully-blown applications in their own right. The latest release includes a competent bitmap image processing and painting module, presentation graphics, and charting. There is also bitmap to vector conversion, optical character recognition, image file management, advanced colour management and colour separation.

There is a high level of interface consistency and integration, with drag and drop OLE between modules. The cherry on this substantial cake is the inclusion of a totally revamped Ventura Publisher, for which buyers of the initial version 5.0 have had to wait. But Corel doesn't merely offer executables, and in the past the bundled collections of clipart and typefaces have grown both in quantity and quality. There are now 22,000 of the former and 825 of the latter, with established names such as ITC and Bitstream having mostly superseded Corel's "own brand" typefaces.

Best Utility

1 WinZip 5.5 2 EZ-SCSI 2 Paintshop Pro

This year's best utility, WinZip, has changed everybody's life at *PCW*. We receive almost all the features and screenshots we publish (from outside contributors and freelancers) by electronic mail. Almost invariably, these files are zipped up using PkZip. Until WinZip's arrival that meant shelling out to DOS and indulging in a spot of old-fashioned command line typing, which in turn often meant system crashes as DOS sessions seem to be one of Windows' shakier areas. If your DOS knowledge was a bit thin, or more likely a bit rusty, you often ended up with files in the wrong directories.

Then WinZip arrived. Like all the best utilities, it is pint-sized and as neat as a button: just 11 files and 475kb. Even on-screen it stays frugal, and by default throws up a window that's just a few inches square. Despite this it packs in just about every feature any zipper or unzipper could hope for. There's

Easy does it with EZ-SCSI

support for ZIP, ARC, ARJ and LZJ archives, and comprehensive help files. Because it's shareware you're free to try before you buy and registration is more than reasonable at $29 a throw or as little as $7 a copy for site licences.

First runner-up is EZ-SCSI. It's the most expensive utility of the bunch because you'll have to buy an Adaptec SCSI controller to get your hands on it, but these controllers now start from as little as £60. Quite simply, EZ-SCSI revolutionises linking up SCSI devices and is plug and play today. Just physically link up your SCSI devices, run EZ-SCSI and that's it. As an added bonus, the latest version comes with extra knobs and dials, including hard-disk speed benchmarking and Windows disk partitioning.

Second runner-up is old favourite, Paintshop Pro. It doesn't even pretend to be a replacement for heavyweight image editors like Photoshop. Instead, it concentrates on being fast and slick at what it does: rapidly loading, cropping and converting virtually every type of bitmap image, and doing so quite brilliantly. In the process it's blown Windows Paint out of the water and has become *the* standard package for anyone in the business of producing screenshots. The latest version, 3.0, is a bit chunkier than before. Let's hope the authors don't let "feature-creep" run away with them.

Best Networking Product

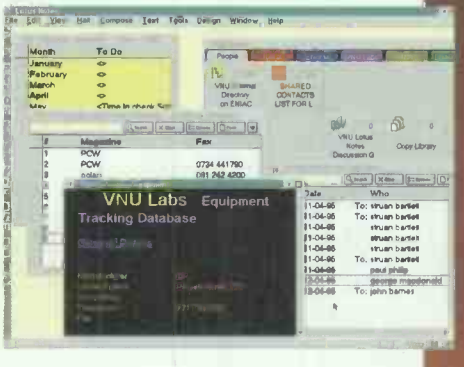
1 Lotus Notes 3.1
2 Novell NetWare 4.1
2 BW MultiConnect for Windows NT

This year's prize for best networking software had to go to Lotus Notes, since it has added OS/2 NetWare and Solaris versions to its original server product. Improved connectivity between mail systems and the Internet also features heavily, and as a bonus, v3.1 can now be installed from CD. We were also particularly impressed with its multimedia guided tour.

Novell NetWare 4.1 is a worthy runner-up due to its enhanced connectivity and portability. NetWare Directory Services (not a new concept with 4.1, however) add considerably to usability within the enterprise-wide network.

NetWare's "additive licensing" is also a boon to the system administrator, since if you have a 50-user setup, you simply purchase another 50-user pack and add the licensing to the original, rather than having to incur extra expense and go through the process of upgrading. The fact that it comes on a CD (although fairly standard nowadays) is also a plus point. Another feature of NetWare 4.1 is the fact that it allows Mac connection via IPX with NDS, which can save server memory. Finally, when it's released, the new TCP/IP interface will allow complete inter-networking integration, replacing the older practice of encapsulating the IPX packet in a TCP/IP wrapper.

The other runner-up award goes to BW MultiConnect for Windows NT. Put simply, BW MultiConnect emulates a Novell NetWare 3.1x fileserver on a Windows NT system, complete with bindery and local and print server printing. It is actually intended for adding an NT machine to an existing NetWare network, but will also function as a standalone NetWare-type server. It is dependent upon the NDIS protocol being loaded on the NT machine, and requires its own private disk space for the NetWare SYS volume area, although it will subsequently allow sharing of the whole NT disk structure, whether in FAT, HPFS or NTFS.



Lotus Notes

Best CD-ROM

1 The Way Things Work 2 Grolier 2 Bookshelf

The winner of *PCW*'s CD-ROM award is a great example of an educational CD covering a wide variety of bases. Although aimed at children, it includes plenty of interest for adults too. While being highly educational, it also manages to be great fun and is a well-conceived British product based on a best-selling book. It is the Dorling Kindersley disc, The Way Things Work.

The explanantions are clear and concise. The style is well illustrated and there are diagrams for every subject with animations scattered throughout — some are informative, others are entertaining. The whole disc is "fronted" by a cartoon mammoth and many topics have a separate, animated Mammoth Movie. Although The Way Things Work was one of the first CDs to bear the Dorling Kindersley name, it is by no means the first disc to which the company has contributed. Twenty percent of the company is owned by Microsoft so several of the most popular educational CD-ROM titles have a large degree of British content, thanks to Dorling Kindersley.

The encyclopedia is one of the most popular genres for CD-ROM discs: in fact, sales of encyclopedia in disc form have now overtaken the traditional book product. Microsoft's Encarta is the best-presented encyclopedia available, while Hutchison's Multimedia Encyclopedia has the best coverage of British and European issues. But Grolier's Multimedia Encyclopedia is the disc we have voted as runner-up. Although not particularly impressive — its presentation is functional — the depth and quality of the text is particularly impressive. It shares the weakness of its American competitors by concentrating heavily on its home country and providing less

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information about others. Nevertheless, the information it does provide is detailed and accurate with excellent bibiographies provided to encourage further study. While it doesn't contain all the knowledge in the world, it certainly has enough information about sufficient topics to be able to whet your appetite for more. Best of all, although it is slightly more expensive than other discs, it has reduced in price substantially during the past year to the critical level of less than £100.

No matter how much you intend to use your CD-ROM drive, it sits empty most of the time as you work in the office. The other runner-up, Microsoft's Bookshelf, should be the disc that you keep in your machine as you work; it contains a dictionary, a thesaurus, a book of quotations, a simple encyclopedia and an atlas. There are also two minor reference works: the People's Chronology and the World Almanac & Book of Facts. The user can browse through any of the texts but its primary use is as a writing aid — you can select a word from a document and look it up in any or all of the reference texts in Bookshelf. For instance, If you are writing about Leonardo Da Vinci, you can read about him in the encyclopedia, reference famous quotations about him in the Columbia Dictionary of Quotations, then use the atlas to look up where he lived, all with just a few mouse clicks.

Bookshelf has been available in the US for several years but due to legal problems it has not been available here until now. Its chief disadvantage is that all the texts and the spellings in the dictionary are American. But Bookshelf is due to be revised in the near future and this may be one of the revisions.

Best Game

1 Doom 2 2 Colonization 2 Tie Fighter

There could only be one winner of this year's game of the year award: Doom (and Doom II). No PC computer game has ever been so famous (or notorious), and its success has inspired dozens of "Doom-alikes" from other manufacturers. This is all the more surprising when you consider its origins.

Doom was produced by a hitherto unknown company, Id Software, and marketed through word of mouth as shareware instead of through the usual channels. The 3D engine which gives the game its smooth and detailed graphics was noticeably superior to anything else on the market at the time, but that alone wouldn't ensure it was a runaway success. Its music and the graphic design of its environment were so atmospheric, a player might find himself jumping at the sound of an enemy behind him during a late-night session. In providing network as well as modem play and having an open game system to allow users to create their own levels, Id was ahead of its time. Even now, few games companies are putting these features into their games, but as use of the Internet and online services grows, multiplayer games-playing is bound to increase. A person makes a much more interesting opponent than a computer, however clever the software is.

Doom: gory, violent and very successful

Of course, the notoriety of the violence in the game wouldn't have hurt sales, either. When Doom was launched, it was one of the most bloodthirsty games yet, and this made it controversial even outside the computer gaming community. Id even emphasised the violence in providing tools like the chainsaw to help you kill things in the most brutal way possible.

In some ways it's a pity that the success of Doom should have inspired games manufacturers to produce more violent pieces, and the early problems running it across a network makes it one of the most damaging games ever to have been unleashed on company machines; but on balance it has to be applauded. It has inspired some excellent successors, like LucasArts' atmospheric Dark Forces, and has shown games companies how useful and profitable it can be to provide demonstration software that is playable.

Colonization, our first runner-up, is a very different kind of game. Instead of mindless, instant fun, it requires a lot of thought, and is even educational in places. It's the latest title from Microprose's legendary Sid Meier, who is widely acknowledged as one of the masters of strategic gaming and one of the few software authors whose name alone can sell a game. Colonization is similar in many ways to one of Meier's last triumphs, Civilization, but while that attempted to cover the whole sweep of human history in an abstract fashion, Colonization covers a particular period: the re-settling of North America by Europeans.

In covering a sensitive time, it lays itself open to criticism. It doesn't include slavery, for example, as this would make the game less fun to play and involve players in difficult moral questions, and the objective of the game is to gain freedom for your colony from the oppression of British, French, Spanish or Dutch rulers. This aside though, Colonization does give some insight into what it must have been like to run a colony, and hours of playing pleasure as you try to juggle food production against armaments and trade goods while befriending or fighting off Indians and other Europeans.

Tie Fighter, our second runner-up, must have been a brave decision for the games designers at LucasArts to develop, a game in which you play a bad guy — a Tie-fighter pilot — in the Star Wars universe. But questions of morality are successfully fudged, and ethical dilemmas quickly fade once you're immersed in combat in the game's exquisitely rendered and well-designed universe. Last year we gave our best game award to Tie Fighter's predecessor, X-Wing, and even now this is still well up there with the best of the competition. In the fast-moving games market, few titles can make that claim.

Best Online Service

1 CompuServe

2 CIX, Demon

The British public made our choice of CompuServe as the best online service an easy one. They have "voted with their feet", and the UK membership has soared above 100,000. Despite the phenominal success of relative newcomers to the UK marketplace, this still makes CompuServe more than six times more popular than any other online service.

It has more dialup points across the UK and the world than any of its main rivals, and with a history that spans more than 15 years and 2.7 million members worldwide, it has been able to put a lot of money and effort into making its service easy to connect to.

It provides unrivalled access to a variety of databases of commercial information, as well as more consumer-based information like film guides and encyclopedias. In the last year, it has made great strides in adding local information, like a British online encyclopedia, a European rail timetable and the Good Pub Guide. By the time you read this, British shopping and share trading schemes will probably also be available. Unlike the Internet, CompuServe's closed structure makes it easy for companies which use it to charge for their services, so commercial information is readily available. Also, because all of it is held and indexed by one organisation, it's easier to find information or files. Because it has been around for so long, it has built up a large assortment of hardware and software companies offering support for their products online. Best of all, CompuServe instituted heavy price cuts earlier this year, and by the time you read this it will provide full Internet access to its users.

CIX (the Compulink Information Exchange) is the oldest UK-based online service, with a loyal base of 16,000 users. It plans to offer its members the option of full Internet access, which should also make it much more economical for its many users outside London. It may now have a substantially smaller user base than CompuServe, but while CompuServe's UK users can feel dwarfed among the millions of foreigners, CIX users have a real sense of community, as shown by frequent barbeques which let members meet face to face.

Demon is our second runner-up for providing Internet access to the general public. It has been phenomenally successful — it started in 1992 on a small scale without advertising, and by January this year it had 22,000 users.

Demon has also been crucially important, almost by accident, in influencing the pricing of consumer Internet provision. From the beginning, it set an aggressive price of £10 per month for unlimited use, a target which other providers have had to approach in order to be competitive.

PCW Team Awards

The *PCW* staff, unencumbered by democracy, readers' votes and objective opinion, get to reveal their favourite products of the year.

Reviews Editor **Gordon Laing** was overwhelmed by the sheer wealth of products he could choose from. "I still love Adobe Photoshop, and version 3, so long as you've got at least 16Mb RAM, is absolutely fabulous. The proliferation of wonderful notebooks hasn't passed me by, with top marks going to the Apple PowerBook 500 series and the IBM Butterfly. Digital Audio Labs' CardD finally allowed me to record and edit high-quality audio with digital in and out sockets. SCSI-2 AV drives, particularly from Micropolis, over a PCI bus were fast enough to cope with the demand. But my favourite product was NEC's MultiSync MTg LCD video projector, which turned my lounge into a true home cinema within minutes, while enlarging Doom and Descent to truly terrifying proportions!"

Cutting Edge editor **David Brake** usually has his nose buried in a copy of NetScape, so it's hardly surprising that it's a product that makes netsurfing easier that gets his vote. "In the six years I've been using and reviewing Macs and PCs, no piece of hardware or software has made as much difference to my life as a single, rather pricey, length of cable. I refer, of course, to Personal Computer World's Pipex leased line connection to the Internet. At 64kbits per second, it is hardly lightning fast; in theory at least, a properly set up ISDN line should be faster (though the way ISDN works at the moment, it isn't). But once we paid the setup and the hefty annual fees, it brought the Internet to me and everyone else on the network at better than modem speeds, and for no additional cost."

News Editor **Clive Akass** has chosen Blackwell's Idealist for Windows 2.0. "I've been looking for years for a database that would allow me to store information in the scrappy way that I receive it. Idealist can cope with everything from complex multi-field records to free text, and even entire files, within the same database. You get most out of it if you can use a simple Windows language like Word Basic. I have set Idealist up so that I can file names, addresses and notes directly from my word processor at the click of a key — and every significant word is indexed."

Features Editor **Chris Cain** has become the latest *PCW* staffer to fall under the spell of the Psion 3a and positively gushed with Psion evangelism. "I still can't believe how useful this little gadget is. Now that I've got into the habit of using its agenda, I never forget an important meeting, birthday or date. The freeform database is a godsend for anyone who needs to keep contact information, and as a replacement for a notepad the word processor is first class. Even when I broke my thumb and couldn't hold a pen, I could still attend conferences and take notes. Brilliant."

Technical Writer **Eleanor Turton-Hill** has been knocked out by a pint-sized printer. "The Citizen PN60 has to get the 'cutest product of the year' award. At first sight it's pretty uninspiring — just a small, grey, plastic block with four buttons on top. But once you realise it's a printer and not a child's pencil case, things get more interesting. It's 10in wide and 2in high and weighs only one pound, so you can easily carry it around without breaking your back. It produces colour, prints on transparencies, and is compatible with both PC and Mac. Definitely the most portable, most flexible and most stealable product I've seen this year."

When Associate Editor **Simon Rockman** isn't writing for *PCW* he's editing *What Mobile and Cellphone Magazine*. Hardly surprising, then, that it's a product that links personal computers and portable phones that caught his eye. "Previous ways to connect mobile phones to modems haven't worked very well, but the Nokia Mobile Data Card is a PCMCIA device which works with Nokia Digital Mobile phones — either the GSM 2110 connected to Vodafone or Cellnet, or the Nokia phone on the Orange network. This gives good, reliable 9600bps connections wherever you are. The card is expensive, but works well and uses the Hayes AT command set so it is compatible with all communications software."

Steven Helstrip, *PCW* staff writer and music fan, writes the Sound column in Hands On, and it's a sound product that he has picked. Last year he chose a Roland SCC-1 and, true to form, it's a sound card that gets his vote this time round — Creative Labs' AWE-32 Sound Card. "While the SCC-1 is still a respected card, it's limited to WaveTable synthesis. The AWE-32 has a WaveTable synthesiser, sampling capabilities and FM to provide compatibility with just about every sound standard. It has on-board RAM expandable to 28Mb, for downloading samples, and comes with some great software." Steven's other favourite is that simple but effective utility, Format.com. On *PCW* unwanted software soon builds up on your hard disk, and unstable and unreliable Microsoft GUIs can wreak havoc with your system files. Often the quickest and easiest solution is to start afresh using format C:."

Staff writer **Nick Lawrence** is knocked out by the Sony PlayStation. "There aren't too many consoles that can come under the heading of 'kit', but this is one of them. Starting life as an ill-fated CD-ROM add-on for the Nintendo Super NES, it has evolved into what I reckon will be the winner of the next-generation console battle. It's got all the hardware to make it successful, and the list of third-party software developers is impressive and seemingly never-ending, with such classics as Tekken and Ridge Racer already appearing."

Editor **Ben Tisdall** fell for IBM's Butterfly notebook at first sight. "I'll never forget lugging a 17lb portable PC to Comdex in Las Vegas in 1989: I vowed never to travel with a computer again. Of course I did, but usually regretted it. Then the Butterfly arrived — or rather, the Thinkpad 701C, to give its official title. It's light enough to carry on the tube yet small enough to fit into a briefcase with enough space left for a stack of paperwork. Above all, it doesn't compromise on keyboard or screen size." The other product Ben loved was the Psion Goldcard faxmodem. "It looks great, worked flawlessly and makes you wonder how they manage to get all that into something so small."

PCW Contacts

HARDWARE

Most Innovative Hardware
Intel 01793 696000. Fax: 01793 641440
Fast Electronics 0171 221 8024.
Fax 0171 792 3449
IBM 01705 492949. Fax 01705 492222

Best PC System
Apple 0800 127755. Fax 0181 8709855
Gateway 0800 172000.
Fax 00353 1848 2022
Dan Technology 0181 830 1100.
Fax 0181 830 1122

Best Notebook
Toshiba 01932 841600. Fax 01932 845606
Texas Instruments 01932 761595.
Fax 01932 780126
IBM 01345 727272. Fax 01345 720072
Apple 0800 127753

Best Printer
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Fax 0171 735 5565
Lexmark International 01628 481500.
Fax 01628 481886
Epson Stylus Colour 01442 61144.
Fax 01442 227353

Best Budget Printer
Hewlett Packard 01344 361300.
Fax 0171 735 5565
Brother 0161 330 6531. Fax 0161 931 2200

Best Peripheral
NEC Peripherals 01345 300103.
Fax 0181 992 7161
Creative Labs 01734 344744.
Fax 01734 320271
US Robotics 01753 811180.
Fax 01753 811191

SOFTWARE

Most Innovative Software
Mosaic can be downloaded from
ftp://src.doc.ic.ac.uk/packages/Mosaic
Netscape Communications 0101 415 254 1900.
Fax 0101 415 254 2601
Netscape be downloaded from
http://home.netscape.com/eng/beta/nn1.1b2;
registration costs $39.
Adobe 0181 606 4017. Fax 0181 606 4044
IBM 01256 56144. Fax 01256 843168

Best Business Software
QuickBooks 2.0: Intuit 0181 990 5500.
Fax 0181 759 2077
Lotus Development 01784 445808.
Fax 01784 445351
Microsoft 01345 002000

Best Creative Software
Adobe 0181 606 4000. Fax 0181 606 4004
Macromedia 0181 200 8282. Fax 0181 200 3788
Evolution (Procyon Pro) 01525 372621.
Fax: 01525 383228

Best Suite
Microsoft 01345 002000
Novell 0800 177277. Fax 0800 525321
Corel Corporation 0800 581028.
Fax 010 3531 295 7723

Best Utility
Winzip: Shareware Marketing
01732 368042. Fax 01732 771513
PaintShop Pro: Shareware Marketing
01732 368042. Fax 01732 771513
EZI SCSI: Adaptec 01252 811200

Best Networking Software
Lotus Development 01784 445808.
Fax 01784 445351
Novell 0800 177277. Fax 0800 525321
BWS 001 919 831 8975

Best CD-ROM
Dorling Kindersley 0171 753 3488.
Fax 0171 753 3564
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Microsoft 01734 270000

Best Game
Doom and Tie Fighter: Virgin 0181 960 2255.
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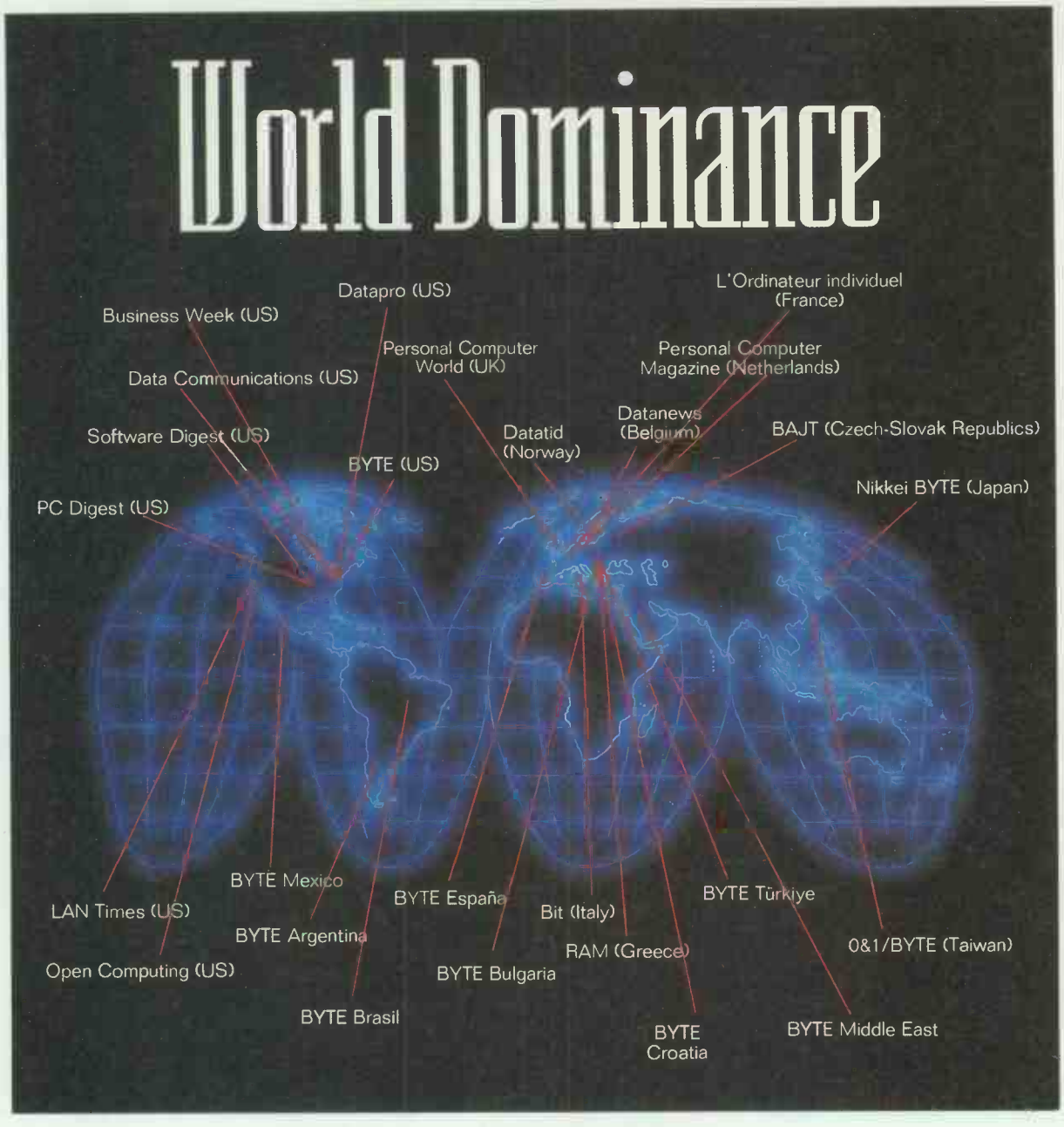
Colonization: MicroProse 01454 329510.
Fax 01454 329 507

Best Online Service
CompuServe 0800 289 378. Fax 0117 925 2210
CIX: 0181 390 8446. Fax 0181 390 6561
Demon 0181 371 1234

Team Awards
NEC Peripherals 01345 300103.
Fax 0181 992 7161
Pipex 01223 250 120. Fax 01223 250121
Blackwell 01865 206206. Fax 01865 721205
Psion 0171 262 5580. Fax 0171 258 7341
Citizen 01753 584111. Fax 01753 582442
Nokia 01480 434343. Fax 01480 445222
Creative Labs 01743 248590. Fax 01734 320271
Sony 01932 816000. 01932 817000
IBM 01256 343000. Fax 01256 843168



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COMPAQ MEANS

BUSINESS

ISSUE FOUR

LEADING THE WAY

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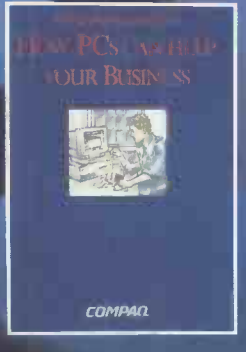


What a difference a Compaq makes.

How the Compaq ProLinea has revolutionised business for Assmann Office Furniture.

COMPAQ

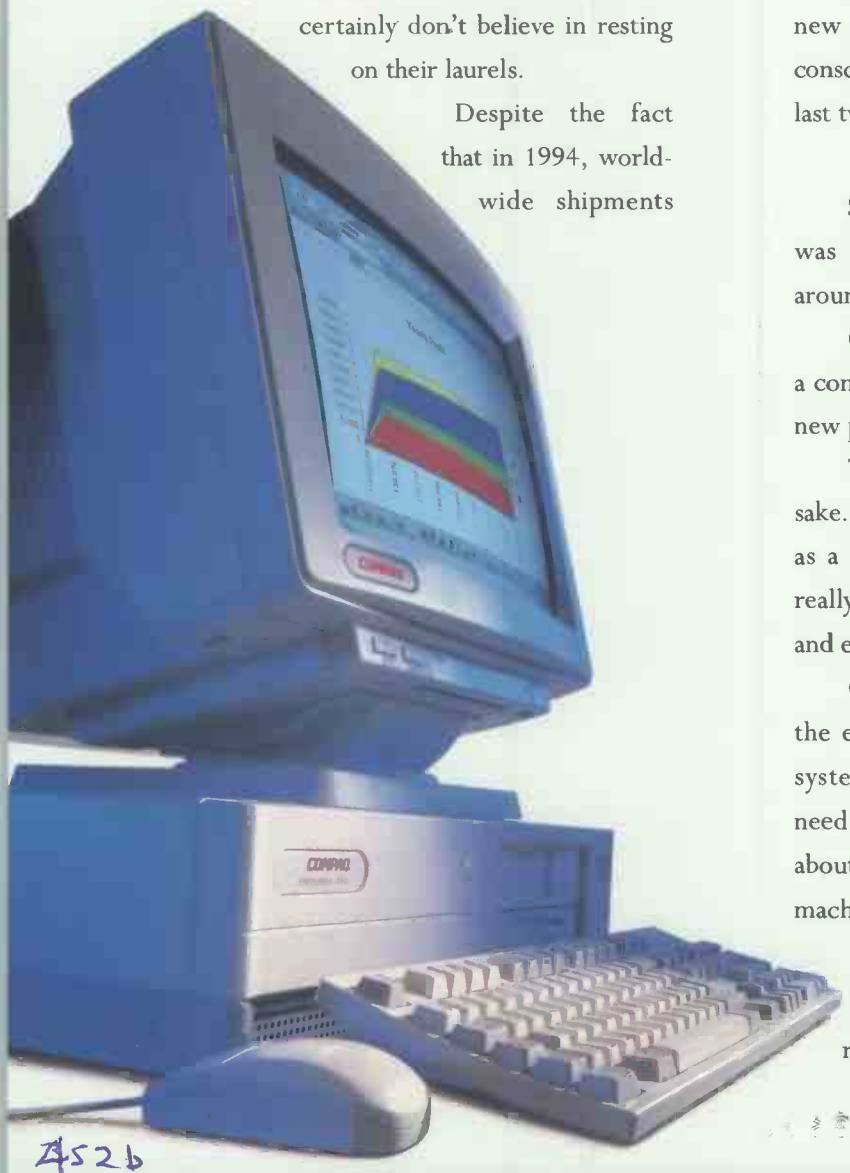
THE LEADER

GOING FROM STRENGTH TO STRENGTH.

The world's no.1 PC manufacturer* has just improved on their no.1 selling PC. The Compaq success story goes on and on.

What do you do when you've just been pronounced 1994's worldwide PC leader? Well, at Compaq they certainly don't believe in resting on their laurels.

Despite the fact that in 1994, world-wide shipments of Compaq computers increased by 56 per cent to 4.8 million units**, Compaq are continuing to develop new, innovative products designed to make computing easier and cheaper for businesses.



The latest quality PCs to roll off their production lines in Erskine, Scotland, are brand new models of the Compaq ProLinea, the cost conscious PC that's been a UK best seller for the last two years.

BETTER FOR BUSINESS.

So why go ahead and change something that was obviously so popular with businesses all around the world?

One of the reasons for their success is that, as a company, Compaq are committed to investing in new product development.

That doesn't mean technology for technology's sake. Every breakthrough they've made has come as a result of listening to what their customers really need. Namely quality, reliability, performance and ease of use.

Compaq could see that in order to cope with the ever increasing demands on their computer systems, tomorrow's businesses were going to need extra performance and features. So they set about incorporating them into their most popular machines – without raising the cost.

BETTER SPECIFICATIONS.

Happily, they succeeded. And as a result, the new ProLinea range boasts more

4526

models, more power and more innovative features per £ than ever before.

Both performance and storage have been dramatically upgraded to match the requirements of today's business software. The whole range now features the new PCI Bus as standard.

BETTER BUSINESS INVESTMENT.

As the world's most successful PC company, and the 13th largest exporter in the UK, Compaq understand all about efficiency and cost effectiveness.

Which is why the new ProLinea is still as easy to use as its predecessor (anyone can learn to use it in just minutes with its special pre-installed software.)

Compaq ProLinea 450 3/3.

It's also why Compaq quality and reliability still come as standard – backed by the reassurance of a comprehensive three year warranty with on-site service included free for the first year.

So if you're looking for a computer system to take your company to the top, without paying over the top, take a look at the ProLinea's specifications in the back pages of this issue of Compaq Means Business. And follow the leader to a successful computer system.

**In 1994 Compaq sold more PCs worldwide than any other manufacturer. Source: Dataquest.*
*** Source International Data Corporation.*

COMPUTER SPEAK

Your Guide to the latest industry buzzwords.

PCI LOCAL BUS

Peripheral Component Interconnect (PCI) Local Bus is an improved method of connecting the components in a PC, such as graphics, network card and hard disk, to the processor and memory.

Basically it provides a faster, wider connection for data to pass along, which greatly improves performance – rather like driving on a motorway instead of a B road.

NEWS UPDATE

COMPAQ TAKE NO.1 SLOT FOR 1994.

Latest PC shipment figures from Dataquest show Compaq is also the clear leader in the UK PC market for 1994, with a unit market share of 11.9% of the total market, a 3.7% lead over its nearest rival.

WINDOWS '95®† DUE IN AUGUST.

Windows '95', Microsoft's new operating system that's set to replace DOS and Windows, is scheduled for release in August.

Amongst other benefits, it will enable those PC's designed with this new operating system in mind – like the Compaq ProLinea – to automatically reconfigure themselves when upgraded, allowing for much easier use and expansion.

The specification for this "Plug & Play" facility was developed jointly by Compaq and Microsoft through their FrontLine Partnership.

FREE NEW GUIDE TO PCs FOR BUSINESS.

Computerisation can be one of the best, and trickiest business decisions you make. The brand new Compaq Guide to 'How PCs Can Help Your Business' is packed with advice to help you make the process easier, along with inspiration on how you can use PCs to improve your business efficiency.

Issues include everything from identifying your requirements to financing, training and security.

For your free copy, simply fill in and return the application form at the back of this issue or call 0800 444 044.

†Windows is a trademark of the Microsoft Corporation.

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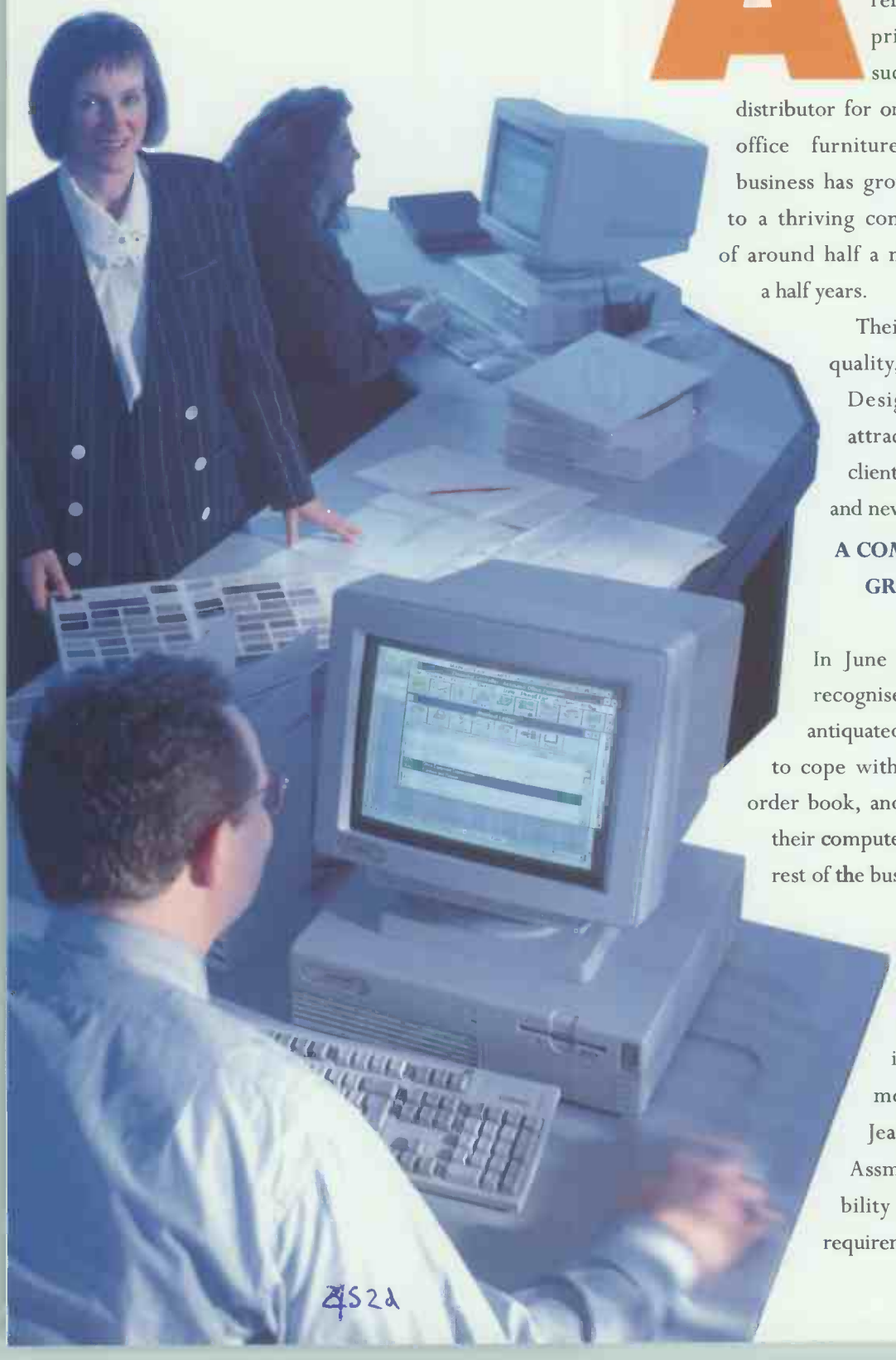
A fitting fix

How the right computer system has revolutionised business for Assmann Office Furniture.



Assmann Office Furniture's stylish new headquarters in Chessington are a fitting reflection of this enterprising young company's success. As the sole UK distributor for one of Germany's largest office furniture manufacturers, the business has grown from one salesman to a thriving company with a turnover of around half a million in just two and a half years.

Their unique brand of high quality, sophisticated Office Design and Furniture has attracted many high profile clients, including retail stores and newspapers.

A COMPUTER SYSTEM TO GROW WITH THEIR COMPANY.

In June last year the company recognised that their one rather antiquated PC was no longer able to cope with the rapidly expanding order book, and it was time to expand their computer system in line with the rest of the business.

Which is where Jeannie Edwards, Assmann's administration manager came in. Fresh from a fast moving career at Pepsi, Jeannie's new role at Assmann included responsibility for their growing IT requirements.

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xture.

Although her time at Pepsi had taught Jeannie a lot about software, she knew little about hardware beyond the fact that she had been very impressed by Pepsi's Compaq PCs. So naturally she turned to her local computer dealer for advice.

"THE DECISION TO BUY CHEAPER BACKFIRED."

"I went through a very painful learning curve." Jeannie told us ruefully. "Instead of sticking to my guns and insisting on Compaq, I allowed myself to be talked into using a cheaper make of PC."

"From day one, everything went wrong. The hardware and software just didn't seem to be compatible. Orders were incorrect and the system kept crashing. In fact, things got so serious, our MD became involved and my job was literally on the line."

"Naturally, I took action. I got on the 'phone to the dealer and simply said, "I want this hardware out and Compaq PCs in, NOW."

Jeannie says the dealer reacted with professionalism and a few days later three Compaq ProLinea PCs were duly installed, and the software reloaded. Since then, true to Compaq's reputation for reliability, the system has worked without a hitch. And Assmann haven't looked back.

The new ProLineas are powerful enough to handle all Assmann's office tasks, from word processing to customer and supplier databases, as well as the vital stock control and order processing.

Their dealer helped them to implement their chosen software packages – Microsoft Office and Sage Sterling – ensuring that they made the best use of the many useful features. They now have an easy to use, integrated system and can easily transfer data between applications, eliminating the need to duplicate information in different parts of the business.

A MORE PROFESSIONAL WAY TO DO BUSINESS.

Jeannie says the difference the new Compaqs have made to her company is remarkable, "We're just so much more professional," she commented. "With the ProLineas, everything is faster. And because things like our purchase records, stock and data base are all linked, we've got better business control too."

Assmann have found the Sage Sterling accounts software so easy to use that they can now bring all their accounting in-house, giving them greater control and more timely access to information.

Linking up the PCs with a simple network has provided everyone with easy access to shared information and has enabled them to save money by sharing resources such as printers. They've also made good use of the Electronic Mail facility for quick, efficient communication.

Because the system has been designed to grow with their business, they are confident they can add to it as the need arises. Already in the pipeline are plans for direct links with the main office in Germany, and one day, Jeannie says, they'd like to have their own design package.

If the past is anything to go by, Assmann will achieve everything they set out to do, and more, in 1995. And with their new-found support from Compaq, Microsoft and Sage, there'll be no stopping them!

A SPECIAL OFFER FROM THE MARKET LEADERS

Assmann are just one of the many companies in the UK who have discovered that the Compaq ProLinea with Microsoft Office and Sage Sterling provides the ideal solution for their business.

To make it even easier for everyone to enjoy the benefits of this combination Compaq have teamed up with Microsoft and Sage to provide a very special offer on this complete business package.

For full details of this winning combination simply fill in and return the coupon at the back of this issue or call 0800 444 044.

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The slim-line desktop ProLinea with high performance PCI local bus graphics and hard disk controller. Three expansion slots and one free bay in a neat package.

The mid-size ProLinea Desktop has all the performance of its slightly smaller partner plus an extra free bay and expansion slot.

The Mini-tower ProLinea offers the ultimate in future proofing. Not only is it available with up to 100MHz Pentium '586' processors but it has five free expansion slots and three free drive bays.

Simply the best.

So how does the UK's no.1 PC manufacturer improve on their best selling PC? Compaq have the answer.

If the Compaq Prolinea is so good, then why are we changing it? Well, quite simply, because you want even more from it.

You see, at Compaq we make it our policy to really listen to our customer's needs. And through our research, we've found that most people are looking for computers that won't be out of date the minute they're out of their boxes – computers that can be easily upgraded to keep up with growing needs of their businesses.

So we set our engineers the task of giving the ProLinea even more storage and higher performance, along with a host of useful new features. Without adding to the cost.

THE BEST FEATURES.

As a result, the affordable new ProLineas are built to last. And last.

We've added larger, faster hard drives (starting at 270MB) and greatly improved the graphics to make applications like Windows work faster and look much better.

And all but one model boasts at least 8MB of RAM as standard. So you can be sure that the new ProLineas are ready to cope with everything that today's and tomorrow's larger, more complex software packages can throw at them.

THE BEST SIZE FOR YOUR BUSINESS.

Amongst your many options in the new, wider ProLinea range is a choice of three main styles or body shells each with different numbers of expansion slots and drive bays, ranging up to the exceptional 5 slot, 5 bay Mini-tower.

Basically, the more slots and drive bays your ProLinea has, the more you'll be able to expand it

4528

in the future. Expansion slots allow you to add features like a modem, additional sound features or network capabilities.

You'll also find every new ProLinea has at least one PCI slot (See ComputerSpeak on page 2) for very high performance additions.

Drive bays are important because they allow you to connect devices such as CD-ROM to give you access to a wealth of information, or a tape unit to protect all your valuable data. What's more, because the ProLinea uses the latest type of device controller, you can often connect whatever you need straight to your PC without the need for any additional controller cards.

THE BEST PERFORMANCE FOR YOUR BUSINESS.

OK, so you've decided you want a ProLinea. The next question is which one? Do you really need a mighty Pentium 100MHz processor, or would something more modest fit the bill?

Its always difficult to strike the right balance between price and performance, but the main deciding factor should be the kind of software you're going to be running. Not just now, but in the future. Generally, we advise businesses to think what they might need, then add at least 10% extra power. (Which is one of the reasons why even our new, entry level ProLinea boasts a speedy 486DX2 50MHz processor, making it about 70% faster than its predecessor – without adding 70% to the price.)

STILL THE BEST CHOICE.

Of course, not everything about ProLinea has changed.

Because it's been designed, engineered, built and tested by Compaq, it's every bit as reliable as its predecessors and even better value for money.

If you'd like to find out more about the new Compaq ProLinea PCs, and how Compaq innovations can make computing easier for you, tick the appropriate box on the coupon opposite and return it to us.

We're sure you'll find the new ProLinea harder to beat than ever.

ProLinea Desktop Specifications

These are sample configurations only. For full range details request the Compaq ProLinea Desktop PC Brochure by ticking box in coupon opposite.

	Compaq ProLinea 450 3/3	**Compaq ProLinea 466 3/3**	**Compaq ProLinea 575 3/3**	**Compaq ProLinea 590 4/4**	**Compaq ProLinea 5100 5/5**
Standard Configurations and Prices* (excl. 17.5% VAT)	Model 270 (270-MB Hard Disk Drive): **£835**	Model 270 (270-MB Hard Disk Drive): **£1,085** Model 420 (420-MB Hard Disk Drive): **£1,155**	Model 270 (270-MB Hard Disk Drive): **£1,415** Model 420 (420-MB Hard Disk Drive): **£1,485**	Model 420 (420-MB Hard Disk Drive 8-MB RAM): **£1,695** Model 720 (720-MB Hard Disk Drive 16-MB RAM) **£1,995**	Model 720 (720-MB Hard Disk Drive): **£2,475**
All models:	3.5" 1.44-MB Diskette Drive; Compaq Space Saver Keyboard; Compaq Mouse. Plug and Play BIOS, Windows 95 Ready.				
Processor:	50-MHz 486DX2	66-MHz 486DX2	75-MHz Pentium	90-MHz Pentium	100-MHz Pentium
Standard Memory:	4-MB of RAM	8-MB of RAM	8-MB of RAM	8/16-MB of RAM	16-MB of RAM
Graphics:	PCI Local Bus Graphics; 1024 x 768, 256 colours (non-interlaced)				
Pre-installed software:	MS-DOS 6; MS Windows 3.1; Compaq Learning Centre and Compaq Control Centre				
Expansion Slots:	1 PCI/ISA shared slot, 2 ISA slots, 1 Compaq option slot			2 PCI/ISA Shared slots, 2 ISA slots, 1 Compaq option slot	1 PCI slot, 1 PCI/ISA shared slot, 3 ISA slots, 1 Compaq option slot
Device Bays:	2 Externally accessible, 1 internal			3 Externally accessible, 1 internal	4 Externally accessible, 1 internal
Security Features:	Power-on Password; QuickLock/QuickBlank; Keyboard Password; Diskette Boot Control; Diskette Write Control; Flash ROM Lock; Physical Lock Provision; Setup Password including: Diskette Drive Control, Hard Drive Control, Parallel and Serial Interface Control				
Power Management Features:	Energy Star Compliant; Lower Power consumption: Energy Saver mode 20-25 watts				
Warranty:	Three year warranty (first year on-site); UK CompaqCare Centre lifetime telephone support				

**Typical Buying Price (excl. 17.5% VAT). Price excludes monitor. Compaq colour monitors available from £190 (excl. 17.5% VAT).*

4529

IF YOU WANT A COMPUTER THAT WILL REALLY HELP YOUR BUSINESS

HELP YOURSELF.

Buying a computer for your business can be one of the best decisions you'll ever make. But finding just the right combination of hardware and software can be tricky.

Especially if you don't know where to start. Which is why you should help yourself to a free copy of the Compaq guide to How PCs Can Help Your Business. The guide contains lots of ideas on how you can use PCs to improve your business efficiency.

It explains simply and effectively how to make the whole process of choosing and buying the right PC and software easier. The guide covers everything from what to look for in a PC and how it works, to more complex issues like training, security and finance.

For your free copy, simply complete and return the coupon overleaf, or call **0800 444 044**.

And help yourself to help your business.

COMPAQ
SHOWS THE WAY

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  Which is committed to hard drives and your future with Allgem.

IDE HARD DRIVES

Up To 700MB

Make	Model	Capacity	Access	Size	Wrnty	Cache	Price/Mb	Price
Fujitsu	M2682T	353Mb	12.0ms	3.5" 1"	2 yrs	256k	£0.33/Mb	£115
Quantum	LT365AT	365Mb	12.0ms	3.5" 1"	2 yrs	128k	£0.33/Mb	£122
West Digit.	WD2420	420Mb	13.0ms	3.5" 1"	3 yrs	64k	£0.29/Mb	£120
Conner	CFS420A	420Mb	14.0ms	3.5" 1"	2 yrs	32k	£0.29/Mb	£123
Seagate	ST3491A	428Mb	14.0ms	3.5" 1"	3 yrs	120k	£0.29/Mb	£125
Fujitsu	M2684T	532Mb	12.0ms	3.5" 1"	2 yrs	256k	£0.27/Mb	£142
Conner	CFS540A	540Mb	14.0ms	3.5" 1"	2 yrs	64k	£0.24/Mb	£132
Quantum	MV540AT	540Mb	14.0ms	3.5" 1"	2 yrs	128k	£0.24/Mb	£130
Quantum	LT540AT	540Mb	11.0ms	3.5" 1"	2 yrs	128k	£0.26/Mb	£138
Seagate	ST3660A	545Mb	14.0ms	3.5" 1"	3 yrs	128k	£0.25/Mb	£138

700MB AND UP

Quantum	LT730AT	730Mb	11.0ms	3.5" 1"	2 yrs	128k	£0.22/Mb	£163
West Digit.	WD2850	850Mb	10.0ms	3.5" 1"	3 yrs	64k	£0.21/Mb	£175
Conner	CFA850A	850Mb	12.0ms	3.5" 1"	2 yrs	256k	£0.22/Mb	£184
West Digit.	WD3100	1,083Mb	10.0ms	3.5" 1"	3 yrs	128k	£0.22/Mb	£243
Seagate	ST31220A	1,080Mb	13.0ms	3.5" 1"	3 yrs	256k	£0.26/Mb	£278
Conner	CFA1275A	1,275Mb	12.0ms	3.5" 1"	2 yrs	256k	£0.21/Mb	£269
West Digit.	WD31200	1,282Mb	10.0ms	3.5" 1"	3 yrs	128k	£0.20/Mb	£261

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Fujitsu	M2512A	230Gb	£474	£577
Sony	SM0F521	1.3Gb	£1322	£1399
H. Packard	C1716T	1.3Gb	£1599	£1799

Hewlett Packard opticals can have warranty extended to 3 yrs osm.

MEMORY

Capacity	Pins	Price
1Mb	30	£38
4Mb	30	£120
1Mb	72	£38
4Mb	72	£123
8Mb	72	£260
16Mb	72	£499
32Mb	72	£899

SCSI HARD DRIVES

Up To 1 GB

Make	Model	Capacity	Access	Size	Wrnty	Cache	Price/Mb	Price
Fujitsu	M2682S	353Mb	12.0ms	3.5" 1"	2 yrs	256k	£0.34/Mb	£120
Quantum	LT365S	365Mb	12.0ms	3.5" 1"	2 yrs	128k	£0.34/Mb	£125
Fujitsu	M2684S	532Mb	12.0ms	3.5" 1"	2 yrs	256k	£0.26/Mb	£140
Quantum	MV540S	540Mb	14.0ms	3.5" 1"	2 yrs	128k	£0.26/Mb	£143
Quantum	LT540S	540Mb	11.0ms	3.5" 1"	2 yrs	128k	£0.30/Mb	£164
Quantum	LT730S	730Mb	11.0ms	3.5" 1"	2 yrs	128k	£0.23/Mb	£170

1 GB TO 1.9 GB

Conner	CFP1080S	1,080Mb	11.0ms	3.5" 1"	3yrs	256k	£0.31/Mb	£330
Fujitsu	M1606S	1,090Mb	11.0ms	3.5" 1"	5 yrs	512k	£0.32/Mb	£345
HP	C3323SE	1,050Mb	9.5ms	3.5" 1"	5 yrs	512k	£0.36/Mb	£374

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Quantum	2100S	2,100Mb	9.5ms	3.5" HH	5 yrs	512k	£0.34/Mb	£717
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Fujitsu	M2903S	2,110Mb	11.0ms	3.5" HH	5 yrs	512k	£0.38/Mb	£810
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Micropolis	MIC3243AV	4,300Mb	8.5ms	3.5" HH	5 yrs	512k	£0.24/Mb	£1,035
Quantum	XP34300	4,300Mb	8.0ms	3.5" HH	5 yrs	1.024k	£0.26/Mb	£1,135
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Group Test

Route 66

If you're after a high-performance multimedia PC but the mere thought of a Pentium makes your wallet run for cover, a DX2/66 could be just the ticket. Eleanor Turton-Hill reports on 20 of the latest complete systems in the £950 to £2,200 range.

PCW **DX2/66MHz** Photography by Bruce *Mackie*

The market for DX2/66s has gone from strength to strength since our last round-up in November 1994. As Pentium adverts have swamped the media boasting ever increasing levels of performance, so the price of the DX2/66 has been rapidly dropping. But the DX2/66 continues to provide a powerful enough system to run the current generation of application software comfortably.

If speed is your only worry then it's easy to choose between a fast 486 and a Pentium, but for most people buying a PC involves weighing up all kinds of considerations. The DX2/66 doesn't, of course, carry the same kind of kudos as a Pentium, but nor does it carry the same kind of price tag; and when it comes to fast performance and economy in high-end systems, the DX2/66 is setting the standard as the reliable entry-level PC.

This time round, we asked 20 manufacturers to submit DX2/66 machines with full multimedia kit, 8Mb RAM, and a hard disk of at least 500Mb. Each machine was assessed for its overall combination of performance, price, and ease of use. We also assessed each machine for system design, overall build quality and expansion capability.

Another important factor is the extent to which the overall system caters for the ordinary user. If PCs are to become a true mass-market product, they will have to become more consumer-oriented. Ideally, they should arrive with as much setting up done as possible so that the user can get started with the minimum of fuss. It's no good presenting new users with a collection of boxes, tangled cables and technical manuals along with a handy guide for resolving interrupt conflicts. Quite simply, you shouldn't have to be a techno-boffin to put together — and use — a computer successfully.

A few enlightened manufacturers have started to realise this and several of the machines in this round-up arrived with "getting started" manuals, pre-installed tutorial software and pamphlets giving an overview of the system. Sadly, the market is also full of PCs which have been slung together with whatever came to hand first and boxed up with a technical pamphlet for each component.

When it comes to build-quality and components, this round-up has shown the usual mixture of good ideas and compromises. Integrating components onto the motherboard is commonplace on slimline PCs, reducing the number of pre-installed expansion cards and freeing up slots for additional components. Certain components appeared repeatedly throughout the group test, including the Creative Labs SoundBlaster 16 sound card, Cirrus Logic GD542X series graphics card, and Diamond Stealth 64. There's a mixture of VL and PCI bus technologies with some machines incorporating both and others including onboard local bus video but only ISA slots.

Prices range from £949 to over £2000, but remember that it doesn't always follow that the more expensive machines are any better in terms of performance or build quality. We've ranked one machine as the best all-rounder, which means that it has the best mixture of qualities to satisfy the average user. But if you have specific requirements, this may not be the best machine for you. Have a look yourself and see what you think.

DX2 Contents

457 Amstrad PC9486 i
457 AST Advantage Adventure 6066d
458 Brother BCR4486 VESA Local Bus
458 Carrera 486DX2/66
462 CompuAdd 466 D Champion
462 Dan Premium 66/MM
464 Dell Dimension 466 DL
464 Espy Impulse 66M
468 Gateway 2000 P4D-66I Family PC
468 HP Vectra VL2PC 4-66
469 Mesh Universal Media DX2/66
469 Mitac DV446V
471 MJN DX2/66 V/CD
471 Panrix Titan
472 Peacock PPDOHDD
472 Simply Computers 66VLB
476 Tag DX2/66
476 Viglen 4DX266 Genie PCI Professional
482 Wearnes DX2/66 AV-Series
482 Zenith Data Systems Z-Select 100

463 Choosing a CD-ROM drive
475 What to look for when buying a monitor
477 Sound Cards
477 Performance Results
480 Monitors
484 PCI vs Local Bus
489 How we did the tests
491 Editor's Choice
494/495/497 Tables of Features

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Amstrad PC9486 i

Amstrad was hugely successful in the mid-eighties and more or less pioneered the sale of PCs in the UK high street. Last year, however, the company was finally forced to withdraw from the retail store market due to fierce competition and continuing losses. It has now reorganised its marketing strategy to sell direct to customers, completely bypassing high-street retailers.

This compact multimedia machine comes with a 540Mb Seagate hard disk, Sony CD-ROM drive and Vibra 16 sound card. The system box is a standard low-profile design with the CD-ROM drive on the left-hand side and 3.5in drive on the right. The pink Amstrad logo sits in a transparent plastic panel on the front, surrounded by various stickers.

Inside, everything is arranged in typical low-profile style. A riser card towards the righthand side of the machine provides three ISA slots and one PCI slot. The video and I/O are built into the motherboard so with just the sound card installed there are three slots free. The two ISA slots on the righthand side would be difficult to fill, however, due to the bird's nest of cables in the middle of the machine, but further investigation reveals a more serious problem. The screws holding on the slot covers are inaccessible due to the positioning of the power unit and can only be used by detatching the entire slot unit from the back of the machine. This means taking out the metal bar from the middle and removing the sound card to get a slot cover off.

Thankfully, the RAM is easy to get to, positioned at the front of the machine on the righthand side. There are four 72-pin slots, two of which are filled with 4Mb each.

An introductory guide to PCs is included with the documentation and there's a good supply of pre-installed software including PFS Window Works from Softkey, Compton's Interactive Encyclopedia as well as a copy of Doom, Cannon Fodder, and Star Wars Rebel Assault.

PCW Details

Amstrad PC9486 i
Price £1094
Contact Amstrad 0800 338844

Good Points Space-saving low-profile box. Good selection of pre-installed software.
Bad Points Poor monitor; badly designed inside.
Conclusion If you don't think you'll ever open the lid of your PC, the internal design might not bother you, but it would be nice to have the option.

AST Advantage Adventure 6066d

All the machines in this group test use Intel processors apart from this AST machine and the one from Peacock. Cyrix Corporation started making processors in 1988 and its principal business is designing chips which are compatible with Intel products. AST was one of the first companies to use the Cyrix DX2/66 chip rather than Intel's. Many Cyrix processors don't look anything like Intel's, and some are not even socket-compatible, but all of them execute the same instruction set as Intel's equivalent chip and this is what makes them true 486 chips.

This is a neat, low profile desktop machine with all the usual advantages and disadvantages this design brings. Low-profile machines are great if you're short on desk space but fail dismally if you need any kind of expandability. Inside, a riser card provides three ISA slots, one of which contains a SoundBlaster 16 sound card. In typical low-profile style, the video adaptor (supplied by Cirrus Logic) is built into the motherboard, but even so, you're only left with two spare slots. This is frustrating as the back panel is cut out to house two extra slots on the righthand side, but AST has chosen not to include the sockets on this model.

The way the RAM is arranged gives rise to another annoyance. There are two 72-pin SIMM slots, each filled with 4Mb RAM, so if you ever wanted to upgrade you would have to discard at least 4Mb to increase the total complement.

When it comes to pre-installed software, AST has made an admirable effort. Like other manufacturers, it has replaced the Windows program manager with its own shell. This provides the novice user with a kind of extended working environment with built-in tutorials and help facilities. There's also a good selection of pre-installed software including Microsoft Works, Microsoft Money and Lotus Organiser.

PCW Details

AST Advantage Adventure 6066d
Price £1,399* (inc VAT)
Contact AST 0181 232 5000

Good Points Neat low-profile design. Good choice of software, especially for the novice user.
Bad Points There are only two free ISA slots — no local-bus slots. The RAM cannot be upgraded without discarding at least 4Mb.
Conclusion Good buy for a novice user who will never open up their machine and needs some introductory tutorial software.
** The AST 6066d is now available with a quad-speed CD-ROM drive at the cheaper price of £1,199.*

Brother BCR4486 Series VESA Local Bus

Brother, like Hewlett Packard, is best known for its printers, but also makes a range of PCs. It entered the PC market in 1985 but initially made little impact. In 1993, however, the company reorganised its marketing strategy to sell PCs direct to the end-user and Kyodai Electronics was formed (Kyodai means "brother" in Japanese).

This machine, the BCR4486, is one of Brother' s series of local-bus machines. The casing is compact but not excessively slimline. The slots are clearly laid out on the righthand side across the base of the machine rather than being provided by a vertical riser card. This makes slots far more accessible and consequently, inserting cards far less traumatic.

This machine has four ISA slots, two VESA slots, and an 8-bit slot. The fan on top of the processor is awkwardly placed on the motherboard, slightly overlapped by the 3.5in drive above. Otherwise, everything is nicely laid out and accessible.

The RAM is well placed in the middle of the machine. There are four 30-pin slots, each of which is filled with a 1Mb SIMM, and two 72-pin slots, one of which is filled with a 4Mb SIMM. This arrangement rather thoughtlessly fills up all slots but one.

There's a Panasonic CD-ROM drive, Maxtor hard disk, a standard Cirrus Logic video card, and a SoundBlaster 16 sound card. There are also two very nice speakers provided from Zydec with individual volume and tone controls and headphone sockets. A good supply of pre-installed software is provided.

This machine is particularly well suited to the novice buyer. It comes with excellent documentation, a good supply of software, nice speakers and enough room for expansion. The best thing about it, though, is the price: only £949. The drawback is the poor quality of the monitor, but you can buy the machine without it for just £799.

PCW Details

Brother BCR4486 Series
VESA Local Bus
Price £949
Contact Brother 01279 416888

Good Points Generally good build quality, excellent introductory manuals, nice price.
Bad Points Average performance scores, poor monitor, no PCI.
Conclusion An absolute bargain.

Carrera 486DX2/66 VLMT-MM

The first thing you notice about this machine is its built-in security features. On the front there's a lockable door which prevents access to the CD-ROM and disk drive. To the left of the drives there's a large power switch and below it are the usual reset and turbo buttons, but there's an extra button which allows you to disable the keyboard before locking the door. These features can be handy, but of course, they won't stop anyone from running off with the actual unit.

Inside are three VESA slots and three 16-bit ISA slots. One VESA slot is occupied by a Diamond Stealth 64 with 1Mb DRAM and one of the ISA slots by a SoundBlaster 16 card — probably the two most popular peripherals on multimedia machines.

The I/O card, which provides Enhanced IDE, is positioned awkwardly in the middle of the machine with its cabling bulging out of the top, making the first free ISA slot difficult to use. The processor is also badly positioned behind the hard disk with its black heat sink preventing the use of full-length cards in this same top slot.

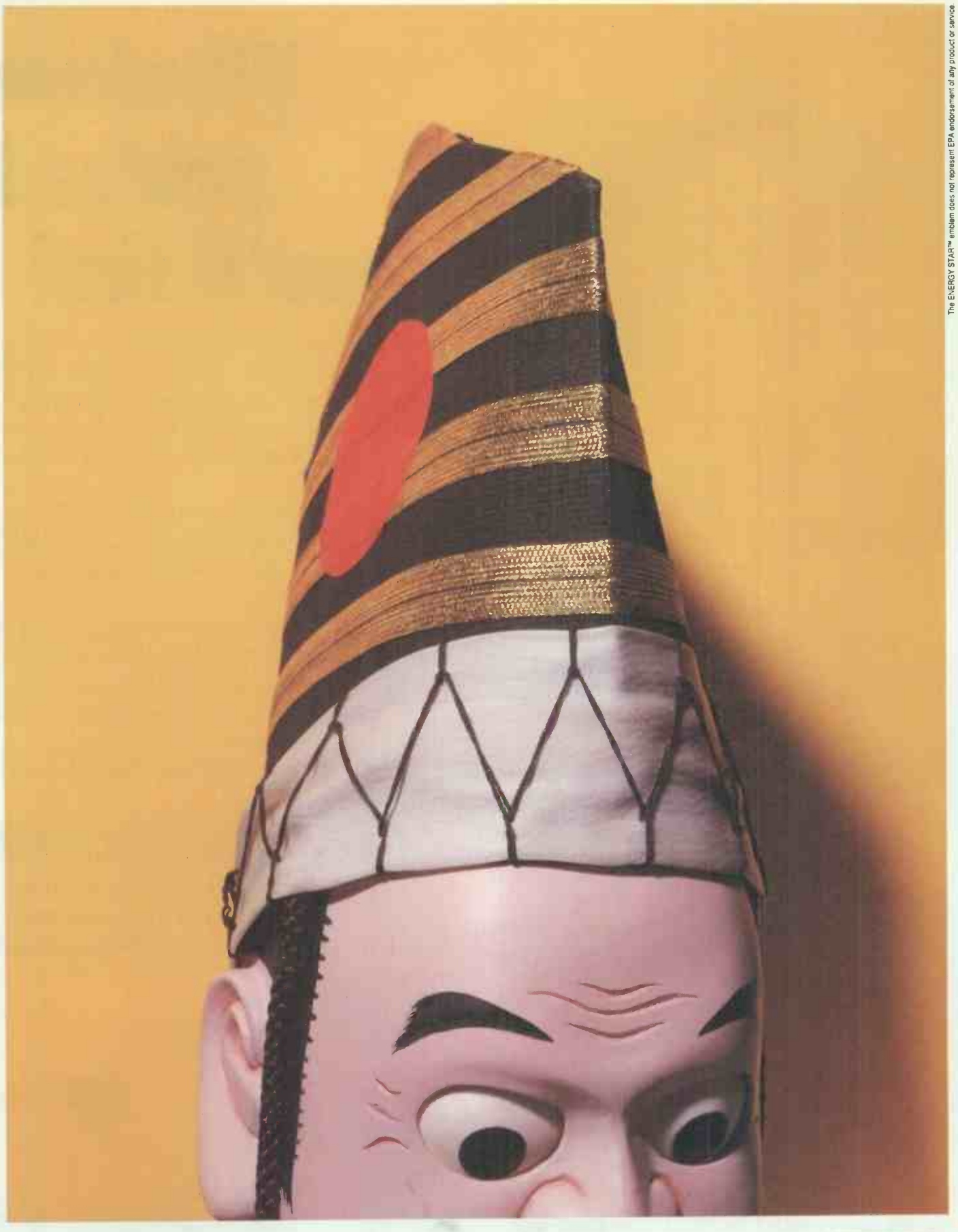
The SIMM slots, on the other hand, are easy to get to, placed towards the top of the tower on the righthand side. And there are plenty of them — two 72-pin slots and eight 30-pin slots. The standard 8Mb RAM has been fitted into just one 72-pin slot, leaving bundles of room for expansion.

There's a good selection of pre-installed software with this machine including Microsoft Works and Encarta, and a selection of CDs as well as a nice pair of speakers from Creative Labs. There's a three-year labour warranty, a one-year parts warranty and a lifetime telephone support service. A few niggles about the way this machine has been put together prevent me from recommending it wholeheartedly, despite the fact that it's made up of good components and came among the top five in our tests.

PCW Details

Carrera 486DX2/66 VLMT-MM
Price £1,299
Contact Carrera Technology
0171 830 0486

Good Points Nice sound card and video card, good selection of software — a good performance.
Bad Points No PCI; badly put together.
Conclusion A good deal if you never take the lid off.



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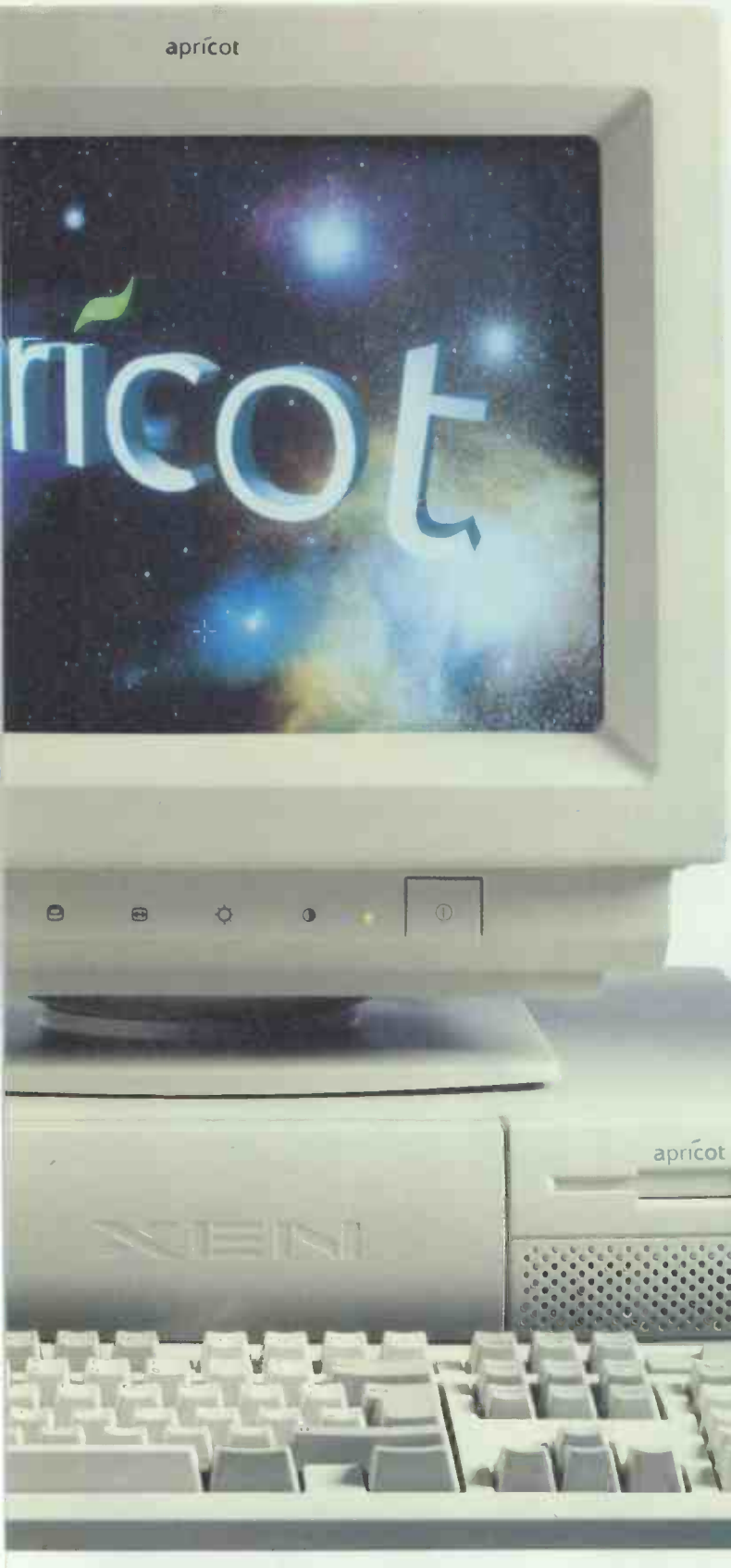

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CompuAdd 466 D Champion Low-Profile Platform

In November 1993 CompuAdd came out of receivership, or "Chapter 11" as its know in the US. The UK arm was not affected and the parent company is now a successful organisation which designs and manufactures its own PCs. All its machines come with one-year on-site warranty, a free technical support line and Lotus Organiser pre-installed.

This is a low-profile machine and inside, everything is arranged in the usual cramped style. A riser card sticks up vertically to the right of centre making three ISA slots available to the left-hand side. The standard Cirrus Logic video chipset is built into the motherboard, as is the I/O. Only one slot is filled with a SoundBlaster 16 sound card, leaving two slots free.

Underneath the SoundBlaster card two rows of 72-pin SIMMs sit in an angled position. The 8Mb has been made up by two 4Mb SIMMs and can be expanded to a maximum of 32Mb.

The processor is well placed at the front of the machine on a beige-coloured Ziff socket covered with a big black heat sink. The Western Digital hard disk sits at the front under the disk drive while the Sony CD-ROM drive is placed to the righthand side.

This machine suffers from all the typical constraints of a low-profile design but also suffers from various cost-cutting attributes. There are no local-bus expansion slots, for example, and only two ISA slots are available for peripherals. This is very frustrating, especially as the design allows for more slots on the righthand side of the riser card. The hard disk is only 340Mb instead of the requested 500Mb, and there are only two 72-pin SIMM slots, both of which have been filled. Combined with very poor test results, these complaints put this machine way down the priority list despite its low price.

PCW Details

CompuAdd 466 D Champion Low-Profile Platform
Price £1,099
Contact CompuAdd 0117 925 7435

Good Points Cheap.
Bad Points No local-bus slots.
Conclusion Suffers badly from the constraints imposed by a low-profile design. If space saving is not important to you, then don't even think about it.

Dan Premium 66/MM

Over the years, Dan machines have developed certain characteristic traits which distinguish them instantly from the crowd. The company has made its name by the excellent build quality of its machines as well as high scores on performance tests and solid after-sales support. All machines come with a 12-month on-site warranty, as well as a free technical support hotline.

Unlike many of the machines in this round-up, the cables are pressed down tidily towards the sides of the box so that all components are clear to view. The processor is well out of the way of any slots on the righthand side of the motherboard, sporting a shiny yellow heat sink. The Ziff socket on which it sits is positioned with its lever right on the edge of the motherboard so that you can get at it easily. In one of the three PCI slots is a Stealth 64 graphics card with 2Mb VRAM (expandable to 4Mb) while one of three ISA slots is filled by a Sound Blaster 16 card. With parallel and serial ports built into the motherboard, this leaves plenty of room for expansion with two PCI slots, two ISA slots and one VESA slot.

The RAM is placed accessibly between the power unit and on-board I/O and consists of two 72-pin slots, one of which is filled with an 8Mb SIMM (upgradable to 128Mb). A generous 850Mb hard disk from Seagate sits in the middle of the machine with the Panasonic CD-ROM drive and disk drive on the righthand side.

Its not just tidiness which distinguishes this machine from the others. It also produced top performance results which put it head and shoulders above all the other machines in this group test. There's also an excellent CTX monitor thrown into the deal along with a pair of 25W speakers, and a good selection of software.

PCW Details

Dan Premium 66/MM
Price £1,487
Contact Dan Technology 0181 3801100

Good Points Excellent build quality, good selection of pre-installed software, top performance results.
Bad Points None.
Conclusion This is not the cheapest machine in this group test, but the price is reasonable considering the excellent balance of components.

Choosing a CD-ROM drive

When choosing a new system, you already have enough to worry about with hard disk sizes, type of processor and whether the monitor is any good. With any luck, one CD-ROM drive should be the same as any other CD-ROM drive and you can at least relax on this element. Right? Of *course* not. This is the computer industry, after all, and CD-ROM drives, like any other IT subject, is a minefield of jargon and misconceptions.

Before you give up completely and are found screaming or weeping behind the sofa, here's a brief guide of what CD-ROM drives actually do, and what you should look for when choosing one. Those who are particularly interested in this field should look no further than our last CD-ROM drive group test, in last April's *PCW*.

When Sony and Philips invented the Compact Disc in the early eighties, even they couldn't ever have imagined what a versatile carrier of information it would become. What was originally designed to carry 74 minutes of high-quality digital audio can now hold up to 650Mb of computer data, 100 publishable photographic scans, or even 74 minutes of VHS-quality full-motion video and audio. Many discs offer a combination of all three, along with other types of information besides.

The trouble with such a variety of formats, continually developed over what is now almost a 15-year period, is finding a machine which can successfully read all of them. After all, your audio CD players at home may have the right laser pickup assembly, but they don't stand a chance of recognising, let alone actually doing anything useful with, other types of discs. This is infuriating since the discs themselves are physically as good as identical.

In order to realise what discs do what and which machine will read what, you need to identify clearly the different formats: at least this is an area of CD that is reasonably well defined. The information describing a CD standard is written on pages bound between the coloured covers of a book. That standard is known by the colour of that cover.

First up is CD-Audio, known as Red Book. CD-ROM is Yellow Book. Recordable CD, which includes Photo-CD, is Orange Book. More recently is White Book, the standard for storing up to 74 minutes of MPEG-1 video and audio on a CD. White Book is also known as Digital Video, DV. Other disc varieties include the native format for Philips CD-i, called Green Book.

Confusion reigned temporarily when Philips put MPEG-1 video on Green Book discs, which could only be played on CDi machines. All new MPEG-1 film titles conform to the White Book standard, which may be read on any White Book-compatible machine including CD-i and suitable CD-ROM drives. Note that additional MPEG decoding hardware is required to view White Book discs. CD-i uses what Philips calls a Digital Video cartridge, while PC owners require a suitable MPEG card.

Put simply, all CD transports are compatible with a certain number of the book standards: all you have to do is work out which discs you are interested in, then ensure your drive is compatible. All CD-ROM drives are Yellow Book- and Red Book-compatible, along with boasting built-in Digital to Analogue convertors (DACs) which enable you to listen to Red Book audio discs directly through headphone or line audio sockets.

Every CD has a table of contents (TOC) which carries track information. Orange Book solves the problems of writing CDs, where later recordings on the same disc require their own update TOC. Part of the appeal of Kodak's Photo-CD format is that you don't have to fill the disc with images on the first go: you can return at a later date and add more images until the disc is full. The information on a Photo-CD is Yellow Book CD-ROM format and consequently readable on any drive — with just one small condition.

The problem is that subsequent recordings, known as sessions, are only recognisable by a multi-session drive. Single-session drives can only see the first TOC and consequently miss any further recordings. Luckily, all but the oldest CD-ROM drives are multi-session devices. Look out for the phrase "Photo-CD compatible", although unscrupulous suppliers may be referring to recognition of the first session only. To be certain, ensure that the drive is labelled "multi-session-compatible".

Once you've got all your books and compatibility issues sorted out, there's performance. The first CD-ROM drives pulled information off at what was described as "single-speed". This translates into a sustained data transfer rate of approximately 150kb/sec, around the same as a floppy drive. Double- and quad-speed drives literally spin the disc two or four times faster, and should sustain data rates of around 300 and 600kb/sec respectively. Doubles are the current standard, but prices are dropping on quads so much that these should certainly be considered. Single-speed drives should be avoided at all cost. Six- and eight-times-speed drives are on their way, raising the transfer rates of CD-ROM to that of average hard disks. Average access time is an important factor too, with CD-ROM drives grabbing at around 250ms. Faster access times and higher transfer rates are obviously highly desirable.

So, you've chosen your drive and now have to connect it to your PC. Several interfaces are in current use, the most common being three proprietary interfaces that have become standards offered on most sound cards. They are Sony, Mitsumi, and Matsushita (*aka* Panasonic). The oldest and still highest performing, although the most expensive, is SCSI.

Increasingly common these days are IDE drives, which may be daisychained with IDE hard drives in much the same way as SCSI, while avoiding the need to buy a new interface. Unfortunately, the IDE interface was never designed for anything other than hard drives, and until companies like Microsoft update their drivers, the desirable 32-bit disk access of Windows 3.11 is sacrificed when an IDE CD-ROM drive is daisychained. Solutions include fitting the drive to a different IDE channel: many I/O cards offer two IDE channels, some sound cards offer an extra one, while additional basic IDE interfaces are available for around £10. Otherwise, wait for Windows 95 and keep your fingers crossed that the problem will be addressed.

Gordon Laing

Dell Dimension 466 DL

This machine from Dell comes with lots of "getting started" help. On removing it from the box you're presented with a huge fold-up piece of card listing stage-by-stage instructions for how to put your system together. Once you've turned it all on, there's an opening screen with various helpful menu options.

Getting the lid off this machine proved something of a feat. It took two of us a solid 15 minutes of wrestling and pulling before we finally liberated it. It's a slimline machine and the whole of the front panel comes off as part of the lid, very much in the same style as the AST machine.

Inside, there's a standard set of components: a 525Mb hard disk from Western Digital to the centre-right of the machine with the power pack at the righthand side at the back. There's on-board local-bus video using the standard Cirrus Logic chip set (GD542X). To the left of the hard disk is a riser card providing three ISA slots, one of which is taken up by the Vibra 16 sound card from Creative Labs.

Although this machine is in Dell's ISA/VL Systems range, there's no VESA slot available on the riser card. Careful study of the manual, however, will tell you that by replacing the existing riser card with a VESA riser card you can upgrade the system to give two VESA slots and one ISA.

The monitor included with this machine is of reasonable quality and there are a nice pair of Labtec speakers with volume, treble and bass controls as well as a socket for headphones. One slight niggle is the positioning of the keyboard against the machine, as it obscures the CD-ROM drive. The test results showed only average performance despite the use of Enhanced IDE.

PCW Details

Dell Dimension 466 DL
Price £1,199
Contact 01344 728000

Good Points Good general build quality, excellent documentation.
Bad Points No local-bus slots available unless you install a riser card upgrade.
Conclusion Generally good quality and reasonable price, but lack of VL slots on the standard model is frustrating, especially when other cheaper machines (like the Brother) do provide such features as standard.

Espy Impulse 66M

This machine is from Matek Business Media, a small Horsham-based company set up last year. MBM produces a range of standard systems from entry-level 486s through to Pentiums, but has built up much of its business creating bespoke systems for corporate clients. One of the advantages of buying from a small company is that the after-sales support and warranty are often of a much higher standard than from large organisations. All systems from MBM come with a lifetime labour and 12-month parts warranty.

This machine's casing is fairly standard. Inside is a familiar set of components including a Panasonic CD-ROM drive and hard disk from Western Digital. The processor is mounted on a beige Ziff socket with a fan placed on top, and a Cirrus Logic (GD5228) graphics card is placed in one of the two VESA slots. There are four ISA slots, one of which contains a Pro 16 Plus sound card from Quickshot. This is Sound Blaster-compatible and supports Sony, Mitsumi and Panasonic CD-ROM drives.

The fan on the processor is poorly positioned as it prevents the insertion of full-length cards into ISA slots. The RAM is also awkward to get to due to the overhanging power supply at the top of the machine. One feature of this machine is that large amounts of glue have been used to hold down the cables, which doesn't help when you try to move cables around or add new components.

A few other bits and pieces are thrown into the deal including a pair of highly impressive Yamaha speakers. There's also some pre-installed Windows software in the form of an Integrated package called TopLevel Complete Works. These things don't make up for the annoyances inside the machine, however, and despite the use of Enhanced IDE it produced only average results in our tests.

PCW Details

Espy Impulse 66M
Price £1,330*
Contact MBM 01403 822199

Good Points Good warranty, nice speakers.
Bad Points Awkward inside, no PCI.
Conclusion Poor build quality is not really compensated for by good warranty support.
** Matek now has a PCI machine available for a reduced price of £1,229.*

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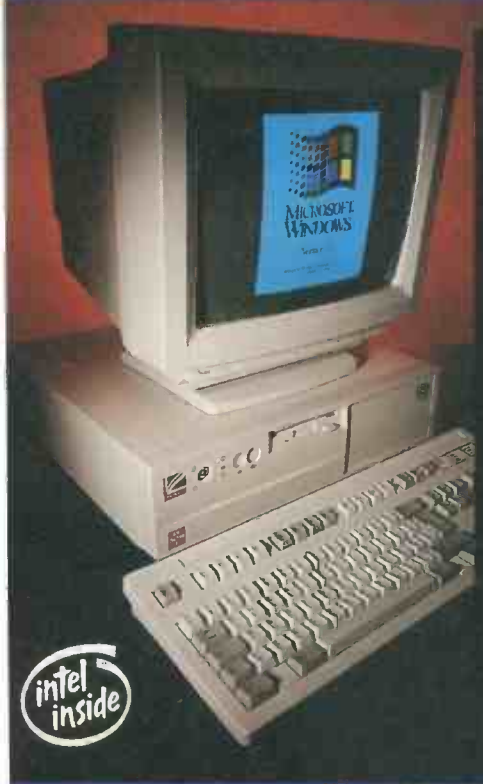

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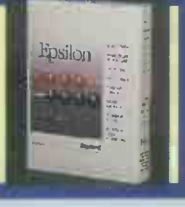

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Gateway 2000 P4D-66I Family PC

Gateway 2000 and Dell are the two mail-order kings of the PC market. This method of selling has several advantages, the greatest being that telephone customers tend to be more knowledgeable about what they want, so mail-order PCs have to conform to higher standards.

The most striking thing about this machine is its colour — a clean white rather than the usual beige. The lid comes off easily, and inside there's a typical low-profile design with a double-sided riser card in the middle providing two PCI slots and three ISA slots. One ISA slot is filled by a SoundBlaster 16 card and there's plenty of room for expansion due to on-board I/O and video (Cirrus Logic GD5430).

To the righthand side of the riser card there's one free ISA and one free PCI slot, but these are slightly restricted due to the positioning of the disk drive and hard disk at the front.

The ISA slot at the bottom on the lefthand side is also restricted by the positioning of the RAM at the front, which precludes the installation of full-length cards. The only slot you could place a full-length card in is the top ISA slot on the lefthand side. The RAM itself is easy to get to at the front of the machine and strangely there are three RAM slots instead of the usual even number. One of them is filled with an 8Mb SIMM.

There's a sensible selection of pre-installed software including Microsoft Works, Microsoft Money and Encarta, as well as a pre-installed Windows program called QA Plus which contains information for new users as well as details on the system configuration. Although this machine only achieved average performance results, its excellent build quality, generous three-year warranty and low price have to put it high up on your short list.

PCW Details

Gateway 2000 P4D-66I Family PC
Price £1,149
Contact Gateway 0800 602000

Good Points Well constructed, good selection of pre-installed software, generous warranty.
Bad Points Cramped inside, average performance results.
Conclusion Good, safe buy.

HP Vectra VL2PC 4-66

Hewlett Packard is a company better known for its expertise in the printer market than for building PCs. Vectra is the name of a series of multimedia PCs produced by HP, all of which come with an integrated speaker, SCSI CD-ROM drive and an audio front panel with jacks for headphones and microphone.

The cover slides off nicely by moving two tabs on the front of the machine inwards. The most noticeable internal feature is the strange metal block on the lefthand side which stretches across the entire length of the machine. This is a removable power unit with a built-in fan which is set up so that it sits directly over the processor. This entire block must be removed each time you want to gain access to the memory sockets, video memory, processor or accessory board slots. At first this seems like a good design feature, but it soon proved annoying.

In the middle of the machine, between the power unit and the hard disk, are four ordinary ISA slots. The bottom one is occupied by the sound card, with the audio cable and SCSI connector trailing upwards and obscuring access to the other slots. This can, of course, be moved to solve the problem, but the top slot is awkward to get at as the screw which holds it in is covered over by the metal lip of the case.

The video is integrated into the motherboard using HP's proprietary local-bus technology and the standard GD-5428 Cirrus Logic chipset. The sound card is HP's own SoundBlaster clone with a SCSI interface.

In some ways it's nice to see a machine which hasn't been cobbled together from off-the-shelf parts. On the other hand, it's depressing that so much design effort has resulted in a machine which is not only awkward to use, but also ranked fifth from the bottom in our benchmarks.

PCW Details

HP Vectra VL2PC 4-66
Price £2,106
Contact Hewlett Packard
01344 369222

Good Points Very nice monitor.
Bad Points No local-bus slots, very little room for expansion, over-priced.
Conclusion The excellent monitor accounts to some extent for the high price but cannot rescue this machine from its poor performance.

Mesh Universal Media DX2/66

This is the desktop version of Mesh's DX2/66 multimedia machine. Inside, everything is fairly standard with the left-hand side of the box housing the motherboard, processor, and card slots while the righthand side holds the power unit and Sanyo CD-ROM drive. In the centre sits the disk drive with a 730Mb Western Digital hard disk underneath.

This machine has all three slot types: there are three VESA slots, three PCI slots and two ISA slots. The I/O card is made up of two parts joined together, one in a PCI slot and another in an adjacent ISA slot. This strange-looking arrangement is called a "paddle card" and provides dual EIDE channels supporting up to four hard disks.

One of the PCI slots is taken up by a Diamond Stealth 64 card while the sound card, a Spectrum from Media Vision, has been put into a VESA slot. Like some other machines in this round-up, this is because of the bad positioning of the processor and fan which prevent the insertion of long cards into ISA slots. This seems like a waste of a good VESA slot, but even with this in place there are still two VESA slots, two PCI slots and one ISA slot free. The 8Mb RAM has been made up of 4Mb SIMMs in two of the four 72-pin slots. These are easily accessible and can be made up to a maximum of 128Mb.

There's a reasonable supply of pre-installed software thrown in with this system, including Lotus Organiser, Microsoft Encarta and Microsoft Musical instruments as well as a selection of CD-ROM games, but there are no "getting started"-type user manuals. There's a nice pair of Aiwa speakers, as well as a good 15in CTX monitor, and the performance results were above average, but the poor build quality prevents me from recommending this machine wholeheartedly.

PCW Details

Mesh Universal Media DX2/66
Price £1,272
Contact Mesh 0181 4521111

Good Points Lots of room for expansion, above average test results.
Bad Points Poor build quality.
Conclusion There are better ways of spending this amount of money.

Mitac DV446V

Mitac is the second-largest manufacturer of PCs in Taiwan after Acer. It invests a lot of money in R&D and makes its own motherboards and monitors.

The outside casing of this, its latest offering, is pretty standard with a large power button and small reset button on the front. The casing can be removed by three screws at the back and comes off fairly easily. Inside, the processor and the gold heat sink are located inside a white Ziff socket.

The CD-ROM drive supplied by Mitsumi is a double-speed 16-bit Enhanced IDE drive. An EIDE controller offers twice the number of channels and double the data transfer rate of IDE. This machine is something of a hybrid with two VESA slots, two ISA and three PCI slots. The 8Mb RAM is made up of two 4Mb SIMMs, leaving two slots free.

The sound card is a Mozart from Oak Technology, a SoundBlaster clone with interfaces for the three most popular CD-ROM drives on the market: Sony, Mitsumi and Panasonic. One of the PCI slots is filled by the graphics card, a tiny ARK 1000 P from Ark Logic. All disk and I/O support is provided on the motherboard so there's plenty of room for expansion with two free PCI slots, one ISA and two VESA slots. The nice thing about this machine is that everything is easily accessible and there are no annoying obstructions which could prevent the use of full-length cards.

The pre-installed software is pretty minimalist, however, so you'll have to weigh up exactly what facilities you need and add their cost to the total before investing. This machine is very well put together, with easy access to SIMMs and good expansion capability. It also produced excellent results in the NSTL benchmarks with its overall score ranking it fourth out of 20 machines.

PCW Details

Mitac DV446V
Price £1,099
Contact Mitac Europe 01952 207200

Good Points Has PCI and VESA local bus, an excellent monitor and good expansion capabilities.
Bad Points There could be more pre-installed software and more guidance for the user.
Conclusion An absolute bargain.

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MJN DX2/66 V/CD

MJN Technology was formed seven years ago, running as an independent company based in Cheltenham. In 1993 it folded and shortly afterwards, Granville Technology bought the name. MJN now runs as a subsidiary company of Granville Technology and has a UK customer base of over 100,000. All machines come with a one-year parts and labour warranty, telephone technical support line and Lotus SmartSuite pre-installed.

This machine looks more like an office fileserver than a home PC. It stands 23in tall and 7in wide, with the CD-ROM drive and 3.5in drive at the top of the unit. Getting the lid off this machine turned out to be something of a Krypton Factor exercise. A panel covering the whole of the back of the machine had to be removed to get at the screws holding down the lid.

Inside, there's bundles of space with three 3.5 and three 5.25in bays free. A long trail of cables and wires drape through the middle of the machine connecting the CD-ROM drive to a Jazz 16 sound card and the I/O card to the drives. Altogether there are four ISA slots and three VESA slots. Two VESA slots are filled, one by the I/O card and another by a Stealth 32 video card.

The I/O card takes up two back plates, making one of the ISA slots unusable. This leaves two ISA slots free and two VESA slots. The processor is placed next to the ISA slots.

There's a generous 1Gb hard disk with this machine as well as a good supply of Help manuals and tutorial software. The RAM is easily accessible at the top of the motherboard, with two 72-pin SIMMs filled with 4Mb each and four 30-pin SIMM slots for future expansion. If you really want loads of room in your machine, then this is the system to buy.

PCW Details

MJN DX2/66 V/CD
Price £1,199
Contact MJN 01282 777555

Good Points Loads of expandability.
Bad Points No PCI, below average test results.
Conclusion Good value for money.

Panrix Titan

Panrix has a reputation for producing high-spec machines at high prices. In the past it has dealt mostly with corporate clients but more recently has branched out into the SoHo market due to increasing demand for multimedia machines.

This Titan DX2/66 tower machine is the entry-level model in a range of PCs from Panrix. It comes with a 540Mb Conner hard disk, a Panasonic CD-ROM drive, a SoundBlaster 16 sound card and a Mach 64 PCI video card with 2Mb DRAM.

The plastic casing is easily removable. Inside, the components are set up in a standard arrangement with the PSU and hard disk placed in the top corner at the back of the machine and the CD-ROM drive directly opposite with three spare bays underneath. The first thing you notice about the motherboard is the collection of bright red jumpers, clearly coloured so you can identify them easily.

Altogether there are three PCI slots and four ISA slots, and with on-board I/O there's plenty of room left for expansion. The processor, as with many of the machines in this group test, is badly placed to the righthand side of the motherboard, preventing the use of full-length cards in at least five of the seven expansion slots. Slightly obscured under the cables from the power unit are four 72-pin SIMM slots. Two of them are filled with one 4Mb SIMM each, and this can be expanded to a maximum of 128Mb.

This machine produced excellent scores on our tests and the Enhanced IDE clearly improved performance in many of the test applications. There's a bare minimum of preinstalled software with this machine, however, and very little help in terms of user manuals, but it comes with a good ViewSonic monitor as well as two very large 80W speakers. This goes some way towards justifying the higher-than-usual price of £1,495.

PCW Details

Panrix Titan
Price £1,495
Contact Panrix 0113 244 4958

Good Points Excellent build quality and impressive performance.
Bad Points None worth mentioning.
Conclusion Well-specified machine with excellent build quality and good performance.

Peacock PPD OHDD

Peacock and AST are the only two manufacturers in this group test to submit machines using Cyrix processors. This machine's CPU, though, stands out in another way — it's a DX2/V80. According to Cyrix, it offers up to 35 percent improvement over an Intel-based DX2/66 for the same price, which is why we decided to include it here.

Saving space obviously wasn't a high priority in the mind of the designer and although this makes the system box a little cumbersome, the advantages are clear when you take a look inside, where everything is immaculately laid out and labelled.

There are two VESA slots and four ISA slots with a local-bus STB Lightspeed graphics card with 2Mb memory and an Orchid 16-bit sound card. There's plenty of room for expansion thanks to on-board IO. Towards the back on the lefthand side sits an incredibly small power supply with at least three inches to spare above it. The hard disk from Quantum is found to the righthand side of the power unit.

On the other hand, all the slots, RAM and screws are accessible and clear to view and the processor is ideally positioned so as not to prevent the installation of full-length cards. It is placed at the front to the right of the slots on a white Ziff socket with the lever well positioned on the edge of the motherboard. There's no heat sink or fan with this processor because the Cyrix V80 runs at a lower voltage than Intel's chips, and next to the processor there's a small cludge sitting on a tiny platform to control this.

For a machine which claims to use a superior chip technology, the Peacock produced disappointing results in our tests, ranking eighth out of twenty DX2/66 machines. This is not disastrous, but we expected much more. The excellent construction quality, however, goes some way towards compensating for this.

PCW Details

Peacock PPD OHDD
Price £1,349
Contact Peacock UK 01256 811775

Good Points Impeccable build quality.
Bad Points No "getting started" documentation. Big system unit.
Conclusion Excellent components and lots of room for expansion but still a little overpriced.

Simply Computers 66VLB

Aesthetically speaking, the case of this machine leaves a lot to be desired. On the front there's a rectangle of smoked glass sporting Simply Computer's red heart-shaped logo, and inside the machine things don't get much better.

The wires are curiously arranged. The audio cable from the sound card has been tacked against the back wall of the case, awkwardly dangling above one of the slots, while the bunch of cables from the power unit has been folded in half and wrapped up with plastic ties.

Further examination of the back wall reveals a more serious design fault: there are no slot covers. The pieces of metal which should be slot covers are in fact pieces of flimsy, welded metal which must be pushed out of their frames in order to get to the slots.

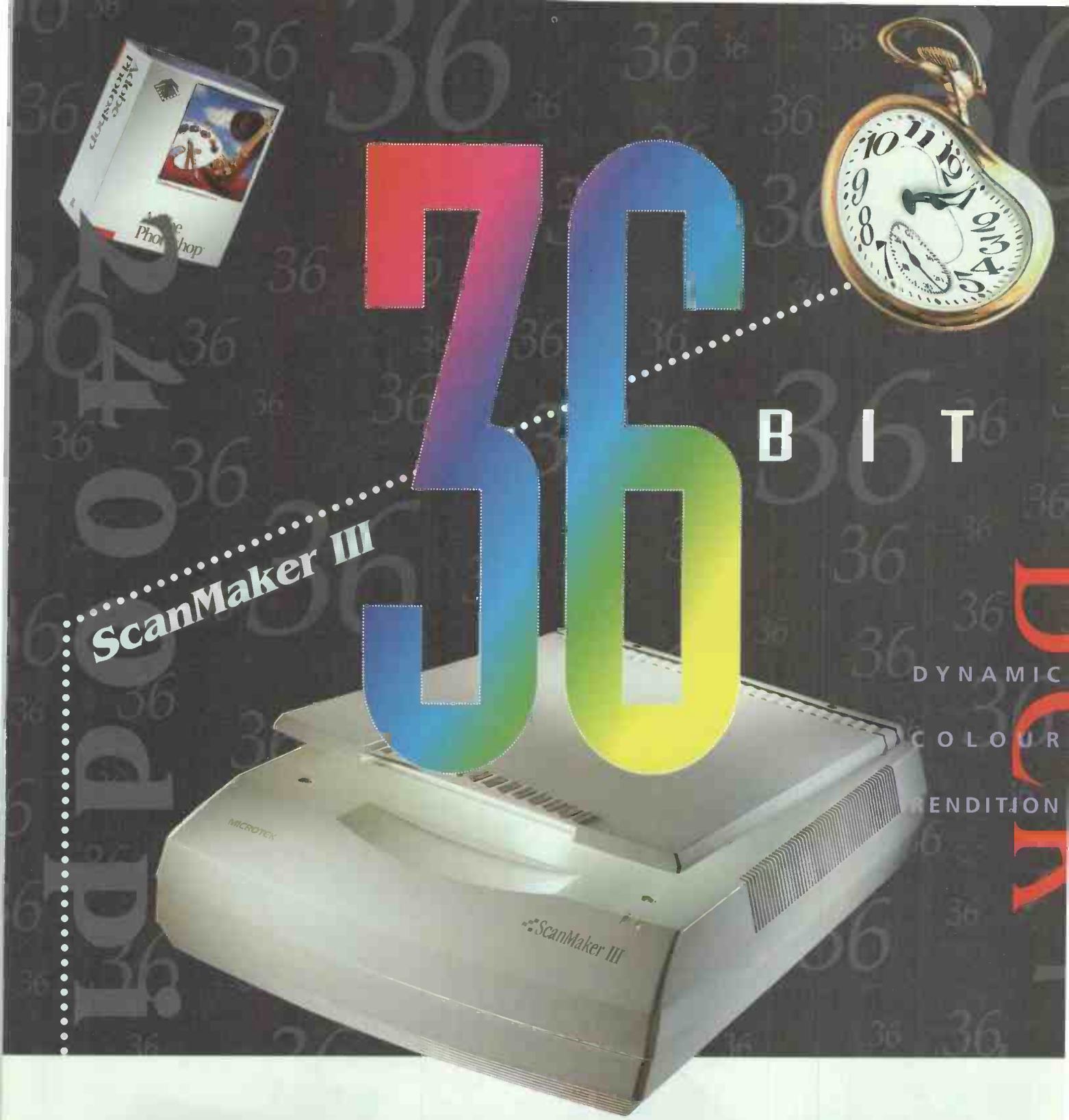
There are seven slots altogether: four ISA and three VESA. One of the VESA slots is being used for the COMMs ports and the cables push out so much towards the middle of the machine that one of the ISA slots is rendered virtually unusable. Another minor annoyance is that the keyboard is slightly higher than the 3.5in disk drive, making it difficult to insert disks without pulling the keyboard away.

This system does have some good features. The components are all of good quality: there's a Mitsumi CD-ROM drive, a Western Digital hard disk and a SoundBlaster 16 sound card. The combination of these components and EIDE have given this machine good scores in the benchmark tests, ranking it among the top third, but none of these things make up for the appallingly sloppy build quality. Even if you're a novice user who will never remove the lid, you'll still have to put up with the ugly casing.

PCW Details

Simply Computers 66VLB
Price £1,351
Contact Simply Computers
0181 498 4002

Good Points Good scores on performance tests, nice speakers and nice monitor.
Bad Points Very badly put together; overpriced.
Conclusion Keep looking.



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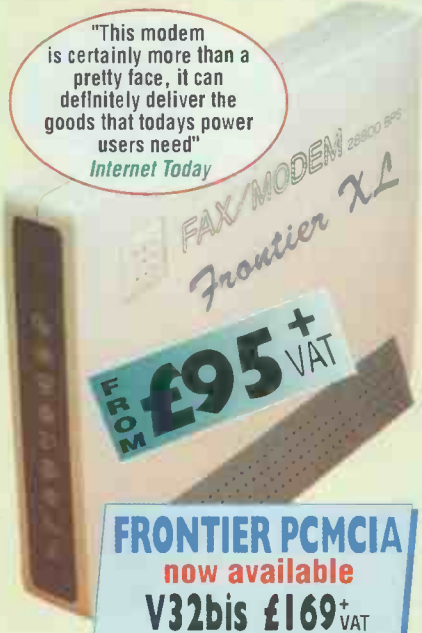

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What to look for when buying a monitor

Remember that when you use your computer, you will always be looking at your monitor. You can easily and cheaply make significant upgrades to most parts of your system at any point, but a new monitor is a hefty purchase. Since it will be possibly the most expensive single element in your system, it's perhaps sensible to buy a good one to start with and worry about expanding memory or storage at a later date.

When considering monitors that are supplied with PCs as standard, manufacturers tend to gloss over the finer technicalities, but a trend has emerged. So-called "standard" 14in monitors tend to be rubbish, "standard" 15in monitors are okay, and "upgrade for only £200 to our superb 17in model" monitors tend to be pretty good — a handy guideline. Sadly, if you want something really good, you'll be better off saying "no thanks" to almost all the standard models on offer and spending a bit more for a brand name like NEC or Sony. This can be a real minefield, so we've provided the following guide.

How much is a bit more? If you're serious about computer graphics work of any kind, then reach deep into your pocket: decent monitors cost at least several hundred pounds, and if you're looking at something very large then you're unlikely to return from the shop with change from a grand.

There are several key things to look out for in a monitor before you even think about auditioning it. First must be the maximum resolution it will display, non-interlaced, at a decent refresh rate. Resolution is the number of pixels the video card is describing the desktop with, expressed as a horizontal by vertical figure. Standard VGA resolution is 640 x 480 pixels, although other popular settings include 800 x 600 and 1024 x 768 pixels.

The terms "interlaced" and "non-interlaced" creep in around this point. Interlacing is the process of drawing every other line, say 1, 3, 5, until the entire screen is full, then going back to the top and drawing the others, say 2, 4, 6 again until the bottom is reached. Since an entire frame is drawn in two goes, the resulting effect is a highly undesirable flickering display. Non-interlaced is where every line is drawn before returning to the top for the next frame, resulting in a far steadier display. Consequently, it's recommended that you only ever buy a monitor that can support your desired resolution in non-interlaced mode.

Another main point to note is refresh rate, measured in hertz (Hz) and representing the number of frames displayed on screen per second. Too few and the eye will notice the intervals in-between and perceive a flickering display; but at a certain point, most people's eyes and brains can't keep up and perceive a perfectly steady display. The worldwide accepted refresh rate for a flicker-free display is 70Hz and above, although many people can see improvements from 72 to 75Hz. Below 70Hz is generally considered unacceptable and will very shortly be discouraged by office safety regulations.

Interestingly, all current broadcast television systems implement an interlaced display; our own PAL system refreshes at 50Hz. That's why a TV picture appears to flicker considerably more than a computer monitor, why a TV is cheaper than a monitor of the same tube size, and why you wouldn't want to sit a foot away from one, typing for hours on end.

So, you should look for a monitor that can support your desired resolution, non-interlaced, at 70Hz or above. Of course, having a superb monitor is no good if your graphics card is only giving out a maximum of say, 65Hz, so check everything before taking the financial plunge.

The combination of a particular resolution at a certain refresh rate will produce a unique signal frequency which your monitor will have to recognise and lock on to. The beauty of a multisync monitor is that it will lock on to any frequency between two ranges; if your graphics card is supplying something in this range, the monitor should be able to display it.

Having worked at high resolutions with finer details and considerably larger "real estate", you won't want to go back and will often want to drive your monitor harder. Some modest-looking smaller monitors can, surprisingly, display an incredibly high resolution, non-interlaced, at a decent refresh rate. While this would render system fonts and icons at tiny sizes, some users may want to try it just because the facility is available.

The fourth monitor specification you should look out for is dot pitch: the smaller the number, the finer and better resolved the detail. If you try to supply too many pixels to a monitor without a sufficient dot pitch to cope, very fine details such as the writing beneath icons will appear blurred. Our best advice is to see the monitor demonstrated in conditions approximating as closely as possible to those present in your office or home — you'll soon spot any problems.

Image controls are becoming increasingly frequent on smaller monitors, which are extremely useful for correcting position, size and distortion. The external size and appearance is important too, especially if you're after a 17in or 20in monitor and only have a small desk.

As far as safety regulations and dangerous radiation is concerned, our best advice is to take regular breaks away from your monitor every hour or so. Additionally, try not to have the monitor up against a wall, since glancing to one side and focusing on a distant object helps the eye to relax. An HSE (Health and Safety Executive) publication, Working with VDUs, contains guidelines for working with computer display equipment. Other guides explain the regulations in legal and practical terms. The HSE is on 01742 892345.

Gordon Laing

Tag DX2/66

At the front of this machine, believe it or not, there's a graphic equaliser, or more specifically, the Equaliser Amplifier Pro from Platinum. It has seven bands, a volume and balance control, and aims to turn your PC into the full-range, stereo, 60W sound machine that multimedia PCs always promised to be.

Inside, there's a selection of good components including a Panasonic CD-ROM drive, a SoundBlaster 16 sound card and a PCI Moviecard from Video Logic. The latter gives high-performance graphics and supports resolutions up to 1280 x 1024 with 256 colours. It also has built-in acceleration for Video for Windows which enables full-screen video at up to 30 frames/sec.

Like most tower systems, this one has a trail of untidy wires draped from top to bottom, held in small clumps by tie wraps. The EA Pro provides a back plate with an output for the speakers and an input from the CD-ROM drive. One small cable from the sound card to the EA Pro at the back of the machine makes this connection.

Altogether, there are three PCI slots, two 16-bit ISA slots, one 8-bit ISA slot and two VESA slots. One of the VESA slots is taken up by the SoundBlaster 16 because it's too long to fit into an ordinary ISA slot due to the bad positioning of the processor. One PCI slot is rendered unusable by the cables from the EA Pro, while another PCI slot and the 8-bit ISA slot are also made unusable by the I/O card. This leaves just one 16-bit ISA slot and one VESA slot free.

Various goodies thrown in with this machine explain the higher than usual price, but it's let down by poor build quality and disappointing test results.

PCW Details

Tag DX2/66
Price £1,618
Contact Tag Technology
0181 803 7770

Good Points Good selection of components including the Graphic Equaliser Pro, PCI Movie card, Platinum speakers and monitor.
Bad Points Poor build quality and unimpressive performance.
Conclusion Great multimedia peripherals, shame about the way they've been put together.

Viglen 4DX266 Genie PCI Professional

Viglen is another of the mail-order giants, selling PCs direct to customers using magazine advertisements and telephone sales. The company was bought out by Amstrad in July last year but continues to sell its own branded PCs.

This desktop machine is one of Viglen's Genie range. It has a 540Mb hard disk, Vibra 16 sound card and a PCI Stealth 64 video card. The system unit itself is a sensible size, and is also available as a mini-tower which offers three free 5.25in drive bays. The front panel is simple with turbo, reset and power switches and a Genie PCI Professional logo. At the back, all connections have been clearly labelled.

Inside the machine, the design is clear and simply laid out. On the left-hand side, there are three PCI slots and four ISA slots. Two of each are left free for expansion. The processor sits on a white Ziff socket at the front of the machine, preventing the insertion of full-length cards into two of the ISA slots. The hard disk from Western Digital is wedged to the righthand side of the power unit while all the cables are nicely tucked away between the power unit and the CD-ROM drive.

Everything seems perfect with this machine, until you realise the RAM is placed under the power unit — probably the worst place. There are four 72-pin SIMMs, two of which are filled with 4Mb SIMMs. If you want to add more you have to take out four screws from the back of the power unit and delve underneath.

Apart from this annoyance, the general build quality of the machine is excellent and there's a good selection of pre-installed software including Microsoft Works, Encarta and Money. It also scored extremely well on our benchmark tests, ranking third out of 20 machines.

PCW Details

Viglen 4DX2/66 Genie PCI Professional
Price £1,463
Contact Viglen 0181 7587000

Good Points Excellent build quality, good quality components.
Bad Points RAM is very badly positioned.
Conclusion Good, safe buy, but a little overpriced.

Sound Cards

If you were to have looked at PC systems five years ago, you would have been hard pushed to find a 16-bit sound card among them. Not only were they expensive then, but software that could use them was uncommon.

Today, it seems that no PC is complete without a sound card, and more and more multimedia packages are taking advantage of 16-bit sound. With multimedia taking off in such a big way, it isn't just games that benefit. You can add sound to most Windows applications — even text documents can have sound files embedded within them.

All the PCs in this group test have a 16-bit sound card (most turned up with a Creative Labs SoundBlaster 16 fitted). The SB16 has long been the industry standard and is compatible with just about every piece of software under the sun. It produces audio in two ways: through its internal FM synthesiser or by playing a digitised, or sampled, sound.

The current crop of 16-bit sound cards are capable of recording and playing digital audio at 44.1kHz stereo. This is the resolution at which CD-audio is recorded, which is why sound cards are often referred to as having "CD-quality" sound. Although to some extent this is true, some produce audible noise which distorts their quality.

Despite some cards being noisier than others, digital audio will sound much the same from one card to the next. When it comes to the audio output from the synthesiser, the story is very different, however.

FM synthesis, used by the SB16, has been around since the early seventies. It produces sound by generating a pure sine wave, known as a carrier, and mixes it with a second waveform known as a modulator. When the two waveforms are close in frequency, a complex waveform is produced. By controlling both the carrier and the modulator, it's possible to create different timbres, or instruments.

FM was impressive in the eighties but it sounds weak now in comparison with WaveTable synthesisers. In our last sound card group test (April 1995) we tested fifteen sound cards, twelve of which were based on WaveTable technology. WaveTable doesn't use carriers and modulators to create sound, but actual samples of real instruments. A sample is a digital representation of a waveform produced by an instrument. The samples are generally stored in ROM, although some WaveTable sound cards store the instrument samples on the hard disk and download the patches to on-board RAM. The advantage here is that you can record your own samples and treat them as instruments.

The quality of instruments is determined by several factors: the frequency at which the samples were recorded and the number of samples used to create each instrument. Most instrument samples are recorded in 16-bit 44.1kHz, but many manufacturers compress the data which often results in slight loss of quality.

When an audio cassette is played back too fast or too slow, its pitch is modified. The same is true of digital audio. Playing a sample back at a higher frequency than its original results in a higher-pitched sound, thus allowing instruments to play over several octaves. But when certain timbres are produced and played back too fast, they begin to sound weak and thin.

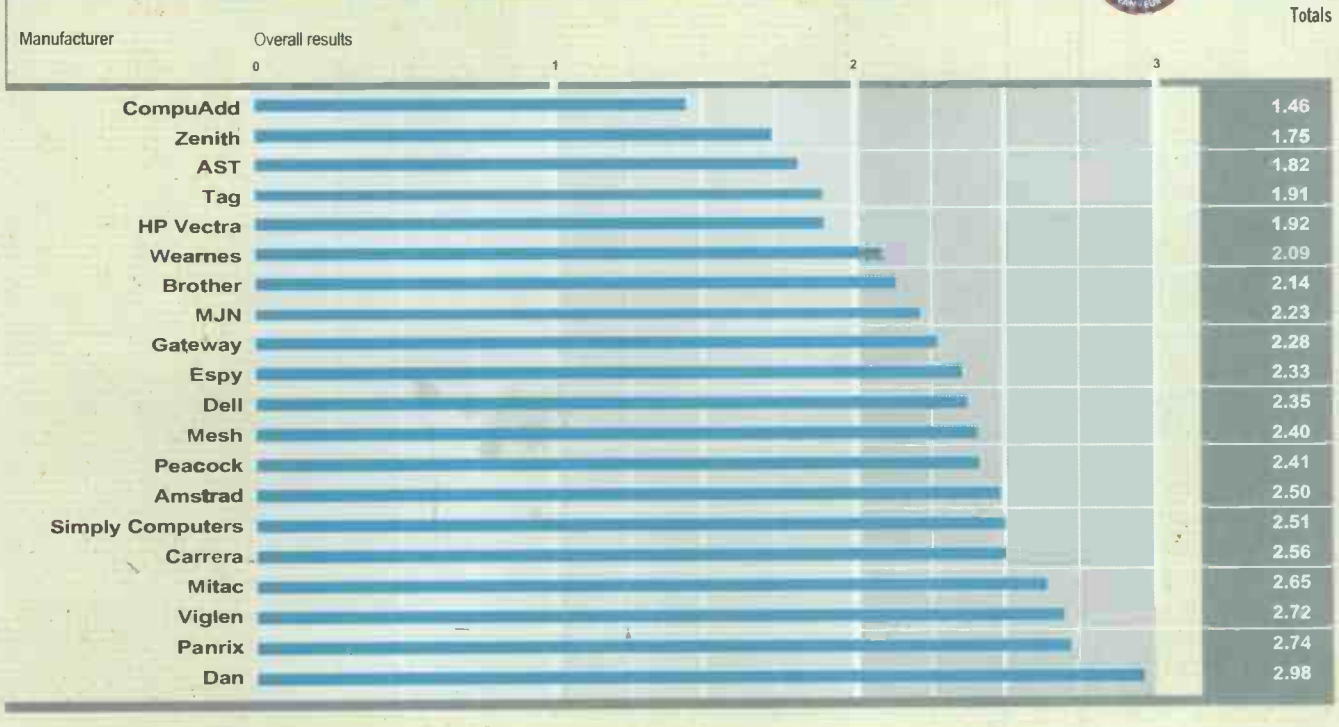
This is also true when a sample is played too slow: it sounds dull and unrealistic. To overcome this, manufacturers split up the keyboard into several regions and apply the relatively pitched sample from the original instrument to it. The more sample regions recorded, the more realistic is the resulting reproduction.

WaveTable produces more realistic-sounding instruments than FM-based cards and more manufacturers are using the technology. Upgrading to WaveTable sound doesn't always mean having to buy a new sound card, though. Most 16-bit cards have a feature connector that connects to a WaveTable daughterboard; one card that doesn't is the SB16 Value edition.

It's obvious that sound cards make sound, but they also double up as CD-ROM interfaces. In addition to SCSI and IDE, which are becoming more popular, there are three proprietary interfaces for Sony, Mitsumi and Panasonic drives. Sound cards have an audio connector for the CD-audio output, too.

Steven Helstrip

DX2/66MHz Overall Results



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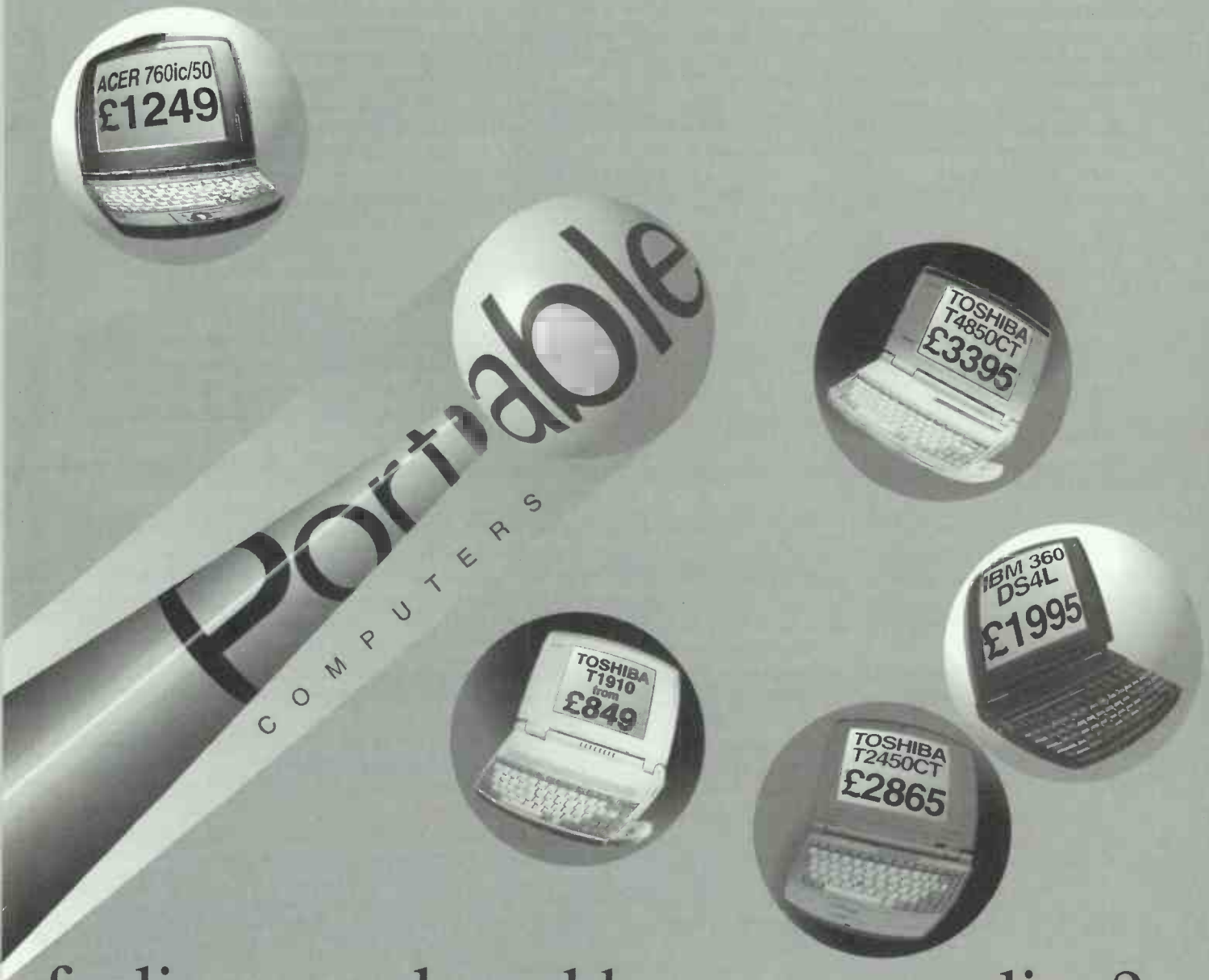

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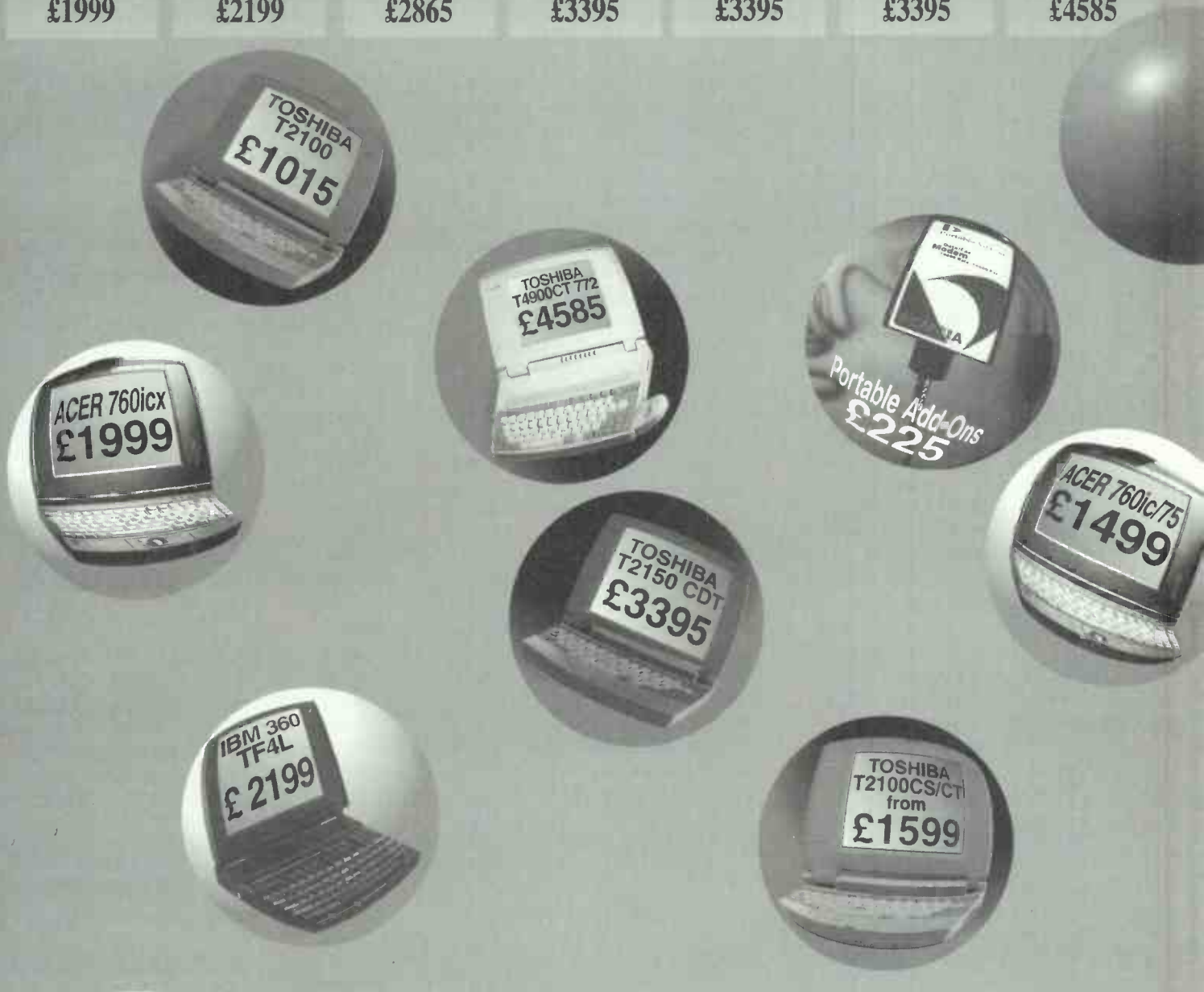

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Monitors

AST Vision 4I

This monitor has been designed with a heavy, deep-set surround which looks like it could be there to disguise an extremely curved screen. Unfortunately it doesn't work, and just makes the whole thing look awkward.

A small panel below the surround opens out to show the usual array of controls for positioning, sizing, brightness and contrast. At 800 x 600 the picture flickers slightly due to its desperately low 60Hz refresh rate, and at 1024 x 768 the image becomes unbearable, running at 87Hz interlaced.

This is not a monitor you would want to look at for any length of time, whether you're using an ordinary word processor or a top-of-the-range graphics package.

Hewlett Packard Ultra VGA 1280

This 17in monitor produced excellent results in our tests. The flat screen, thin surround and sharp colours are nice and it's one of the few monitors in this review which displays 1024 x 1280, although this is not its most stable resolution.

The controls give onscreen dialogue boxes, providing the usual sizing and positioning functions as well as a pincushion control. All controls are manipulated using two mode buttons which select and highlight functions, and two arrow buttons which alter the levels. It also displays the current refresh rate, which confirms its superiority over other models in this round-up.

Wearnes VGM 1415N

Wearnes makes its own monitors as well as CD-ROM drives, which may be a factor which helps to keep the overall price down. This model displays a clear, stable image at its maximum resolution of 1024 x 768 running at 70Hz. The colour test revealed slight discolouration in the form of an oval shape towards the bottom of the screen, but the focus and geometry tests gave reasonable results.

What really lets this monitor down is the design of the control panel at the base of the screen. Features of the display are adjusted using a combination of mode buttons and + and - controls. While you adjust the chosen feature, the green light on the side of the screen turns orange, and a few seconds after finishing the adjustment, the light goes back to green. This system makes a certain logical sense but is tough to operate.

Goldstar 14in (with Espy machine from Matek) and 15in (with the Carrera)

The 14in Goldstar monitor is a very basic piece of equipment with an annoyingly rounded screen, and simple rotating controls for sizing and positioning at the base. Like most of the monitors in this round-up it is Energy Star compliant, which means that the power consumption will be automatically reduced when the machine is not in use. Very poor picture quality is achieved at 800 x 600 at a pitiful 56Hz and 1024 x 768 at an unbearable 87Hz interlaced. If you care about your monitor at all, don't end up with this one.

The 15in Goldstar monitor, re-badged by Carrera, has several noticeable improvements. The screen is flatter and the controls are enhanced by added pincushion and trapezoidal functions. The picture at 1024 x 768 is reasonably stable, but the colour tests showed up the grainy quality of the display as well as slight discolouration towards the edges of the screen — not a good monitor for heavy graphics use.

Mitac Monitor 1450 PD

This is an excellent-quality monitor manufactured by Mitac. It has on-screen positioning and sizing tools, a neat, shallow surround and a reasonably flat screen. A flap at the base of the screen opens out to reveal five buttons which provide on-screen controls for sizing, positioning, pincushion, barrel distortion, and a trapezoidal function. The two selection arrows allow you to pick the function you require from the on-screen palette and adjust with the + or - buttons. A status button displays the current vertical and horizontal refresh rate. This monitor displays 800 x 600 at 75.5Hz, giving an excellent-quality stable image and vibrant colours.

CTX 15in colour

This highly recommended monitor has been included with the machines from Dan, Simply Computers and Mesh. It has touch controls for the normal sizing and positioning functions at the base of the screen, as well as pincusion and trapezoidal functions. The picture is equally stable running 800 x 600 (at 72Hz) as at 1024 x 768 (at 75Hz) and colours are bright and clear. It performed particularly well in the tests, showing good focus and even colours across the display.

Tag

The 15in monitor shipped with the Tag machine gave excellent results in our tests. It has a completely flat screen and gives a stable, clear picture at 1024 x 768 with 65K colours at 70Hz and will cope with a slightly less stable 1280 x 1024 at 60Hz. The controls at the base of the screen are in the form of a digital control panel and LCD display, so you can control the size and position as well as adjusting barrell and pincushion functions and trapezoidal distortion. A recall button puts the display back to factory settings, a degauss function corrects the display after magnetic field interference, and there's a function to display the current refresh rate. This is undoubtedly one of the best monitors in this round-up.

Brother BM76L

This 14in monitor displays 800 x 600 at 75Hz and 1024 x 768 at 60Hz. It has an unusual grey surround which is easy on the eye, and a curved screen. The screen control dials at the base have the usual set of functions for sizing, positioning, brightness and contrast. The picture on this monitor is slightly flickery, even at 800 x 600 and curvature of the screen can become annoying. At 1024 x 768 the flickering is accentuated and Windows icons become completely fuzzed up. The colour tests revealed an overall graininess across the display. Not the best monitor in the world, but it is part of a very cheap deal.

Dell

This 15in monitor is one of the few which displays 1024 x 768 at 72Hz. The screen is reasonably flat and there are six rotating controls at the base of the screen for positioning, sizing, brightness and contrast. The surround is a little too bulky but not anything like as clumsy as the AST model. The monitor tests showed up slight patchiness on some of the blank colour screens, although general colour definition seemed good. Generally, this monitor performed well in the tests although best results were achieved at 800 x 600 resolution.

Gateway 2000 CrystalScan 1024 N I

The best picture I could get on this monitor was 800 x 600 with a refresh rate of 72Hz. It

TAG

is capable of displaying 1024 x 768 at 60Hz, but this is a little flickery. The screen is slightly curved and has a chunky, deep surround in the same clean, white finish as the system unit. The colour tests showed up slight patchiness and some discolouration in parts of the display. The usual sizing, positioning, brightness and contrast controls are at the bottom of the screen, but there are no extra functions. Not the best monitor in the world, but overall not bad for the price.

Peacock AG

This 15in monitor from Peacock displays its best picture at a resolution of 800 x 600 at 72Hz refresh rate. The screen is nice and flat, and the controls provide more than the average selection of functions. A panel at the bottom of the screen opens out to two groups of four buttons, in diamond shapes, which provide sizing and positioning controls. The two bottom buttons when pressed together force the controls into mode 2 which gives pincushion and rotation controls. A degaussing button resets the monitor if it has been damaged by magnetic equipment. Despite its superior set of controls, this monitor is let down by its pale, washed-out colours, and the geometry tests revealed slight distortion towards the edges of the screen.

Tatung 14in monitor (with the Amstrad) and 15in Tatung CM15VDE (with the CompuAdd)

The Tatung 14in colour monitor is a typically budget piece of equipment. The best picture I could get was 800 x 600 at a painful 60Hz refresh rate. It is noticeably flickery and has a blue tinge which cannot be altered using the brightness or contrast controls. The screen is also horribly rounded, and after looking at it for a few minutes it can make you feel quite ill. If you value your eyes, shop around for something better.

The 15in Tatung monitor produced much better results in our tests, giving its best picture at 800 x 600 at 72Hz refresh rate. It does 1024 x 768 at 70Hz, but this is not as stable. Like most of the monitors here, this one is EPA approved and has a power button which changes colour from green to amber when it's in power-saving mode.

The usual array of buttons is available at the base of the screen, plus an additional zoom button. If you frequently move from one screen mode to another, this will allow you to switch quickly between two screen setups. The picture is slightly bulbous towards the top, however, and cannot be corrected because there are no trapezoidal controls supplied.

MJN Proscan 15in

This basic Taxan monitor has the usual rotating controls for sizing, positioning, brightness and contrast at the bottom of the screen and gives a reasonable picture at 800 x 600, at 72Hz. At 1024 x 768, however, the picture is virtually unusable as it runs at an extremely low 60Hz. The monitor tests revealed a lot of patchiness across the screen and colours seem generally fuzzy. The focus tests also showed up a certain amount of distortion at the edges of the screen. This is not a monitor you would want to look at for any length of time but its poor quality is somewhat justified by the economical price of the overall system (£1,199).

Zenith

The Zenith monitor performed well on our tests. It's a stylish 15in flat screen model and is built of bright, white plastic. There are basic screen controls hidden behind a small opening panel at the base of the surround, as well as a trapezoidal function. In 800 x 600 x 64K colours the picture is stable, and colours display evenly across the screen. But in 1024 x 768, the picture becomes unpleasantly flickery.

For home use this monitor is more than adequate, but it is not suitable for heavy graphics work.

Dell

Amstrad

Viglen Monitor Envy-15P

This Viglen monitor has a thin, unobtrusive surround with a full set of controls hidden in a panel at the base. As well as the basic controls, there are trapezoidal, rotation and degauss functions. Like many of the monitors provided with machines in this round-up, this one offers the best picture at 800 x 600 with 64K colours, but is capable of resolutions up to 1280 x 1024. The Viglen produced excellent results in our tests, and with its sharp colours and even display across the screen, is a pleasure to use.

Panrix Monitor ViewSonic 15G

This ViewSonic 15in monitor has a thin, plastic surround and a full range of touch controls at the base including rotation, trapezoid and degauss. There's another interesting control called a Colour Temperature button which switches the display from 9300K, which gives a bluey tinge, to 6550K which is a warmer pinkish colour. The picture is stable at 1024 x 768 although colours in both modes seem a little patchy. There's an annoying white streak down the righthand side of the display which could not be removed.

Mitac

Wearnes

Wearnes DX2/66 AV-Series

Wearnes is a large Singapore-based company which has just started selling PCs in the UK. Recent problems with its UK distribution caused some bad feelings among many Wearnes customers, but the company has now turned over a new leaf with a distribution structure handled by its own staff.

The AV-Series comes in a mini-tower case with the corporate logo stretched out across the base at the front. The CD-ROM drive is Wearnes' own double-speed model and looks similar to the Panasonic drive.

Other components include a Wearnes microphone, ADSP-16 sound card, and two Labtec speakers. The sound card comes bundled with two pieces of software: Voyetra, which provides the tools for configuring the sound card, and HSC interactive, a multimedia authoring program. There's also a collection of CD-ROMs supplied by Softkey, the more useful of which includes a supply of fonts, clip art and photos to help you to liven up your documents and presentations.

The inside of the machine is pretty cluttered, but there's plenty of room for expansion with two VESA slots, four 16-bit ISA slots and one 8-bit ISA slot. The positioning of the fan would make it difficult to install more than one full-length card. With the ADSP-16 sound card installed in one of the ISA slots and the standard local-bus Cirrus Logic card in place, there are still four 16-bit ISA slots, one VESA, and one 8-bit slot free. This expandability is made possible partly by the on-board I/O number, and the maximum system RAM is 128Mb.

The expansion capability of this machine is one of its best features. Although it produced less than average results in the performance tests, the overall price represents a reasonable deal.

PCW Details

Wearnes DX2/66 AV-Series
Price £1089
Contact Wearnes Thakral
01895 430888

Good Points Nice price, good expandability and on-board I/O.
Bad Points No PCI; below average performance.
Conclusion There's nothing exceptional about this machine, but it has been put together from reasonable-quality components and is competitively priced.

Zenith Data Systems Z-Select 100

Zenith's system arrived in three boxes: one for the system unit, one for the monitor and one for — you guessed it — the multimedia upgrade kit containing sound card, CD-ROM and speakers.

Fitting your own CD-ROM drive and sound card is not everyone's idea of fun, and apparently Zenith normally does it for you but for some reason made an exception in this case. The multimedia kit provided includes a Spectrum 16-bit sound card and a SCSI CD-ROM drive from Sanyo as well as two interactive CD-ROMs, and a pair of standard Labtec speakers.

This machine is stark white, but the CD-ROM drive does not match so you end up with a two-tone beige/white effect at the front of the machine.

The lid is secured by just two screws at the back, and when removed, the whole of the front panel comes off with it in one piece.

Inside there's a Seagate hard disk placed on its side at the front of the machine. There are just two 72-pin RAM slots at the front of the motherboard, one of which is filled with an 8Mb SIMM. The RAM can be upgraded to a maximum of 64Mb.

Like most of the slimmer machines, this one has a central riser card which provides four ISA slots. One of these is filled with the sound card, while video is incorporated into the motherboard using a standard local-bus Cirrus Logic GD542X chipset. I/O is also built into the motherboard, leaving three ISA slots free.

The absence of any local-bus slots is a major drawback with this machine and there's a definite shortage of general documentation. A good monitor is included, but the price still seems a little high for what you get and the poor performance results only add to the various annoyances.

PCW Details

Zenith Data Systems Z-Select 100
Price £1,399
Contact Zenith 01756 702800

Good Points None worth mentioning.
Bad Points Poor performance results, no local-bus expansion slots.
Conclusion Overpriced. Best look elsewhere.

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PCI vs Local Bus

It's all very well having a high-performance 486, but if the disk can't get the information to the processor and the graphics card is waiting for the bus to yield its bits, then you might as well have a frame and a set of beads. The need for compatible expansion has produced ISA, a system where 32-bit, 33MHz processors talk to an 8MHz, 16-bit bus. The need for performance has produced some innovative work-arounds: various manufacturers offer local bus and some have joined the VESA (Video Electronics Standards Association) local bus standard which aims, but does not always succeed, to produce a high-performance bus with some level of compatibility.

The initials VL stand for Video Local, which is clearly aimed at the video market, and while *PCW* has seen a number of VL disk controllers it does not offer much scope for a number of cards. VL-Bus has become more of a way for small manufacturers to integrate systems than a consumer product. PCI, on the other hand, is intended to become an all-encompassing standard, for the connection of high performance video, disk, LAN, motion video and audio features; not just for PCs, but for DEC Alpha machines and the Macs of the future.

Intel engineers decided that it was imperative they discover how signals behaved on a computer's motherboard, something they claim was not well understood before. By using the HSPICE software Intel was able to model the electrical properties of traces travelling down tracks; they found that the drivers in the chips on the boards put on a bus rarely had enough oomph to produce a clean signal which went from +5v to 0v, and that there was an echo when this signal hit the end of the bus. Intel built a special board, "A PC for the second decade", with chips to simulate 10 devices, although three of these were to be PCI controllers. The high-performance bus was known as the PCI Speedway — PCI for Peripheral Component Interconnect, Speedway after the funny kind of motor racing Americans do.

The work Intel had done on PCI was published as revision 1.0 and handed over to a separate organisation, the PCI SIG (Special interest group). The SIG produced the PCI Local Bus Revision 2.0 specification in May 1993: it took in the engineering requests from members, and gave a complete component and expansion connector definition, something which could be used to produce production-ready systems based on 5 volt technology.

Beyond the need for performance, PCI seeks to make expansion easier to implement by offering plug and play hardware — no need to work out interrupts and break fingernails on jumpers; upgradability — today's 32-bit PCI will work with the planned 64-bit version; and an insistence on reliability and compatibility. The use of reflective wave voltages and the restriction to 33MHz at a time when most motherboards will run at 40MHz — and Intel is shipping true 50MhHz 486s and 66MHz Pentiums — keeps the tolerances within the manufacturing capability of any experienced company and allows for the use of ASICs (Application Specific Integrated Circuits — custom chips) based on established 1 micron technology. The throughput of a PCI bus should be 134Mb/sec; the 64-bit version will increase this to 234Mb/sec, which is up with the cheap workstations. The Silicon Graphics Indy runs at 267Mb/sec, but since 64-bit PCI is still some way off, the workstations, even the cheap ones, can claim twice the data throughput of a PCI machine, especially since the workstation talks to the memory at 400Mb/sec and really fast chips like the new MIPS R10000 run at 1.6Gb/sec. While this may make Silicon Graphics machines sound a lot faster, you need to look at where the PC is coming from: the EISA specification talks of a maximum transfer rate of 33Mb/sec.

VL-Bus and other systems, including Intel's first dabblings, put the peripherals on the processor bus. With no system I/O controller to get in the way, this might seem quicker, but while it is much easier to engineer than making special system I/O chips and provides the end-user with a quick system, it is really only suitable for graphics and limits system expansion. By separating the "local" bus from the processor bus, the peripherals are not quite as local, but there are benefits. With the PCI local bus there is the ability to switch between 32- and 64-bit operation. A card which fits into a 32-bit slot should work in a 64-bit slot, and vice versa. The bus also becomes independent of the processor type. A processor-bus type local bus solution ties the peripherals to the pinouts of that processor. The bus multiplexes address and data, combined with a burst mode to increase throughput. While VL-Bus has to send address, data, address, data... PCI can burst address, data, data, data. Adding a buffer helps, but using the PCI controller eliminates the waits and makes the most of the burst mode. Intel claims that this can give up to 50% better graphics performance than VL-Bus.

Clever physical design, with the PCI slot offset from the endplate, allows systems to be built with both a PCI and an ISA or EISA socket next to each other, sharing an endplate. While both slots cannot be filled, it gives the user a choice without having to make the case huge.

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PCI LOCAL BUS

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17" Monitor	£390
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16bit Stereo Soundcard & Speakers only	£55

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intel inside pentium PROCESSOR

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Amstrad **BUSINESS PACK** PC9555i

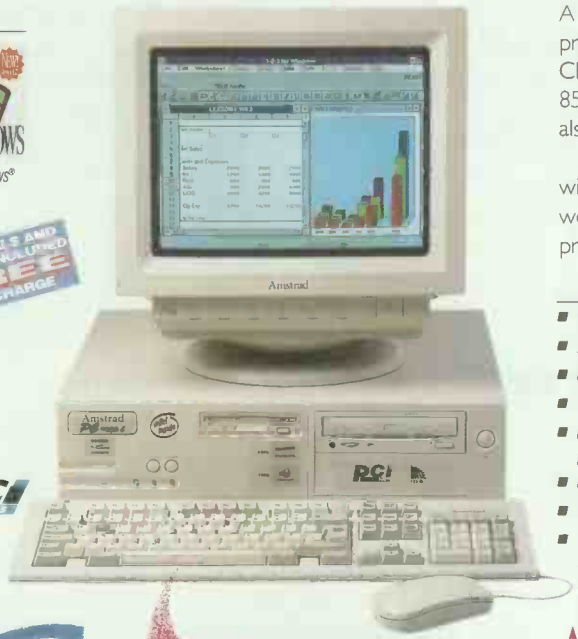
SOFTWARE

MS-DOS® 6.2

MS Windows® 3.11

Lotus Smartsuite

MANUALS AND DISKS INCLUDED FREE OF CHARGE



A true business workhorse with massive processing power driven by the 90MHz Pentium CPU, and huge data storage capacity with an 850MB hard disk. The PC9555i Business Pack also incorporates a double speed CD-ROM.

The PC9555i Business Pack comes supplied with Lotus Smartsuite on CD, giving fully featured word processing, spreadsheet and professional presentation graphics and much much more!

SYSTEM SPECIFICATION

- 90MHz Pentium Processor
- 256K Cache
- 8MB RAM
- 1.44MB 3.5" Floppy Drive
- PCI Local Bus Graphics, IDE plus expansion
- 850MB IDE Hard Disk
- 1MB Video RAM
- 14" SVGA 0.28dp Low Radiation Colour Monitor
- Ergonomic Keyboard & Mouse
- Double Speed CD-ROM
- Desktop Case
- MS-DOS® 6.2 & MS-Windows® 3.11
- Lotus Smartsuite (Lotus 1-2-3, Ami-Pro, Freelance Graphics, Approach and Organizer)

UPGRADE OPTIONS*

	Add
100MHz Pentium Processor	£110
8MB to 16MB RAM	£240
1.05GB Hard Disk Drive	£80
15" Monitor	£130
17" Monitor	£390
Internal 14.4 Fax/Modem Card	£150
16bit Stereo Soundcard & Speakers only	£55
Three Year at home & office service upgrade	£149

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Amstrad LARGE DISPLAY **MONITOR** OPTIONS

Manufactured by Tatung

SPECIFICATION

- Super VGA Colour
- FST (Flatter Square Tube)
- 0.28 Dot Pitch Anti-Glare Tubes
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- MPR11 Low Radiation Compliant
- EPA/Energy Star Power Saving Compliant

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The OKI OL400ex printer is a state-of-the-art LED/laser quality printer, designed to sit discreetly and quietly on any desktop, prints 4 pages per minute, and is easy to use.

SYSTEM SPECIFICATION

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Delivery	£15.00
VAT 17.5%	£171.32
Total to pay	**£1150.32**

EXAMPLE 2

The fastest possible system for complex Desktop Publishing

Business Pack PC9555i	£1499.00
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Upgrade 8-16MB RAM	£240.00
Upgrade 1.05GB Hard Disk	£130.00
Upgrade 17" Monitor	£390.00
OKI OL400ex Printer	£299.00
System Price	**£2668.00**
Delivery	£15.00
VAT 17.5%	£469.53
Total to pay	**£3152.52**

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GOODS	£1073.96	NIL	25	£54.00	£32.96	£1382.96	26.8%

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PLEASE QUOTE PCW05

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How we did the tests

The key to accurate benchtests is proper configuration of the test machines. NSTL's test setup program makes a clean sweep of every machine it tests, automatically adding CONFIG.SYS and WIN.INI files as required. This usually scuppers the manufacturers' efforts to deliver attractive-looking machines with applications pre-installed. The first step in testing is backing up all existing software. Files are copied to VNU Labs' fileservers via Xircom parallel port/Ethernet adaptors, after a very careful virus scan.

Timing over 20 machines at a time, all running a mammoth suite of application tests, is too hard even for the VNU Labs staff, but it's a piece of cake for our dedicated test control system. This machine has two important functions: timing and recording the results. When, for instance, a copy operation in a spreadsheet is about to take place, the application macro containing the {COPY} instruction will first trigger the stopwatch. When the copy has completed, the time taken is written into a controller-machine based database file, along with the data from the other machines in the batch. Every test is run three times, to provide a consistency check.

Performance is assessed in three key areas (word processing, spreadsheets and databases) using DOS and Windows applications. The Windows suite includes Word version 6.0, Excel 5.0, FoxPro 2.6 and WordPerfect 6.0. Our chosen DOS applications are the FoxPro 2.5, Lotus 1-2-3 Release 3.4 and WordPerfect version 6.0.

Word for Windows tests

After auto-installing MS Word for Windows 6.0, a macro automatically assesses a wide range of Word's features. Spreadsheet-like features are now becoming more popular in word-processing packages, and the Calculation test is a macro which solves multiplication and division problems, assessing the overall impact of embedding calculations in tables. Next, a pair of documents are compared, recording the time taken. The Copy and File I/O tests record the time taken to cut/copy/paste various blocks of text into a second document, and to save the resulting file on disk. Fast screen updates are essential for a good word processor.

To measure them, the formatting test performs various operations such as blocking and bolding lines of text. The next test times inserting various objects in different ways — additional text, pictures, tables and so on. Lastly, the time taken to select (highlight), search, and paste blocks of text is

measured. Further tests, which are less highly weighted, time some of the less frequently used functions like text sorts.

WordPerfect 6.0 for DOS/WordPerfect 6.0 for Windows

WordPerfect for Windows has many features in common with Microsoft's Word for Windows. A couple of differences have been introduced where the two packages do things differently, for example, the Sort and Calculations tests. Similar weightings are given to comparable components in both suites of tests.

WordPerfect 6.0 for DOS is a different creature owing to its longer DOS-based heritage, and our tests are based on the old NSTL WordPerfect 5.1 tests. This is because, despite the new features in version 6.0, the majority of users stick to the methods they already know. The actual tests measure how quickly text can be typed in, scrolling speed, times taken to switch between two documents (Shift-F3), search and replace speed, Block/copy/paste performance, retrieve Styles speed, time taken to write large documents as ASCII files, spell-checking performance, and regenerating an index page using Mark Text.

Excel 5.0 and 1-2-3 for DOS tests

Before running any Excel tests, the NSTL reconfiguration scripts completely remove all traces of the previous (Winword) tests. Fresh copies of any shared modules and DLLs are reloaded in place of the old ones, reflecting the situation achieved by a standalone Excel installation. Then, a set of macros executes, timing typical operations. These are recalculating a large spreadsheet, which includes a broad spread of database, arithmetic, database lookup and other functions, Copy/Paste through the clipboard, scrolling through large and small worksheets, highlighting various different-sized ranges, and screen updates including graphing ranges of numbers and labels. Various other formatting controls — toggling bold/italic and font changes are also timed, and a further test times clip-art paste operations: many spreadsheet users now create presentation-type documents rather than actually crunch numbers.

The 1-2-3 tests, which use the latest DOS release, are more numerically based. Most people who want to produce fancy charts have now gone over to Windows-based programs like Excel and 1-2-3 Release 4.01. Nonetheless, 1-2-3's graphing features (using WYSIWYG) are timed when producing 3D bar charts, line graphs, area, and stacked bar graphs. File I/O (loading and saving large .WK3 files), screen scrolling speeds, and range copies make up the remainder of the tests.

FoxPro for DOS and FoxPro for Windows tests

These test suites are very similar to one another. Using a set of five tables, we run a bookshop application which firstly joins and queries the tables, searching for entries by ISBN number, author name, and book title using both specific and wild keys. After finding a selection of titles, an order number table and payment table are updated, reflecting the accounts department's side of the story when the books are sold. The database tests are especially useful for identifying those systems with weak disk subsystems.

Throughout all the changes in the computer industry, the 486DX2 has remained relatively consistent. For a large proportion of users, the ascent of the Pentium has been superfluous: most of their work is word processing, spreadsheeting and database management rather than more demanding multimedia applications. Still, new versions of applications like WordPerfect 6.0 and 6.1 are extremely memory-hungry, placing greater demands on entry-level PCs. While we emphasise that performance isn't everything, we also appreciate the frustration of using bulky new applications on a slow PC.

Julian Evans and Paul Philip

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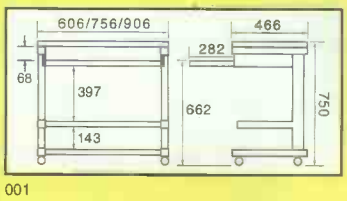

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PCW 06

Editor's Choice

All machines in this round-up have been assessed according to a list of basic criteria which together allow us to identify the best all-rounder. Initially, all machines are put through our VNU European Labs benchmark tests and scored on their performance in DOS and Windows applications. The performance results give us a rough idea of the calibre of machines in the round-up, but are not used as a deciding factor when it comes to choosing the best.

Other considerations such as construction quality play a big part when it comes to assessing the relative merits of 20 group test PCs, and in this round-up there's a wide range of variation even among those machines which produced the most impressive performance results.

Once we've ranked machines for their general build quality and performance, other factors come into play such as the amount of expandability, the choice of components and the type of local bus which the manufacturer has chosen to implement. Out of all the machines looked at here, nine have VESA expansion slots and four have PCI. Some have implemented a combination of slot types while others have no local-bus expansion slots at all. Those with PCI provide the best possibilities in terms of available peripherals, but VESA is cheaper to implement.

In the final analysis, we looked at the combination of characteristics which came with each PC and weighed them up with the overall price of the system.

The Editor's Choice goes to a computer from a respected manufacturer which produced excellent performance results, is solidly built and has both PCI and VESA expansion slots without being too pricey. Several machines fitted into this category but the overall winner was the Dan Premium 66/MM.

Personal Computer World EDITOR'S CHOICE

Dan has long been established as more than just another clone manufacturer and has built a reputation for reliability as well as good warranty and after-sales support. At £1,487, the Premium is not the cheapest machine in this round-up but it is a fair price considering what has gone into it. There's an excellent balance of components, including a Stealth 64 graphics card with 2Mb VRAM and a SoundBlaster 16 sound card, as well as plenty of room for expansion with the choice of VESA and PCI slot types. The combination of excellent build quality, top performance results and generous 850Mb hard disk puts the Dan machine head and shoulders above the rest.

Two other machines which stand out from the crowd are the Mitac DV446V and the Brother BCR4486. Both provide excellent value for money. The Brother, at only £949, comes with a good selection of documentation for novice users, has great expansion capability and came very close to winning an award. Unfortunately, it is let down by lack of PCI local bus, a poor quality monitor and unimpressive test results.

The Mitac offers all the things which the Brother lacks for only £150 more, at £1099. It has a combination of PCI and VESA local-bus expansion slots, an excellent monitor and generally good balance of components. These characteristics, combined with excellent performance results, earn the Mitac PC a Highly Commended award.

The Panrix Titan also wins a Highly Commended award due to its high scores on our benchmarks as well as its neat design and immaculate build quality. Panrix machines have previously performed well in our tests and are well known for using only the best components, so the good quality of this machine was no great surprise. It has on-board I/O, three PCI slots and four ISA which give it good expansion capability. It's also well prepared for multimedia applications as it comes with a good monitor and two large 80W speakers.

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TABLE OF FEATURES DX2/66

Manufacturer	Amstrad	AST	Brother (Kyodai)	Carrera	CompuAdd 466-D	Dan Technology	Dell
Model Name	PC9486i	Advantage Adventure 6066d	BCR 4486 Platform	Carrera Power	HomeWorker	Premium 66/MM	Dimension 466DL
Price (as tested)	£1,094	£1,399	£949	£1,299	£1,099	£1,487	£1,199
Phone number	0800 338844	0181 232 5000	01279 416888	0171 830 0486	0117 925 7435	0181 380 1100	01344 728000
Fax number	0277 209009	0181 568 5337	01279 418130	0171 830 0286	0117 925 4881	0181 380 1100	01344 860187
Sales and Support							
Free technical support line	●	●	●	●	●	●	●
Fax support?	●	○	○	●	○	●	●
Basic warranty (months)	12 On-site	12	12	36 (labour)	12	12	12
Secondary cache and RAM							
Secondary cache (kb)	256	None	128	256	0	256	0
Max secondary cache (kb)	512	N/A	256	512	0	512	256
Main RAM (Mb)	8	8	8	8	8	8	8
Max RAM (Mb)	128	32	128	128	32	128	64
SIMM Type (pins)	72	72	30 & 72	72	72	72	72
Expansion Bus							
Motherboard expansion slot types	PCI/ISA	ISA/Prop Local Bus	ISA/VESA	ISA/VESA	ISA/VESA	ISA/PCI/VESA	ISA (opt.VESA)
Local bus architecture	PCI	Proprietary Local Bus	VESA	VESA	VESA	PCI/VESA	Proprietary
Free 8-bit ISA slots	0	0	1	0	0	0	0
Free 16-bit ISA slots	3	2	3	2	2	2	3
Free EISA/MCA slots	0	0	0	0	0	0	0
Free PCI/VESA slots	1	0	1	2	0	2	0
Motherboard manufacturer	Amstrad	AST	Brother	ANCO	Intel	Dan	Dell
Mass Storage and Floppy Drives							
Hard disk interface	PCI EIDE	IDE	IDE	EIDE	IDE	IDE	EIDE
Hard disk controller cache (Mb)	none	none	none	none	32	none	none
Max. controller cache Size (Mb)	none	none	none	none	32	none	none
Hard disk controller host bus	PCI	Proprietary Local Bus	ISA	VESA	ISA	PCI	ISA
Hard disk size (Mb)	420	420	540	520	340	850	525
Average access time (ms)	12	15	12	12	11	9	12
Hard disk manufacturer	Seagate	Various	Maxtor/Conner	Conner	Western Digital	Seagate	Seagate
CD-ROM manufacturer	Sony	Mitsumi/Sony	Panasonic	Wearnes	Sony	Panasonic	Sony
CD-ROM model	CDU 55E	CR-5633	CR-562B	CDD-120	CDU-33A	CD-562	DUR 5P1N
Average access time (ms)	250	300	300	280	320	320	320
Sustained data transfer rate (kb/s)	320	300	300	300	300	300	320
Burst data transfer rate (Mb/s)	8.3	3.3	2	1	2	0	0
Number of spare 3.5in bays	0	3	0	1	0	0	0
Number of spare 5.25in bays	1	0	1	1	1	1	0
Sound Card							
Sound card manufacturer	Creative Labs	Creative Labs	Creative Labs	Creative Labs	Creative Labs	Creative Labs	Creative Labs
Sound card model name	Vibra 16	SB16	SB16 Value	SB16	SB16	CT2230	Vibra 16
SoundBlaster compatible	●	●	●	●	●	●	●
General MIDI compatible	○	●	●	●	○	●	●
Video & Monitor							
Video circuitry location	Motherboard	Motherboard	Expansion card	Expansion card	Motherboard	Expansion card	Motherboard
Video card manufacturer	Cirrus Logic	Cirrus Logic	Cirrus Logic	Diamond	Cirrus Logic	Diamond	Cirrus Logic
Video chipset manufacturer	Cirrus Logic	Cirrus Logic	Cirrus Logic	Diamond	Cirrus Logic	Tseng Labs S3	Cirrus Logic
Chipset model	GD5430	GD5428	GD5424	Stealth 64	GD5428	Stealth 64	GD5429
Video bus type	PCI	Proprietary Local Bus	VESA	VESA	VESA	PCI	VESA
Highest display resolution	1280 x 1024	1024 x 768	1280 x 1024	1024 x 768	1280 x 1024	1280 x 1024	1280 x 1024
Maximum colour depth	16m	16m	16m	16m	12m	16m	16m
Video memory type		DRAM	DRAM	DRAM	DRAM	VRAM	DRAM
Video memory (kb)	1024	1024	1024	1024	1024	1024	1024
Max. video memory(kb)	2048	1024	1024	2048	1024	2048	1024
Monitor size (inches)	14	14	14	15	15	15	15
Max. N-I refresh rate at 1024x768	60Hz	87Hz	60Hz	72Hz	72Hz	80Hz	72Hz
Monitor manufacturer	Tatung	AST	Brother	Goldstar	Tatung	Dan	Dell
Monitor model number	PC14M28LR	AST Vision 4i	BM76L	1520DM FST	CM15 VDE	15659M	V515

● = Yes
○ = No

TABLE OF FEATURES DX2/66

Manufacturer	Espy Computer Systems	Gateway 2000	Hewlett Packard	Mesh	Mitac Europe	MJN	Panrix
Model name	Impulse 66M	P4D 66I Family PC	Vectra VL2-466	Universal Media DX2-66	DV446-V	DX2-66 V/CD	Titan
Price (as tested)	£1,330	£1,149	£2,106	£1,272	£1,079	£1,199	£1,495
Phone number	01403 822199	0800 602000	01344 369222	0181 4521111	01952 207200	01282 777555	0113 2444958
Fax number	01403 822470	010 353 1 848 2022	0171 7355565	0181 2084493	01952 201216	01282 770844	0113 2444962
Sales and Support							
Free technical support line	●	●	via dealer	●	●	●	●
Fax support?	●	●	via dealer	●	●	●	●
Basic warranty (months)	Lifetime (12 months parts)	36	36	12 months (Back to base)	12	12	12
Secondary Cache and RAM							
Secondary cache (kb)	256	128	0	256	256	256	256
Max secondary cache (kb)	256	256	256	1024	1024	256	512
Main RAM (Mb)	8	8	8	8	8	8	8
Max RAM (Mb)	64	48	64	128	64	96	128
SIMM type (pins)	72	72	72	72	72	72	72
Expansion Bus							
Motherboard expansion slot types	ISA/VESA	ISA/PCI	ISA	ISA/PCI/VESA	ISA/PCI/VESA	ISA/VESA	ISA/PCI
Local bus architecture	VESA	PCI	Proprietary	VESA	PCI/VESA	VESA	PCI
Free 8-bit ISA slots	0	0	0	0	0	0	0
Free 16-bit ISA slots	4	2	3	1	2	3	3
Free EISA/MCA slots	0	0	0	0	0	0	0
Free PCI/VESA slots	1	2	0	4	4	1	2
Motherboard manufacturer	Elite	Anigma	HP	Intel	Mitac	Soyo Technology	Panrix
Mass Storage & Floppy Drives							
Hard disk interface	EIDE	IDE	IDE	EIDE	EIDE	IDE	EIDE
Hard disk controller cache (Mb)	none	64	none	none	256	none	none
Hard disk controller host bus	VESA	PCI	Proprietary local bus	PCI	PCI	VESA	PCI
Hard disk size (Mb)	540	540	540	730	540	540	540
Average access time (ms)	11	11	12	12	12	11	12
Hard disk manufacturer	Western Digital	Western Digital	Quantum	Western Digital	Conner	Western Digital	Conner
CD-ROM manufacturer	Panasonic	NEC	NEC	Sanyo	Mitsumi	Philips	Panasonic
CD-ROM model	CD-562	CD-R260	2 Xi	CDR-1194 SMV	FX001DE	CM206	CD-562B
Average access time (ms)	320	320	320	300	350	357	300
Sustained data transfer rate (kb/s)	300	300	300	300	340	299	300
Burst data transfer rate (Mb/s)	2.3	8.33	1.5	2	1.5	2	2.3
Number of spare 3.5in bays	1	0	1	1	0	0	0
Number of spare 5.25in bays	2	1	0	2	1	1	2
Sound Card							
Sound card manufacturer	Quickshot	Creative Labs	HP	Media Vision	Mozart	Media Vision	Creative Labs
Sound card model name	PRO 16 Plus	Vibra 16	Proprietary	Spectrum	Mozart OTI 601	Jazz16	SB16
SoundBlaster compatible	●	●	●	●	●	●	●
General MIDI compatible	●	●	●	●	●	●	●
Video & Monitor							
Video circuitry location	Expansion card	Motherboard	Motherboard	Expansion card	Expansion card	Expansion card	Expansion card
Video card manufacturer	Elite	Cirrus Logic	Cirrus Logic	Diamond	Ark Logic	Diamond	ATI
Video chipset manufacturer	Cirrus Logic	Cirrus Logic	Cirrus Logic	Tseng Labs S3	Ark Logic	Tseng Labs	ATI
Chipset model	GD-5428	GD-5430	GD-5428	Stealth 64	Ark 1000P	W32P	Mach64
Video bus type	VESA	PCI	Proprietary local bus	PCI	PCI	VESA	PCI
Highest display resolution	1280 x 1024	1024 x 768	1280 x 1024	1280 x1024	1280 x 1024	1024 x 768	1280 x 1024
Maximum colour depth	16m	16m	16m	16m	16m	16m	16m
Video memory type	DRAM	DRAM	DRAM	DRAM	DRAM	DRAM	DRAM
Video memory (kb)	1024	1024	1024	2048	1024	1024	2048
Max. video memory (kb)	2048	1024	1024	4096	2048	2048	2048
Monitor size (inches)	14	14	17	15	14	15	15
Max. N-I refresh rate at 1024x768	87Hz i	60Hz	70Hz	72Hz	70Hz	60Hz	72Hz
Monitor manufacturer	Goldstar	Gateway	HP	CTX	Mitac	Taxan	ViewSonic
Monitor model number	1462DM	GCS	D2806A	1565 GM	1450 PD	510LR	V15G

● = Yes
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Diamond Stealth 64V 2Mb	VL/PCI	227.40

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RTM Systems

TABLE OF FEATURES DX2/66

Manufacturer	Peacock	Simply Computers	Tag DX2-66	Viglen 4DX2-66	Wearnes	Zenith Data Systems
Model name	DX280 PPD 0HDD	66VLB	Tagsound	PCI Professional Platinum Genie	DX2-66 AV Series	Z-Select 100
Price (as tested)	£1,349	£,1351	£1,618	£1,463	£1,089	£1,399
Phone number	01256 811775	0181 498 2130	0181 803 7770	0181 758 7000	01895 430888	01756 702800
Fax number	01256 811839	0181 523 4002	0181 345 5358	0181 758 7080	01895 430777	0181 479 2267
Free technical support line	●	●	●	●	●	●
Fax support?	○	●	I & E-Mail	●	●	●
Basic warranty (months)	12	12	12	12	12	36
Secondary Cache and RAM						
Secondary cache (kb)	128	256	256	256	256	128
Max secondary cache (kb)	256	256	512	512	256	256
Main RAM (Mb)	8	8	8	8	8	8
Max RAM (Mb)	96	128	64	128	128	64
SIMM type (pins)	30/72	30/72	30/72	72	72	72
Motherboard expansion slot types	ISA/VESA	ISA/VESA	ISA/VESA/PCI	ISA/PCI	ISA/VESA	ISA
Local bus architecture	VESA	VESA	VESA/PCI	PCI	VESA	Proprietary
Free 8-bit ISA slots	0	0	0	0	1	0
Free 16-bit ISA slots	3	3	1	2	4	3
Free EISA/MCA slots	0	0	0	0	0	0
Free PCI/VESA slots	1	1	2	2	1	0
Motherboard manufacturer	Mitsumi	Mitsumi	Chaintec	Viglen	Wearnes	Zenith
Hard disk interface	IDE	EIDE	IDE	IDE	IDE	IDE
Hard disk controller cache (Mb)	mne	mne	mne	mne	mne	mne
Max.controller cache size (Mb)	mne	mne	mne	mne	mne	mne
Hard disk controller host bus	VESA	VESA	PCI	PCI	VESA	ISA
Hard disk size (Mb)	420	540	560	540	420	210
Average access time (ms)	11	11	12	10	13	13
Hard disk manufacturer	Quantum	Western Digital	Western Digital	Western Digital	Samsung	Western Digital
CD-ROM manufacturer	Mitsumi	Mitsumi	Panasonic	Panasonic	Wearnes	Sanyo
CD-ROM model	FX400	FX400	562B	CR-571	CDD120X	CDR 1194 SMV
Average access time (ms)	250	250	300	370	250	320
Sustained data transfer rate (kb/s)	450	600	300	300	385	300
Burst data transfer rate (Mb/s)	2	2	0	0	2	1
Number of spare 3.5in bays	0	1	2	1	2	1
Number of spare 5.25in bays	2	1				
Sound card manufacturer	Orchid	Creative Labs	Creative Labs	Creative Labs	Wearnes	Media Vison
Sound card model name	SDrive 16EZ	SB16	SB16	Vibra 16	ADSP 16	Spectrum
SoundBlaster compatible	●	●	●	●	●	●
General MIDI compatible	●	●	●	●	●	●
Video circuitry location	Expansion card	Expansion card	Expansion card	Expansion card	Expansion card	Motherboard
Video card manufacturer	STB Lightspeed	Diamond	Video Logic	Diamond	Cirrus Logic	Cirrus Logic
Video chipset manufacturer	Tseng Labs	Tseng Labs	Video Logic	Tseng Labs S3	Cirrus Logic	Cirrus Logic
Chipset model	ET 4000W32	ET4000/WSZ	PCI Movie	Stealth 64	GD 5428	GD 5428
Video bus type	VESA	VESA	PCI	PCI	VESA	VESA
Highest display resolution	1280 x 1024	1280 x 1024	1280 x 1024	1280 x 1024	1280 x 1024	1024 x 768
Maximum colour depth	16m	16m	16m	16m	16m	16m
Video memory type	DRAM	DRAM	VRAM	DRAM	DRAM	VRAM
Video memory (kb)	1024	1024	2048	1024	1024	1024
Max. video memory (kb)	1024	2048	2048	2048	2048	2048
Monitor size (inches)	15	15	15	15	14	15
Max. N-I refresh rate at 1024x768	72Hz	72Hz	72Hz	72Hz	70Hz	85Hz
Monitor manufacturer	Peacock AG	CTX	Forefront	Viglen Ltd	Wearnes	Zenith
Monitor model number	50115065	1565 GM	DM-1564	Envy 15P	1415	1540XT

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1Gb	8Mb	1395	1555	1720	2125
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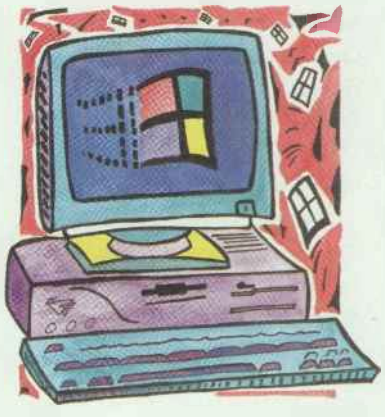

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WASTE DISPOSAL

Clear out

Instead of buying a bigger hard disk, consider clearing away the rubbish from the one you've got. Paul Begg has waved various feather dusters across the cobwebbed nooks and crannies of his hard disk and reports on which worked best.

Windows applications act like unwelcome day-trippers at the seaside; when they go home, they leave all their litter behind them.

When you install Windows applications they position bits of themselves all over the place, and when you delete them, assorted rubbish gets left behind. This gobbles up hard disk space and may cause conflicts that will impair the efficiency of your machine.

You may believe that you don't load enough programs for this accumulated detritus to become a problem. But just think: have you loaded the software thoughtfully supplied on computer magazine cover disks? Have you experimented with shareware? Have you downloaded from a BBS?

If you have, gigabytes of software may easily have passed over your hard disk in a very short time. And every one of these programs will have left a little souvenir of its stay.

During the past few years, uninstallers have grown in popularity. In the previous issue, *PCW* briefly reviewed two uninstallers but there are a number of others on the market. So how do they differ? Are they all the same filling wrapped in different chocolate? Or do we have a selection box offering assorted centres to suit every taste?

CleanSweep

Probably the best known name in the market of uninstallers is Quarterdeck, renowned for its memory management utility and Program Manager replacement, SideBar. Its CleanSweep for Windows software is similar in appearance to MicroHelp's Uninstaller 2.0.

In use, the first screen you see offers four options: Uninstall, System, Find Unused, and Find Dups. There are three ways of uninstalling programs but the default is via a dialogue box that lists all your program groups in alphabetical order. Clicking on one of these groups shows all those with an icon within that group — in other words, CleanSweep does not recognise programs without an icon, which means you can't uninstall orphaned or DOS programs using the default method.

To gain more control over CleanSweep's actions you must use the Browse or Search buttons. The Browse feature provides a list of all the applications on your hard disk. You can scroll through this list to delete whole directories or subdirectories, known orphaned and DOS programs. The Search option examines your hard disk and presents you with a list of Windows applications so you can choose those you wish to uninstall. The choice is made from a drop-down search list: Windows Programs, Orphaned Programs, or Orphaned Windows Components.

When using uninstallers, a common problem is that many alternative Windows shells — Norton Desktop, PC Tools for Windows, Dashboard or Quarterdeck's own SideBar — allow you to create program groups within others. This is known as nesting and uninstallers either don't recognise nested groups or, as in the case of CleanSweep, regard

them as orphaned programs.

CleanSweep gives you three other file search and deletion options. You can choose to look for system components such as documents, screen savers, display drivers, unused fonts, system and DOS files and so on.

You can look for files that are obsolete or unused, either letting CleanSweep search for what it thinks are unused files or by specifying certain types of file such as backup, archive files, lost cluster files, and help files.

The remaining choice is Find Dups (duplicates). CleanSweep comes into its own here because it allows you three search choices: by name, size, date and time; or by name and size; or by name only. This is particularly valuable if you have more than one document file with the same name. For example, a company might have a word processor document called Jones.doc filed in a letters subdirectory, as well as an invoice, also called Jones.doc, but in an invoice subdirectory. Although they may have been created at different times and be different sizes, most uninstallers will list them as duplicate files. With CleanSweep you can filter these out by specifying a search for files of the same name and size.

Another plus point in CleanSweep's favour is that it will check across all installed drives, which is a good idea if you have added a second hard drive. Not all packages give you this flexibility.

CleanSweep is thoughtfully designed and even has a module for uninstalling itself. Quarterdeck has taken great pains to prevent even the most fumbling user from making disastrous mistakes. Because it includes a database of files that should never be deleted (such as SYSTEM. INI and WIN.INI) it brings up a safety dialogue with four options before starting to uninstall anything. Trial Run gives you the option not to uninstall applications but to see what would be deleted and gain an idea of the hard disk space you'd recover if you went ahead. You are given the option (the default is "accept") to back up all components in case you later discover you've deleted something you shouldn't have. Confirm Deletions requests your confirmation that the item should actually be deleted, and Save to Master Log creates and saves a report of the action.

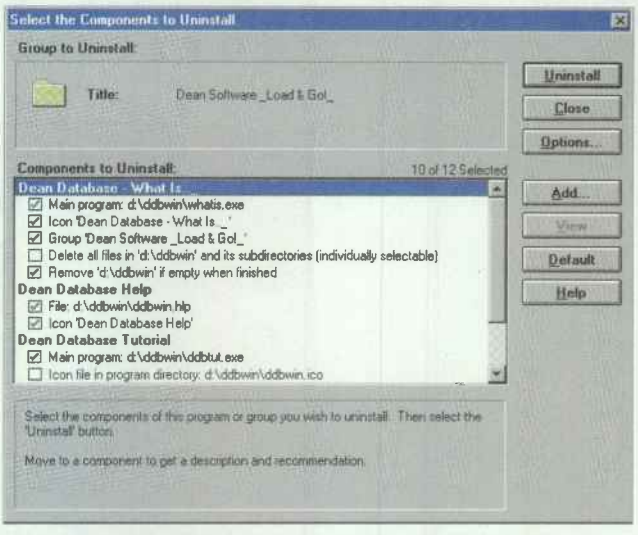
On the down side, CleanSweep doesn't track file usage, although Quarterdeck may add a file-tracking module in a future upgrade. Neither is an installation log available — this is a module that keeps an eye on what is happening when a program is being installed. Access to manual deletion within .ini files is not offered by CleanSweep, which is unfortunate, as this is an area in which a fair bit of detritus can build up.

There were a couple of other minor niggles, admitted by Quarterdeck and noted in the Readme file. For example, if there is more than one program icon for a single program — that is, an icon for the same program in different groups or folders — CleanSweep will only remove one icon. To remove the others, it will automatically uninstall them or enable manual deletion of the extra icons.

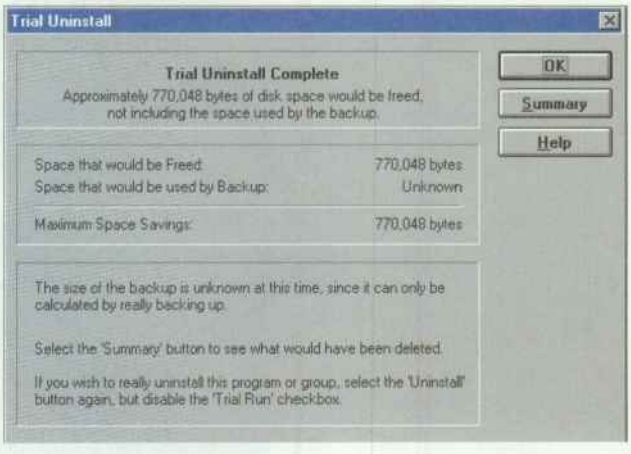
Overall, not venturing into .ini files and the absence of an installation log are negative points against CleanSweep, but

CleanSweep

CleanSweep's uninstall options allow you to be very selective about what goes and what stays



Before committing yourself, CleanSweep offers a trial uninstall, displaying what you'd free up if you went ahead



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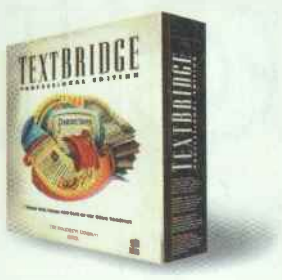

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the protection against error and the flexibility to search for duplicate files weigh heavily in its favour.

Remove-IT version 1.0

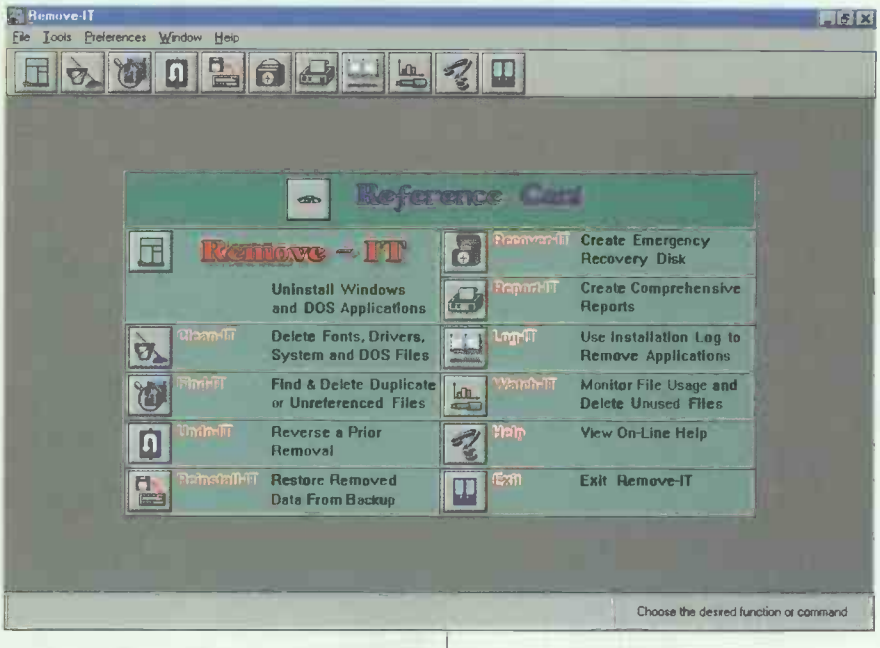
Remove-IT comes from the US company Vertisoft Systems, which claims that its product is the most comprehensive Windows and DOS application remover available. This is the sort of daring claim that almost begs to be disproved, but in this case it would be difficult.

Remove-IT is easy-to-use and has a pleasing interface to which animated icons add a little fun. There is also comprehensive documentation — the thickest manual of any of the products reviewed. Although intended for single-users, Vertisoft Systems can advise on support for network drives.

Another brave claim by the company is that using Remove-IT guarantees 100 percent safe removal of applications, and certainly, Vertisoft does provide enough security features to rescue even the most accident-prone user. There are nine modules: Remove-IT, Clean-IT, Find-IT, Undo-IT, Reinstall-IT, Recover-IT, Report-IT, Log-IT, and Watch-IT.

Remove-IT enables you to perform an Express or Custom uninstall. In the former case, Remove-IT decides which files, icons and so on should be uninstalled, while the Custom method gives the user a say in the matter. The program will not delete anything your system needs to be able run. It uses a colour-coding system: a yellow warning flag (why not red?) will alert you if you try to remove anything it believes you might want to keep. Deletions are automatically compressed and backed-up to a floppy disk. One small point here, though, is that currently the backup function neither checks format integrity, nor will it reformat disks. Remove-IT can take a long time to archive large applications like Microsoft Word for Windows.

The Clean-IT option enables you to remove undesired fonts, unnecessary device drivers, and other system and DOS files, and there is an automatic backup feature. Find-IT looks for duplicate and orphaned files but regrettably does not check across disks. Undo-IT is the safety net for those moments of cack-handedness that result in the accidental deletion of necessary files. It lets you undo the most recent activity and restores your system. Reinstall-IT does pretty much the same thing but calls upon the backup files and allows you to reinstall an application or a file. But using



Choose what you want to do from Remove-IT's Reference Card

Undo-IT means that you can not only reinstall the application, but reinstall it to a different directory, drive, or system.

With Recover-IT, you can prepare an emergency recovery disk that will help you recover your system in the event of corruption or accidental deletion of critical configuration files or system settings.

Report-IT creates detailed reports of the exact status of your system and any actions performed using Remove-IT. Log-IT, which runs continuously in the background, pops up a dialogue box every time you use the Windows Run command to install a new application. It then captures a detailed record of every change made to your system and Remove-IT uses this log later on to precisely remove each from your system.

An installation log is an essential element of an uninstaller; some have trouble uninstalling every little bit of an unwanted program. Although Remove-IT sometimes failed to uninstall small files, usually icons, the log lets you know where to look for detritus so you can delete it manually. More importantly, if you note a reduction in performance after a software installation, you can use the log to see where files have been put and then check for possible conflicts.

Remove-IT also has Watch-IT, which constantly monitors file and application usage over a 30-day period. The statistics generated can help you select unused files and applications to delete from your system. Unfortunately, Watch-IT does not support the detection of file usage in Windows for Workgroups if the 32-bit File Access option is enabled. This could cause problems for anyone who upgrades to Windows 95.

A point to watch is that when you install Remove-IT, a program item called "More Than About" is added to the Remove-IT program group. This simply displays an animation with licensing information; it has no practical purpose and gobbles up 1Mb of disk space, so use Remove-IT to get rid of it.

Overall, Remove-IT looks like the most comprehensive uninstaller in this review. It has features that many of the others do not possess such as the installation log, monitor of file usage, or the ability to back up to floppy or hard disk. On the down side, it didn't look for duplicates across more than one hard disk. This aside, it strongly rivals CleanSweep to be the best of the bunch.

Rosenthal UnInstall

This is one of two shareware uninstallers (the other is Winformant). It has a few tricks up its sleeve of which the commercial packages might take note — in particular, its ability to work in both DOS and Windows. This is an important feature because situations can arise when a rogue program can lock you out of Windows. The easiest way of resolving such a problem is to delete the program. Rosenthal UnInstall removes it as well as all the nasty bits that a program may have deposited here and there.

Unfortunately, we were unable to get this program to run under Windows: when in Windows or OS/2 it forces the

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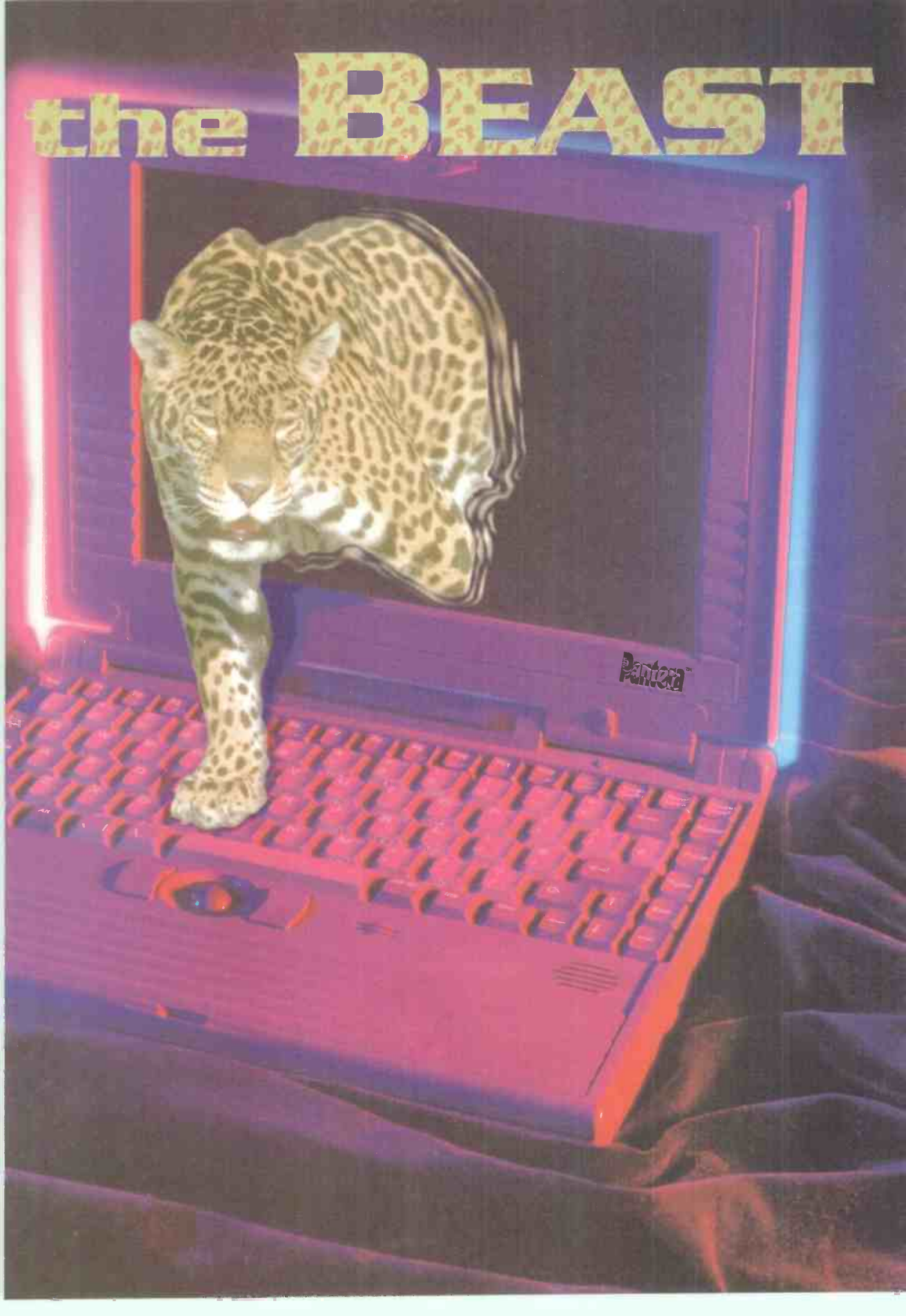
the BEAST
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system into the DOS mode. For some reason, the DOS window under Windows wouldn't open and the cause of the problem was not immediately obvious.

Rosenthal UnInstall simply replaces Windows' Run command when you install new software — it takes a look at, and keeps a record of, your system configuration before installation. When you have completed your installation, it has another look around your system configuration and makes a note of all the changes. When it comes to uninstalling the software application, Rosenthal UnInstall merely looks at what changes were made and then restores everything to the way it was.

The company claims that it will work with any drive with read and write access. This includes networks, multiple and removable drives, PCMCIA, RAM-card and an unlimited number of floppy disks.

All modifications, additions and deletions made to the autoexec.bat, config.sys, win.ini and system.ini can be restored. Registered users receive a usage log utility which maintains a running timeline of changes, additions and deletions made to the autoexec.bat, config.sys, win.ini and system.ini files. Rosenthal History enables a plain text history report to be set up and referred to when uninstalling software.

Overall, this software does the job for which it is intended at a knock-down price.

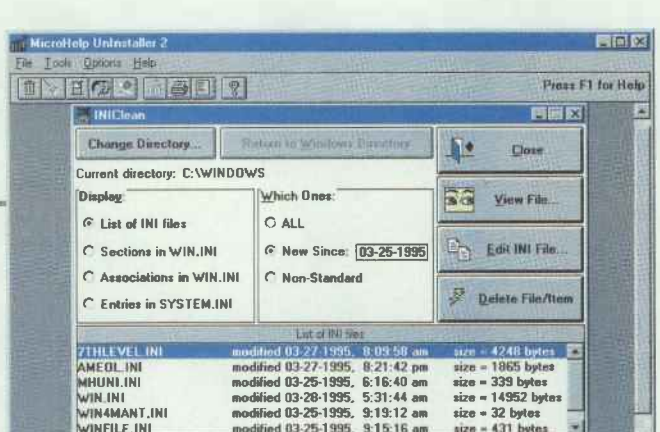
UnInstaller version 2.0

MicroHelp's UnInstaller has been available for quite some time now. Version 2.0 was released back in November 1993, so it's now lacking some essential features and an upgrade is way overdue. We believe that plans are afoot but UK distributor Contemporary Software would not comment on these.

All the cleaning features are found under Tools. You get five choices: Uninstall Applications, System Cleanup, Iniclean, Duplicate File Finder, and Orphan File Finder.

Uninstall Applications is self-explanatory. You are given a list of all your Windows groups. Just click the appropriate icon and the programs in the group are listed. Click on a program and you get a list of all the files. Then click on the one you want to get rid of and Uninstaller does the business. If you wish, you can get Uninstaller to search directories for specific files. System Cleanup allows you to delete files in specific categories: display drivers, System Support files

The first uninstaller — MicroHelp's Uninstaller still gives you the best access to .INI files



(files you won't need if you never use Windows in standard mode), fonts, DOS applications and Miscellaneous Files. The latter consists of those files that might be superfluous to requirement such as moricons.dll. I think System Cleanup lists files that you really shouldn't delete. Inexperienced users should exercise extreme caution, especially as Uninstaller does not possess a backup feature.

The Duplicate File Finder and Orphan File Finder seemed to present a danger: identified orphan files were not orphaned at all, they were.exe files contained within applications. And the duplicate file finder is very weak; finding duplicate filenames rather than duplicate files — in other words, it found files that shared the same name in directories and subdirectories and listed them as duplicates. A moment of incaution and you could delete something you would otherwise need.

Uninstaller creates a report every action so if something refuses to work, you can check back to see exactly what happened — small satisfaction when you can't get it to correct the action. However, although it does have a lifesaving Undo feature to rescue you from moments of stupidity, this doesn't work if the mistake is only realised later on. The reporting feature is optional.

The program has the most comprehensive .INI file cleaner of all the packages reviewed. You can view all your .INI files: either those that are new since you last viewed them, or non-standard .INI files. IniClean tells you the name of the file, when it was last modified, and its size. You can also view the contents and this is a useful feature because it often provides a clue to the application to which it belongs. You can then edit the file when you need to delete sections within it. Users can also view sections within WIN.INI and entries in System.INI.

Uninstaller is not without a few weaknesses: you can encounter conflicts with screen savers and on-the-fly font packages, and it generally has trouble deleting icons. However, while it is an excellent package, the .INI cleaner being especially strong, it does lack the safety features of CleanSweep and Remove-IT, and it is short on features.

Unless MicroHelp get their act together with a very smart upgrade, Uninstaller could find itself being uninstalled.

Uninstall-it! version 1.03

Unlike some other programs reviewed here, Uninstall-it! will load from alternative shells such as PC Tools' Desktop for Windows and Norton Desktop. The down side is that application icons in Norton Desktop will not be displayed unless you are using an .ICO file and in PC Tools they won't be displayed if the groups contain more than 35 items. Also, Uninstall-it! does not recognise applications in nested groups. The program did not run under the Beta release of Windows 95.

The opening screen of Landmark's Uninstall-it! offers four options: Scan Applications, Find Strays, Find Duplicates, and Restore Backups.

Scan Applications reviews and provides you with a list of Windows groups and program icons. There is an abundance of detail. You are shown the icon, told which program the icon represents, told what the program does, and given property information such as the working directory, command line, and the icon path or file.

You then select the program you want to uninstall. Uninstall-it! then analyses what files, items, icons, and entries within key system files are associated with the program you selected. It looks for references in your autoexec.bat, config.sys, win.ini, system.ini, and reg.dat, and uses whatever it learns from sticking its nose into these files to search elsewhere; such

as directories, associated data files, Private .INI files and Drivers, DLL, and VBX files. This done, a list of items for suggested deletion is produced. The list shows you various information such as where the item for deletion has been found — config.sys, autoexec.bat, and so on.

You can view the file if necessary. Uninstall-it! can view various file and graphic types including Microsoft Word, Microsoft Write, MS Works documents, WordPerfect, Ami Pro, and more. Graphics types include PCX, TIF, GIF, BMP, ICO, and WMF. Once files have been selected, you can call upon the View Predictions facility which indicates how much hard drive space could be recovered.

Once a decision has been reached, you are given the choice of uninstalling, moving files or performing a backup. This ability to do more than simply uninstall is an excellent feature of Uninstall-it!. Moving a program from one directory to another might not sound much, until you consider that moving a program manually doesn't affect the program and icon properties and references within key system files. This means than quite often you can't load the moved application but with Uninstall-it! the move is undertaken lock, stock, and barrel.

Making backups isn't one of Uninstall-it!'s strengths. You can perform the backup as a simple safety measure, in case you want to reinstall the uninstalled program, or simply to back up a program in use. But Uninstall-it! does not support tape or floppy drives, so you can only back up onto your hard disk. However, once compressed and backed up, you can copy the backup files to floppy disk for restoration later.

A safety feature of Uninstall-it! is its recommendation not to delete certain files such as shared files like .Dll's. Unfortunately, this is where alternative shells like PC Tools can cause uninstallers such problems. A widely used feature of PC Tools is its ability to create multiple desktops. Because Uninstall-it! does not recognise more than one at a time, it will not identify a file shared between a program on desktop one and a program on desktop two. It won't caution against deleting it and your program on desktop two will cease to function.

The program did a good job of tracking down strays, but the lack of information about the program to which the strays were related was unimpressive. You can select the sort of strays to look for — win.ini sections, win.ini associations, system.ini references, empty Windows groups and so on. This is an excellent feature but unfortunately you can't search for specific system files such as fonts.

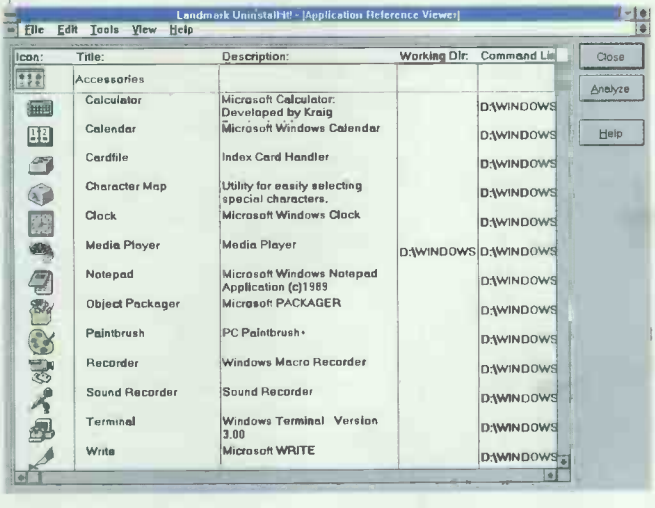
The Find Duplicates tool has the neat addition of a cross-reference feature. There are sometimes important files which have been duplicated in both DOS and Windows. A good example given in the documentation is himem.sys. It is probably not a good idea to delete these files but in case you do, the difficulty would lie in knowing which of the files is accessed by your config.sys. Calling up sysedit.exe would be simple enough, but not all such examples as so easy — Uninstall-it! can do the job for you.

There is quite a clutch of "will not work with" notes in the Readme file; mostly concerned with networks, to which Uninstall-it! has an aversion. Put it within sniffing distance of a network and it will refuse to work. More importantly it mentions, but does not specify, features that won't work without a mouse. And it quietly observes that problems can be caused during analysis if you have win.ini and system.ini files greater than 60kb and that no single section within win.ini or system.ini may be more than 30kb.

Uninstall-it! does a cracking job of searching every nook and cranny for detritus and the backup facility is a great strength, but it's a pity it won't back up directly to floppies. It would be good to see a usage log and an installation log, and it's refusal to run under 32-bit Windows may cause would-be users a problem.

Overall, it is hard not to like Uninstall-it! and few users will be disappointed, but it's not as good as CleanSweep or Remove-IT.

The wealth of information offered by Uninstall-it!'s "Scan Applications"



WinDelete version 1.0

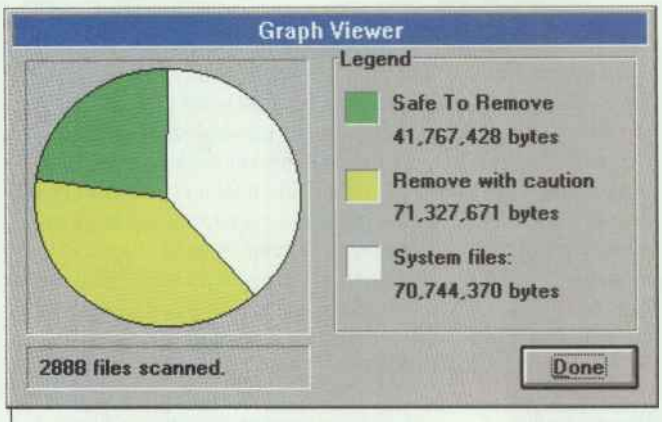
Installation is easy and trouble-free, but WinDelete will only install and work from Windows Program Manager, not from alternative desktops like Norton or PC Tools. The Readme file warns that problems may be encountered with some shareware applications that directly change the Program Manager. Neither will WinDelete install under Windows NT (contrary to what is stated in the user manual) or Windows 95. And It won't run on 80285 machines (contrary to the documentation).

This is the least sophisticated uninstaller program reviewed here and is essentially a replacement for Windows' Program Manager's Run command. Like the shareware program Rosenthal Undelete, WinDelete keeps a record of your current system configuration and takes another look at it following an installation, then logs the differences. When you perform an uninstall, WinDelete simply puts everything back the way it was prior to installation.

There have been reports of WinDelete not being able to handle the deletion of big applications and of being less than satisfactory when deleting .INI files and DLL's, but we encountered no problems.

The safety features in WinDelete consist of a colour-coding system in which green represents those files the program thinks it is safe to delete, while yellow denotes those which should be treated with caution. An Express Mode can be used to delete only the green items.

If there is more than one hard drive on your machine you can tell WinDelete which to scan before, during, and after installing or uninstalling an application. It can only delete programs with an icon on the desktop and it will create icons for DOS programs — the DOS icons otherwise serve no purpose as you can't use them to execute the application. If a



WinDelete's stats button offers this graph viewer — is it really safe to delete the system?

program's icon is removed, you can't uninstall that program.

WinDelete does have a couple of extras. A Statistics button reads all the files on your hard disk, then displays a pie chart that shows: the amount of hard disk space containing green files; the amount containing yellow files; and the amount used by files that need to be retained. System Information provides a lot of information about your hardware: the type of processor, and whether or not a maths co-processor is installed; the operating system; system resources; and local fixed-drive information.

A log file is automatically created every time you install or uninstall an application. The installation log lists the program files, where they were located and their size. The uninstall log file shows what files you've just deleted, where they were and their size.

WinDelete has a nice, uncluttered interface that worked well and was easy to use. On the whole though, WinDelete is too basic and therefore limited. But then it makes no claim to be other than a "safe and simple Windows uninstaller".

It could have been better though, and anyone other than a computer novice might be frustrated by the program's limitations. For instance, there is no backup facility to hard or floppy disk, it doesn't look for orphans and it doesn't delete unwanted .INI files. Neat, basic and simple sums it up. It does the basic job pretty well, but if you are going to spend money, you might as well get something more sophisticated you can grow into.

Winformant

This is a polished little utility that does more than simply delete unwanted files. It has a nifty file finder with the additional benefit of enabling you to edit, execute or delete found files with a simple mouse double-click.

You can use various search criteria and during the search you are kept up to date with its status, the number of directories searched and the number of files fitting the criteria found. The Swap file tells you your current Windows Swap file settings, the status of the existing file and suggests improvements. It also shows the drive, path and filename of the current Swap file. A button labelled Change is provided that automatically loads Windows Control Panel for easy Swap file modifications. Restart is a quick button for exiting and reloading Windows following modification of win.ini, system.ini, or other files, or following a GPF (general protection fault) or other critical error, and the Eject button quickly exits Windows

Two modules of particular interest are DLL/VBX and Prof.Edit. The former finds and optionally eliminates redundant DLLs and Visual Basic custom controls VBX files. Only exact duplicates are listed for deletion and there is a feature to protect Windows DLL/VBX files in the WINOS2 directory of OS/2. The Prof.Edit (profile editor) is a great little module that allows most .INI modifications to be made using only a couple of keystrokes and mouse clicks. This makes editing .INI files the act of a moment, and as the documentation points out, editing .INI files is important because Windows has a 64kb .INI file limitation.

The uninstaller module does a good job. It seeks out and selectively wipes out programs, help files, .INI files, icons, groups, subdirectories, OLE objects and even system.ini entries. It does all this in much the same way as other uninstallers reviewed here. You are provided with a list of groups. Clicking on a group shows a list of programs within that group and clicking on a program (or using the Probe button) gives you a list of all the files that make up that group. Also included is some important information such as the type of file and whether it is likely to be in use by another application.

A safety feature is a No Prompting checkbox. Leaving it unchecked means that deletion safety warnings are issued. Although leaving it unchecked can slow you down, bear in mind that performing on the highwire without a safety net can be extremely hazardous. You can also use Browse, which enables you to uninstall programs that are not in program manager groups.

Once you have selected the files for deletion, press the delete button and Winformant gets on with the job. It does lack many of the features of programs like CleanSweep, but may nevertheless satisfy your needs. At least it gives you the chance to check out an uninstaller, and a good one at that, for no more than the cost of a few pounds.

Conclusion

Uninstallers can be dangerous tools even in experienced hands, so you can't really do without too many safeguards. For this reason CleanSweep and Remove-IT come out best. CleanSweep just has the edge because of the flexibility it offers in finding duplicate files across disk drives. Winformant deserves an honourable mention, and so does Uninstaller for the access it gives to .INI files.

PCW Details

CleanSweep
Price £59
Contact Quarterdeck 01245 496699. Fax 01245 496941

Remove-IT
Price (US) $69.95
Contact VertiSoft Systems 0101 803 295 5875

Rosenthal Uninstall
Price $19.95 + $5 shipping (shareware disk about £3)
Contact Rosenthal Engineering (Shareware disk supplied by PC Independent User Group 01732 771512. Fax 01732 771513)

Uninstaller
Price £49
Contact Contemporary Software 01273 483979. Fax: 01273 486224

Uninstall-it!
Price £49
Contact David Case 01908 232350

WinDelete
Price £50
Contact IMSI 0181 7581447. Fax 0181 581 2200

Winformant
Price (US) $39 + $5 shipping. (Shareware disk about £3)
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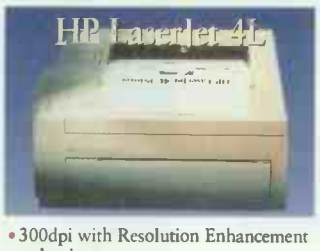

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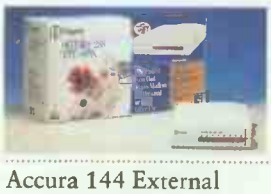

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HOW TO GAIN ACCESS

Microsoft Access 2.0 is well known as an end-user database, but with a little effort it can also be an effective developers' tool. Iain Summers and Angus MacKellaig present the first in a series of guides to developing applications in Access.

Access is a great database system for end-users, but it's been criticised in the past for the difficulty developers experience when they want to produce serious database applications. This was exactly our experience when we undertook some development work using Access 1.1 recently. After much head scratching, manual (and soul) searching, together with a trip to the local bookshop to supplement Microsoft's documentation, the task becomes a bit more manageable.

Access 2.0 addresses many of the shortcomings we first experienced, through the use of Wizards, the simple interactive tools which prompt you for any necessary information required to perform a task. There has also been a general improvement in the user interface and a revamp of the programming language Access Basic. We would heartily recommend that anyone wishing to develop applications upgrade to version 2.0 as soon as possible.

The purpose of this series of articles is to provide an introduction to developing applications in Microsoft Access. Each stage is broken down in a step-by-step guide. The sequence of steps taken is designed to get you up and running with a usable system as soon as possible, adding "bells and whistles" as they are developed.

The application revolves around a relatively simple Mailing List Manager whch allows you to edit and categorise subjects, plus create and use customised reports on-the-fly. It will introduce you to Access Basic code, providing some generic routines which can be used in any Access application without modification. It will also provide a few ideas on providing an easy to use interface for the user.

For your convenience, the completed application will be supplied on the July cover CD-ROM. The more adventurous among you can follow the form and report design steps, but import the code from text files supplied on the CD.

We recommend entering the application as detailed in the notes, closing Access, then making a copy of the database which you can then open for experimentation without corrupting the original file and losing all your hard work. After all, playing around is often the best way to learn. In particular, move the mouse around the toolbars and design tools, pausing over each icon, whereupon Access, like the other Microsoft Office applications, displays a small tab describing that button's function.

Access is an object-oriented database system, that is, all the elements are treated as objects on which appropriate actions can be performed. It stores all the objects for a particular system in a database, which is one large file with the file extension MDB.

The MDB file can be viewed as a container that holds all the objects in the database. The first logical step in creating an application is to create the main object around which everything revolves, which is of course the database itself.

Select New Database from the File menu, or type ^N, or click the New Database button on the toolbar. (Hold the mouse still over the buttons on the toolbar for a description of each button's function.) Type in the name of the database in the File Selector dialogue box, then click OK. Access will now present you with the Database Window which displays the name of the database (PCW) in the title bar.

All objects are accessed via the Database window, which as you can see from Fig 1, divides them into Tables, Queries, Forms, Reports, Macros and Access Basic modules.

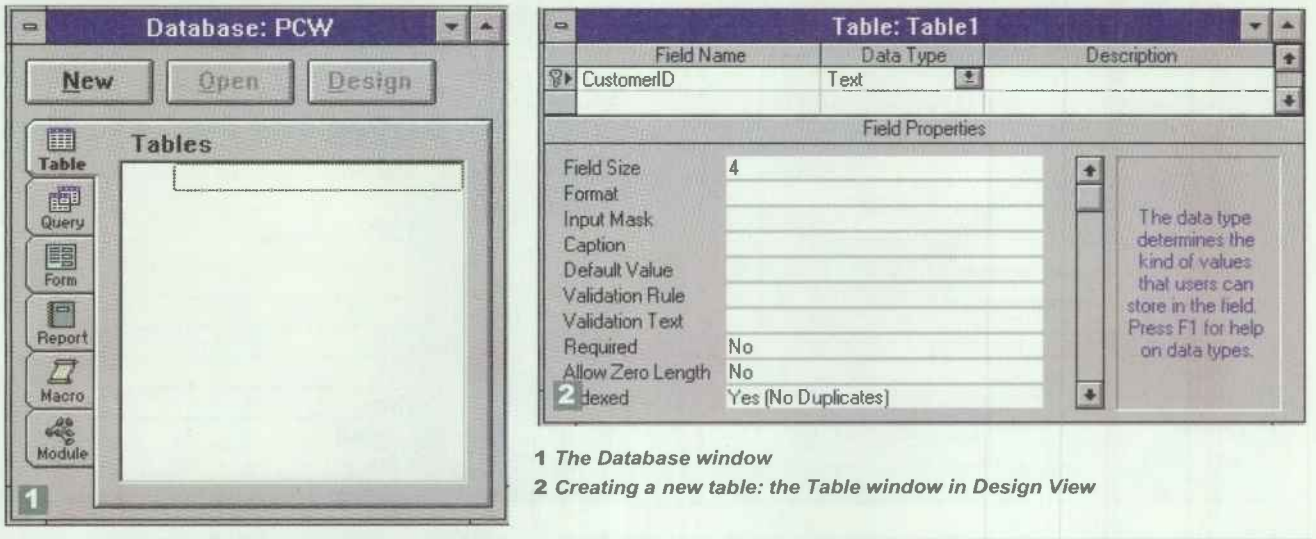
By clicking on the required tab, a list of objects of that type will be displayed in the window.

Creating the tables

Once the database has been created, we need to create tables, the objects that store the data we will be using.

Our Mailing List Manager uses three tables, one to hold details of all our subjects, the other two simply lists containing

The Database and Tables windows



1 ***The Database window***
2 ***Creating a new table: the Table window in Design View***

categories that are used to classify these subjects for mail-shot extraction.

Ensure that the Table tag is selected in the Database Window, click the New button, and select the New Table option in the New Table dialogue box.

Access now presents you with a Table Window in design view (note that we have resized the window to reduce the size of the graphics). See Fig 2.

The top portion of the window is used to specify the name and type of fields, as well as an optional — but recommended — description that will appear on the status bar when that field is selected for editing.

The lower portion is used to set properties for the currently selected field, such as the maximum number of characters or digits used to store data, input validation criteria for data entry, etc.

Enter the field name in the Field Name area, then press the Tab key. Click on the arrow button on the Data Type area or press F4 to produce a list of allowable types — the default type is Text. Click on the Field Size area with the mouse and enter a more sensible value than the default of 50. Next, use the Tab key to advance onto the other properties (Default Value etc), and click on the next Field Name area to enter the details for the next field, repeating the above steps for each field.

When you have entered details for all the fields, click on the Save button on the toolbar, enter the name of the table in the dialogue box, then click on OK. Select Close from the File menu to close the table. The three tables are AddressBook, Category1 and Category2.

Create these tables using the field definitions given in the tables below. To simplify testing at later stages, enter some sample values in the Category1 and Category2 tables.

A

Field Name	Type	Size	Default Value	Validation
Rule				
CustomerID	Number	4		
Title	Text	10		
FirstName	Text	20		
Surname	Text	30		
Sex	Text	1	"M"	(="M") Or
(="F")				
DOB	Date/Time	8		
Address	Text	35		
Address1	Text	35		
City	Text	20	"Edinburgh"	
Region	Text	20	"Lothian"	
Postcode	Text	8	"EH"	
STDCode	Text	6	"0131"	
Phone	Text	8		
Category1	Text	5		
Category2	Text	4		

B

Field Name	Type	Size	Default Value	Validation Rule
Category1	Text	5		
Category1Description	Text	4		

C

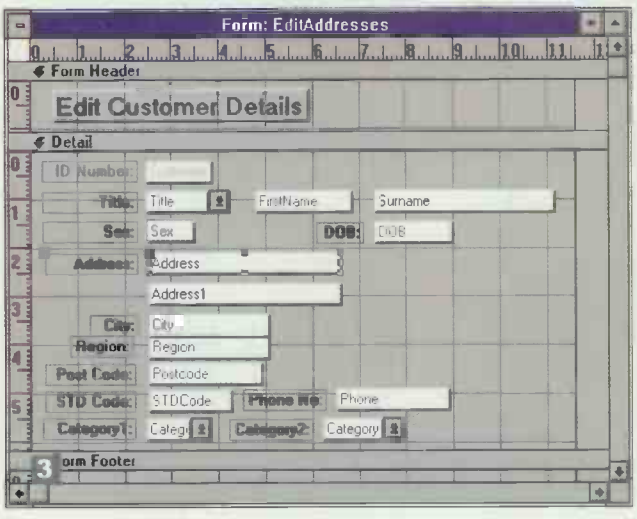
Field Name	Type	Size	Default Value	Validation Rule
Category2	Text	5		
Category2Description	Text	4		

A ***Field definitions for the AddressBook table: make the CustomerID field the primary key by clicking on the Primary Key button on the toolbar. Index the table (Duplicates OK) on the Surname field.***

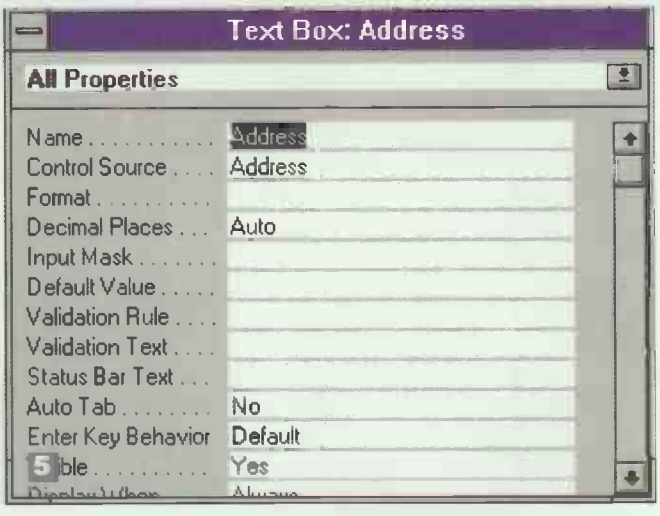
B ***Field definitions for the Category1 table: set the Index property of the Category1 field to "Yes (no duplicates)".***

C ***Field definitions for the Category2 table. Set the Index property of the Category2 field to "Yes (no duplicates)". Specifying input validation rules in the fields' properties allows the user to start entering data immediately. Do this by selecting a table in the Database Window, then clicking the Open button (or simply double-clicking the table name). This opens the table in Datasheet View which is similar to the Table Window in Design View without the properties portion. This is adequate, but is not very user-friendly. Too many records are displayed to find the one you require easily, and all the fields may not be visible without using the scrollbars etc.***

Art & Design



3 *A form being edited in Design View*



5 *The Property sheet*

4 *The Palette tool*

Data entry using forms

To make things a little more user-friendly, form objects are used. The first step is to create a basic form using the Forms Wizard, then add extra functionality. The user-friendly bells and whistles will be added in next month's column.

Creating data entry forms

One form is required for each of the tables. To create data entry forms, select the Forms tab in the Database window. Click the New button, click on the name of the target table from the list, then click the Form Wizards button.

From the option list select Single Column Wizard, then click OK. Click the >> button to select all the fields, then click on the Finish button. (This uses default values for the remaining Wizard screens which will save quite a few minutes on a slow system.) The form is then created and loaded in Data Entry mode.

Select Save Form in the File menu, entering the name of the form in the dialogue box when prompted, and then select Close from the same menu.

Create a form for each table, naming them EditAddresses, EditCat1 and EditCat2 respectively.

Editing a form

Select the Forms tab in the Database Window. Click the form to be edited, and then click the Design button (see Fig 3).

Selecting objects on forms

Most objects on forms created by Wizards are generally fields in the table. The fields are comprised of two parts: a text box which is the actual data entry area, and an attached label for the field name. Clicking on either will select that object for editing. See the Address field in Fig 3 for an example of a selected field.

Positioning the mouse pointer on the border of the text box causes the mouse pointer to change to a hand, signifying that the object can be dragged. If the text box is moved, the attached label will follow — the handles on the text box and label allow you to resize either.

The large handle at the top left of the label or text box allows either to be moved independently of the other. Note that if you click on a field's text box and then delete the object, both the text box and the label will be deleted.

If you click on the field's label, and then delete the object, only the label is deleted.

Editing objects

Whenever an object is selected, its appearance can be modified using the Palette tool, and its properties changed with the Property Sheet (see Figs 4 and 5).

Either tool can be displayed or hidden using the relevant buttons on the toolbar.

Adding objects to a form

The Toolbox is used to add a new object to a form by clicking on the relevant object's command button. This can also be displayed or hidden as with the Property Sheet and Palette Tool — see Fig 6 for details. The bottom-left button in Fig 6 is the Control Wizard button which loads a Wizard to guide you through the creation of many of the objects you may wish to place on a form.

These are excellent tools for the novice Access programmer, but when you become more experienced, you may find it easier to switch the Wizards off and edit the objects' properties manually. Again, hold the mouse still over each button for a description of its function.

We will shortly be editing the EditAddresses form and will initially use Wizards, then for speed, copy objects and manually change their properties.

User-friendly forms

We will now modify the EditAddresses form, adding some user-friendly touches

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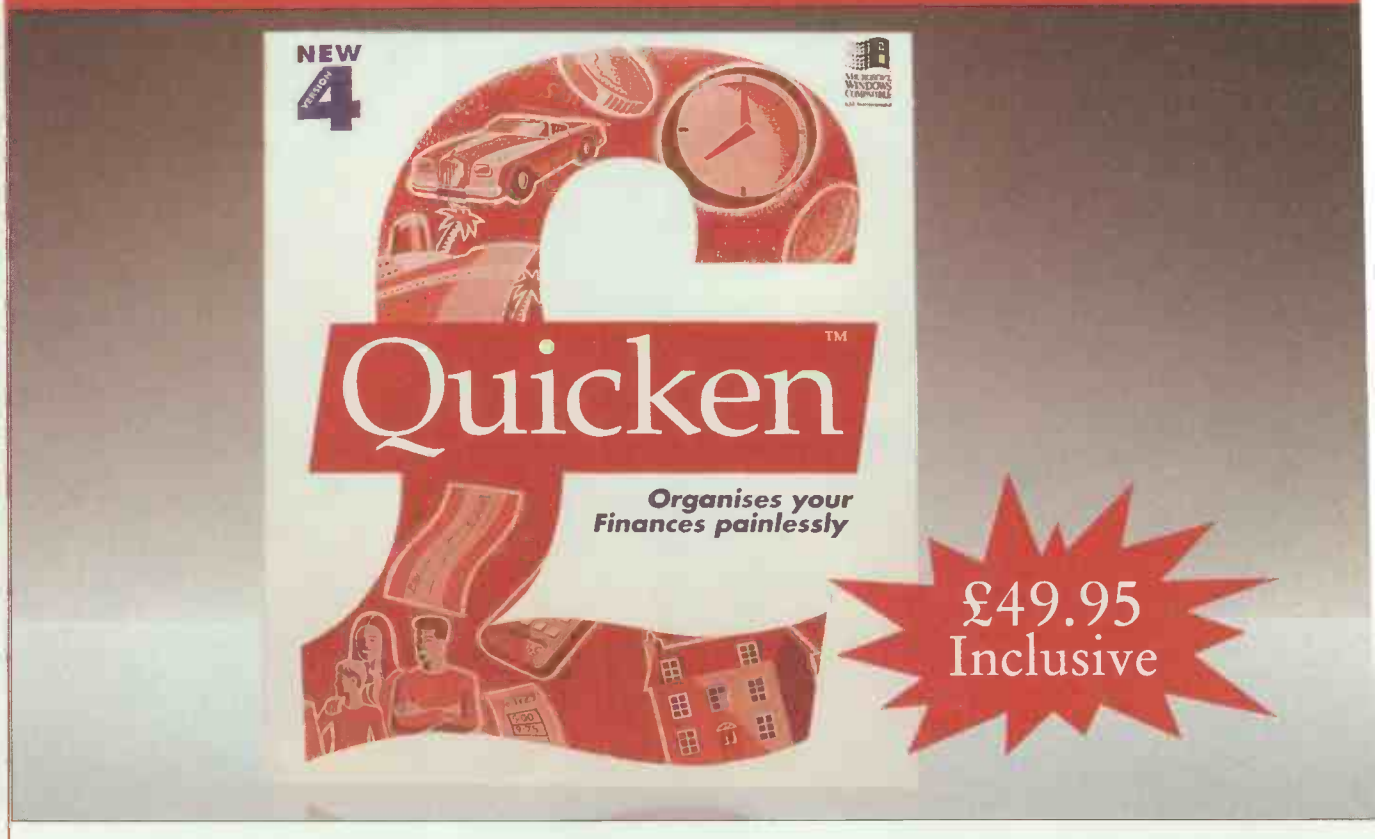

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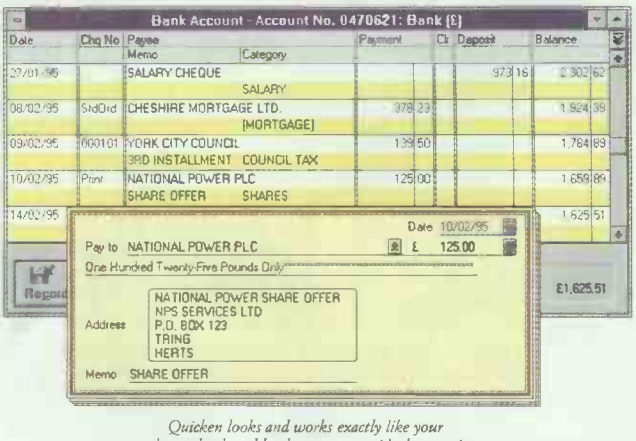

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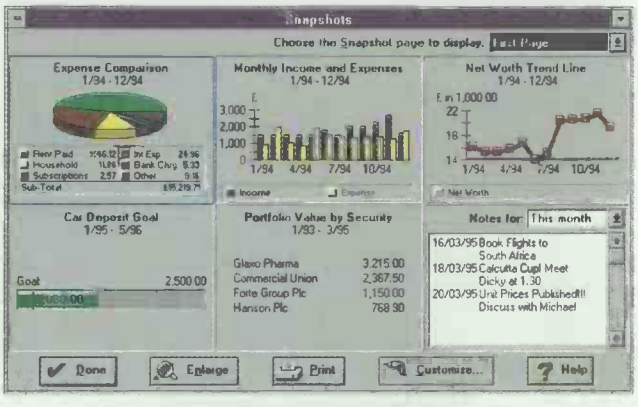

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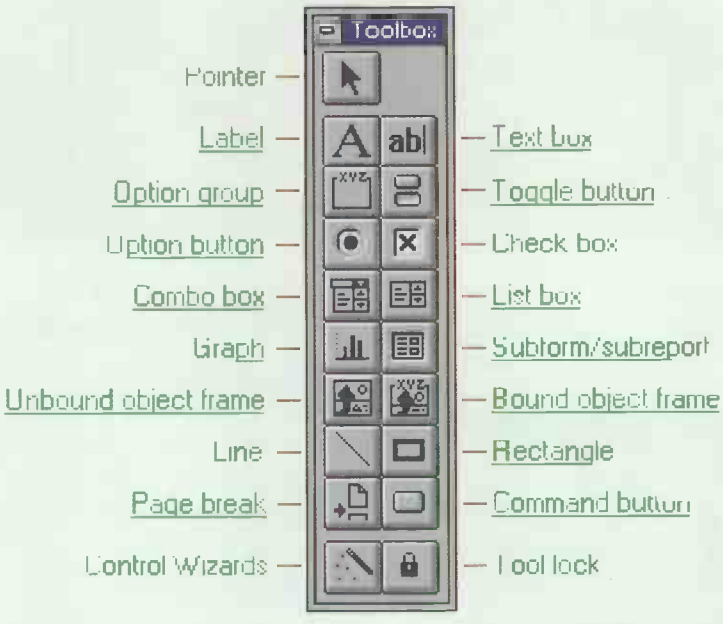
6

The Toolbox



to speed up data entry.

Delete the Title, Category1 and Category2 fields and their labels, and also delete the labels for the FirstName, Surname and Address1 fields. Ensure the Control Wizard's button is active (depressed), and click on the Combo Box button in the Toolbox.

Drag the mouse over the area in which you wish to place the new Title field object. Access will then run the Combo Box Control Wizard.

Enter the following values for each dialogue: select "I will type in the values that I want" then click Next>. Change the value of Number of Columns to 1, and click in the first field area.

Type in the following list of values, pressing the Tab key between each: Mr, Mrs, Miss, Ms, Master, Dr, Rev, Prof, then click Next >.

Select "Store that value in this field", select Title from the field list, then click Next >. Type "Name:" in "What label do you want for your combo box?", then click on Finish. Resize and reposition the Combo Box and Label as required.

We must now add a few minor tweaks, to assist later stages. Select the new Title combo box, and if necessary, open the Property sheet by clicking on the Property Sheet button on the toolbar. Change the Name property to "Title", and click on the Save button on the toolbar.

The Category1 and Category2 fields must match up with values found in the corresponding tables. We will now add combo boxes to present these values to the user.

At the position you wish the Category1 field to appear, create a combo box as for the Title field, using the following Wizard options:

Select "I want the combo box to look up values in a table or query", then click Next >. Select Category1 from the table list, then click Next >. Click the >> button to select all the fields, then click Next >.

Adjust the sizes of the columns as required, then click Next >. Select Category1 field as "The value to store in the table", then click Next >.

Select Store that value in this field, select Category1 from the list, then click Next >. Enter "Category1" as the label for the combo box, click Finish, and resize the combo box and label on the form if required.

Set the Name property in the Property Sheet dialogue to Category1, and set the "Restrict to listed values" property to Yes (which allows the user only to select a value in the list). Click on the Save button on the toolbar.

Since the Category2 combo box is almost identical to the Category1, it is much quicker to modify a copy of the Category1 combo box than creating a new combo box via the Wizard.

Select the Category1 combo box. Copy the combo box to the clipboard ^C, or Edit, Copy. Paste the clipboard to the form ^V or Edit, Paste. Move the copied combo box to the required location.

In the Property sheet...

Change all occurrences of Category1 to Category2 in the Name, Control Source and Row Source properties.

Change the field label on the form to "Category2".

Set the Enabled property of the CustomerID to "No". This prevents the user accidentally editing the key field which is assigned automatically by Access and cannot be modified.

Select Tab Order from the Edit menu and check that the fields are in the correct order. Change the tab order of the fields by clicking the record selector at the left of the field, then dragging it up or down to the required position. (Note that only the title field should need to be moved — just after the CustomerID field.)

Size headers and footers as necessary by dragging the bar above and below the main form. You may wish to select all fields by holding down the Shift key and clicking on each object on the form, then setting their appearance using the Palette tool.

You can use Format, Vertical Spacing, and Make Equal to speed the process of alignment. Your form (with a little bit of tweaking) should now resemble the one in Fig 3. You can now click on the Form View button on the toolbar to test that the new form is functioning correctly. We now have a database with three data tables and associated forms to assist users adding/editing records.

In the next article we will adding control buttons to these forms to further assist the user.

PCW Contacts

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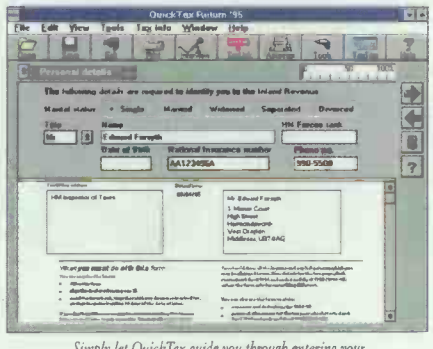

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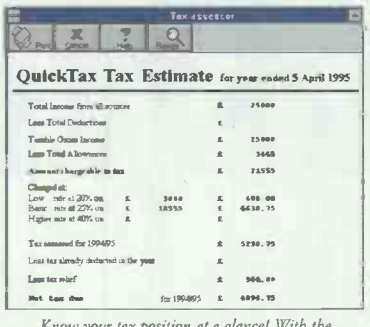

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A walk on the wild side

OPEN HOUSE AT THE INSTITUTE

In the Media Lab at the Massachusetts Institute of Technology, radical research is taking place which can and has affected the way we live. Wendy M Grossman visited MIT and spoke to the force behind the lab, Nicholas Negroponte.

Imagine a cello whose notes can be sustained, and the exact sound of a note and its overtones can be stretched, twisted, or subtly changed. Or imagine a daily newspaper that displays a summary of your email, the daily results worldwide for the sport in which you are most interested, and a note that your local weekly rubbish collection day has been changed. On an inside news page you might wonder about a reporter's description of how President Clinton sounded when answering a tough question and click a mouse to obtain a video replay of the speech. Or consider the addition of electronics to Lego bricks so that kids can program their toys to move about in the way they want.

The cello, known as the hypercello, has already been used in a special concert by an internationally famous cellist. The program used to create the personalised daily newspaper, known as Fishwrap, is already in use by a community of 6,000 American Indians in New Jersey which publishes a special-interest newspaper. The Lego bricks are being marketed now and a working model is on show at Boston's Computer Museum. A PC's keyboard is used to command a walking tractor and when it passes a sensor, a windmill starts to turn.

All three futuristic pieces of technology were developed in the Media Lab at the Massachusetts Institute of Technology (MIT) in Cambridge, USA. MIT was founded in 1984 by its director, Nicholas Negroponte following five years of fundraising, planning, and building.

Like Stanford University in Silicon Valley, MIT dominates the surrounding area at least in terms of the technology business. A couple of blocks off campus is the Open Software Foundation; Richard Stallman, its director, works in MIT's artificial intelligence laboratory.

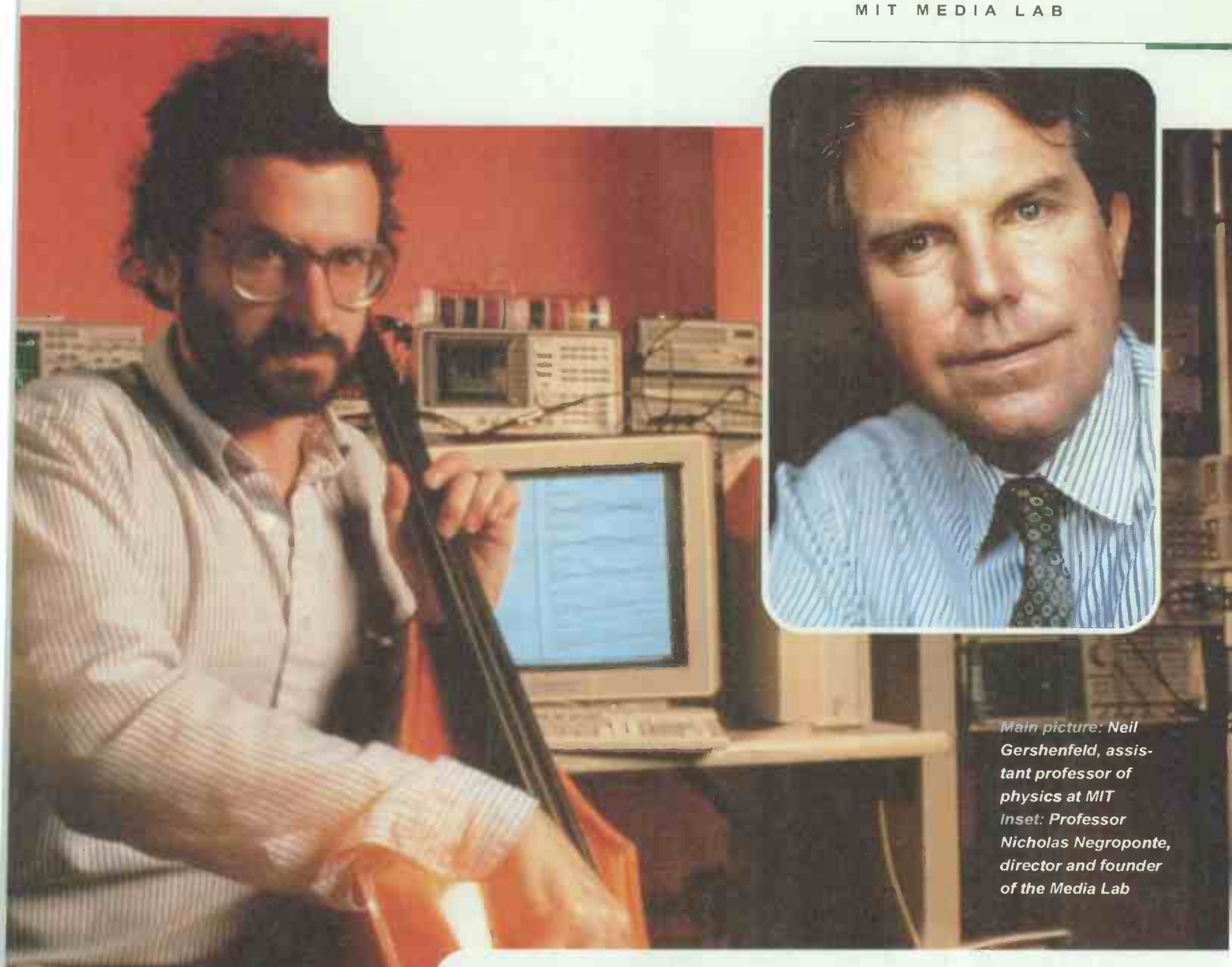
It's not easy to get a handle on what goes on at the Media Lab because it's not a single unit pursuing one goal. Rather it is a mosaic of projects and bits of research that overlap in some areas but not in others.

Currently, research projects at the lab fall roughly into three main groupings: learning and common sense; perceptual computing; information and entertainment. The information sheet given to prospective students stresses that media, arts and sciences — the field in which students initially work at the lab — is new, cross-disciplinary, and unpredictable. Many successful applicants have academic backgrounds that are variously described as unorthodox, innovative, or self-generated.

Students are expected to have some level of proficiency in programming in C and/or Lisp, and to be familiar with Unix. But beyond that, graduate students are just as likely to have completed their undergraduate degree at an art school as at an engineering school.

The areas of expertise within the faculty are diverse. Professors in charge of research areas include: Marvin Minsky, co-founder of MIT's artificial intelligence lab; Tod Machover, whose background includes intensive musical training as well as a degree in computer science; Neil Gershenfeld, a physicist; and Seymour Papert, MIT's "LEGO Professor of Learning Research" who must be the only professor with a chair named after a toy company.

Matching these professors with the areas mentioned earlier reveals that Gershenfeld, Machover and Benton fit



Main picture: ***Neil Gershenfeld, assistant professor of physics at MIT***
Inset: ***Professor Nicholas Negroponte, director and founder of the Media Lab***

into information and entertainment, while Minsky and Papert are loosely grouped within the areas of learning and common sense — the home of the programmable LEGO bricks.

The perceptual computing section works on machine interpretation of sensory data — trying to end what Negroponte likes to term sensory deprivation; a computer's general lack of ability to hear, see, or understand you.

Negroponte is probably the name that's most often heard in connection with the Media Lab. If you had read Wired magazine, you would probably have come into contact with at least some of his ideas as he writes the back page column. The sensory deprivation of computers is just one of the topics to which he often returns. He also likes to rail at fax, for slowing down the process of converting the world from analogue signals to digital bits, and becomes intemperate on the subject of the tardiness he sees as inherent in wiring up countries outside the US.

Negroponte says, however, that a recent request by publisher Alfred Knopf to publish a book based on his Wired columns, and the consequent need to expand those columns, made him stop and think about what a difference the last ten years have made to computing.

"I believe there is now no ten-year-old in the US who isn't computer literate," says Negroponte. Asked if he would like to qualify this in view of the fact that many families in the US still don't have computers, he says: "If I'm wrong, it's only for ten minutes."

The biggest difference though, he continues, is that the concept of multimedia — shocking when the lab was founded — is now commonplace. Accordingly, the lab itself must change direction, and indeed is already doing so.

"The next big wave," Negroponte says, "is intelligent interfaces; the concept of agents and personalisation. That is, computers that know you well enough to make intelligent decisions about items such as which news stories to clip from the wires for your personal daily newspaper, or which email messages you would consider most important. Computers are on their way to no longer being sensorily deprived. The big new wave is in understanding."

Once he starts talking about his projects you begin to understand some of the differences between corporate research and corporate-sponsored academic research. There is no master plan, or at least the Media Lab doesn't admit to one. Students start to experiment and once they reach a certain stage of research, projects "sort of surface". Projects don't get stopped and this is even more unlike corporate research. "If they are not leading anywhere, they tend to stop themselves, or divert into useful channels," says Negroponte.

"There's an external discipline imposed," he continues, "by the fact that most students work at the Media Lab for four years, at the end of which they have to obtain their degrees. To qualify for these, they have to produce some solid work. One must remember that this is a place where 25 percent of the personnel changes every year; a problem (or opportunity) even the most unstable corporation doesn't have."

So, you wonder; he doesn't do research and he doesn't manage projects. What does he actually do all day? "Service debt," he tells you. In the years since having founded the lab, he says, it has spent $200m. Eighty-five percent of the lab's funding is corporate (compared to 12 percent for MIT as a whole) and 21 percent of that comes from Europe, so a lot of his time is taken up with travel, presentations, dinners with sponsors. Meanwhile, the students and professors working at the lab carry out their work on high-end machines such as Onyx workstations.

Open house

It's probably fair to say that a certain amount of the point of Digital Expression — this year's version of the Media Lab's annual open house — was to show the corporate sponsors what their money buys and hopefully, to make them feel good about it. Some of them certainly seem to: a spokesman from one of the regional telephone companies spoke of the importance of being involved with the content of a project, that it's the content owners that eventually make the money, not the carriers.

Another visitor to Digital Expression, Hewlett Packard's Leslie I. Halberg, who is a patent-holder in part of the technology behind ultrasound scans, said: "We find that some of the things the Media Lab works on are directly applicable to the issues that we face in medical ultrasound imaging." As an example, he cites the difficulties inherent in the way that today's ultrasound pictures are synthesised; that is, from tiny sound signals. This is especially significant when ultrasound is used in areas where movement, such as those of the heart, can give problems in reading the scans. So this area in which the Media Lab is working — trying to eliminate the effects of such motion — coincides with the same problem that HP's team has to cope with.

Other industry commentators point out that corporate research is contracting throughout the US. Wall Street's short-term view, focused on quarterly results, is persuading companies into short-term planning rather than into speculative investment for the future. But an organisation like the Media Lab can still carry out research that isn't specifically product oriented while simultaneously working in those areas a single company couldn't afford.

Demo or die

It somehow seems typical that everyone at Media Lab has been too busy to update the project list since September 1993. When asked about this, Negroponte simply didn't believe it. So like a good scientist, he went and checked, coming back with a sheepish expression on his face suggesting that by the time you read this, the list will almost certainly have been updated.

It has been frequently said of the Media Lab that the rule is "demo or die". Unlike most research institutions where the rule is usually "publish or perish", the pressure here is to achieve practical results. In the evening following the Digital Expression event, there were certainly a variety of demonstrations to visit. The holograms were the most popular, up to the point where you could not get into the room without a long wait.

Meanwhile, in the basement, a couple of students showed off the sensor technology that physicist Neil Gershenfeld has been working on and which was such an integral part of illusionists Penn & Teller's musical spirit chair.The concept is that sensor technology could be embedded in furniture, eventually providing more flexible and comfortable input devices.

One of the students explained about Penn & Teller's chair: a pad on the seat creates a tiny electrical field throughout the body of whoever sits in it. Thus, when a hand is waved in front of a sensor, it breaks the electrical field to set off pre-programmed sounds and lights.

On the third floor a former student, Stephen Piper, has started a small company called Medical Media Systems with two other Media Lab graduates. They intend to provide surgeons with tools to help them increase their understanding of anatomy.

"We were members of the computer graphics and animation group at the Media Lab," says Piper. "We had done a lot of work on anatomical modelling and became interested in developing tools for helping to plan surgical procedures such as wound closures and transfers of things like skin and muscle from one part of a body to another, and began looking for ways to commercialise it."

Most of today's common medical imaging technology is based on film of slices of the body. So, instead of the surgeon having to assemble a three-dimensional picture in his head, Piper's device presents 3D images of that data. These techniques are contributing to the development of less invasive procedures such as arthroscopic surgery for example.

Work being carried out on interactive storytelling, however, is harder to understand. The idea is to build elements into the piece as the story unfolds: one student proposes to call his works "thinkies", in the tradition of "talkies" or "movies", because he wants his viewers/interactors to think about the long-term results of their actions. A sample system on which he was working used a psychiatric ward. One of the ways in which you could assimilate the stories of individual patients is by reading the therapists' files. Your choice of how to approach the material requires thought; what drives you to think is your desire for a story.

Another student is working on a system that looks as if it could be a saleable and successful product, although the student says that in fact it is further away from being finished than it looks. It is an interactive system that allows you to place actors on a set and move them around, with the cameras, so as to be able to plot angles from which to shoot. This would be useful in the film and television industries. At the moment though, the hardware required, a Silicon Graphics Onyx, is too expensive. Computing power needs to become cheaper.

Along the hall, yet another student demonstrates a system for interacting with a virtual environment using body movements. Computer recognition of human movements has all sorts of possibilities for interface design, for video conferencing (sending the joint angles rather than the whole image), and for animation.

All of these demonstrations seem far removed from Marvin Minsky. Minsky has plenty of practical inventions behind him; among others, his inventions include the robot arm. "But nowadays," he says, "I think about how the mind works and talk to students about it, to try to get them to consider such things when they construct their systems."

So as the lab moves towards Negroponte's envisioned next big wave, the subject of "the understanding computer" will be a major consideration. PCW

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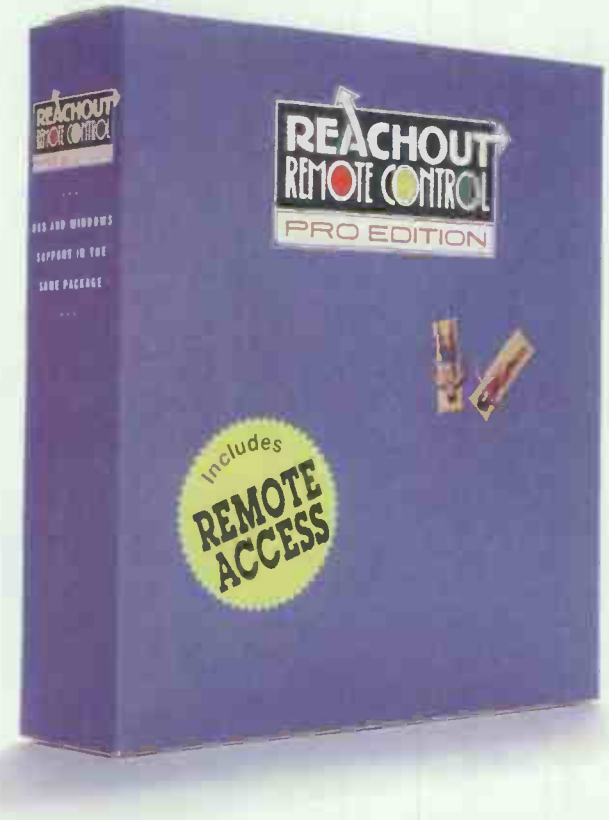

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Maths Software Contents

531 Derive 3.0 XM
532 Macsyma 2.0
534 Maple V version 3
538 Mathcad Plus 5.0 for Windows
539 Matlab 4.2
541 Mathematica 2.2.3 Enhanced
542 PV Wave Personal Edition

543 Programmability & Connectivity
543 Editor's Choice
545 Table of Features

The right solution

As the boundaries which separate the various mathematics software packages become more blurred it is increasingly difficult to choose the right package for particular needs. Eric Adler reviews a selection of maths programs and calculates the best.

Although manufactured by competing firms, the mathematics software packages reviewed here are to a certain extent complementary. Although the categories may be blurred, beneath a heading of symbolic mathematics and equation visualisation one could place Maple and Macsyma; under the heading of numerical calculations and visualisation for pure mathematics would be Mathematica; while Matlab is within the realms of a matrix environment for numeric computation and visualisation, in an applied mathematics environment. Yet Maple also offers advanced numerical procedures and the new version of Mathematica includes symbolic maths output. New Wave is designed for numeric computation and representation of applied data, but while Matlab offers a vast range of procedures and add-on modules, the former utilises a small but carefully chosen group of robust tools for use in a more restricted environment.

Most university mathematics departments have either Mathematica or Maple on line. Maple is often preferred as a teaching tool for pure mathematics, whereas Mathematica is more research oriented. Matlab installations may be found within hospitals, large manufacturing companies and research centres, but many of these installations may well include Maple kernels for symbolic processing; these are likely to have Mathematica on hand to use for advanced numerical work. PV Wave in Unix is a favourite of the City finance houses and merchant bankers.

To add to the confusion it is possible, using Mathlink, to utilise Mathematica as a front-end to access the Matlab matrix engine. Matlab can be used to call up the Mathematica kernel. It can also utilise an installed Maple kernel for advanced symbolic mathematics. Maple can be used to call the Matlab Matrix engine, as can Macsyma.

Then there is Mathcad Plus 5; a program favoured by many technical computer users who need to perform numerical and symbolic calculations and who like to both input and obtain output, in simple mathematical symbols, either to the screen or to the printed page. You can't use Mathcad to calculate pi to ten thousand digits but you might well be able to use it to design and build a better product. Derive, on the other hand, is an uninhibited DOS package which can be used to calculate pi to five thousand places. Mathematica 2.2.3 may have better graphics but you can't run Mathematica from a floppy on an 8086.

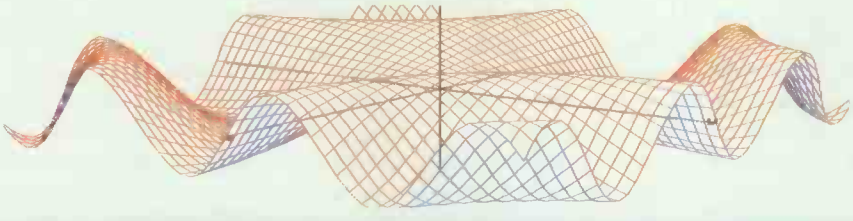
Above all, however, it must be borne in mind that even though the computer may take all of the drudgery out of mathematics, the user must nevertheless be aware of what the formulae and equations mean and be able to interpret the results.

Derive 3.0 XM

Derive, the only DOS mathematics software reviewed here, is available in two versions: the Classic (£59), which will run on anything from an 8086 with 512Kkb RAM upwards; and the XM Professional version (£120), which requires an 80386DX with at least 2Mb of RAM. The latter version will accept larger matrices and has been optimised for speed. Other than that, the two versions are identical and share the same front-end interface and range of functions. The total number of functions is in excess of 500 and covers areas such as symbolic computation, numeric computation, calculus, matrices, equation solving and equation simplification, in addition to statistics, financial mathematics, Laplace and Fourier transforms, Boolean algebra and truth tables, and Taylor polynomials.

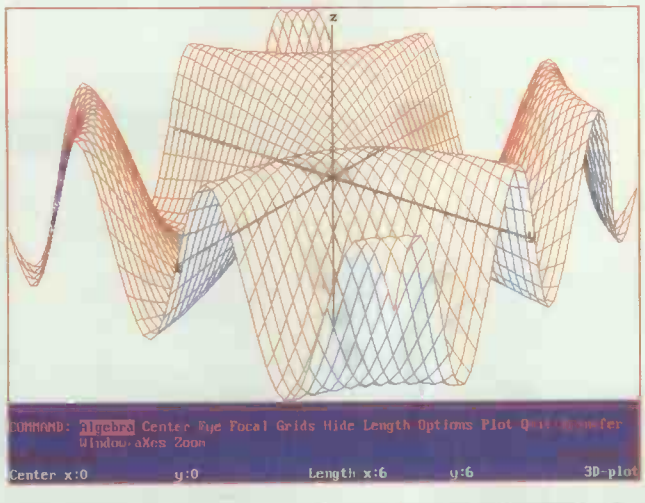
Derive permits the user to set precision to as many digits as necessary. This is a program which will calculate the first 10,000 digits of pi in a couple of minutes — but the 10,000 digits appear on screen as one line. It is very difficult to fault Derive from a point of view of accuracy, precision, or range of functions, but as a computer implementation the interface is infuriating.

Despite lowly system requirements, Derive supports colour 3D plotting and colour printing to HP DeskJet printers.



Derive 3.0

Derive's front-end workspace



Derive supports 3D colour graphics

Second opinion on Derive Classic

These are the main points of Numbers Count contributor, Alan Cox's, opinion of Derive Classic:

- The editing interface is irritatingly inconsistent. When previous work has to be cleared out, Remove offers default settings at Start and End.
- It is surprising that Derive does not seem to have built-in solutions for standard cases. For example, it solves ax+b in 0.1 seconds (on an 8MHz 8086); ax^2+bx+c takes 2.9 seconds; but ax^3+bx^2+cx+d takes a horrendous 15 minutes and 16 seconds. Also, ax^4 +bx^3+cx^2+dx+e produced nothing after 3 hours.
- Simple arithmetic is impressively fast: for example, 2^10000 in 3.7 seconds. It is questionable, however, just how useful this capability might be to the average user.
- An irritating feature is that there is no indication when there are more digits off-screen. Although one would know that 2^10000 is longer than a line's worth, there will be cases where the overlap is only a single digit and this could be confusing to say the least.
- It does nothing for one's confidence in a program when the manual and its output are inconsistent. Unless the manual is easily misunderstood, it does not seem possible to tackle SQR and therefore non-linear recursion. In our view, it should include either context-sensitive help, a tutorial program, or at the very least a document listing in detail the solutions to the various exercises in the manual.
- Overall, an excellent program within its limitations. Although Derive Classic is very capable, the learning curve is very steep and its ease of use leaves a lot to be desired.

PCW Details

Derive XM 3.0

Price £59 (Classic), £120 (Professional)
Contact Chartwell Bratt 0181 4671956. Fax 0181 4671754

Good Points Fast and accurate, with a wide range of functions.
Bad Points Poor front-end interface.
Conclusion Power packed, yet irritating.

Macsyma 2.0

This is high-quality software, developed at the Massachusetts Institute of Technology. It is based on a command line interface, with separate kernel and front end. Output is formatted symbolic mathematics and numerics, to a notebook-style document. Macsyma has over 160 customisable graphics routines and features such as camera panning for animation, and it will also play sound.

Although written in Lisp, while its competitors have been compiled in C or Fortran, Macsyma is a mature product and one of the easiest to use of all those reviewed here. For example, it will generate a dialogue on data and command entry which simplifies its use and obviates the need to learn complicated instruction sets or data entry formats. If you make a mistake, for instance miss out a bracket, it will tell you to put in another. Other programs will merely inform you that there is a mistake in the syntax.

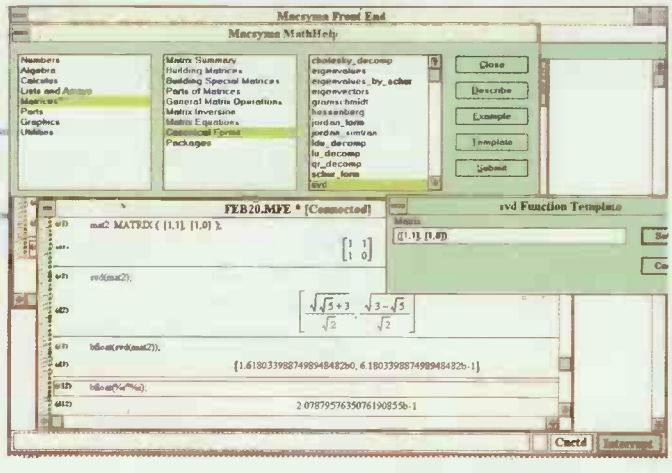
This dialogue feature, combined with a high tolerance on entry syntax, makes this an easy piece of software to use. The excellent help files which interface with active demos in the Macsyma MathHelp menu, contain sub-menus of major mathematical topics with other, even more narrowly defined sub-menus. These offer a choice of description, example, or template for each mathematical topic, thereby making this an almost revolutionary mathematical reference source. There are literally hundreds of examples which cover almost every aspect of mathematical programming in the online tutorial. Full documentation is provided by a user handbook, a system reference manual, quick reference and mathematical function manuals.

The range of functions provided is exemplary: the 1,700 or more functions provided include libraries for symbolic mathematics, differentiation and Taylor series, differential equations, definite and indefinite integration; also included are Laplace transforms, Fourier series and tensor calculus. The numerical analysis feature offers arbitrary size integers, single, double and arbitrary precision floating point arithmetic, combinatorial operations, and number theory functions. Bernoulli and Euler functions are included as well as Fibonacci numbers, Riemann Zeta and other related functions. The statistical distributions covered include binomial, Bernoulli, beta, gamma, students, normal, chi square and hypergeometric. These are serious functions for the professional mathematician. If anything, this is an understated package and there are functions available which appear to be unlisted in the index.

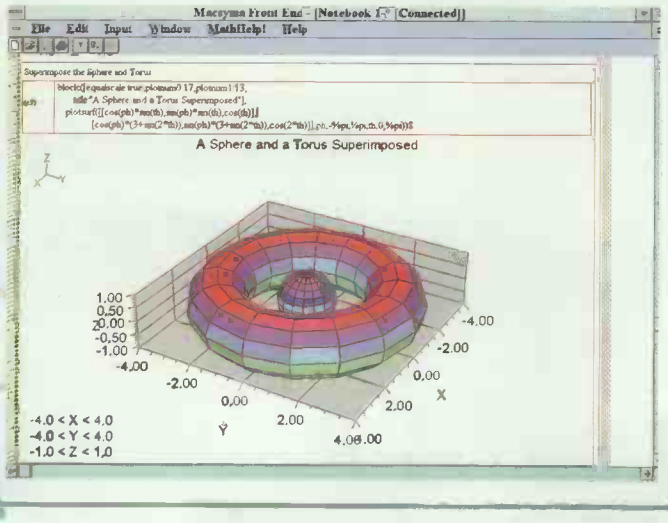
At a cost of £299 for the full package with no extras to pay for, Macsyma fairly romped home ahead of every other package tested in terms of value for money and functionality. However, the tests for this review were all run on a standard 486DX/33 with 8Mb of RAM, in Windows 3.11 on DOS 6.2, and in this environment Macsyma was none too sprightly: it took more than 100 seconds to load and continually needed to make extensive use of a 20Mb Windows swap file. Stripping down the Windows environment by losing such unnecessary extras as the anti-virus scan, the screensaver and so on, dropping the smartdrive cache to 256kb, rem-ing out mscdex and other drivers freed up enough memory to make a noticeable improvement in performance. However, there definitely comes a point at which one can no longer describe this as "software which will run in 8Mb of RAM under Windows." Nevertheless, at this price one could afford to buy an extra 16Mb of SIMM memory with which to run it and still be left with plenty of change from the cost of a comparable software package (Matlab base, Maple kernel, Extended Symbolic).

Macsyma may not offer those specialist application toolboxes which are available for Matlab or MathCad but in terms of pure mathematical functionality, ease of use, quality of interface and output quality, let alone the range of functions offered, it is a good bet.

Macsyma 2.0



Macsyma features an advanced MathHelp facility



3D graphics in Macsyma

PCW Details

Macsyma 2.0
Price £299
Contact Chartwell-Bratt 0181 4671956. Fax 0181 4671754

Good Points Good symbolic maths, MathHelp, user friendly and a wide range of functions.
Bad Points Requires at least 16Mb of RAM to run quickly.
Conclusion Well worth considering if you have enough RAM.

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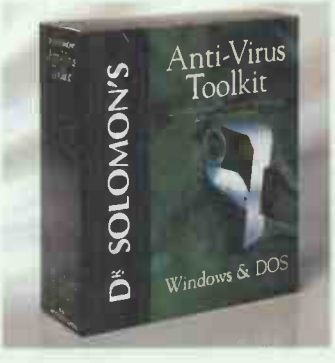

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PCW 6/95

Maple V version 3

Personal Computer World HIGHLY COMMENDED

This is a cheerful mathematics package; it launches quickly and produces well-formatted mathematical symbols on screen which also print well using a laser printer. It is a highly capable program which includes facilities for calculus, linear algebra, equation solving, polynomials, combinatronics, graph and number theory. There is a range of standard functions and constants and it can be used to produce high-quality plots. Because it is a command-line driven package, It is case, spacing and parentheses sensitive but not as difficult to use as some packages. As with all command line packages, ease of graphics use leaves something to be desired, but in Maple's case the quality of the 3D plots on screen must be seen to be believed.

Specific program areas include Simplex optimisation. There is a good range of statistical routines and as well as the usual financial mathematics there is an implementation of the Black-Scholes function which calculates the present value of a call option. Strangely, Black-Scholes wasn't included In the base package libraries of any of the other packages being tested.

Maple has its own Pascal-like programming language. This can be used to call on the Maple mathematical procedures to produce routines which can be added to the library. Numerical precision can be as many digits as desired and although Maple V does not boast the ability to truncate inaccurate digits, neither does it produce answers like 1.999999999 instead of 2.0

It is a worksheet-based program: worksheets may be scrolled up or down and text regions inserted. However, as only one worksheet at a time can be opened, it is not possible to switch from one to another within a single session. It is possible to run two or more Maple sessions concurrently and paste from one to the other.

The math browser allows a knowledge tree approach to mathematics and there are online help and tutorial facilities which permit multiple help files to be opened simultaneously. While examples from the help files may be pasted into a document, the order in which they are pasted can be critical.

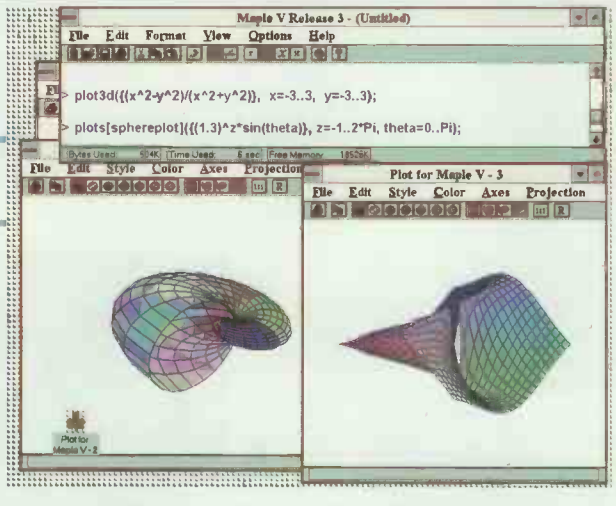
The documentation leaves something to be desired; the review software package included a spiral-bound handbook which referred to a previous version and two hard-back reference manuals which related to an even earlier version. Although the spiral-bound handbook offers a form of tutorial, not all the examples worked with this, the latest version of Maple V, and a user would porbably have to phone the help line for advice. The documentation of a program should be an intrinsic part of the software, not an afterthought. Clecom, who distribute Maple V in the UK, offer a first class telephone help service manned by PhD and MSc mathematicians and MSc computer specialists. Although the service they provide is quite excellent, it needs to be given the backup of good-quality documentation.

The Maple V symbolic kernel is very quick. Having used Maple V, almost all the other packages seemed to be running really slowly in comparison. If anything, the Maple V kernel is intrinsically faster and easier to use than any of its illustrious competitors. In the case of integer factorisation, it is a great deal faster. In fact, it was the fastest package on test when it came to factorising H1 (see *PCW* December 1994) in 8Mb of RAM.

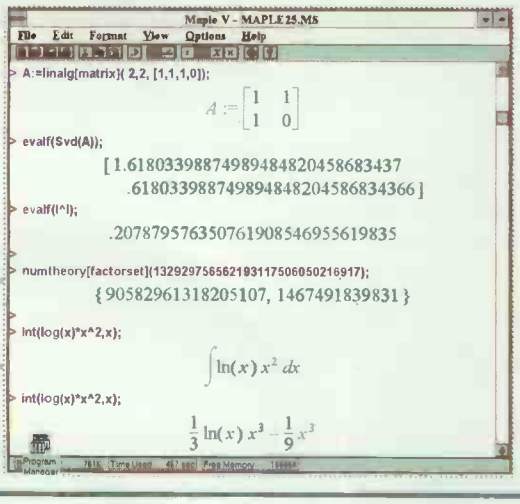
Most PC users who are interested in maths would find it easier to reach a given level of mathematical literacy with Maple V than with any other package. This would certainly apply if they were interested in producing well-formatted symbolic mathematical output along the way. But it must be taken into account that there isn't even a quick reference card and only one notebook can be open during a session, and this tarnishes an otherwise competent program.

Maple certainly is an excellent program: every school and college with a serious maths department should have a copy available on a computer in the library. However, as a mathematics reference and teaching resource it needs better documentation.

Maple V



Maple V graphics and command line structure



Maple V has a strong numeric capability

PCW Details

Maple V version 3
Price £695
Contact Clecom 0121 4714199.
Fax 0121 4715169

Good Points High-quality symbolic and graphic output.
Bad Points Poor documentation, only one active worksheet at a time can be used.
Conclusion The best mathematics kernel but marred by a poor front end and poor documentation.

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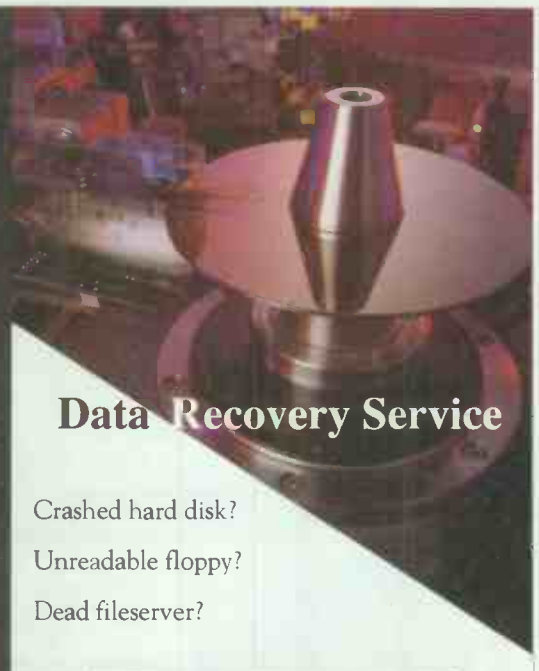

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TRANSCIEVERS & REPEATERS	
Allied Telesyn	
AT-MX10 BNC Micro Transceiver	24
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AT-210TS Slim Line UTP Transceiver	24
AT-MR111T AUI to UTP Micro Repeater	182
AT-MR112T BNC to UTP Micro Repeater	182
AT-MR113 AUI to AUI Micro Repeater	253
AT-MR114 AUI to BNC Micro Repeater	253
AT-MR115 BNC to BNC Micro Repeater	301
Trust	
2 Port BNC/AUI to BNC/AUI Micro Repeater	112
6 Port (4 BNC/2 AUI) Repeater	234
HUBS	
3Com FMS II	
12 Port UTP Hub	374
24 Port UTP Hub	658
6 Port Link/Switch UTP Hub	3692
SNMP Management Card	297
Local Bridge Module	319
Hub Expansion cable	25
48 Port Managed Hub Bundle	1401
Allied Telesyn	
AT-3012T 12 Port UTP Unmanaged Hub	282
AT-MR420T 4 Port UTP Hub	141
AT-MR860T 8 Port UTP Hub	149
AT-3608 8 Port BNC Stackable Hub	927
Cray Communications	
8 Port UTP/1 BNC Unmanaged Hub	141
16 Port UTP/1BNC/AUI Unmanaged Hub	264
12 Port UTP Stackable Hub	423
Trust	
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16 Port UTP Smart Hub	207
Hewlett Packard Advance Stack	
24 Port UTP Hub	609
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£185	14"	0.28	1280x1024 @60Hz 1024x768@ 76Hz		47-70KHz	47-120Hz	110MHz	YES	YES	YES
£242	15"	0.28	1280x1024 @60Hz 1024x768@ 76Hz	YES	47-70KHz	47-120Hz	110MHz	YES	YES	YES
£519	17"	0.26	1280x1024 @76Hz 1600x1200 @60Hz	YES	29-82KHz	47-120Hz	135MHz	YES	YES	YES

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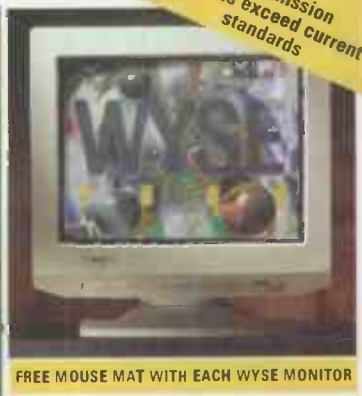

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Mathcad Plus 5.0 for Windows

Mathcad is a nimble mathematics package based on an active document language. It deals with input and outputs as standard mathematical symbols, and this means that instead of entering a command at a prompt, the command can be entered in mathematics, anywhere on the screen.

The Mathcad screen works, looks, and feels just the way you would expect a normal maths book to appear on the screen; that is to say, a combination of equations, text and graphics. The difference between, say, a Mathcad screen and the page of a book which has been word processed with the formulae entered using an equation editor, is that Mathcad actually calculates the screen. It performs numeric and symbolic calculations, solves differential equations and handles advanced matrix operations.

Plus 5.0 combines pull-down Windows menus with active toolbars and keyboard-entered data, to provide a wide range of graphical, symbolic and numeric processing. The symbolic processing is due to a built-in Maple symbolic processor. Numerical calculation of complicated integrals and other functions is facilitated by the SmartMath feature which will optimise an equation prior to its calculation and solution.

Mathcad has been designed to be an affordable, easy-to-use package. It is intended to provide advanced symbolic and numerical computational facilities for technical professionals who neither feel the need to learn a computer language, nor acquire a shelf of computer manuals in order to be able to perform their calculations. In fact, it is so easy to learn that it is being adopted by the Open University for their symbolic mathematics programs.

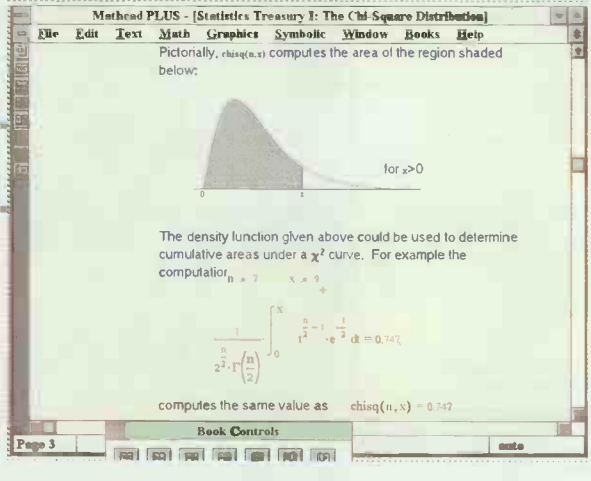
Ease of use, however, does not mean a limited range of features. The graph facility which allows 2D, 3D polar, contour and parametric plots has a zoom facility as well as co-ordinate trace and direct title editing features. The enhanced functions include complex root procedures for the solution of polynomials, improved linear and non-linear curve fitting routines, and advanced matrix handling. The range of routines for the solution of differential equations has been expanded using methods based upon the Bulstoer function in addition to the more usual Runge-Kutta techniques. The inclusion of Laplace, inverse Laplace, Fourier, Inverse Fourier and other advanced symbolic transforms makes this a powerful symbolic mathematical tool. The numerical techniques are selected for their robustness and feature a Romberg algorithm for integration, and the Ridders method along with the Levenberg-Marquardt augmentation of the Gauss Newton method.

These functions can either be augmented by additional function packs for specific applications, or by more than forty electronic books (application packs) which cover a variety of topics ranging from economics to fluid mechanics, statistics to thermodynamics, to astronomy, to building thermal analysis and materials science. These electronic sources provide sections of mathematical formulae. Diagrams and graphs can be copied, pasted and edited into documents for everyday use.

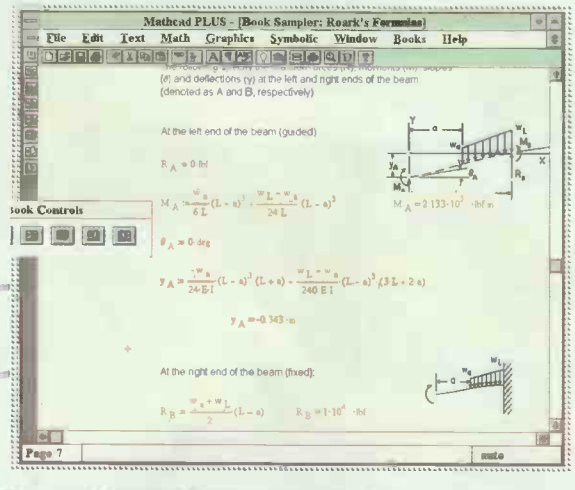
Mathcad 5 Plus is a full 32-bit application which will run in Windows 3.1, Windows NT or Windows 95. It features drag and drop editing and has faultless DDE and OLE which makes it possible to live-link Mathcad equations, text and graphics with word processors and spreadsheets to create very impressive documents. It has its own enhanced text editor with Windows fonts and custom colours and features a Houghton-Mifflin technical spelling checker. There are also page headers and footers which offer date time stamps and automatic page numbering. A programming interface is provided for C/C++ which permits one to call C/C++ routines from Mathcad and allows the insertion of compiled user-specific codes.

Mathcad Plus 5 requires a minimum configuration of Windows 3.1, a 486DX, 8Mb of RAM and 24Mb of free hard disk space (16Mb swap file). Alternatively, Mathcad 5 for Windows, which costs £199, can be run using a 386 DX/387 with 4Mb of RAM.

Mathcad Plus 5.0 for Windows



Mathcad's statistics pack is useful for teaching theory as well as for calculating probability levels



The Mathcad desktop reference is a ready source of technical information

PCW Details

Mathcad Plus 5.0
Price £395
Contact Adept 01462 480055

Good Points Powerful and easy to use with a wide range of functions and a reasonable price.
Bad Points Fails to truncate inaccurate digits.
Conclusion For technical professionals, Mathcad Plus 5 is an excellent choice.

Matlab 4.2

Personal Computer World HIGHLY COMMENDED

The Notebook suite is a new addition to Matlab and this enables the computational power of Matlab to be output to Word 6. The most complicated functions can now be called from within a Word document to enable the output to be fully formatted and edited, thereby enabling the creation of interactive documents. The program runs with the Matlab command window minimised as an icon and its toolbar integrated with another from Word 6, and facilitates the production of great-looking electronic notebooks.

The Matlab environment consists of a base module to run in Windows. The user adds application modules (toolboxes) to undertake specific tasks. The base contains a Windows shell with a fast fourth generation programming language, 4GL. It uses advanced matrix operations accessed from simple command line instructions, and graphical routines which can produce some of the most stunning colour graphics. Although the base module can be used to call up a wide range of mathematical functions and matrix operations, most users do not go looking for ways in which to manipulate Hilbert spaces or perform Cholesky factorisations or other matrix operations and so on. Therefore the value of Matlab, or any other computing environment, should be gauged by comparing the quality and power of those programs it supports, to those of other environments.

Most of the toolboxes for the Matlab environment have been designed for interactive real-time data situations, for example; in hospitals to provide visualisations of body scans, or in industry to monitor process controls. Thus they are not intended for standalone use, so Rapid Data (Matlab's UK distributors) provided the Statistics, Maths Symbolic (Maple Kernel) and Extended Maths toolboxes for this review.

The Statistics toolbox provides 19 basic distribution functions, each with probability density, cumulative distribution, inverse cumulative functions and random number generators. There is a full range of moments and descriptive statistics, plots, linear modelling, and tools for hypothesis testing. Only two of the reviewed statistics packages could equal this range of distribution functions and not one of them exceeded it.

The Math Symbolic toolboxes combine an OEM Maple kernel with a library of extended routines which harness the matrix engine of Matlab with the symbolic mathematics of Maple. This combination is awesome: systems of differential equations handled in matrix format; Eigenvalue trajectories combined with interactive plotting; formulae for single value decompositions which reduce to pi — all can be calculated in the Notebook Word 6 environment.

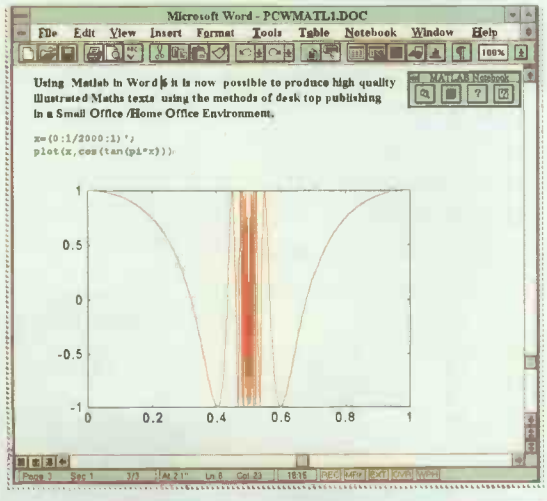
Other toolboxes range from Simulink, an interactive tool for simulating dynamic systems and which can handle linear and non-linear discrete and continuous time multivariable systems, to those in areas such as neural networking and control systems. The latest addition is the Fuzzy Logic toolbox, designed for application development in areas which can be described as conditional probabilistic situations. The Optimisation toolbox offers a choice of algorithms for minimisation, maximisation, minimax and other forms of goal attainment using linear and non-linear methods.

Matlab's method of generating graphics differs from that of other programs: it is first necessary to call up the independent vectors, perform the function and then call up a graph of the result. Although data entry requires more entry lines, a plot is often obtained more quickly. When special mesh, grid, or contour effects are required, the changed plots can be obtained more quickly than by using the non matrix-based method.

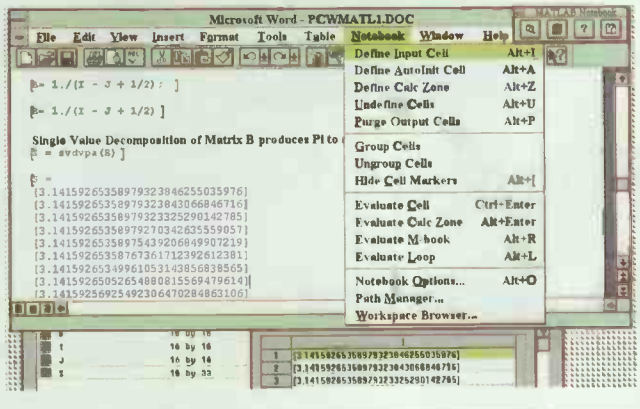
Matlab has few faults. One is that data can only be imported into Matlab as ASCII files. Another is that although the graphic user interface tools allow DLL linkage with other Windows applications, and there is a Windows pasting and copying feature in addition to OLE2 linkage, drag and drop graphics editing is not possible.

The minimum recommended configuration for Matlab is a 486DX with 8Mb of RAM, Windows 3.1, 20Mb of disk space and a 16Mb swap file.

Matlab 4.2



The Matlab Notebook toolbar is integrated into the Word 6 toolbar

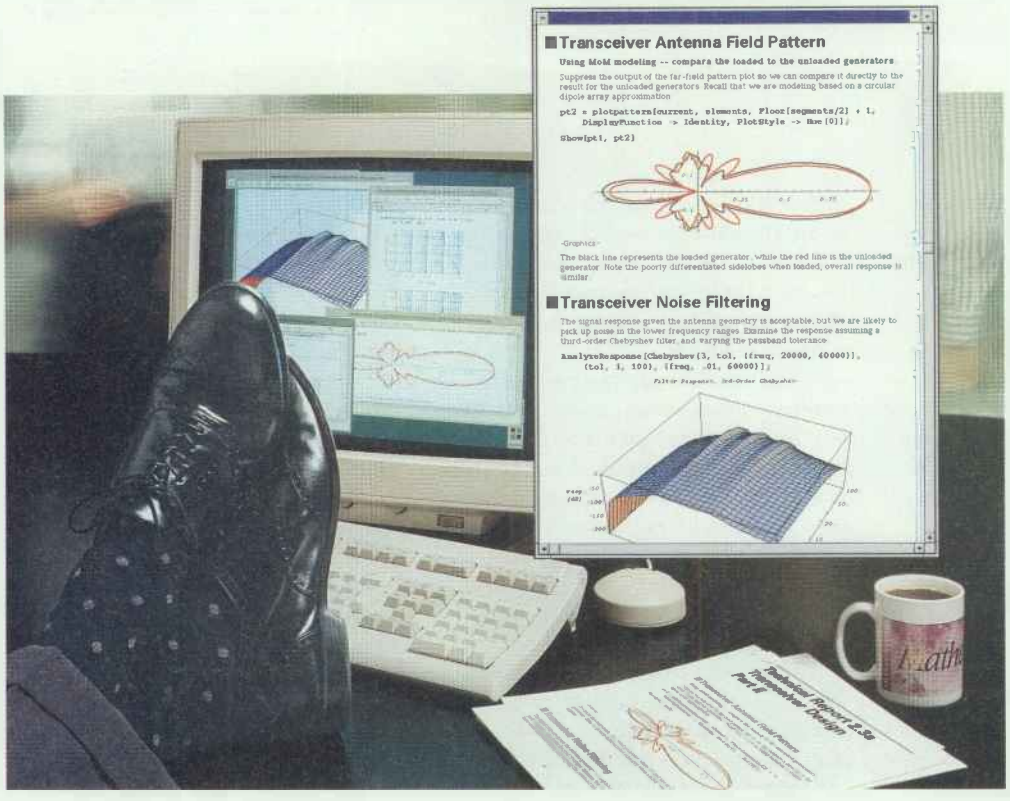


Matlab Notebook pull-down menu

PCW Details

Matlab 4.2
Price £1,500
Contact Rapid Data 01903 821266.
Fax 01903 820762

Good Points OLE2 and awesome computational power.
Bad Points Can only import in ASCII.
Conclusion Good all-round performance, with stunning graphics, a comprehensive range of tools and few faults overall.



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Mathematica 2.2.3 Enhanced

Mathematica is the program which helped define the way in which we perceive computer mathematics. For many years it was the yardstick against which other mathematical software packages were measured. Once synonymous with precision and quality, it attracted the interest of more mathematical programmers than probably any of the other packages in this review. There are now more than 100 books and magazines dedicated to Mathematica and different aspects of Mathematica programming.

Aimed squarely at the professional mathematician, Mathematica consists of a vast library of routines and subroutines accessed and driven by essentially the same software engine — the Kernel — irrespective of program version. For this review, we were sent the 2.2.3 enhanced version featuring a separate Windows front end, in an easy-to-use Notebook format, providing an interactive document interface from which the kernel may either be called up or run separately. It is possible to have two or more active notebooks running from a kernel during a single session and this permits work to be copied and pasted from earlier documents, and the values of constants and defined variables to be shared between active notebooks.

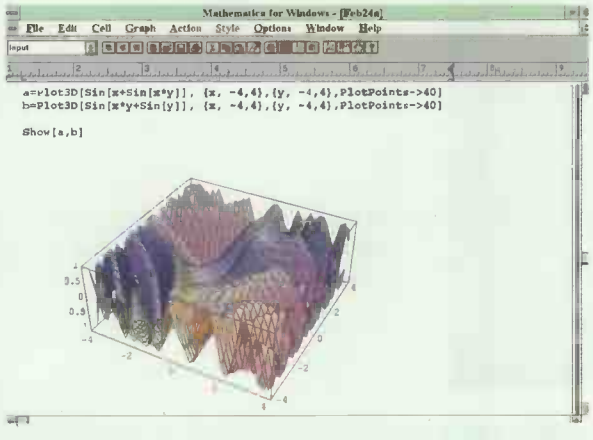
The language of Mathematica is command line driven. It is extremely sensitive and makes extensive use of different forms of parentheses. This has resulted in Mathematica users developing high levels of keyboard discipline, in which they take great pride. Even in version 2.2.3, input to and output from Mathematica is the same as the DOS command line output of the first version: that is, a stream of letters and numbers with parentheses. Mathematica is said to provide such a powerful computational engine that its devotees are willing to forgive the command line language and the fact that it is unable to output to mathematical symbolic format. They even put up with the fact that it cannot accept input in mathematical symbolic format and that even version 2 2.3 does not offer menu driven mathematical commands.

It is very easy to be critical of a package such as Mathematica which was once state of the art, but is it really too much to expect of Wolfram that they should keep pace with other packages in terms of user interface? Items such as quality of output cannot be dismissed as trivial and discounted against the power of the kernel. Software must be easy to use and the form of the finished product is important; a page of mathematics should look like a page of mathematics, not like a page of computer printout.

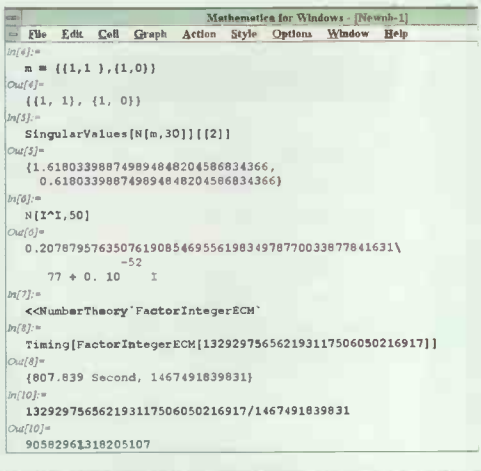
Mathematica's numerical routines are reputed to be second to none, but during the *PCW* tests it took version 2.2.3 (enhanced) 13 minutes and 27 seconds to find the first factor of H1 (see *PCW* December 1994) on an 80486DX with 8Mb of RAM. When Wolfram Research was informed of this, it replied that Mike Mudge (*PCW*'s Numbers Count contributor) had come up with a very difficult number for Mathematica to factorise. The company added that Mathematica could factorise less difficult thirty-digit numbers in an average time of 37 seconds, on an Apple 68040 Power PC. It was claimed that no other package offered the same degree of precision of numerical integration, and within this RAM category Mathematica's robust integration routines are good but not exceptional.

This version offers a wide range of functions and there are over 60Mb of high quality, public domain, mathematics programs available such as Maths Source on the Internet (also available on a CD-ROM). Wolfram also market specialist packages such as a Financial Maths pack which includes a Black-Scholes routine, and a Time Series pack. The package is well-documented in a good-quality handbook. Useful help files and an excellent tutorial are also provided. Mathematica can be used to produce 3D colour graphics of stacked functions and the student version offers good value for money at a cost of £99.

Mathematica 2.2.3 Enhanced



Mathematica command line and 3D graphics



Mathematica displays numerical precision but takes 807 seconds to factorise H1

PCW Details

Mathematica 2.2.3 Enhanced
Price £795
Contact Wolfram Research
01993 883400. Fax 01993 883800

Good Points A wide range of functions as standard
Bad Points Poor quality output
Conclusion If you need Mathematica, you are probably using it already.

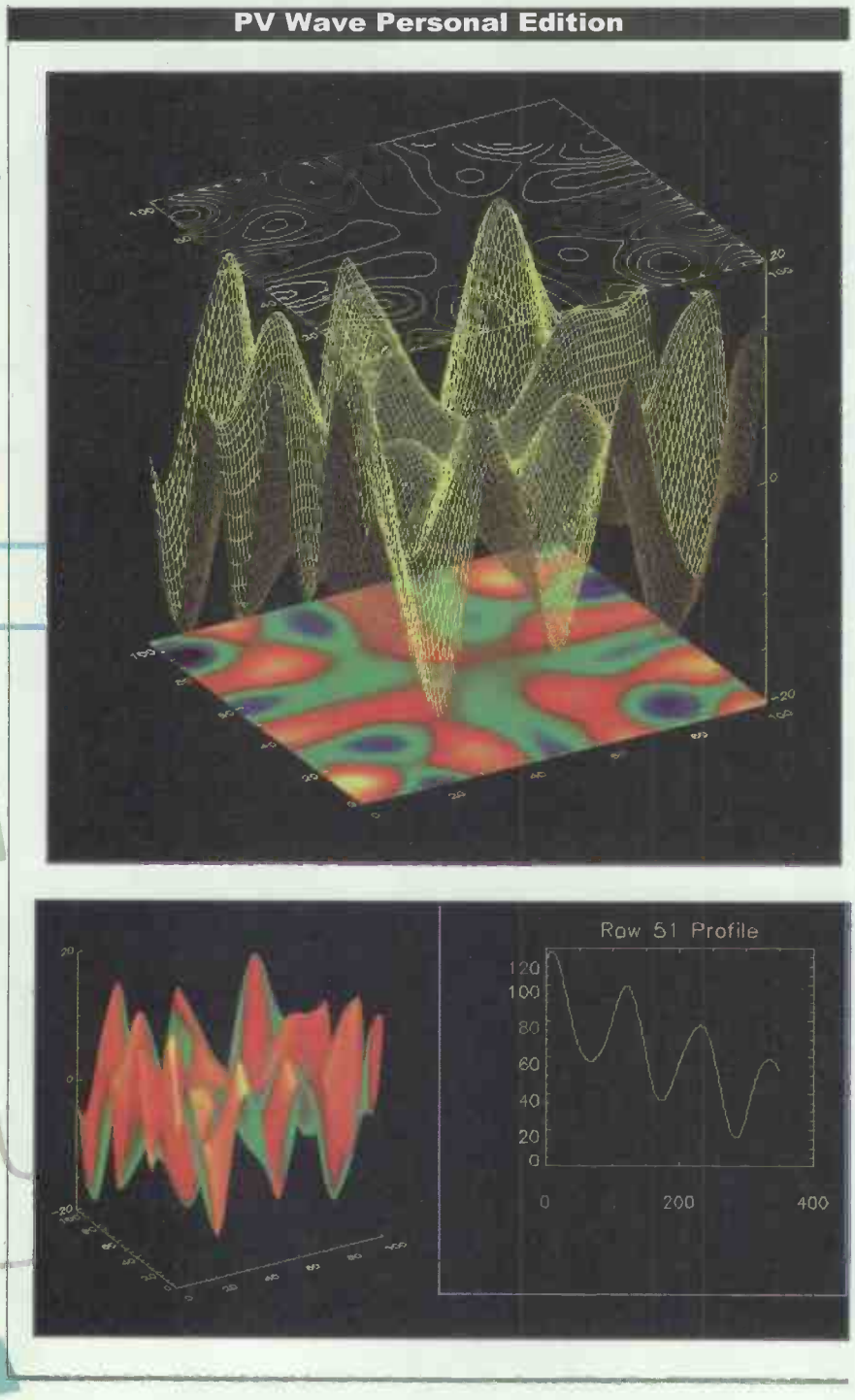
PV Wave Personal Edition

The Personal Edition of PV-Wave is a cut-down version of a Unix Workstation application and can now be run on a 486DX with 8Mb of RAM. It provides a unique collection of robust numerical analysis tools for specific application areas and is intended to be used by the likes of astronomers, designers of Formula 1 motor engines, pharmacologists or aerospace guidance systems designers. PV Wave is not for amateurs. It is for use as a bridge into the world of real-time Unix applications.

PV Wave is a hands-on package and utilises a command line to access routines which can be combined as procedures and then compiled into .exe files as programs for specific data handling situations. The command line is neither case sensitive nor spacing critical and it does not make good use of the Windows environment. Output is to command line but the package is capable of high-quality graphics and can produce multi-dimensional layered graphic visualisations. The Personal Edition enables routines to be constructed to access and visualise data which changes from minute to minute (as opposed to second to second in the Unix version). The negative side of PV Wave is that it is purely a numerical visualisation program with almost no symbolic mathematics capability and the learning curve is quite steep.

While many of the routines available in PV Wave are included in other products, no other offers such a collection of carefully selected and robust tools. Visual Numeric is clearly aiming at two groups of users for this product: existing users of PV Wave who would like to have a version to run on their PCs and portables; and existing PC owners who might be interested in switching to PV Wave — presumably in a Unix Workstation environment.

PV Wave is well documented and the demo can be used as a tutorial. Online help is available and in addition, Visual Numerics provides a UK telephone help line. Three-day training courses aimed at mathematically literate and experienced computer users are available at a cost of £700.



Left ***PV Wave Personal Edition offers advanced, customisable, 3D graphics visualisation***

PCW Details

PV Wave Personal Edition for Windows
Price £995
Contact Visual Numerics 01753 790600

Good Points An elite collection of robust tools.
Bad Points Makes poor use of the Windows environment.
Conclusion The Personal Edition is the only way to access PV Wave from a PC.

Programmability and connectivity of maths software

All the maths packages reviewed here feature their own programming languages. Some can be used to call up routines and functions, others can be used to create program objects for use in a Windows environment. But some offer more connectivity than others. Mathematica, for example, features a series of Mathlink modules which permit the Mathematica kernel to be accessed from Excel or Matlab using Mex. link, or Matlab to be called from Mathematica.

Mathlink even includes a facility to produce a compilable C file of the interface between the external function and Mathematica; the file can then be compiled via the usual procedures. Matlab, on the other hand, takes programmability far more seriously: included as standard in the basic package, there is a set of GUI tools (such as radio buttons, sliders, menus), with a handbook which can be used as a super Visual Basic with which to build Matlab applications. The GUI interface can be used to create external interfaces; with Mathematica, or with C and Fortran routines for example. These can be called up from Matlab or can be used to call up Matlab matrix functions.

But it is the Simulink Real Time Workshop module which really grabs the imagination. At a mere £8,500, the real-time workshop will automatically generate C code from block diagrams — no need for hand coding and no debugging, and no need for C programmers either. Matlab supports CMEX, WATCOM C386, Metawhare, MS Visual Basic, Borland C++ and Fortran.

Mathcad Plus 5 provides a C/C++ programming interface and offers DDE and OLE2 Windows integration. Macsyma has its own programming language which includes debugging tools and a facility to generate Fortran and C coding as well as providing TEX output.

Maple provides debugging routines and procedures for C and Fortran Code Generation. PV Wave Personal Edition includes a 300-page programmer's guide, has its own compiler and can access or write to C code. Even Derive has its own programming language and can be used to translate algebraic expressions into Basic, C, Fortran or Pascal using the Transfer command.

Editor's Choice

Unless you live in some mathematical never-never land, where people sit around exploring the functionality of mathematical software packages all day, you must choose a mathematics package on the basis of its fitness to perform a series of practical tasks.

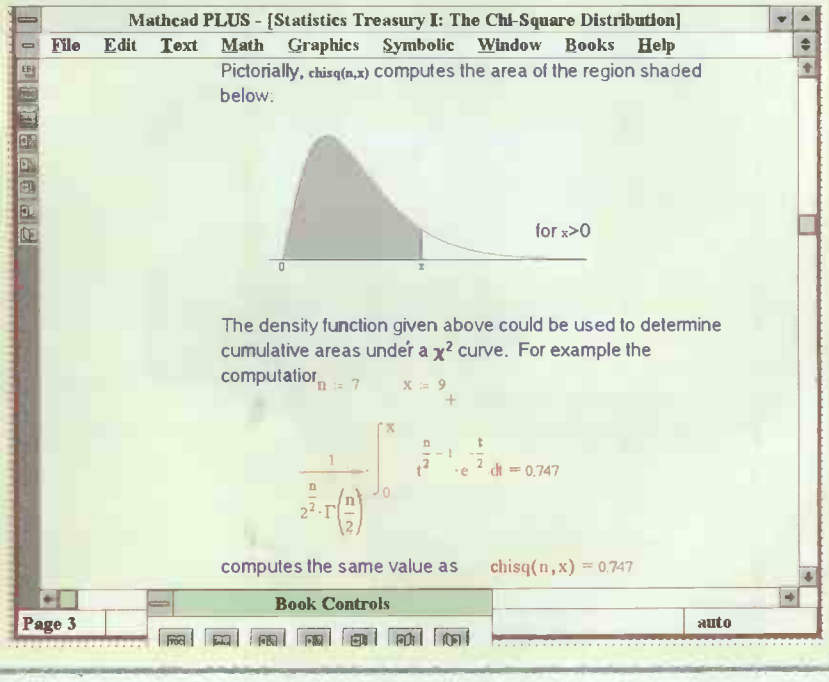
When we attempted to assess a recommendation for Editor's Choice on the basis of a number of factors ranging from ease of use, to connectivity, through the range of functions offered, to the quality of documentation and the price, the task was far from easy as too few points separated the leaders.

The tests for these reviews were all run on two standard 80486 DXs with 8Mb of RAM using WfWG 3.11 and 20Mb swap files. While there is little doubt that 16Mb of RAM is rapidly becoming the standard, it was felt that a large proportion of our readers, especially those with notebooks, are limited to 8Mb of RAM. Although excellent programs, Macsyma 2.0 and PV Wave Personal Edition both displayed memory problems running in this environment. Mathematica 2.2.3 displayed low memory warnings but never actually went down in 8Mb.

Derive was a fast worker on the first thousand digits of pi but was somewhat constrained, so the Editor's Choice was narrowed down to Mathematica 2.2.3, Maple V version 3, Matlab 4.2 , and Mathcad Plus 5. Having decided that we were making an award on the basis of usability for technical professionals, Mathcad Plus 5 wins the Editor's Choice award for ease of use, value for money, quality of output and its range of applicable notebooks. Matlab 4.2 receives a Highly Commended for its excellent OLE2 notebook implementation and range of toolboxes.

Considering Maple V version 3 and Mathematica 2.3.3, we wondered whether either merited a Highly Commended award; Maple V has the better kernel and although marred by the single document front end, it is probably the better program of the two despite its faults. Nevertheless, Maple V beat Mathematica in the *PCW* tests in terms of both speed and output quality and thus deserves the editor's award of Highly Commended in the category of pure mathematics.

There is little doubt that next year we will be using more RAM when reviewing similar products. Maple V release 4 may carry proper documentation and there may be new versions of PV Wave Personal Edition and Macsyma — and hopefully, a different yardstick.



Summing up: Mathcad Plus 5, our Editor's Choice

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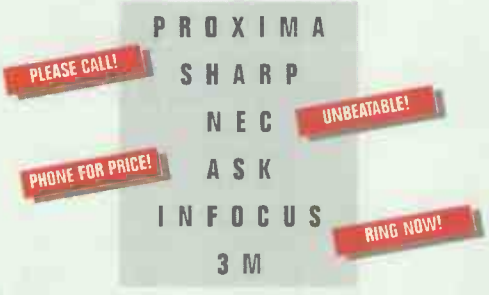

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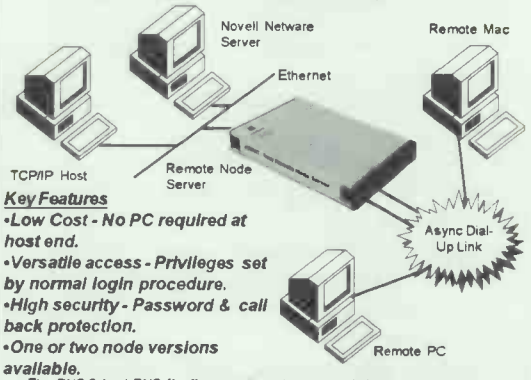

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- ***One or two node versions available.***

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TABLE OF FEATURES MATHS SOFTWARE

	Derive XM	Macsyma 2	Mathcad Plus 5	Maple V version 3	Mathmatica 2.2.3	PV Wave PE	Matlab 4.2
Product	Derive XM	Macsyma 2	Mathcad Plus 5	MAPLE V version 3	Mathematica 2.2.3	PV Wave PE	Matlab 4.2
TYPE	DOS Shell	Notebook	Document Interface	Document	Notebook	Document	Environment *
Distributor	Chartwell Bratt	Chartwell-Bratt	ADEPT Scientific	CLECOM	Wolfram Research	Visual Numerics	Rapid Data
Telephone	0181 467 1956	0181 467 1956	0462 480055	0121 471 4199	0993 883400	01753 790600	(44)-(0) 903 821 26
Price	£125	£299	£395	£695	£995	£995 inc modules	£1,500
Academic Discounts	student vers. £29	●	●	●	●	○	student vers £35
SYSTEM REQUIREMENTS							
Minimum Processor/Ram/Disk	80286/ 512kb	386/ 12Mb / 20 HD	386/8Mb/ 12HD	386/ 4Mb / 12 HD	386/ 4Mb / 13HD	486/ 8Mb/ 20 HD	386/387/ 4 / 10 HD
Recommended							
Processor/Ram/Disk	486 4Mb 2Mb	486 /16Mb/ 20	486 / 8Mb / 12	486DX/8Mb/ 25	486 / 8 + / 13	486/ 16 to 32Mb /20Mb	486/ 8+ / 20Mb
Operating Systems	DOS	Windows 3.1 Unix, VMS	Windows 3.1	W3.1/NT, Apple, DOS VMS, Unix, OS2	Windows 3.1/ NT Apple/ DOS	Windows NT/3.1 Unix , VMS	Windows/ Apple Unix
Time to launch (seconds)*	6	110	10	8	32 (Kernel 22)	13	11
Functions supported	500+	1500+	300+	2500+	2500+	400+	775
Units Conversions and constants	●	●	●	○	●	●	○
Mathematical Equation Notation							
Entry	○	○	●	○	○	○	○
Display	●	●	●	●	○	○	○
Numerical Computations	●	●	●	●	●	●	●
Truncate inaccurate							
Digits in results	○	●	○	○	●	●	●
Symbolic Computations	●	●	●	●	●	○	●
Equation optimization	●	●	●	●	●	●	●
Calculus differential	●	●	●	●	●	●	●
Calculus Integral	●	●	●	●	●	●	●
Complex numbers	●	●	●	●	●	●	●
Evaluate i ^i (= 0.2078795763507...)	●	●	●	●	●	○	●
Differential equations	○	●	●	●	●	●	●
Single Value Decompositions	○	●	●	●	●	●	I (module extra)
Financial functions	●	○	Electronic book extra	●	Toolbox extra	○	Toolbox extra
Statistical Functions	●	●	Electronic book extra	●	yes and toolbox	●	Toolbox extra
Max. Matrix size.	50*50 or RAM limit	no limit	100 * +augment	no limit	no limit	no limit	no limit
Customizable Graphics	●	●	●	●	●	●	●
graphics editing	○	●	○	○	limited	●	○
Supports Sound	○	●	○	○	●	○	●
Supports Animation	Acrospin module extra	●	●	●	●	●	●
Graphics Export Formats	TIF	WMF, BMG.	WMF, BMP	WMF BMG PostScript	WMF, BMG, PostScript	WMF. BMG, PostScript EPS2	WMF, BMG, TIF
Technical Spell Checker	○	○	●	○	○	○	○
External Links	C, Fortran, Basic	C, Fortran, TEX.	C/C++, OLE, DDE	Math Edge c/c++	Mathlink, C/C++	not on P. Ed	MEX, C, Fortran,$
Application Package Support	○	●	●	●	●	●	●
Notebook Support	○	●	●	●	●	Maths/Stats included	●
Public Domain packages available	○	○	○	●	yes CD-ROM	○	○
Online tutorial	○	●	●	●	○	●	●
Online help	●	●	●	●	●	●	●
UK phone helpline	○	●	●	●	●	●	○
Other Features				Training available		Training available*	*N/book suite

* time to launch seconds on a 486DX with 12ms hard disk, times may vary.

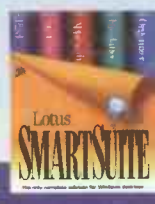
* Keyboard limit
* no functional limit

*plusWindows/ DOS package

* plus new version July

* inc $ OLE2

WATFORD computers



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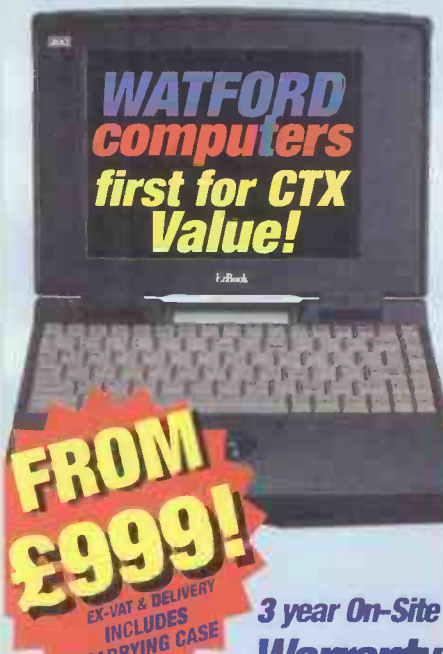

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910N	486DX 475	8MB	510MB	D/S COL	£2665
910N	486DX 475	8MB	510MB	TFT	£3215
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BN100C	486SX 25	4MB	200MB	STN	£1885
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AER04/33C	486SX 33	4MB	170MB	STN	£1025
AER04/33C	486SX 33	4MB	250MB	STN	£1195
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360DS4L	486DX2 50	4MB	340MB	STN	£2049
360TF3L	486DX2 50	4MB	170MB	TFT	£1949
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T1910CS	486SX 33	4MB	200MB	STN	£1355
T1950CT	486DX2 40	4MB	200MB	TFT	£1865
T1950CT	486DX2 40	4MB	320MB	TFT	£1995
T2400CS	486DX2 50	4MB	250MB	STN	£1865
T3600CT	486DX2 50	8MB	250MB	TFT	£2630
T3400CT	486SX 33	4MB	250MB	TFT	£2128
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486SX 33	4MB	540MB	£729
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486DX 33	4MB	210MB	£729
486DX 33	4MB	340MB	£739
486DX 33	4MB	428MB	£769
486DX 33	4MB	540MB	£799
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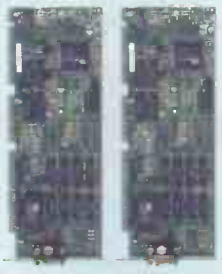

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Poster modernism

To make a full-size, full-colour poster which really catches the eye, all you need is a PC, some fairly inexpensive software, and access to a colour printer. Film-maker and designer Chris Jones takes you through the surprisingly easy and highly enjoyable process.

I am a film director by profession, and usually broke because of it. I made a film called White Angel, a serial killer thriller, and a damned fine one at that. Being of a creative slant the task of producing the film's poster fell upon my shoulders and, as usual, I turned to my trusty PC to help me achieve the seemingly impossible. I am now working on the international poster for White Angel, which has been retitled "Interview with a Serial Killer".

Posters can be vital to the success of a film. They need to be big, bright, and look expensive — and with a typical full-colour A1 poster run costing up to around £2,000, they often *are* expensive. However, if you want to produce just a small number of posters, you can do so with surprisingly little cost or fuss.

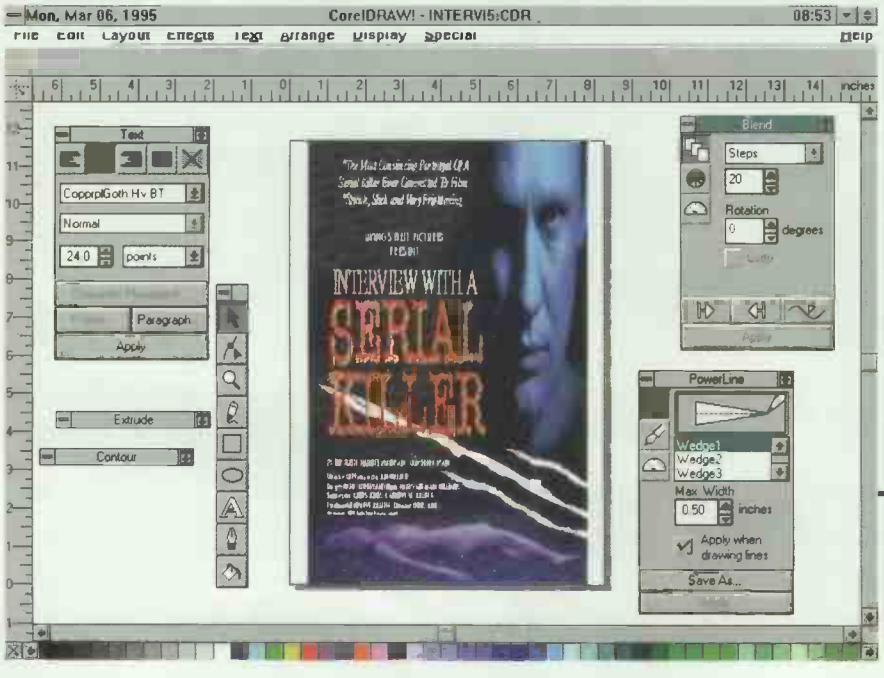
The first thing I did on discovering my transition from film director to poster designer was to check out what the competition looked like. To my surprise, when examined up close, a standard poster has an appalling resolution. The text is often quite crisp but images seem to have less than 100dpi. Check it out yourself: next time you're in a bus queue, take a good close-up look at the posters around you.

The next problem, of course, is how to create the artwork. The poster was to be comprised of photo images, text and a main graphic — the "logo". I used CorelDraw to paste everything into position, and the photographic images were pulled off a Photo-CD that I had "cut down" at Boots (from stills taken on set during the shooting of the film). The photo image montage was put together and enhanced using the fabulous yet inexpensive Photofinish. This image would form the main backdrop for the poster and it was important to keep in mind the spatial positioning of the words to help balance the whole image. I could have easily produced a snappy 3D logo in Simply 3D but I opted for a rather ragged ATM font with a white drop shadow.

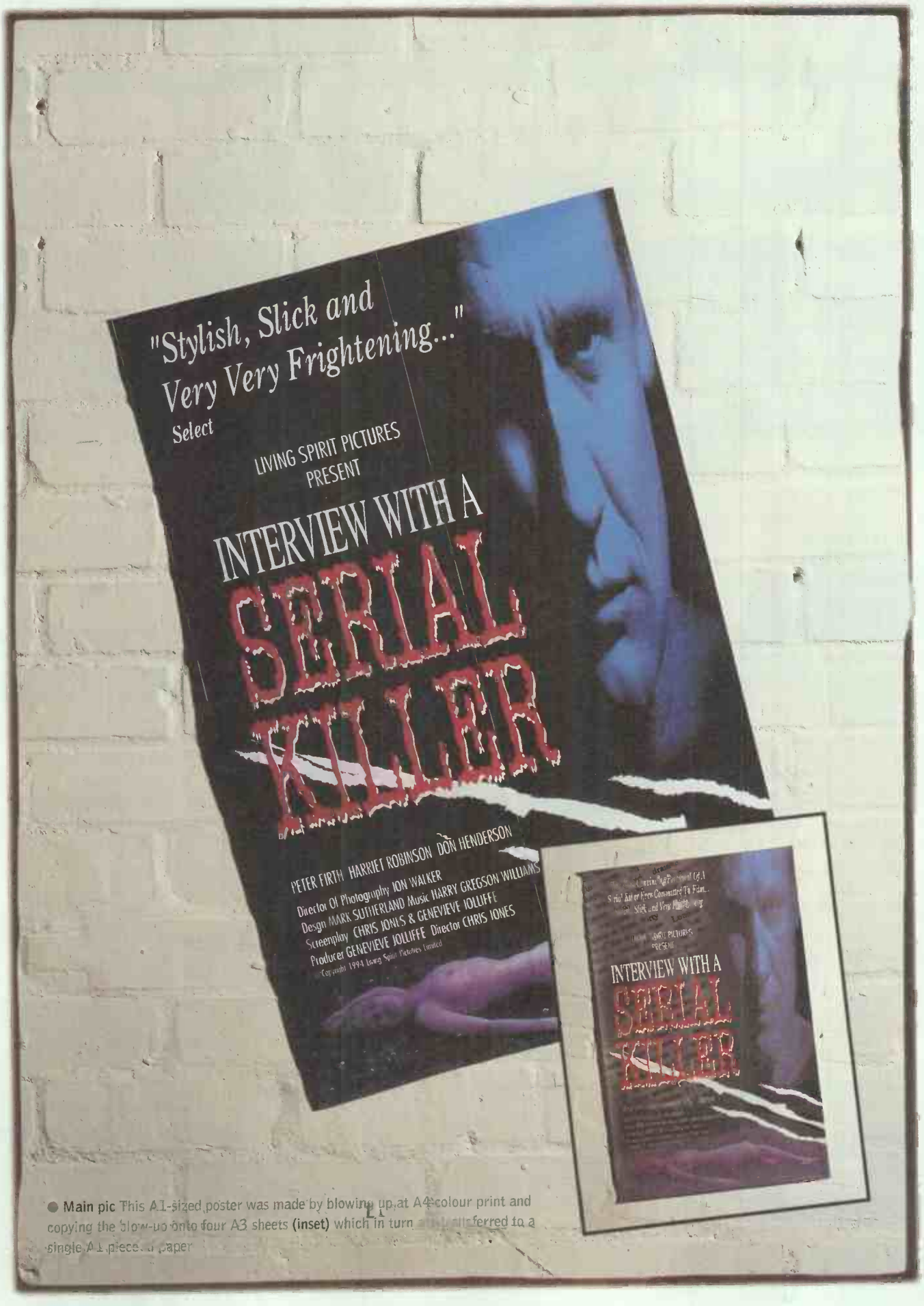
After jigging everything about on screen, and once I was happy with what it all looked like, I had to take that expensive step to final production.

There are two ways to go: cheap and not so cheap. The former may sound crude at first, but is extremely effective.

If a standard poster has a resolution of 100dpi or thereabouts, you can produce something smaller, with higher resolution, and blow it up. The Epson Colour Stylus has a superb image output at up to 720dpi with an almost photographic



The poster for "Interview with a Serial Killer" under construction in CorelDraw, with text and images being sized and placed



● **Main pic** This A1-sized poster was made by blowing up at A4 colour print and copying the blow-up onto four A3 sheets **(inset)** which in turn were transferred to a single A1 piece of paper

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quality — certainly the best in its price range — and is ideal for this sort of job.

A1 is roughly eight times larger than A4, and I was therefore able to blow up an A4 colour print in 720dpi to A1 and achieve approximately 100dpi. The blow-up is produced on a standard colour laser copier (found in almost all local printers) and copied onto four A3 sheets. This process is fully automated by the copier and takes only a few minutes. It's worthwhile checking several shops for quality as colour photocopies can be extremely varied. While in the store, use their trimmer to cut the edges clean, and buy a sheet of A1 paper. Buy some spray mount and paste all four sheets into place. The result is a surprisingly good A1 poster that looks like it may have been folded once. Laser copiers are very good with colour and will retain all the vibrancy of the original, and (best of all) the whole lot should cost less than £10.

The second, more expensive method requires output at a bureau and an A1 inkjet or electrostatic printer.

Don't paint it black

Large-format printing is often slightly patchy, especially on inkjets, so it's worth avoiding large block colours if possible. Black is often the worst and it is worth considering using a broken background image, like a dark marble. In the past I have even opted for a poster that contained a lot of white as I knew this would sidestep the majority of inkjet printer problems.

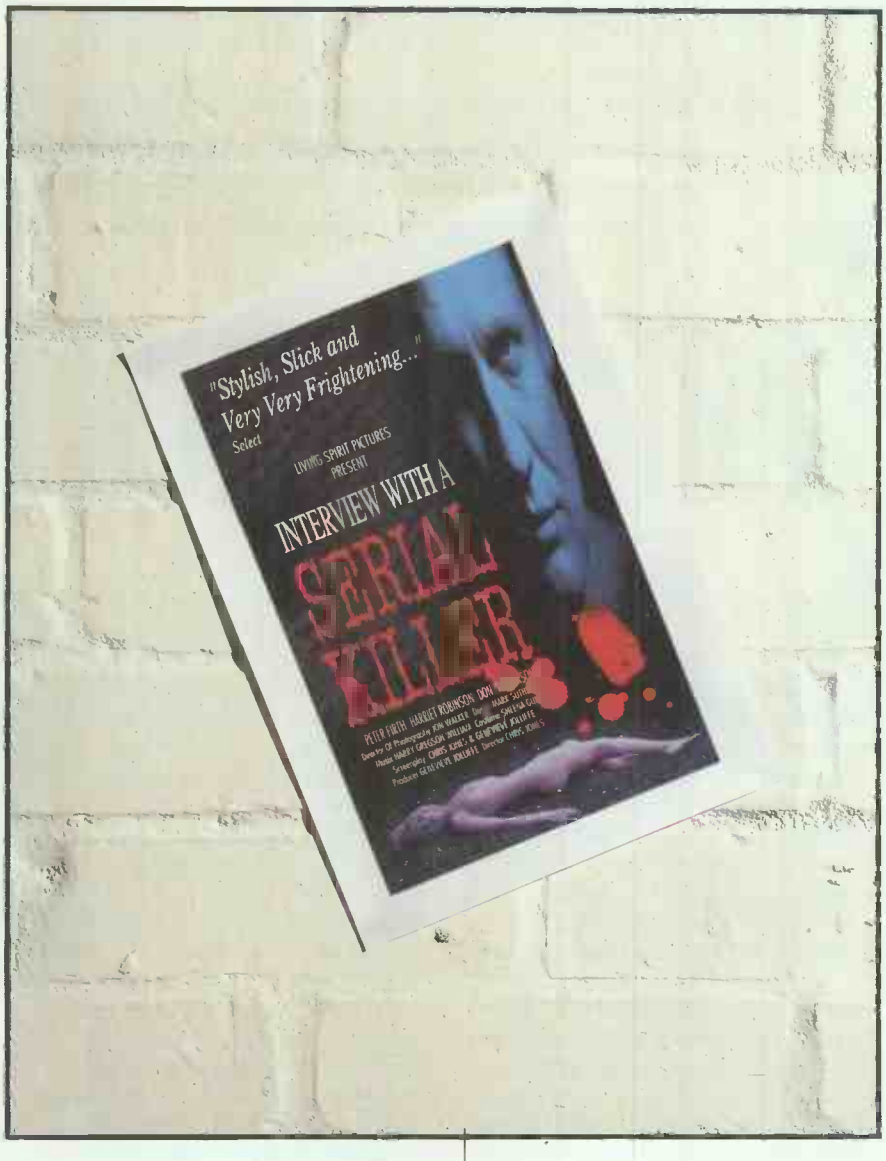
The major problem is that most bureaux are set up for Macs and will moan if you so much as utter the phrase "PC"; they can, in fact, handle the PC format, but will give you grief about it. If you manage to find a bureau that can handle native PC files, use it as this will reduce file compatibility problems.

The best file format to supply is EPS (Encapsulated Post Script File) as this is pretty much an industry standard. When exporting to EPS, ensure that all the fonts are converted to "curves" in case the printers don't have duplicate fonts. The EPS file has a header (a low-resolution copy of the file, which the printers use simply to line everything up) which should be set to something like 75dpi.

My 5Mb CorelDraw file produced a 12Mb EPS file. Luckily, No Limits (0171 383 2686), the bureau I had chosen, understood PCs and were quite happy to have the EPS supplied zipped up by using PKZip, and spread over several disks (once zipped, the file was only 2Mb). Zipping is a major advantage as it avoids the necessity for any high-capacity storage system like Syquest or Exabyte. No Limits specialise in large-format printing and recommended an electrostatic printer for this job. My first print was not very good — low contrast, dodgy colours and problems all round. Transporting files between systems is notoriously troublesome, with things often ending up very different from the original concept. Run as many tests as possible before committing to any major project, and make sure the bureau knows that if the final product isn't what it should be, they will have to redo the work. I have produced posters with other companies on Canon Inkjets and the results have been superb. The average cost for producing an A1 poster is £45.

Last but not least, I would recommend laminating the resulting poster with the finest sheet of laminate plastic available. This will save your investment from wear and tear and make it that bit glossier. A glass frame is even better and will ensure that your investment is protected, as well as making it look good.

One-off poster production can be very cheap and extremely rewarding — it has that "name up in lights" feel to it. So whether you're advertising a new product range, a chef's special, a performance at the amateur dramatics society, or in my case, a full-length feature film, you can be sure that if you put your full-colour, full-size poster in the right place, your efforts will not go unnoticed. PCW



An A4 print at 720dpi will reproduce quite acceptably at A1 at about 100dpi, if it's prepared properly

In the second part of our tutorial, it's the turn of CIX to benefit from the Procomm Plus treatment as Stephen Rodda concentrates on a simple automatic session and builds up the original script into a more complex version, with enhancements.

GETTING YOUR CIX

For external use only

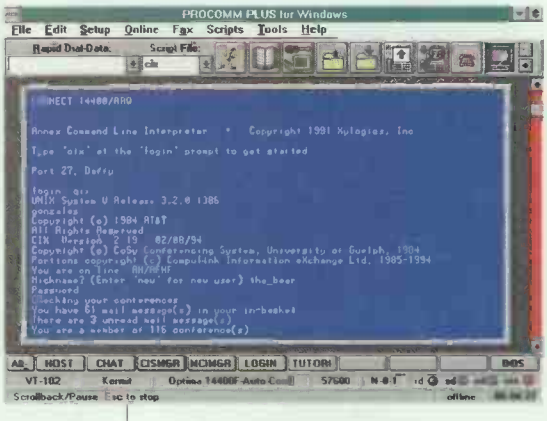
Last month I suggested how you might use Procomm Plus for Windows to access the Internet. This month, CIX comes under the spotlight. Why CIX? Aren't there enough packages already which will work with CIX? Shouldn't we be using Ameol, Wigwam, Telepathy and suchlike instead?

In the main, I'd reply "Yes", but there are some situations where using an external communications package can be advantageous. These are especially where you are looking for faster file transfer than some of the "blinking" (offline reading, OLR) packages allow. Even between Zmodem implementations, all packages are not equal; but some are more equal than others, to paraphrase George Orwell. If we look at the situation simply from the point of view of economics, it becomes easy to discover that there is more money available for the programmers of the likes of Procomm than there would be for the programmers of the CIX reader programs.

Now don't think that I'm decrying Ameol and all the rest; I use them, but when you're transferring a biggish file or a series of files you'll naturally want to make sure that you aren' t online any longer than you need. I personally transfer series of files of 8Mb and more on many occasions, and I wouldn't want to be on the line to CIX a moment longer than necessary, since apart from telephone call charges and CIX charges I have also an Internet service provider's charges to think about.

Of course, you'll have to use some of the external communications abilities that the OLRs have; some will build up a script file for CIX which you can upload into your scratchpad and run it on CIX's computer. In this case, you will simply start your CIX communication session (as we did in the last article with the Internet provider) and start the upload, run the script, and read all topic messages and mail messages into a file and download them.

Certainly you can't use some of the more complex utilities which the OLRs provide (like the Internet and so on) as they'll need to be online in order to read CIX's responses to various commands. In this article, therefore, we are going to concentrate on a simple automatic session (called "blinking") and from there we'll build up the original script into a more complex version, complete with some enhancements.



Our script accessing CIX

The first thing, as ever, which one must do is to create a log of what goes on during a connection to the remote service. In CIX's case this could well be as shown in Fig 1.

From this log, we can see that we have to look out for two different flavours of login; first the Unix account, which is "qix" or "cix", then the user name, which in my case is, of course, "the_bear".

Note that the "cix" login will present you with a screen of information, most of it about CIX's maintenance — when necessary; as long as you keep up to date (using cixnews, a conference from which you can't resign) you don't need the long form of the login, but can alternatively use the faster "qix" login.

Preparing a script

Now we need to prepare a script. We can do this the same way as last month, simply by recording a session during which we press the right keys (or some wrong ones and backspaces) and let Procomm get on with the nitty-gritty of producing the script, or we can write one from scratch. This time, we'll look at the necessary keystrokes and write a script ourselves, since CIX isn't a difficult service to write a script for straight from the keyboard.

The first thing to do will be to dial the relevant number. Remember that with CIX, you should use the correct line for the modem you have connected to your machine. If your modem is 14,400 baud or less (V.32bis or worse), then you should use 0181 390 1244 or 1255. If it's a V.34, then the correct number is 0181 390 9787. Note that it is useful to add a caret into the dialling string, so that the modem gives an occasional bleep. This bleep is known as a calling tone and can make the difference between a successful connection and a failure.

Another thing some manufacturers

Fig 1 Creating a log

```
Login: qix
UNIX System V Release 3.2.0 i386
gonzales
Copyright (c) 1984 AT&T
All Rights Reserved
CIX  Version  2.19   02/08/94
Copyright (c) CoSy Conferencing System, University of
Guelph, 1984
Portions copyright (c) Compulink Information eXchange
Ltd, 1985-1994
You are on line: AG/AFGl
Nickname? (Enter 'new' for new user) the_bear
Password:
Checking your conferences
You have 1 file(s) in your private subdir.
Disc space occupied = 10k.
You have 52 mail message(s) in your in-basket.
There are 5 unread mail message(s).
You are a member of 116 conference(s).

 Type HELP<return> for help

M:opt terse unix y d z u z compact y term pag 0
Opt:messagesize 65535 ref n autorecent y edit quiet file
single y q
Max messagesize during file has been set to 65535 bytes
M:read forward q
Read direction is FORWARD.
M:opt recent 100
M:killscratch
Scratchpad Deleted
M:upl
Zmodem upload (to abort ^X^X^X^X^X)
**B0100000027fed4
Upload succeeded
Scratchpad is 12851 bytes.
M:scput script
M:script
No new messages waiting.
Scratchpad is 2025730 bytes.
M:download
Zmodem download started... (to abort ^X^X^X^X^X)
Filesize 2025730 bytes, estimated time at 240 cps : 140
min 41 sec
**B00000000000000

Download succeeded
OK to delete the downloaded scratchpad-file? (y/n)? Y
R:q
M:go newsnet
To access the Interactive reader, type reader at the
Newsnet prompt

Setting up environment variables
Reading newsrc into memory
.
Building up command list
Welcome to the CIX Usenet Read/Write Gateway Version 3.1
Newsnet:batch all endbatch
Batching messages
....
Newsnet:opt zwindow 8192
Newsnet:download messages
.
Finished
Connection closed.
M:bye
the_bear, you have been online 34:10 on AG/AFGl
Goodbye from CIX     !!!HANGUP NOW!!!
```

omit to mention, since they assume that as you've bought a modem you already know how to use it, is to point out that a modem often needs to be matched to the gain (volume) of your local telephone exchange. Remember this tip if you are using a portable modem: sometimes the modem will work perfectly; others you may get a lot of trouble with dropped carrier problems. The command for the modem to establish a connection (and to compensate for the line) is AT\E1. It is issued once only before trying to connect on each new line, and you may have to try a couple of times further before a connection is established. This is best issued from the command line since it shouldn't be part of your startup procedure.

But back to CIX. The command line will start off with:

```
proc main
   transmit "ATDT ^0181 390 1255^M"
```

Now we'll need to wait for CIX to answer the call and ask for us to log in: remember that we should reply "cix" or "qix".

```
   waitfor " Login: "
   transmit "qix^M"
```

Having connected to CIX, we've only now got to give our user name and password:

```
   waitfor " new user) "
   transmit "the_bear^M"
   waitfor " Password:"
   transmit "secret^M"
```

Now we have to initialise our CIX environment so that it is in a state ready for the OLR (in the case of this example Ameol, although WigWam and other OLRs will accept much the same initial CIX environment as we achieve below).

```
   waitfor " M:"
   transmit "opt terse unix y d z u z
         compact y term pag 0^M"
```

This starts CIX with terse responses; it also drops the download time. The "unix y" option ends lines with character number 10 (a linefeed with no carriage return). "d z u z " sets download and upload protocols to Zmodem type. The compact y option sets CIX message headers to compact headers since Ameol prefers these. Term pag 0 sets CIX not to page when we are reading messages, which is not sensible if these messages are to be sent to file!

```
   waitfor "Opt:"
   transmit "messagesize 65535 ref n
         autorecent y edit quiet file
         single y q^M"
```

Here we are waiting for a new prompt; the "Opt:" prompt, which is the one CIX gives when we have issued an "Opt" command without a subsequent "q" in the same line. Note that I have joined a series of lines containing "Opt" commands into two lines rather than place these on separate lines, simply

because it saves CIX interaction time. In these two commands I'm telling CIX to limit downloaded message sizes to 64kb, not to bother reading messages as per their threaded structure, since the OLR will do that for us, setting autorecent to yes which limits the number of messages in a new conference and/or topic we join to a maximum of one month's worth. Edit quiet selects a particular text editor (known as the "text gobbler") which simply picks up input from the file and doesn't bother responding to it, so you will get the minimum rubbish on screen (and hence less information to be downloaded which we don't need anyway).

Now we must start looking at uploading the script which any self-respecting OLR will write for you and allow you to include in your own routine. As I am using Ameol, the file's called newmes.scr; it's simple to include it as a file which is uploaded into the scratchpad, and from there is run as a script, but first we'll need to kill the old scratchpad (just in case there's anything there which might interfere with the smooth running of the scratchpad commands).

```
Transmit "killscratch^M"
transmit "upload^M"
Sendfile zmodem
   "c:\ameol\archive\newmes.scr"
transmit "scput script^M"
transmit "script^M"
```

Notice above that the sendfile command specifies Zmodem; if it is already selected as the default file protocol (and if you'll take my advice, that's how Procomm should be set up) you could replace that line with "sendfile default c:\ameol\archive\newmes.scr" which selects the default protocol only. The "scput script" line moves the file from the scratchpad into the script holding area and the "script" command actually gets CIX to run the script from the holding area.

Once that has been done, we'll need to get the results of the script (which currently has added mail messages and comments into the CIX message base). The way to do this is simply with a file read all, followed by a mail file all. This allows CIX to finish processing our mail messages (which it does in the background) while we read our says and comments themselves.

```
waitfor "M:"
transmit "file read all^M"
waitfor "M:"
transmit "Mail^M"
waitfor "Ma:"
transmit "file all^M"
waitfor "Ma:"
transmit "q^M"
waitfor "M:"
transmit "download"
getfile zmodem
waitfor "? (y/n)? "
transmit "Y;bye"
endproc
```

Here, having read and downloaded all our messages, CIX asks whether to delete the old scratchpad. Since it's already been downloaded, we answer "Yes". Note the semicolon after the "Y". This tells CIX to put the next command on the next line, so we don't have to wait for CIX to send us the prompt again. CIX simply terminates.

This script as it stands, however, has a few problems. We don't know whether we are going to connect to CIX first time as it might be engaged (a factor we ignored with the Internet last month). File transfers might not go according to plan, so we need to check for successful completion both of upload and download. In the captured log which is included at the beginning of this piece, you'll see that I'm a user of Usenet; this script doesn't take account of Usenet at all. Finally, someone could have sent us a crafty mail message between our reading the mail and the end of our download; this will leave the script hanging at another "y/n" prompt, which we'll have to test for.

Firstly, let's make sure that we manage to connect to CIX properly. We're going to use a function for this, but first let's talk about subroutines, which is what a function is. Most programming languages allow you to define subroutines from the simple GOSUB of Basic to the constructs available in a structured programming language. A structured programming language is one which requires no line numbers; we call the procedures and functions by name. A procedure is simply a method of putting a frequently used series of commands into a specific area of a program which is denoted by name. A function is just the same as a procedure, but for one extra advantage — a function can return a value. If we were to create a dialling procedure, all we would have to do would be to remove the dialling portion of the script (in our case the "ATDT ^0181 390 1255" line) and refer to it whenever we need it by the name of CIXlog, for example.

```
Procmain

   CIXlog
.
.
endproc

Proc CIXlog
   transmit "ATDT ^0181 390 1255^M"
endproc
```

So, at the end of the program we define the procedure, otherwise it will be called accidentally when the program initialises.

This, however, doesn't give us a result. For this we'll need to use a function:

```
procmain
   while cixlog() = 0
      endwhile
.
.
endproc

func CIXlog : integer
   transmit "ATDT ^0181 390 1255^M"
   waitfor " Login: "
   if success
     return 1
   endif
return 0
```

Note that there are two return statements in the function. These allow both cases to be tested for, but only the relevant one will, of course, be acted upon. See also that in the function declaration line, we have to prepare ASPECT to return a value to the calling line. We also have to specify the data type of the value to be returned.

I'll leave the other error-trapping routines and the USENET message collection as an exercise for the reader; these should not be difficult now that the basis of error-trapping has become evident. Another thing you will notice is that CIX is (often) slower than Aspect's default timeout period. This may have to be adjusted, simply by adding a figure of (say) 60 or 120 — or even to "FOREVER" — during the "file read all" if you belong to a large number of conferences.

Next month we'll be looking at a simple fax management script, which Aspect supports very well.

PCW Contacts

Stephen Rodda is an independent computer consultant specialising in DTP and networking. He may be contacted as **the_bear@cix.compulink.co.uk**

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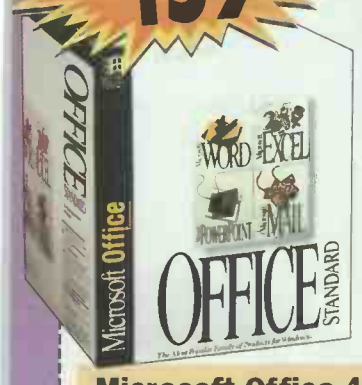

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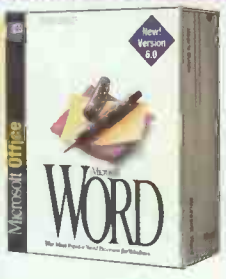

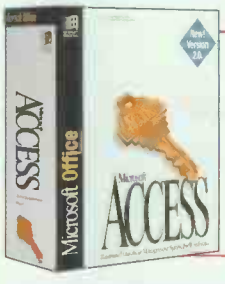

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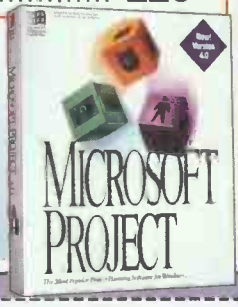

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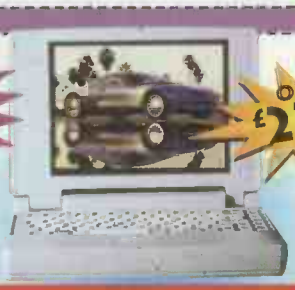

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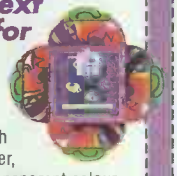

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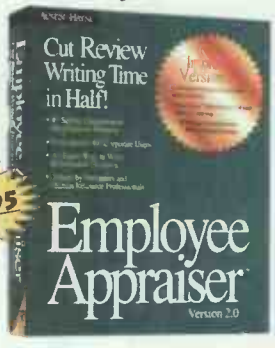

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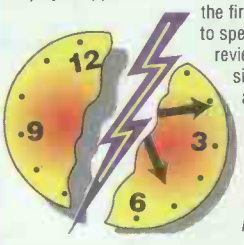

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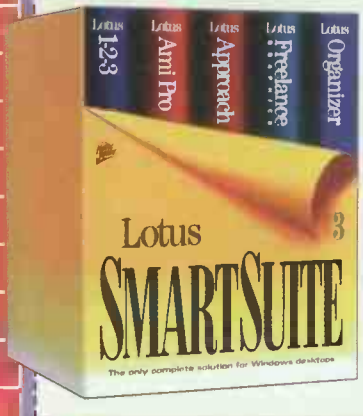

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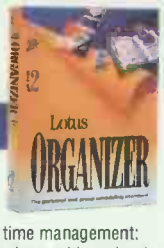

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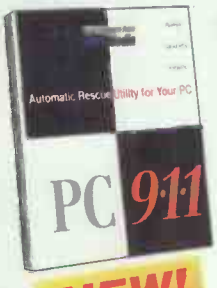

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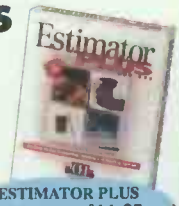

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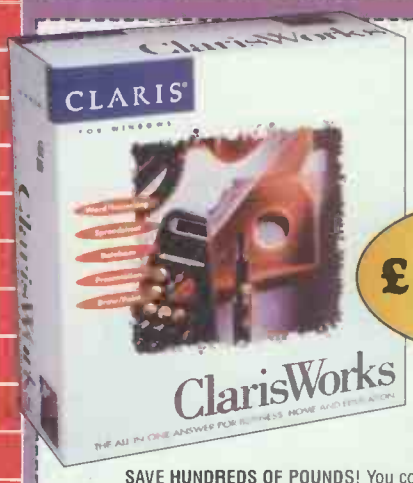

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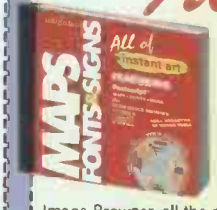

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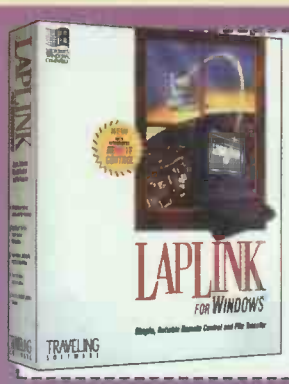

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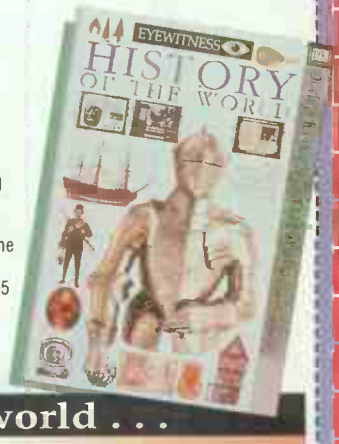

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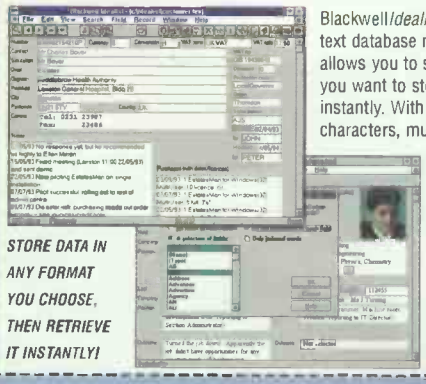

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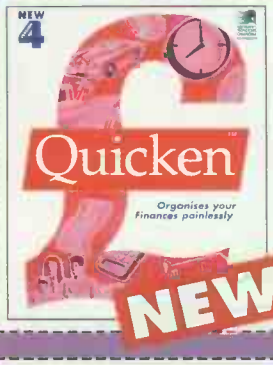

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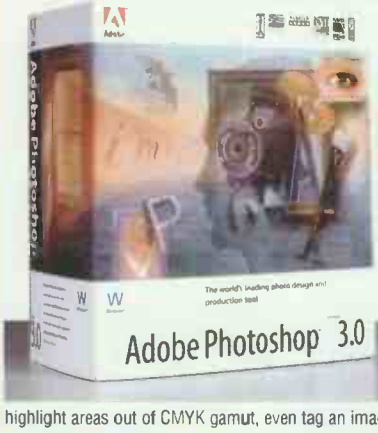

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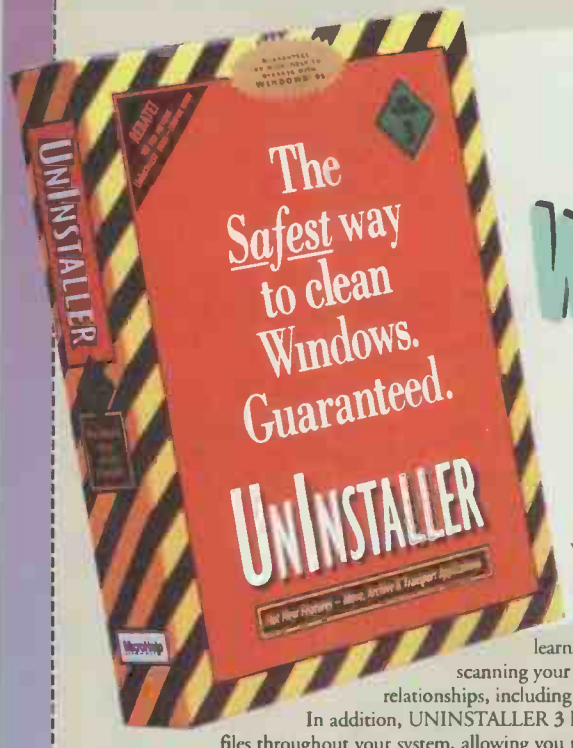

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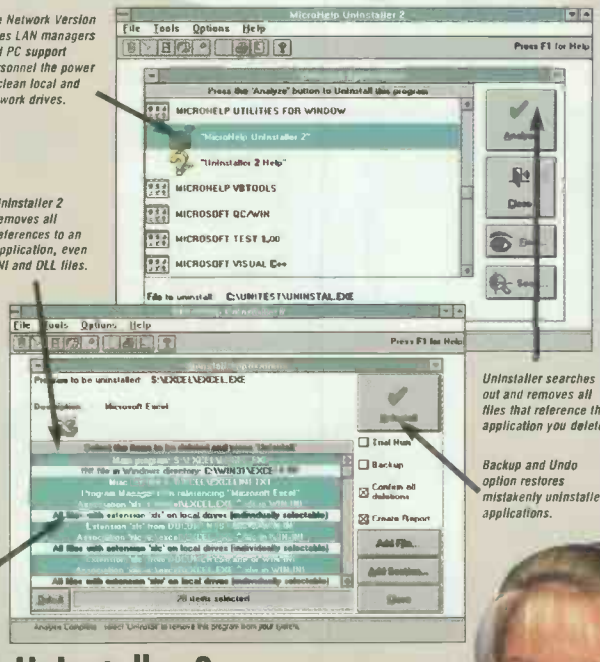
The Network Version gives LAN managers and PC support personnel the power to clean local and network drives.

Uninstaller 2 removes all references to an application, even INI and DLL files.



Uninstaller searches out and removes all files that reference the application you delete.

Backup and Undo option restores mistakenly uninstalled applications.

File Viewer lets you view documents and files, and asks you to confirm removal.

UnInstaller 3

UT6224 (3.5")

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Requires: 386 PC or higher, 4 MB RAM, Windows 3.1.

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IN3760: ScanMaker Scooter £210

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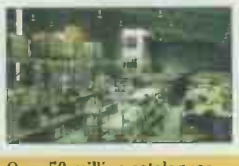

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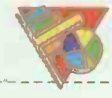
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MICROMART INDEX

A
A Plus P Computers 679
A1 Shareware 626
Altek Instruments 669
Apex Data International Ltd 585

B
Blue Quetzal Ltd 629

C
Cafe Net 589
CD Express Ltd 639
Clinton Turnbull Computers Ltd 635
Clove Technology 653
Computech 615
Computer Essentials 630
Contemporary Software 663
Commander Games 687

E
Engine House Developments 629

G
Graham Jacobs Associates 661
Green Disk Ltd 647
Graffix Consultancy 687

H
HSC Ltd (Legacy) 647
Harper Collins 657/659

I
Ink Well 657

J
JA Information Solutions 669/626

K
Komputer Knowledge 582
Kosmos Software 615

L
Lasermoon Ltd 635
Learned Information (Europe) Ltd575
Linefeed 676
Longman Logotron Ltd 570

M
Mega Download 583
Monitorman 647
Microcosm Limited 669
Micromail 615
Microtronics Ltd 640

O
One Stop Software 635

P
Permax Ltd 589
Print Revival 639
Prozess Software 630
Perfect Image BBS 584

Q
Q Action 626

S
Scene Double 653
Soho Soundhouse 661
Spiderweb Systems 582
Squire International Ltd 633
System Insight 631
Strangeway 584

T
Tech-Mate (UK) Ltd 661
Telesystems Ltd 641
The Direct Connection Ltd 573
The Keyboard Company 643
Themis (UK) 659
Trevan Designs Ltd 584
The Legend BBS 582

U
U-Net Ltd 589
Unixland (UK) Ltd 677

V
Vectorjet Ltd 628
Vine Micros Ltd 657
Visual Software 626

W
Wise Imaging 633
Worthington Data Solutions 638

On the CUTTING EDGE

Welcome to **Cutting Edge**, the section in *Personal Computer World* that combines our regular reviews of games, books and CD-ROMs with features bringing you the latest news about computing and consumer technologies and online services.

We now have the most comprehensive coverage of these topics available in a general computing magazine. Stay with us and we'll take the pain out of keeping on the cutting edge.

PCW Online

572 **net.answers** — A graphical guide to getting connected to the Net, plus a query about Navigator.

574 **net.surf** — How to get free Web pages, Reed Employment's new online venture, Usenet searching, and high-performance motorbikes online.

578 **net.news** — Britain finally looks like getting a free Internet access point, RM launches a Net access service, and Forté's brand new Free Agent.

582 **net.comms** — Stephen Cobb invests in a US Robotics modem and experiences a few software glitches, plus the latest on your many complaints about Mercury.

588 **net.newbies** — New to the Net? Wondering what it's all about? Net.newbies will help get you started.

PCW Futures

591 **Innovations** — Tim Frost reports on Panasonic's revolutionary ENG direct-to-disc video recording.

593 **Horizons** — Ben Tisdall looks at BT's new Laureate speech synthesis system.

597 **Bluesky** — Nick Beard on various means of data compression.

601 **Retro Computing** — Simon Rockman remembers the Sinclair QL, the great PC that never quite made it.

PCW Media

602 **Books** — A disappointing introduction to cyberspace, plus eight of the latest guides to the Internet.

610 **CD-ROMs** — Culture, cooking, computer equipment, and a guest appearance from Bob Dylan. David Brake takes the latest discs for a spin.

PCW Fun

614 **Kids' Stuff** — Paul Begg finally learns about the birds and the bees, tracks down a sneaky egg thief, and looks at the National Curriculum.

619 **Competitions** — Multimedia kits, Microsoft hardware, and music software up for grabs.

621 **Screenplay** — Battling the Empire in Dark Forces, and going into a spin with Descent.

624 **Leisure Lines** — Puzzles with JJ Clessa.

CD-ROMs

● *The times they are a' changing with the Bob Dylan CD-ROM*

Screenplay

● *Descent: a Doom-alike in three dimensions*

Retro Computing

● *The Sinclair QL never quite lived up to expectations*

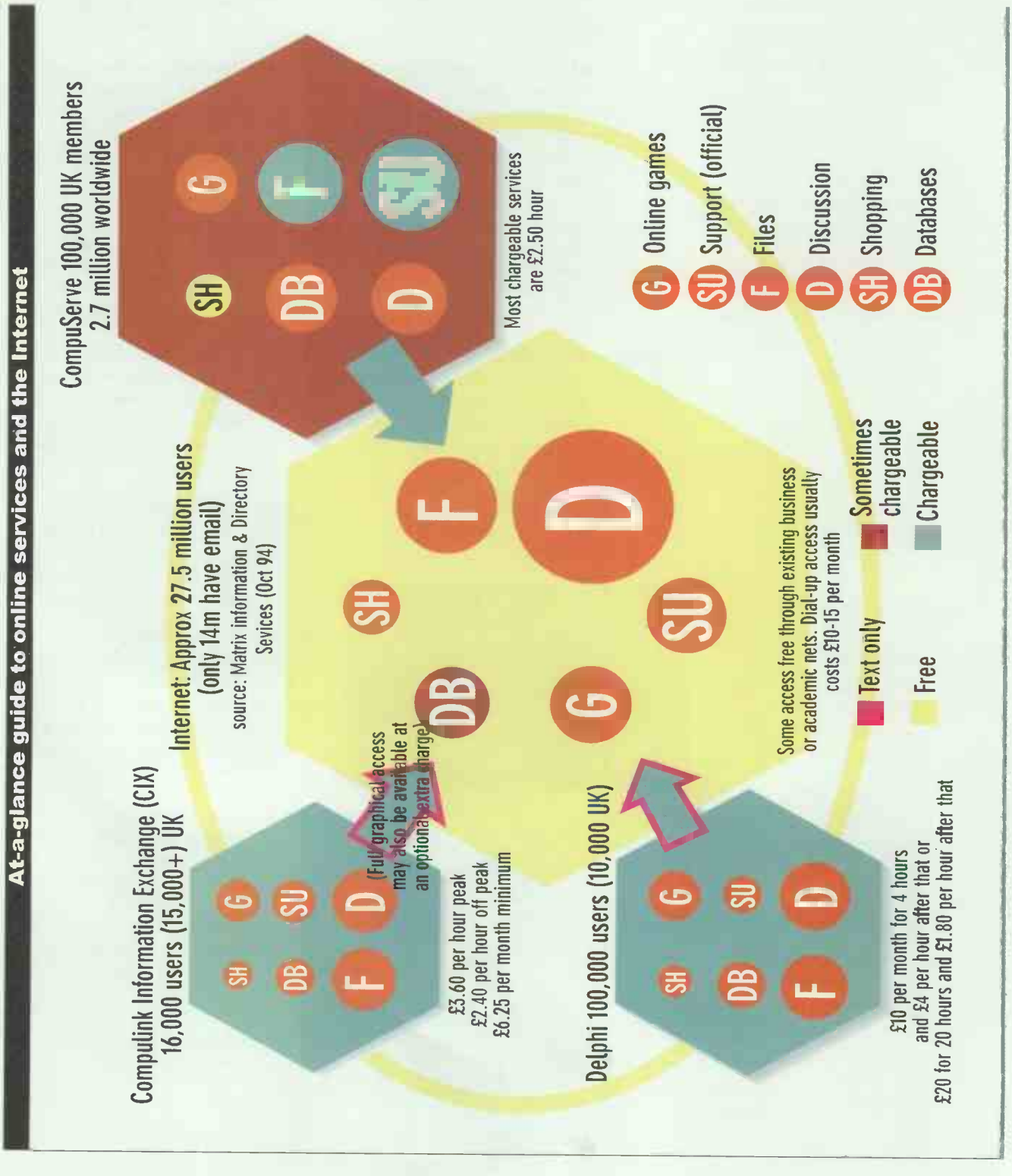
CUTTING EDGE

net.answers

Will Navigator work?

Q: Do you have any info on OLRs for the Net? I use Navigator, CompuServe's own OLR, and find it a dream. I just launch the program and it goes searching for mail and messages. Could I use Navigator across the Net?

A: Second question first. As far as I can determine, you can't use CompuServe Navigator to automate Internet operations, though the designers of the software are aware of the demand for this feature and may work it into future versions. This is because of the way CompuServe has provided Internet services. They don't work like forums, so software that automates reading of forums can't automate reading newsgroups in the same way. Both Navigator and CIM for Windows will automate the sending and receiving of email, whether from the Internet or from other CompuServe users. Best of all, when CompuServe implements its TCP/IP service — perhaps as soon as you read



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this — you'll be able to use any third-party software to access the Internet, some of which works offline (see Free Agent in the net.news pages for a good free offline reader for newsgroup reading).

Tired of Grey pages

Q: I really enjoy using NetScape Navigator to browse Web pages but I wish there were some way to change the background colour of the pages, which is relentlessly grey. Is this a function of Windows, or the Web page designers, or Navigator? And how do I change it?

A: In this case, grey for the background is a decision that NetScape Navigator made. The standard HTML coding system used to create Web pages does not include an option to set a page colour. Mosaic 2.0.0 Beta allows you to set your own background colour, and NetScape 1.1 goes one further — you can choose your own colour, or the pages you connect to can use a proprietary extension to HTML to specify a background colour for you. This can produce some quite garish effects from time to time, but that's the price you pay for progress.

Watch out, there's a virus about

Q: Michael Whooley (mwhooley@icl.rtc-cork.ie) asked, can viruses be transmitted via the World Wide Web?

A: Possibly, but you will always know when you are at risk. At the moment, the only files that are transferred automatically when you connect to a Web site are text (which contains codes that are translated by your Web browsing software into hypertext links and formatted text) and graphics files in GIF or JPEG format (which provide the illustrations that make Web pages more attractive). The important thing to realise here is that you aren't downloading and running any program files, and (according to the virus experts at S&S) there's no way to receive a virus across the wires unless it is hidden inside a program. Of course, you can use the Web to find programs, download and run them: at that point you would be opening yourself up to a possible virus attack, but this is something you do at your own risk, and we therefore recommend you download or purchase an anti-virus package and test any downloaded program for viruses before you run it.

NetScape's use of HTML extensions allows Web page authors to give their pages a less grey look

Interestingly, a new development in Web browsing technology could change all of this. Hot Java, a technology being worked on at Sun Microsystems, will allow Web page programmers to embed applications into their pages. Of course, this has a number of obvious benefits: instead of being limited to text and graphics, it could allow Web designers to create entire multimedia experiences for people to connect to. But you may also find in future that the pages you have connected to have given you a virus as well as a good time. Not that you need to worry about this for the time being: it is still in the planning stages, and will require powerful machines with a fast connection to the Internet to use effectively.

David Brake and Stephen Cobb

PCW Contacts

If you've got the questions, we've got the answers. Just drop me **(David Brake)** a line at **derb@pcw.cityscape.co.uk** or by post and I'll try to sort you out. Anyone whose letter we use will receive a copy of the second edition of Ed Krol's bestselling **Whole Internet User's Guide and Catalog**, which is published by O'Reilly and distributed here by International Thompson Publishing.

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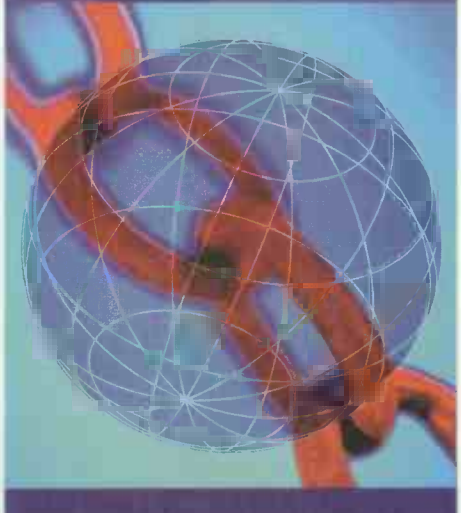

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CUTTING EDGE

net.surf

Something for nothing

If you are serious about selling your company using the World Wide Web, then you're best off buying your own Web space. But if you just want to show a picture of your baby, share information about your pet topic or put the contents of your CD collection online, there are several places on the Internet which will give you space for free.

MarketNet here in the UK will allow you a single free page without graphics for commercial or private use; look at http://mkn.co.uk/HELP/USERS/FREEPAGE. If you are non-commercial and you don't mind having your page resident in the US, they are more generous. Volant Turnpike will donate up to a megabyte, which is enough space for several pages with graphics. Its terms and instructions are at http://turnpike.net/turnpike/plist.html.

The first place to offer free pages, and the best-known, is on http://www-bprc.mps.ohio-state.edu/HomePage/ at Ohio State University, but it only allows text without graphics and it is also the most popular, with a maximum of 1,500 pages at any time. This means your page may "expire" after a few weeks or months.

If all you want to do is put up a brief announcement of your existence or of something to sell, there are several Web-based directories which offer free entries — notably Apollo Advertising at http://www.apollo.co.uk/, GoldSite Europe at http://www.gold.net/gold/indexdir.new.html, the World Wide Yellow Pages at http://www.yellow.com/ and Millennium Facilities http://www.milfac.co.uk/milfac/. For more information on this sort of service, see last month's net.answers.

Job centres

Reed, the largest British employment agency, has launched an online division, Direct Access. Candidates for full time or contract work in the IT sector can post their CVs via email, through a form on a Web page, by fax or through a bulletin board. Reed has invested more than £1 million in the venture, which, if successful, could be extended to the other employment areas Reed covers.

Because of the system's increased efficiency and lower costs, employers who find staff through Direct Access pay half Reed's usual rates. Software allowing employers to search Reed's bulletin board is available free. The Direct Access team is also behind the installation of desktop videoconferencing in seven offices around the country.

CVs should be sent to directaccess@solo.pipex.com, 100546,1416 on CompuServe or by dialling Reeds's BBS at 0181 288 3838. More information on the service is available on 0181 288 3888 or on Reed's Web pages at http://www.reed.com/reed/.

At last a Web-based British recuitment service that isn't aimed largely at IT professionals. Price Jamieson Online specialises in media, marketing and healthcare vacancies and it lists them by category online at http://www.gold.net:80/price-jam/. You can submit your CV online, but at press time there was no way to search the jobs using set criteria or apply for specific jobs online. There are plans afoot to improve the site in several areas, some of which should be ready by the time you read this.

For more information, call Price Jamieson at 0171 631 1005 or email them at Price-Jam@cityscape.co.uk.

Usenet filters

The only way to be sure that you don't miss something in Usenet newsgroups is to read every last message that is posted. Even reading selectively, though, you may find yourself drowning in words. The Stanford Netnews Filtering Service at http://woodstock.stanford.edu:2000/ is one way to keep up to date. You register one or more "profiles" (groups of keywords like "apple computer NOT fruit") and it will search through the usenet newsgroups periodically, sending you articles which match the criteria you select by email. Unfortunately, it often seems to miss matching articles and since it can take a few hours or even days for it to deliver the goods, it doesn't help when you want to search everything on Usenet immediately.

Infoseek, which I mentioned last month, at http://www.infoseek.com/, runs a Usenet news search facility among other services, but it charges money to use it. Another company, IBD, has a public access service which allows you to do an instant search of five days' worth of Usenet postings for free. It is available at http://ibd.ar.com/Search-IBD.html, and the results it provides seem more complete than the Stanford service (though it still doesn't index the "local" newsgroups like the groups specific to the UK or to a service provider like Demon).

Imaginary world

It seems you don't need to be a multinational with money to burn to start producing multimedia titles which straddle the worlds of film, the World Wide Web and CD-ROM. Imaginary Projects, a British collaboration between Jon Weinbren and Lynda Russell-Whitaker, put the Notting Hill carnival up on the Web last year, and more

Left The limited space available through the Ohio server means pages on it tend to be spartan

Below The kind of page you can make with the megabyte of space Turnpike will give you for free

CUTTING EDGE

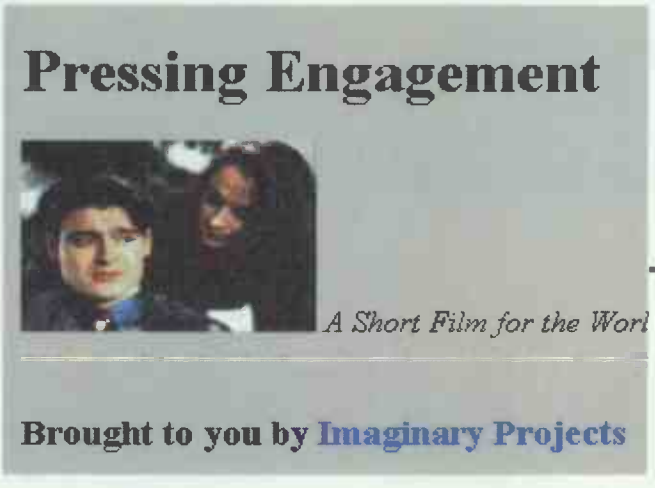
The Press Association

The Press Association, the national news agency for Britain and Ireland, has put up a free shop window on the Internet at http://www.padd.press.net/. It includes selected news and sports stories, single-line summaries of news as it happens, television listings in all regions for the day on terrestrial stations, Sky One and Sky Movies, "now and next" information for more television and radio programmes, and 24-hour

weather forecasts for all regions. For more info, email info@padd.press.net.

recently has made available excerpts from a short film of Jon's, Pressing Engagement, possibly the first British film to be downloadable. The film is 15 minutes long, but unless you have a very fast Internet connection it will take you much longer than that to download. There are 11 excerpts between 300kb and 1Mb in size. Unfortunately, you can't get an idea of what the film would be like any other way as the story outline provided is sketchy.

Their next projects will include Home Entertainment, a "surreal fantasy story focusing on a series of romantic encounters via a computer network" on film, CD-ROM and Website, and The Gunpowder Program, a "thriller about a computer virus triggered to obliterate London's financial community". For more information, check out http://www.gold.net/~imagine/ or email info@imagine.dircon.co.uk.



It's good to see British entrepreneurs using the Internet to sell their multimedia wares, though most of us don't yet have the bandwidth at our disposal to download even a short film

On yer super bike

Are you tired of waiting for that new Harley-Davidson Super Glide that you ordered? Apparently, most HD dealers in the U.S. are having to maintain long waiting lists due to a classic case of demand exceeding supply. Anyone who has done first year Economics knows what that means: opportunity.

One company using the Internet to cash in on that opportunity is American Motor Works of Palm Bay, Florida. The company announced a brand new motorbike, the AMW Spirit, during the annual Bike Week in Daytona Beach and provides product details and pictures online. A classy collection of Web pages (http://www.iu.net/amw) gives you extensive details of this precision-built, high performance, production machine. If you're interested, the Spirit is based on a high technology 84 cubic inch V-Twin (that's c.c.) featuring four valves per cylinder and fuel injection. Space-age materials are used throughout and the AMW Tri-Iso Mount chrome moly frame weighs less than 50lb. The oil tank is made of stainless steel and all the sheet metal work and fenders are hand-crafted.

So how effective is the Web as a promotional tool for this type of business? You could expect a natural fit between bikers and the Internet. Well, American Motor Works reckons that their pages attracted over 4,000 enquiries in the first two weeks. And it is probably

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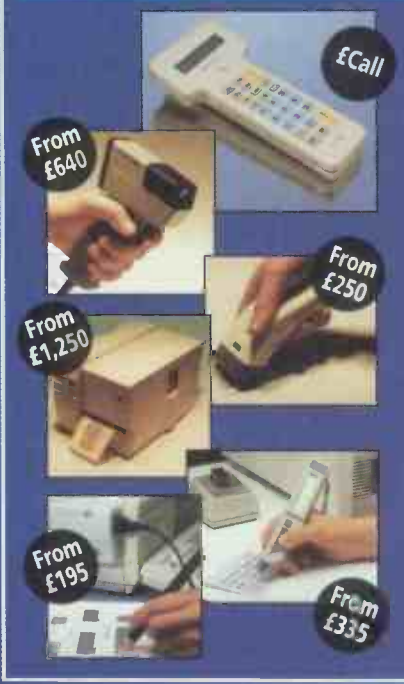

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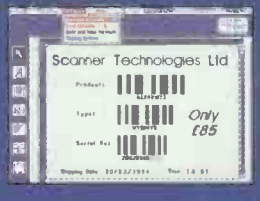

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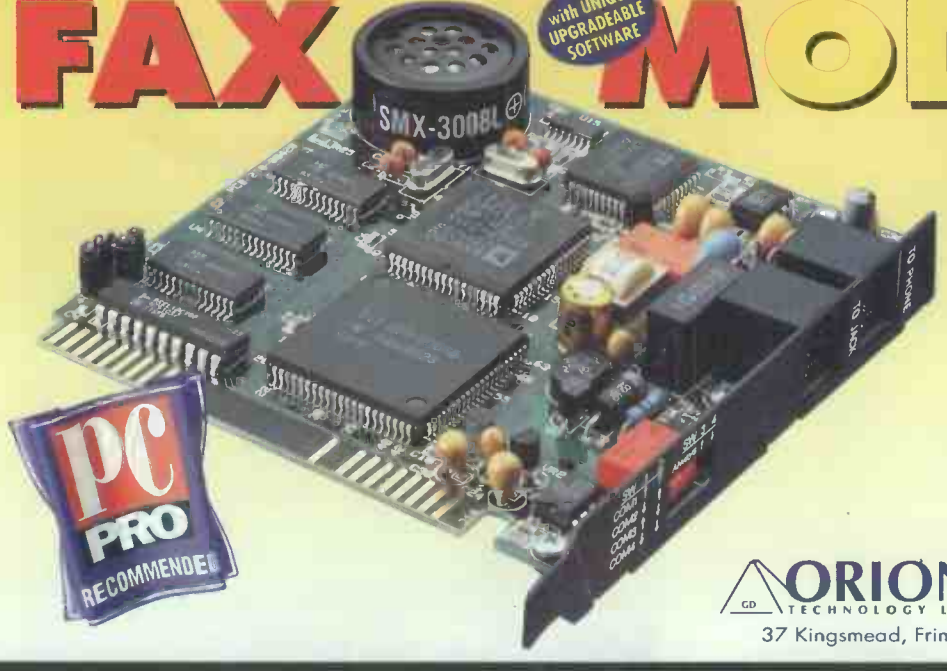

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not a coincidence that the consultant who designed those pages has now been hired as the Information Technology Director for, you guessed it, AMW.

Going down in Flames

Do you write letters to the papers? Are you often tempted to sound off about local and national issues? The Internet provides an ideal platform. Usenet newsgroups are full of bile and cross words — there's even a special term for hurling abuse: "flaming". But messages on newsgroups are here today and gone tomorrow. For a more permanent record of your discontent, why not sign up with the 21st century equivalent of vanity publishing? Steinkrug Publications runs Flames, a Web server at http://www.gold.net/flames, which will publish your diatribes for just £15 a year. For good measure, it will even send a postcard to the person or organisation being flamed. It expects to have 100 members by the time you read this, and hopes to have 4,000 by the end of the year.

Sadly, from what I've seen to date, the contributors are just as likely to have poor grammar and spelling as those who write in green ink to local papers, and Steinkrug doesn't seem able or willing to correct these faults, which makes reading many of these flames a chore.

For more information, call Steinkrug Publications on 01223 208926 or email Flames @Flames.cityscape.co.uk.

Star gazers

The Internet may be full of scientists, but there is plenty of room for the supernatural — horoscopes, the I Ching, tarot card readings and other superstitions are all available through the Web. Now one of our own astrologers has turned up there. Jonathan Cainer, the Daily Mail's horoscope writer, publishes his horoscopes at http://www.dircon.co.uk/itsokco/, together with invitations to purchase more detailed personal information by post or on the phone, of course.

Top Check what the stars have in store for you
Above Get general financial information — and the odd giveaway— from Barclays

Child's play

There may be some distinctly "adult" stuff in odd corners of the Internet, but this shouldn't discourage parents from letting young children online. You are unlikely to stumble across anything disturbing unless you are looking for it, and the Internet offers great opportunities for kids to explore, express themselves and communicate with other children.

If you want to encourage your child to write, what better incentive could there be than a chance to be read by others across the world? KidPub WWW Publishing at http://www.en-garde.com/kidpub/ offers free Web space for stories from children aged six to 13; mail KidPub@en-garde.com.

MidLink at http://longwood.cs.ucf.edu:8/~MidLink/ is a bi-monthly Web publication which links together schools with pupils aged 10 to 15. It is based in Orlando, Florida, but has contributors from all over the world, including Australia, Stockholm and Shepshead High School in Leicestershire. To add your school to it, send email to mccullen@aquarius.cc.ucf.edu.

The most polished Web site for children is KidsCom at http://www.spectracom.com/kidscom/, for children aged eight to 12. It includes a (monitored) grafitti wall, a pen pal page, a geography quiz, a place for children to ask Scott Yanoff, a recognised Internet expert, for help, and other entertaining resources.

Stephen Cobb

Cash for questions

What's the best way to get people to check out your Web site and read through information about your company? Offer them money! Many American companies are using this approach to attract custom, and you can keep an eye on the offers at http:// www .yahoo.com/Business/Products_and_Services/Contests/, but since most of the prizes are restricted to American entrants, they are of limited interest. Barclays Bank is one of the biggest British organisations to get onto the Internet and one of the few companies offering pounds to surfers.

By the time you read this, a contest offering £100 to 10 lucky winners will be over, but it's worth keeping an eye on http://www.barclays.co.uk/ for news of further giveaways. You might even learn something useful about Barclays' travel insurance, banking services or Barclaycard.

For more information call Mark Cloke at 01203 532258 or email talkback@barclays.co.uk.

Credit notes

A British company specialising in worldwide credit reports has popped up on the Web at http://www.dbinfo.co.uk/dbinfo/. It gives some examples of the kind of information it will provide its customers, but it doesn't give free samples — it charges from £58 to £190 for each company search. Nor is the service instantaneous: the most expensive "Express" report can still take up to seven working days to arrive in your email in-tray.

The write stuff

It's possible to get to know people on the Internet through discussions on public forums, but the Pen Pal Connection at http://www.start.com/start/ppmenu.html provides a shortcut to finding a pen pal with the same sorts of interests. It also has a racier companion called Romance Rendezvous.

A second organisation has also come to my attention: the Email Club. While Pen Pal Connection is free, the Email Club is run as a non-profit group but it asks for a one-off payment of $10 to help pay for the running of the scheme. For more information, check out http://www.mbnet.mb.ca/~lampi/email.html or mail emailclub@delphi.com.

David Brake PCW

CUTTING EDGE

net.news

Freenets

At last, the launch of Britain's first free Internet access point seems imminent. The equipment has mostly been donated and help is being sought from both local councils and the EC. Exact details about the new service are sketchy at present but it seems it will be run from a location in Derby.

Until now the only free, publicly accessible service connected to the Internet has been Spuddy's Xanadu BBS on Canvey Island. But this is run on a small scale and only provides a subset of full Internet access to its users; email, file transfer and news reading services.

The new service will support Telnet and email access will be supported on the new service. It is expected that limits will be placed on the total amount of time users will be able to stay online — possibly 30 minutes a day. It is not expected that users will be able to connect using SLIP or PPP, so support for applications like the World Wide Web is likely to be limited.

For further information or to help with the project, write to the FreeNet Project, c/o EMS Ltd, The Old Court House, St Peter Church Yard, Derby DE1 1NN.

WebWorks Publisher

Quadralay's WebWorks Publisher is one of the first utilities available which can translate desktop published pages into HTML (hypertext mark-up language) for placement on the World Wide Web.

The package works with FrameMaker, a popular package for technical documents. Since HTML allows page authors only limited control over typography, graphics placement and the like, the translation cannot be completely automatic. It does allow you to view the original and HTML versions side by side however, and can convert tables, graphics and foreign language characters.

Versions for Windows and several Unix variants are available now, and a Mac version is due shortly. A UK distributor should have been appointed by the time you read this.

For more information, check http://www.quadralay.com/products/products.html or email info@quadralay.com. To find the UK distributor, call Quadralay in the US on 001 512 346 9199.

RM Internet for Learning

Research Machines (RM), a leading supplier of PC-compatible computers to British education, has launched an Internet access service.

The company says that RM Internet for Learning is competitively priced, at £10 per month, for full access with preconfigured Windows software. The service is tailored to meet the potential needs of the school or home user, claims RM.

Importantly, it provides a limited amount of censorship of Usenet newsgroups to prevent schoolchildren from accidentally stumbling across sexual or other contentious material. The RM news server passes on around half the total number of available newsgroups.

There are no plans to limit access to other Internet resources but the Web browsing software is set to use an RM server as a proxy, so accesses to controversial Web sites are logged and can therefore be prevented if neccessary.

Even though a sufficiently curious Internet user could circumvent these restrictions by changing the setup of the software, this would require a reasonable level of technical competence. Teachers (or parents) could check the settings from time to time to ensure they had not been tampered with.

Internet-hungry students can run up heavy phone bills, even at local rates. A unique feature, says RM, is that it can offer users a voluntary limit on the duration of connection time. The scheme would allow schools (or homes) to set a voluntary cap on their monthly expenditure. All the modems for dial-up access will support the currently fastest available access speed.

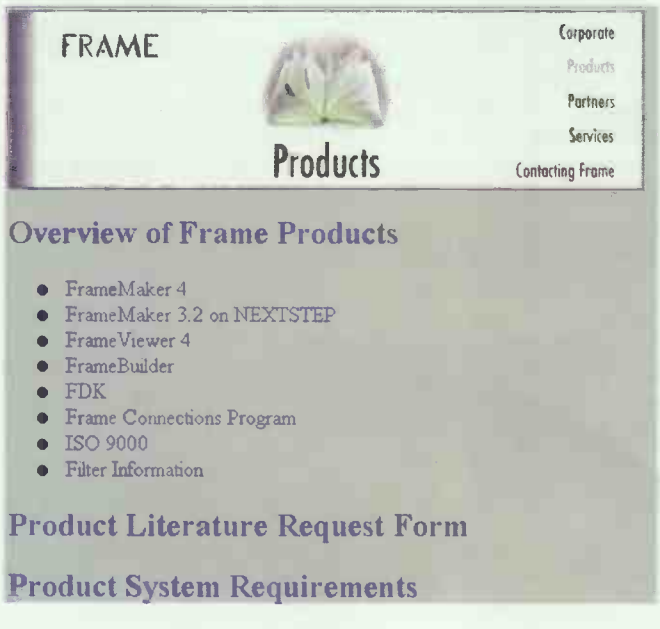
Initially, there will be nine Points of Presence (local dial-up sites) spread across the country and RM expects to be able to install five or six additional points soon. By early May, it expects to have connected more than 200 schools.

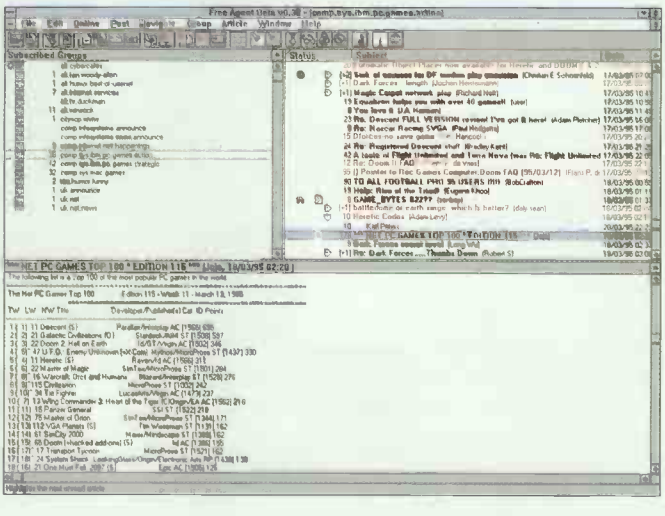
For more information call 01235 826868, email sales@rmplc.co.uk, or check RM's Web page at http://www.rmplc.co.uk/.

Nildram

Nildram Online, a new spin-off from a British shareware publisher, plans to offer a variety of Internet access services including full SLIP or PPP access at prices well below the going rate of between £10 to £15 per month.

Nildram plans to charge £20 per quarter as a starting rate for





Left Frame's own Web pages were produced using WebWorks
Below Free Agent is a radical improvement over earlier Windows news readers, and works as well offline as it does online

PPP and SLIP users. This will include a limit of ten hours per month, on the length of time users can remain online. Each additional hour will cost £3.

It will also offer access to Telnet and FTP as well as email and newsgroups through its Shareware Support BBS, to its subscribers. Nildram will also help other BBS owners who wish to offer email and Usenet news on their systems.

At the moment, the only point of presence is at Tring. There are other points available across the country but these are only available via the standard rate, unlimited use account, which costs £30 per month.

Nildram Online is on 01442 891331 or email info@online.nildram.co.uk.

Free Agent

Several British companies have been beaten to the punch by Forte which has produced Free Agent; a newsreader which the company claims is streets ahead of its competitors in most respects.

Previously, because most Internet software originates in America where local telephone calls are free and unlimited Internet access is often provided by organisations, there have been few offline news readers available.

The company says that Free Agent works equally well either on or offline and can be extensively customised. Typically, a dial-up user would set up to connect, then download only the headers to articles in subscribed newsgroups, then disconnect. Any subject lines of interest could be marked. The body text of the selected articles would be downloaded following reconnection.

Several tasks can be undertaken simultaneously, so users can read messages that have already been downloaded while it connects to a news server, reads new headers and downloads messages.

The commercial version, Agent, will cost $40 and add more sophisticated email handling features such as the capacity to filter out messages from specific, boring or offensive posters. There will also be a spelling checker, user-defined folders for organising messages, and full technical support will be offered. It is free of charge for evaluation or non-commercial use.

Usenet is one of the most popular uses for the Internet and until now relevant Windows software in this area has lagged behind both email and Web browsing packages in terms of ease of use and functionality.

Anyone with a Windows PC and full Internet access should check out Forte's Web pages at http://www.forteinc.com/ or its FTP site at ftp.forteinc.com and look in the pub/agent directory.

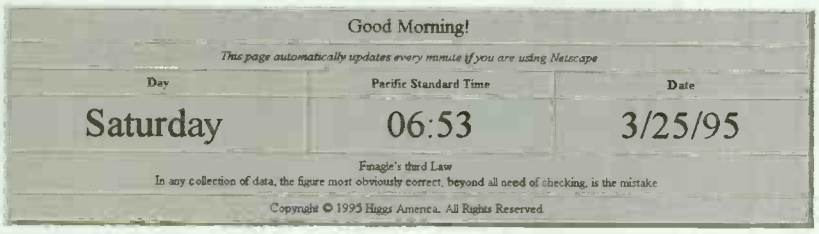
Forte's email address is agent-info-www@forteinc.com or you can call them on 001 619 4316400.

NetScape Navigator

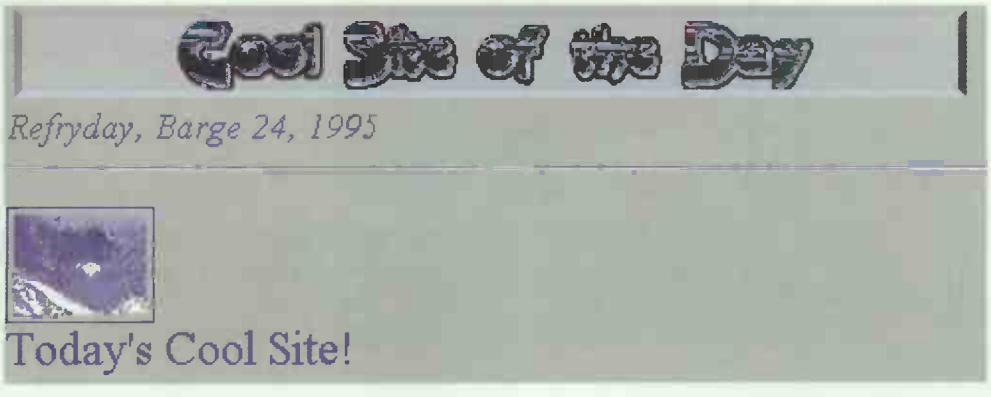
It would appear that NetScape Navigator has become the Web surfer's choice almost overnight. Various, although unscientific, surveys of browser use around the Internet suggest that between 70 and 80 percent of browsers now use NetScape. One such survey is at http://WWW.netaxs.com:80/%7Ejay-far/sursays.html and it holds pointers to several others.

Although the NCSA's freeware browser Mosaic has recently been enhanced to give Navigator a run for its money, NetScape is not standing still. The latest version, Navigator 1.1 for Windows and Macintosh, has fixed a few bugs and added improvements to the interface. Controversially, it includes some support for features included in HTML 3.0, a standard yet to be ratified.

Version 1.0 used some non-standard instructions to display centered and blinking text. Version 1.1 builds on this to add support for tables and documents that update themselves. An example is the Higgs WWW Clock at http://www.higgs.com/x.acgi$Time, which updates every minute and displays its information in



● *This clock, which updates every minute and appears in table form, is part of the new NetScape Navigator 1.1*



Top *A NetScape Enhanced page — you may find the enhancements garish*
Bottom *The same page when viewed by Mosaic, which doesn't have the same features as NetScape*

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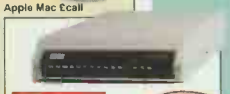

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tabular form.

It also allows Web page authors to specify a page background, coloured text or other, fairly limited enhancements to the look of a page.

All these changes are handy but they are also beginning to cause the Web to fragment. A page designed to look attractive when using NetScape may not look the same in Mosaic.

Differences seen so far have been largely presentational. But if the capabilities of Navigator and other browsers continue to diverge, users may have to keep more than one browser on their hard disks, just to ensure they can make sense of documents on the Net which have been differently formatted. NetScape is aware of this concern and has pledged to ensure that its browser will conform to standards.

The new version of Netscape includes more features and there may be even a newer version available soon. So, for the latest information check out NetScape's home page at http://home.netscape.com/home/welcome.html.

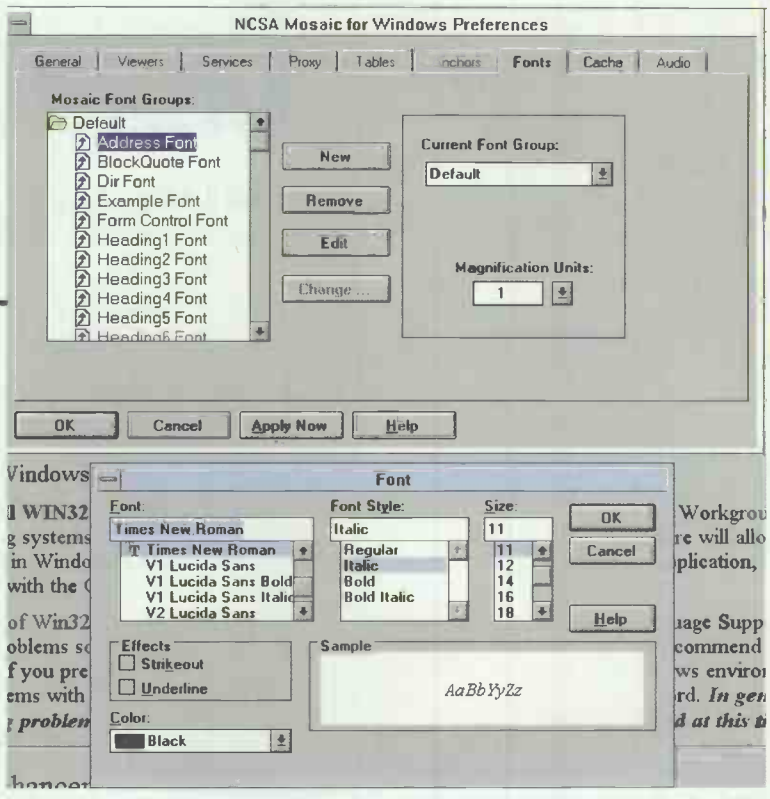
NSCA Mosaic 2.0.0 Beta (Mosprefs)

When the original NetScape Navigator was launched, it quickly overtook Mosaic in popularity because it was significantly easier to install and had a number of built-in enhancements, most of which provided welcome speed improvements.

The latest version of NCSA Mosaic for Windows returns it more or less to parity with NetScape. Both allow you to view the text of a document before the images finish loading and you can follow a link to another page while this is happening.

In addition, setting up Mosaic is now much easier. Whereas configuration used to be carried out by editing a text file, the authors now allow users to customise settings using standard Windows controls.

● *Mosaic now offers control over its settings from a standard Windows dialogue box. It also allows more detailed user control over fonts for display than NetScape*



Unlike most other browsers, Mosaic 2.0.0 only works as a 32-bit application, so users not running Windows NT, or beta copies of Windows 95, must additionally install Microsoft's Win32s software on their systems.

At present, the chief advantage of Mosaic is that unlike NetScape it is free, even for commercial users. Its various licensees can charge for it though and it cannot be commercially distributed to others without the licence.

On the other hand, NetScape Navigator is freely distributed but you are only licensed to use it without charge if you are a non-commercial user or if you are evaluating it with a view to purchasing a copy. The full version comes with 90 days' free support and costs $39.

The latest version of Mosaic is about 1Mb in size and requires the latest version of Win32 from Microsoft. This takes up another 2Mb, but don't let that put you off.

For the latest news about Mosaic, look at http://www.ncsa.uiuc.edu/SDG/Software/Mosaic/NCSAMosaicHome.html.

Quarterdeck Free Guide

Quarterdeck UK has produced a free 19-page pamphlet which is a well-written, basic guide to the Internet. Although it is no substitute for a book on the subject, it is nevertheless worth a look and is called "Discover a New World".

It can be requested by calling 01245 496699 or faxing 01245 495284.

Science Museum on the Superhighway

Last time I went to the Science Museum its coverage of the computer world was sadly lacking, but it has now clearly resolved to pull its socks up.

It is mounting an exhibition called Information Superhighway which will feature an introduction to the technologies involved. There will be a "Surf City" where visitors can see what it is like to be connected to the Internet, and a future technology section will feature demonstrations of online shopping and interactive television. This latter should be fairly realistic since the whole exhibition is co-sponsored by BT and Oracle, both currently working in this area.

The Science Museum is on 0171 938 8080.

CompuServe

CompuServe has purchased Spry Inc, the company which sold "Internet in a Box", a pre-configured bundle of Internet applications. A Lite version of the software is likely to be downloadable for CompuServe customers and the new CompuServe Member CD-ROM should have a similar package in addition to the new version of WinCIM 1.4.

CompuServe paid $100m for Spry, which will be at the heart of CompuServe's new Internet Division.

USR

US Robotics wants your stories about how you use the Internet to use in a new free booklet to be entitled "The Internet Case Book". If your story is published, USR will give you a Sportster 14.4 modem.

Send your stories to Nicola Casey at US Robotics. Call 01734 228200 or fax 01734 695555 for more details.

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Quality lines

by Stephen Cobb

Like many other people I recently gave in to temptation and purchased a V.34 modem. Because the dollar has been weak, I was able to get one from the US for just under £140 (plus taxes). I chose a US Robotics Sportster but had to settle for the internal model: first, the external models were back-ordered at least three weeks; and second, I had no spare serial port with a 16550 UART chip, which you need to make the most of a V.34 modem.

I installed it in a 486SX/25 where it replaced a Zoom V.32bis modem. Lately the Zoom had been performing poorly; it could have been the modem itself, the lack of IRQs in the rather crowded computer (hand scanner, SCSI card, sound card, network card, two IDE drives plus a Bernoulli) or deteriorating line conditions (that insulation has a naturally tendency to wear off). The Sportster went to work with no trouble, once all the comms software setups had been changed: WinCIM, WinRAMP, and Netmanage Custom TCP/IP for my PPP Internet connection.

The QuickLink II software that came with the Sportster, however, caused a problem. Like many newer comms packages for Windows this replaces the standard Windows comms driver (replacing the comm.drv= entry in SYSTEM.INI). This makes sense as comm.drv does not fully support today's higher modem speeds. Unfortunately, I have not been able to get the Sportster to run Netmanage TCP/IP with anything but the original comm.drv, which means that the modem hardware is being restrained by the driver software. I hope to report a fix in next month's column.

Despite this, and although my CompuServe connect point is limited to 14.4kb/sec, the performance seems much better, with fewer lost connections and faster file transfers, particularly when accessing Web pages. There may still be a problem with my line as I sometimes get "Unable to Locate Host" messages when browsing Web links. However, simply trying the link again successfully locates the host in most cases.

While checking out the US Robotics support section on CompuServe (GO USROBOTICS) I found some useful tips on V.34 connections and can thank US Robotics for letting me pass them on. The most important one is: "Very few people can get consistent 28,800bps connections." This is not due to any weakness in the modem design but to the limited specifications of analogue phone lines. Speeds of 28,800b/sec require "pristine line quality along the entire length of the connection". However, VFC and V.34 modems are capable of pushing the limits of analogue phone lines, "commonly offering connect speeds of 21,600, 24,000 and even 26,400 b/sec".

US Robotics believes that variations in line quality are mostly to blame for low connect rates. Most people are familiar with calling someone to chat and getting a bad line. You either suffer through the interference and keep the call short, or hang up and call again to get a better connection. Sometimes modems hit bad connections too and cannot make much progress until they drop the connection and try again (which is where the auto-resume feature of the Zmodem protocol comes in handy). However, you will want to investigate the line quality of your connections "if you find that you never or rarely connect at rates above 19200 b/sec". Here are some suggestions:

1. Try calling a different location. Line quality varies geographically and it may be a problem with the lines or with the modem at the other end of a call.
2. Try connecting with a local call. Sometimes the connections within a long distance call can cause impairments. If this isolates the problem, you can try complaining to your phone company.
3. Try plugging the modem into a different phone line or wall jack. US Robotics suggests: "If you know someone else in your area with a high-speed modem, ask what type of connections they make. Try making the connection from their location. If you encounter the same low connection rates, the problem may be resulting from impairments along the lines running to the local telephone company or within your home or office. Your telephone company or a private consultant may be able to help."

MICROMART
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Stephen Cobb splashed out on a US Robotics Sportster modem which went to work with no trouble. The QuickLink II software that came with it, however, took some time to settle in

Modem configuration and software setup can also affect connection rates and throughput. When there is a sharp decrease in line quality during a call, your V.34 modem will switch to rates as low as 4,800b/sec to compensate for these changes. If the loss of quality is severe, it will drop the connection.

However, VFC connections can only switch rates down to 14,400b/sec. If you connect using VFC and line quality drops below that allowable for a 14,400 connection, the modems will disconnect. If this occurs frequently for a particular call, you will want to disable VFC before calling that modem again. A different modulation protocol (V.32 bis, for example) will be established and will allow the modems to switch to lower bit rates as line quality warrants. If you are using a US Robotics modem, you can give the modem this command to disable V.FC: ATS56=128.

You must remember to return the modem to its original configuration after the call is completed by resetting the modem or entering ATS56=0. US Robotics believes that some VFC modems from other manufacturers do not support rate switching and so these connections "are more likely to drop". For these calls, you can force a lower connect speed by locking the modem to a lower link rate via the &N command, or disable VFC by entering ATS56=128. Remember to reset the modem or return it to its original configuration after the call is completed (AT&N0 or ATS56=0).

Both V.34 and VFC connection rates are based on the phone line's available bandwidth. Modems of this type test the phone lines before establishing a connection rate and then select the highest symbol rate allowable. In general, a higher symbol rate allows greater speeds but requires greater bandwidth. If the bit rate is much lower than the maximum bit rate supported by the symbol rate, the phone line has noise or other impairments on it. Note that when using V.34, the modem can operate at either of two frequency ranges for any of the given symbol rates. This allows it to select the frequency range of better quality for that call.

Mercury without wings

About the middle of last November I contacted Mercury for a response to a number of messages I had received complaining about poor data connections. I got a call back saying that someone would be looking into the matter, but heard nothing further. I tried again more recently and again received a call saying that Mercury engineers were being consulted. By the time this article went to press I still had not heard from Mercury.

If Mercury replies, I will pass on its remarks in this column. Meanwhile, I am going to share with you the messages I sent Mercury because I don't think holding them back any longer is fair to the people who took the trouble to contact me.

As an example, one reader reported that he signed up for the PC User Group link to the Internet, called WinNet, and had many problems getting reliable connections via Mercury, mainly during the day. He checked all the possible physical and software options.

After a few weeks, he says: "I got fed up enough to ring the technical support at PC User Group who, after one or two alternative solutions, gave me a BT number to try, saying that they had some experience of poor data connection via the Mercury serviced number they give out as default...I have not had a problem since. My obvious conclusion is that the Mercury line was of much poorer quality than the BT line."

A commercial user who makes two data connections per day from the UK to the Seychelles, using V.32Terbo modems, writes as follows. "The performance [over Mercury] was abysmal, with many calls dropping out and poor throughput. Fortunately our modems (Sonix) can return quite a few parameters about the line, including the delay. This is the delay for

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the signal to travel to Seychelles and back again. For a normal satellite circuit (one hop), this should be around 0.5 seconds. That's 23,000 miles (or so) up, down and back up, down — 92,000 miles divided by 186,000 miles/sec.

"However, our modem was returning figures of up to 1.3 seconds. After much digging within Mercury I eventually found an engineer who could trace our calls. He reported that they were being routed via India which involved two satellite hops — as borne out by the delay figures. We then switched to BT and the delay figures were consistently 0.5 seconds. Better still, the number of failed calls reduced dramatically and the throughput improved. Mercury claim that once a call leaves their international switch, they have no control over the routeing. That may be true — their calls to Seychelles certainly don't take the same route as BT's. Of course, BT manage Intelsat which has a bird right over Seychelles, so it makes sense for them to put their calls on that. Possibly BT exclude Mercury from using direct routes if they can."

Here is another example: "I am convinced that Mercury restricts the bandwidth to domestic customers, but doesn't advertise the fact, figuring that most customer won't notice because they are voice only. The connection sounds different between BT and Mercury as well, almost as if it's clearer via BT. I've used Mercury at home in South Kensington, and at work using an office Mercury connection, and in Ruislip, and I had identical experiences: restricted bandwidth and poor connections. BT has been fine for the last two months with dozens of perfect 9600 connections."

Another reader says: "I often call bulletin boards in the USA using a V.32 modem and have had the following experiences concerning the various international carriers. With BT I can connect at 9600 with no problems over 90 percent of the time. The modem takes about 15 seconds to connect, though. With Mercury, I can almost never connect at 9600 or 4800 baud, but can connect at 2400 over 90 percent of the time. I now use BT exclusively for any USA bulletin board downloads, because I find that I am online for roughly half the time so it works out cheaper even though the cost/min is higher."

If I get any more input on this I will pass it on to Mercury.

Hackers cut off

The following events didn't happen in the UK, but they could have. A few months ago, on a sunny Sunday morning, Internet users in central Florida found they could not dial up their local provider; they could dial the number, but they couldn't log on. This is not a back bedroom bulletin board but a commercial operation, run by people with many years of Internet experience. Calls to the provider's office found the line engaged.

For some users it was a couple of days before the cause of the problem was revealed and a fix was obtained. All the user passwords had been changed. Was this a prank? A sophisticated hack? No, it was a deliberate action on the part of the provider. Here is the message that customers received, either over the phone or by snail mail:

"There have been reports all over the country about break-ins to computer systems on the Internet for the past several weeks. On Friday, the 3rd of February, it became clear that these had occurred on several local systems, specifically at a local college and at least one local high school. The reason these systems are important to us is that we have a number of users who also have accounts on those systems, and who telnet back and forth from those systems to ours.

"There was significant damage done at the college as a result of those break-ins. Files were destroyed, and several Unix systems have been taken off the network because they were compromised. Several machines were found to be running 'sniffers', programs that spy on information going out onto the Internet. They can be used to capture login/password information when someone telnets from an affected machine to another computer. Then, the person reading the log can log in to the other computer, plant another 'sniffer' and gain access to other systems, all by hijacking someone's account.

"Sniffers were also found at one high school and in light of this information, it became apparent that some of our customer passwords could have been available to the people who planted the sniffers. Other software found at those sites would allow such an individual to do severe damage to the system. Based on this, and the advisories issued by the

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Computer Emergency Response Team, the staff decided to take immediate action. It was impossible to notify you any sooner via mail, and email could not be used because accounts might not be secure.

"We spent Sunday installing a new operating system which has security patches to defend against the sniffer software and related programs, and we issued new passwords to re-secure any compromised accounts. One member of staff spent about six hours on the phone on Sunday and 12 hours on Monday trying to notify customers of the password change and help those that needed it. Several other staff members put in a great deal of time doing the same. Our security expert spent much of Saturday generating the new passwords and the letters that went out, and all of Sunday putting the new operating system on our server.

"We knew that this would involve a great deal of work, and we did not undertake it lightly. The result was that the system was down for about 12 hours, and some of you didn't have access to your accounts for an additional day or two. We apologise for this, but note that the alternatives could have been much worse. No files were destroyed or damaged on our system, and we had minimal downtime. Allowing the situation to remain the way it was so that we could give you ample notification time could have resulted in loss of data from your accounts, major system damage, and a much longer recovery period.

"To sum up, we hope we never have to do anything like this again. You can help by protecting your account and your password as explained in the letter we sent. If you have an account on another machine that you use to telnet to our server, please make sure that account is secure. If you have questions about the security of that account, please speak to your system administrator."

My purpose in passing on this account is not to alarm, but to raise awareness. To put it into information security, or "infosec", jargon, the customers of this regional Internet provider suffered an "indirect denial of service" attack. The effect of hacking activity in their area was to prevent them from using their accounts for a significant period.

The Internet provider's sensible action ensured that security compromises were kept to a minimum. As soon as they were informed of what was happening, the customers involved were appreciative of such prompt, albeit drastic, action. The provider has given permission to share the details of this incident, thus enabling others to learn from their experience — in marked contrast to the attitude of some larger companies. The American company GE, for example, found its computers invaded from the net last November, but refused to discuss the details.

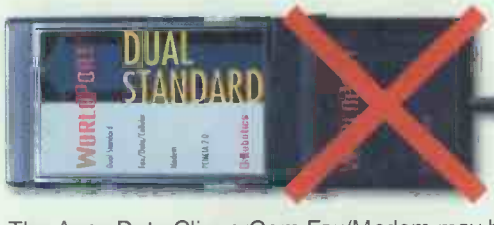
At this point I can almost hear some readers muttering: "Attacks like that might be bloody annoying, but they hardly portent the demise of the Internet." Sadly, I cannot agree. I say "sadly" because I believe the Internet, together with its logical extensions, the bulletin boards and commercial services, has the potential to become one of civilisation's greatest achievements.

Consider this statistic from a company called Input, based in Mountain View, California. At current rates of growth, there will be an Internet connection for everyone on the planet by the year 2009. It remains to be seen whether there will be any noticeable reduction in the demand for new Internet accounts due to these problems.

The problems include the SATAN program, one of a number of "security testing tools" promoted by people who think that uninvited freelance testing of network security is a public service. Someone needs to ask these people if they would welcome me testing the security of their TV or car radio with my crowbar. Just because something is digital doesn't mean it belongs to the world in general. Snatching private messages from the ether and reading them is no different from the postman opening your letters before he delivers them. The sooner we dispense with the adolescent notion that hacking into other people's computers is a bit of lark and recognise it for what it is, electronic voyeurism, the sooner we can get on with building a global network that works for people, not despite them.

PCW Contacts

Stephen Cobb can be reached on CompuServe as **72662,546** or the net as **cobb@iu.net**. He is currently at work on a new edition of his Guide to PC & LAN Security.



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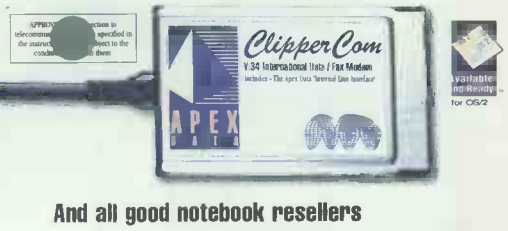

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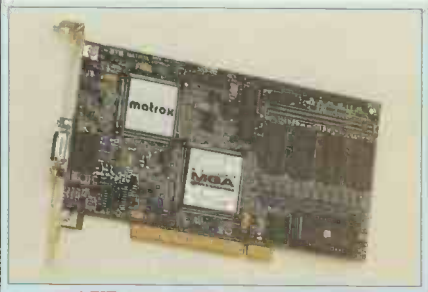

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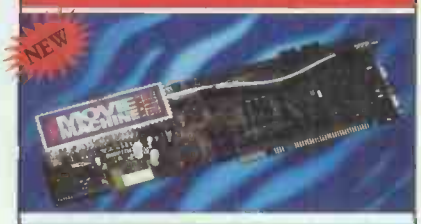

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CUTTING EDGE

net.newbies

Getting started on the Net

If you don't know what a "newbie" is, you probably are one. These pages are designed to be an easy-to-use reference guide to the Internet for the novice — or newbie, as hardened netters will call you.

If you don't understand what I have written or you have any suggestions, please don't hesitate to mail me at David_Brake@pcw.ccmail.compuserve.com, or via "snailmail" — Internet-speak for paper mail.

Meanwhile, here's an easy-reference guide to the tools which will help you make the most of the Internet.

Mail

Almost every BBS and on-line service can offer you some kind of gateway into the Internet for electronic mail — it is the "lowest-common-denominator" service. The standard way of addressing Internet mail is person@organisation.something.something. But the way you send mail out from a local system varies from system to system.

On CompuServe, to send a message to me at CIX you'd type "internet:derb@cix.compulink.co.uk" in the address field. To send a message from the Internet to my CompuServe account (70007,5442), you'd send to "70007.5442@compuserve.com".

Because many users are limited to electronic mail-only access to the Internet, a number of ways have been devised to allow you to read newsgroups and search for and download files. All these methods are very clumsy, though, and not to be recommended unless you are desperate or don't have any choice.

One of the most commonly asked (and understandable) questions about the Internet is "how do I find a person on the Internet?". There are at least ten different ways of doing this, none of them particularly reliable. It is a subject in itself : to get a mail message giving some of the options, send mail to mail-server@rtfm.mit.edu with "send usenet/news.answers/finding-addresses" in the body of the message.

It is hardly surprising that finding people is tricky, since there is no central authority with which every user has to register to get on-line, the population of the Internet is growing incredibly quickly, and many companies and individuals don't want their internal electronic mail addresses listed.

Mail was Tool of the Month in last October's Internet column.

Newsgroups & Mailing Lists

The ability to read and post to these is probably the second most popular service after mail. They are the equivalent of forums or special interest groups on bulletin boards, and cover every special interest imaginable.

In both cases the idea is simple: any subscriber can post queries or comments which can be read and replied to by all other subscribers across the globe.

A mailing list, as the name suggests, uses mail, which has the advantage that anyone with mail can use it. Accessing newsgroups requires a newsreader program — there are dozens available — and they generally allow you to organise messages by subject and produce "kill files", which enable you to ignore messages on boring subjects or by boring or offensive people. (Sadly, there are a lot of the latter, and the problem is getting worse.)

Specialist newsgroups such as bionet.molbio.embldatabank (discussion about the EMBL nucleic acid database) generate a manageable number of messages each day. But a popular newsgroup like rec.arts.movies generates thousands of messages a month from its huge readership — estimated at 100,000 in May last year, which means it could be twice that now. Reading through a couple of newsgroups of that size without sifting through them beforehand could be a full-time job and run your phone bill into the stratosphere.

WWW — the World Wide Web

This tool was designed at CERN (the European Laboratory for Particle Physics) in Switzerland. As discussed in the July issue, it is by far the sexiest interface to the Internet, and if someone wants to produce an impressive Internet demonstration, nine times out of ten they'll use WWW to do it.

The good news is that it can provide a graphical front-end to almost any Internet resource, and like Gopher it provides links to information all over the Internet. The bad news is that unlike Gopher, it lacks mature search tools to allow you to find just the item you want. Instead it encourages you to browse from link to link. This is a good way to learn and have fun but a poor way to get things done.

There are many WWW searching tools you could try — the best one is probably the Yahoo search page at http://akebono.stanford.edu/yahoo/bin/menu?185,16. There is a less user-friendly but more comprehensive database called Lycos that might be worth a try if the Yahoo index draws a blank — it's at http://lycos.cs.cmu.edu/cgi-bin/pursuit..

The WWW's graphical interface requires a lot of speed. Unless you have a V.32bis modem, you may as well forget about the pretty pictures, alluring sounds and even video clips on the Web. A large number of the more interesting resources on the Net are arriving on Web servers, so it's worth knowing that a much faster, if less glamorous, connection to the Web is available via telnet (see the telnet entry opposite).

For the moment, at least, CompuServe subscribers have no WWW access at all, and most other BBS-based services like Delphi and CIX offer text-only access. For full graphical WWW access, you need a TCP/IP connection (ask for it by name).

Gopher & Veronica

Gopher, designed in 1991 at the University of Minnesota, is called that because it "goes for" information and

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because the football team at the college is called the Golden Gophers.

It resembles the WorldWide Web in that it provides a way of linking together different information resources. While the WWW provides links in the form of "hot buttons" on pages of styled text with pictures, Gopher takes the form of a series of menus and sub-menus on each server, some of which lead to other Gopher servers.

CIX and some other service providers allow you to run it from their systems, but if your provider doesn't have it set up you can download your own Gopher client software and use it or telnet to gopher.ebone.net to try it out.

Rather than wander through the maze of menus to find the information you are interested in, you can use Veronica to search through all the menu entries on all the world's Gophers (in theory) for the information you want. To use it, direct your Gopher software to info.mcc.ac.uk and select the Veronica menu item.

Gopher and Veronica were featured in August's Internet column.

Anonymous FTP & Archie

Both these services are all about files — how to find them and how to get them. FTP stands for File Transfer Protocol. It is "anonymous" because FTP servers require a username and password before you can connect to them but allow you to connect to parts of them by giving them a login name of "anonymous" and your email address for a password.

Once you are connected, looking around the server for a file usually works much like DOS. DIR or LS tells you the contents of your directory, cd directory-name puts you into that directory.

There are several graphical interface programs available to make FTP easier to use.

Many files stored on other servers are compressed or encoded in various ways, indicated by an extension at the end of the file name. .HQX, .TAR, .ZIP, .SIT and .ZOO each indicate a different kind of file requiring one or more utility programs to convert them.

Finding the file you want on the Internet is not as hard as finding the person you want. But it is still not straightforward or dependable.

There are several tools available to help you find specific documents, but Archie is, as far as I know, the only tool which helps you find the file you want from the 2.5 million or more binary files in its database. You can use it via mail (send mail to archie@doc.ic.ac.uk to find out how), via telnet (to archie.doc.ic.ac.uk or one of 23 other Archie servers), via the WWW (http://src.doc.ic.ac.uk/-archieplexform.html) or using one of several pieces of front-end software.

If you know the name of the file you are looking for, your task is fairly easy. Archie allows you to search for exact file names or files containing a set string. If you don't know the name and it isn't obvious, life gets more difficult. There is a database which indexes files by keyword — it's called "whatis" — but it isn't very well kept.

Archie is supposed to provide a complete index of publicly accessible files and each of the several available servers should have the same data.

This is not the case in my experience. Each night, the servers index one thirtieth of the files on the Internet, so they should be a maximum of a month out of date. Unfortunately, the Internet is growing so fast that being a month out of date can exclude many files. Also, not every publicly accessible file archive is indexed. Demon, a service provider for personal and small business use, maintains a 5Gb archive of useful software at ftp.demon.co.uk — because of a technical problem, Archie used to be unable to index Demon's files, but it now can.

Lastly, each server seems to have a slightly different database, so if you're sure a file is out there somewhere but you don't find it on one of the UK servers, try one in the US.

Telnet

This is probably the easiest command to understand — telnet to a site by running one of the many available telnet programs (in many cases this is as easy as typing telnet <site> from the prompt of the computer you normally dial into) and you will be confronted by the login prompt of your target computer. Whatever you type will be transmitted directly to the remote computer as if you were typing on its keyboard, and its replies are sent back to your screen.

Normally when you log in like this, you either have an account on the target machine already or it is set up to give you access for specific tasks. To see what you can do, try telneting to telnet.w3.org (a computer in Switzerland). This gives you text-only access to the World Wide Web. The Web program runs on the Swiss machine, but you can manipulate it from the comfort of your chair. PCW

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With four test channels of digital TV being broadcast in London this very moment, the focus is moving to the acquisition end of the business, and video recording directly to disc for electronic news gathering (ENG). Over the past few years, ENG has been the cutting edge of broadcast technology, with news gathering companies like CNN demanding ever smaller camera/recorder systems and the fastest possible methods of getting a broadcastable news item back to the studio.

In the old days, a foreign report would be made on 16mm film which would have to be flown back to the TV station, processed and edited before it was transmitted. This worked remarkably well, although at a high cost because of all the transporting and the number of people involved. Today, the use of portable satellite links which can run off a car battery means that reporters can deliver live-to-camera reports from virtually anywhere in the world. Although not cheap, the cost of the satellite links are now considerably lower than those involved in physically transporting film or tape half-way around the globe.

But there are always further demands for delivering completed reports on-air at even higher speed and less cost, which has lead to the development of the portable hard-disk camcorder.

Panasonic, which has already done well in the broadcasting world, has come up with its DVCPRO, a hybrid video format which can use video tape and phase-change rewriteable optical discs for storage.

The video is kept in the digital domain and is data compressed at a 5:1 ratio so that it isn't quite up to full studio quality, but is of the same quality as the other acquisition formats used currently by ENG teams worldwide. The compression doesn't lose frames of video which is important because it means that the video can be easily edited, which is not so easy using a system like MPEG which must have complete blocks of frames to decompress the images properly. Usually, a new video system is inextricably linked with its physical tape format. Panasonic has gone for a system that will record on a 1/4in video cassette tape or onto the rewriteable optical disc that gives 45-minute recording — more than enough for small news segments and usable for longer interviews, given a suitable break to drop in a new disk.

In doing so, Panasonic is starting a new way of working with ENG video, giving the news gatherers the chance to edit their reports in the field before transmission back to the studio, rather than sending back the raw footage to be edited in the studio.

Videotape editing can be a time-consuming job. As with any linear system, if the editor decides to change an edit at the start of the piece, then everything after the new edit has to be re-done. Since video editing needs at least two videotape machines, plus video monitors and vision mixers, it can't easily be done on the move.

But computer-based non-linear editing is a different matter. Placing the video onto computer gives the editor instant access to any clip. These can then be built into a single virtual news item which is virtual because the final result will not necessarily exist as a single linear recording, but as a list of linked references to the original video recorded on the disc.

The laptop field edit package developed jointly by Panasonic and CNN's reporting teams reduces all the traditional editing hardware down to a hand-held package, a dedicated computer with LCD screens for monitors and a disc drive to replace the tape machines.

This will make the news-gathering team even more self-contained. Not only will they go out in the field and record the interview and news footage, they will also edit it on the spot. And as the icing on the cake, Panasonic is working on a four-times fast transfer protocol so that the edited video footage can be downloaded to the studio's main video server faster than realtime.

Speedier news delivery is one plus, although the attraction of further cutting back of staff costs by removing a lot of the in-house editing function is likely to be a strong driving force to the new system.

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Horizons

With a new voice

Bt's new Laureate system takes speech synthesis into new realms of credibility — no longer will we have to listen to Dalek-like mechanical voices coming at us over the wire. Ben Tisdall has his say.

It's Christmas Eve 2010. You're back late from a hard day of electronic shopping on the information superhighway, so late that you've missed the 10 o'clock news bulletin. Of course, you could pull it off the video-on-demand news server, but instead you decide to use the PCTV in your living room to access a news report created just moments before by CNN. Next, a menu of newsreaders appears. You decide to choose Trevor Macdonald, from his younger days in the early eighties, but for a laugh and a bit of variety select Jeremy Paxman's voice. Seconds later your very own news bulletin is being read by Trevor, with Jeremy's voice.

If that scenario sounds far fetched just consider that all the technology required exists today, in its infancy. The movie Forrest Gump uses advanced video editing techniques to lip-synch words that President Kennedy never uttered with archive footage and voice synthesis technology. Now, the Laureate system from British Telecom is able to take chunks of ASCII text and read it aloud in a voice that sounds almost human.

Making machines that talk

For hundreds of years now, people have been interested in creating machines that can talk. Early attempts by the Greeks and Romans relied on straightforward trickery; using voice tubes connected to the mouths of statues. But by 1791 an inventor called Van Kempeln had made the first serious stab at building a machine to synthesise real speech. His machine used a system of leather flaps to imitate the human voice.

The whole business of making machines that talk falls into two distinct categories: those which deal with harnessing real human speech; and those which tackle synthesis of the human voice from scratch.

The former category began with voice tubes and developed into concatenated, or linked, recorded speech as used by the speaking clock for instance (introduced in 1936). Another example is the computerised voice which reads telephone numbers to you from directory enquiries.

The latter category, that of voice synthesis, developed from Von Kempeln's first efforts with bellows and leather flaps, to a mechanical talker invented by a man called Riesz. A talking piano appeared about the same time as the speaking clock.

Advances in computer technology and rapid falls in the cost of digital storage have enabled concatenated speech to become a fairly straightforward and affordable technology, but it does have serious limitations. The vocabulary is limited to words, numbers or sentences that have been prerecorded and it is almost impossible to make it sound natural.

Because the system is unintelligent it is unable to add things, such as intonation, that make the meaning easier to understand. Computer synthesised voices are more flexible. But although there are no limitations on vocabulary, they do tend to sound robotic, lifeless and mechanical. Many of the voice synthesis systems available during recent years originated from research carried out by Dennis Klatt and Jonathon Allen in the late seventies.

BT's Martlesham Heath Laboratories recently announced its Laureate system which is intended to combine the best of the concatenation and purely synthetic approaches. Laureate starts with a recording of someone speaking a carefully structured 20-minute script. This contains all the sounds required to generate natural sounding speech. During the synthesis process, these sounds are matched to the components of written words from a large pool that includes a list of 8,000 names. The names are included with an eye to future applications like automated telephone catalogues.

This approach also has the great advantage that Laureate can be made to mimic a particular voice. For example, the physicist Steven Hawking lost his voice a few years ago and now uses a voice synthesiser. Had he recorded his voice prior to losing it, it would have been possible to reconstruct it using Laureate. Although Laureate's first "voice" is English and male, female voices, regional accents and foreign languages will be added in the future.

Laureate has a fair degree of

Ben Tisdall

intelligence built in. For example, it is able to distinguish between St (saint) and St (street) from the context in which it is used and will correctly read 1cm as "one centimetre" and 20cm as "twenty centimetres".

It also has the ability to correctly read out numbers, even very large ones. It would realise that 32678483924 was thirty two billion, six hundred and seventy-eight million, four hundred and eighty-three thousand nine hundred and twenty-four, far quicker than any human reader.

Laureate will also look out for punctuation and will read out questions with a rising inflection. This is more crucial to comprehension than one might think as questions are often written as statements, for instance; "she's still married?" The meaning of this phrase changes depending on which word is emphasised. Try reading it out loud for yourself.

The BT engineers who developed Laureate say that there were two main constraints when they were developing the system: technical constraints and theoretical unknowns. Technical constraints have receded during the past few years as the price of memory, storage and processing power has fallen.

The reducing cost of memory was a particularly important factor as it allowed the flexibility to save small portions of speech and nail them together, end to end on the fly, but theoretical unknowns or lack of knowledge about how the mechanics of speech are put together remained a problem. The BT engineers' response was to develop an extendable architecture for Laureate. The interface mediates between the linguistic object, which is a dynamic database of information, with a simple understanding of the structure of language and a whole range of language models and theories (see diagram).

These satellites, as BT calls them, are completely isolated from the rest of the system and each may have its own internal linguistic structure unlike any of the others. Satellites which need a lot of linguistic information can be placed after components which add a lot of information to the linguistic object. Although satellites are separate, the linguistic rules they contain frequently overlap with others. For example, text normalisation is the satellite which copes with distinguishing between St, Saint or Street.

Phonotactics and Parsing are both involved in working out how similar words are pronounced, but in different ways. Phonotactics decides how Laureate tackles a word ending in "ough" and whether it sounds like cough, plough or enough. Parsing breaks down sentences into separate words and will work out from the context whether the word "bow" is a verb or a noun and how it is pronounced.

Often, Laureate uses a process called "constraint satisfaction", where for example a question in a sentence has to pass a number of tests. Does the sentence start with a "wh" word like who, why, what or where, and are there clues in the intonation at the beginning and end of the sentence as to whether or not it is a question?

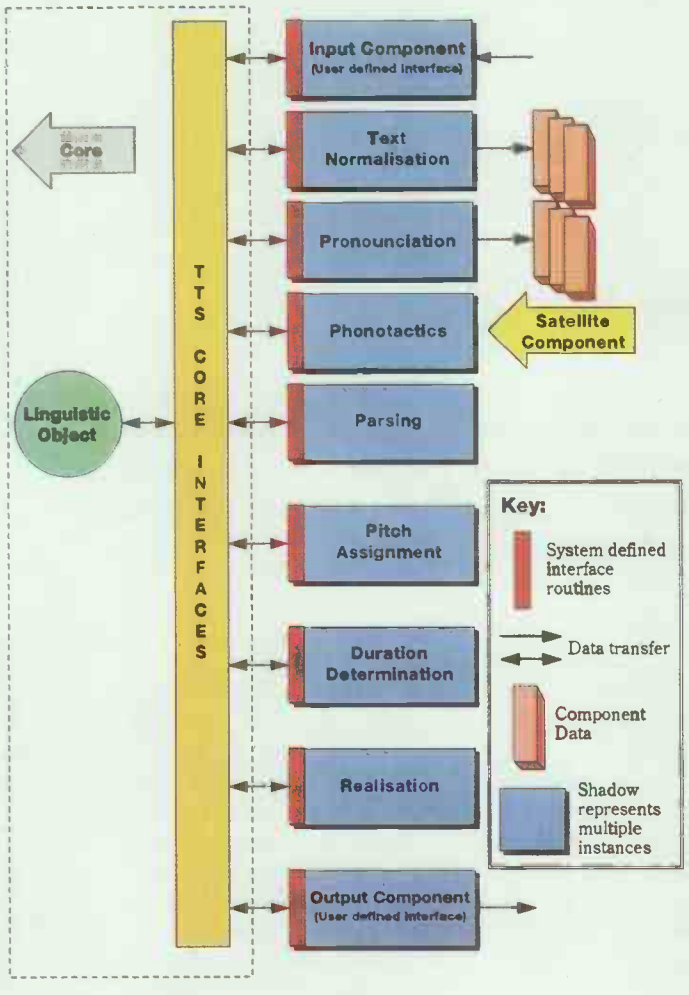
Laureate's architecture also makes it relatively straightforward to port the program into other languages with different linguistic rules. And because it is written in ANSI C running under Unix, it should be easy to port to different platforms. It is already running on HP and Sun workstations as well as PCs. Sadly, BT has no plans to release Laureate as a shrink-wrapped application but the prototype version currently being demonstrated has a particularly unpalatable command line interface.

Researchers who work in language synthesis apparently tend to suffer from what is known as the "golden ear" effect, where they lose their ability to distinguish between the quality of different speech synthesis technologies. So the quality of Laureate was tested by assessing the listening effort required by test subjects to understand a series of sentences.

At Laureate's launch, BT played synthesised sentences from Berkeley Systems' Best Speech and from Dec's Dectalk. Laureate easily outshone the others although it did appear to have a marked Scandinavian accent — or is it just that Scandinavians speak English like robots?

Although the concept of a personalised TV newsreader is still years away, there are already masses of application possibilities for Laureate. An automated telephone-based catalogue ordering service is one. Laureate would be able to read out the contents of the catalogue held in a database. It would also be able to read back the address to which the item is to be sent. This is an application where the sheer quantity of data would render using pre-recorded speech impractical. Another application that BT proposes is to allow the police to check car registration details by dialling the Swansea computer direct and getting that computer to read the details back. And for people who have lost their voices, Laureate could help them speak again.

The structure of the Laureate software



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PC's & Compatibles

Dabhand Desktop PC's

All Dabhand systems come complete with a 1 year return to base warranty, 486 systems include desktop or mini tower case, 486 VLB "Green" Motherboard 256k CACHE 7 slots Inc. 3 VESA LOCAL BUS, 4Mb RAM, 1.44Mb floppy drive. Viewsonic 14" Non Interlaced @1024x768 Low Radiation MPRII 72Hz 0.28 Dot pitch "Green" Monitor, Avance Logic VLB 1Mb 2nd Generation GUI and DOS Accelerator "Green" SVGA Card 16.7 million colours (20% faster than CIRRUS 5428), Fast 16550A VLB I/O (2 ser. / 2 par. / 1 games port), 102 key keyboard, 3 button mouse, Windows 3.11, DOS 6.22 (full versions supplied), Multimedia option consists of Creative Soundblaster 16 Value, Panasonic 56x Double Speed CD-ROM & Speakers.

486 Systems	420Mb	540Mb	730Mb	M/Media
u486 VLB SX-40Mhz	749	769	799	+170
i486 VLB DX2-66Mhz	839	859	889	+170
i486 VLB DX4-100Mhz	899	919	949	+170

Pentium systems as above with the following changes - 4PCI / 2VLB / SIS/A 256k CACHE Motherboard, 8Mb RAM.

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Swift 200/240 ASF	65	Swift 9x/24x ASF	119

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LX1050	172	LQ150 Mono	115
LQ150 Colour	145	LQ300	146
LQ570+	185	LQ870	349

Panasonic

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KX-P2135 Colour	131	KX-P2124	202
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KX-P1624	199	KX-P3626	285

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LC240	96	LC240C	110
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BJC4000	275	BJC600	329
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Deskjet 1600 Colour	Call	DJ/DW Mono OSM	40
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UF322	769	UF755	1469

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PC Components

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Orchid

Kelvin 64 VLB 1Mb	99	Kelvin 64 PCI 1Mb	99
Kelvin 64 VLB 2Mb	139	Kelvin 64 PCI 2Mb	139
Fahrenheit Pro 64 2Mb	255	Fheit Pro 64 4Mb	349

MONITORS

Viewsonic 14" NI1024x768LR	165	AOC 45 SVGA	145

CASES

Desktop Slim	49	Desktop	32
Mini Tower	32	Midi Tower	45
Pentium Midi	65	Full Tower	59

MICE

MS Ballpoint Serial	99	MS Serial Version 2	18
Logi. Pilot Mouse Serial	19	Generic PC Mouse	7

Scanners

Epson

GTx6500 Par+PS LE	516	GTx6500 SCSI+PS LE	579
GTi6500 SCSI+PS full	675	GT8000 Par & SCSI	625
GT9000 Par & SCSI	740	GTx8000 Par+PS LE	675
GTx8000 SCSI+PS LE	675	GTi8000 SCSI+PS full	885
GTx9000 SCSI+PS LE	895	GTi9000 SCSI+PS fl	1039

Hewlett Packard

Scanjet 3p ISA	342	Scanjet 3p MCA	342
Scanjet IIcx ISA	674	Scanjet IIcx MCA	674

Logitech

Scanman 32 DOS/OCR	57	Scanman 32 WIN/OCR	57
Scanman 256	82	Scanman Colour	165
Fotoman+	375	Scanman Easytouch	105

Inkjet Refills

Premier Inks

Colour	Single	Double	Colour	Single	Double
Black	5	9	Cyan	5	9
Magenta	5	9	Yellow	5	9
Brown	5	9	Dark Green	5	9
Light Green	5	9	Dark Blue	5	9
Dark Red	5	9	Light Red	5	9
Gold	5	9	Silver	5	9

Also available in the following packs

Tri Colour C/M/Y	17	Bulk (6) 125ml same col.	21
Bulk (12) 250ml same col.	39	Bulk (25) 500ml same col.	59

Items not listed

Dabhand Computing carries a large range of software. Too many items to list on the pages of this advert. If you have a particular requirement for software or any other item that is not shown in our advertisement please ask when you call. Our database has over ten thousand stock items on it and is constantly being updated for content and pricing.

Consumables

Discs- each	10	100	250
720k dsdd	45p	40p	Call
1.44Mb dshd - Preformatted	70p	60p	Call
Branded			
720k dsdd	50p	47p	Call
1.44Mb dshd	85p	80p	Call
Recordable CD's			
74min	6	Call	Call
Disc Boxes		3.5in	5.25in
10 cap. Slimpak		1	1
40/50 cap. lockable		5	10
80/100 cap. lockable		5	10
Posso stackable 150		15	15
Loose labels per 1000		8	10
Laser Labels 100 sheets		20	20
Cables	2m	3m	5m
Parallel Printer	5	7	10
Laplink Cable (Parallel)	-	15	-
Laplink Cable (Serial)	15	-	-
IBM 25F-25M	5	10	15
IBM 25M-M or F-F	5	10	15
Printer 36-36	5	10	15
Mains-IEC or iEC-IEC	5	-	-

Longer cables available. 9-25 Adaptors £5.

Switches

2/1 Parallel Man	13	2/1 Parallel Auto	25
4/1 Parallel Man	23	4/1 Parallel Auto	70
2/1 Serial Man	15	2/1 Serial Auto	45
4/1 Serial Man	29		

Inkjet Cartridges

Canon BJ10e/ex/sx	14	Canon BJ130	10
Canon BJ200 BC-02	16	Canon BJ300	13
Canon BJC600 Black	6	Canon BJC600 Colours	7
Canon BJC4000 Black	22	Canon BJC4000 Colour	34
Canon BJC800 Black	16	Canon BJ800 Colours	18
Epson Stylus 300	13	Epson SQ1170/870	20
Epson Stylus 800/1000	9	Epson Stylus Col. Black	14
Epson Stylus Col. Colour	29	HP Thinkjet/Kodak	8
HP DJ5x0 Dbl.Cap.	19	HP DJ5x0 Colour	20
HP 1200C Black	20	HP 1200C Colours	24
HP Paintjet Colour	20	HP Paintjet Black	18
HP XL Black	15	HP XL Colours	17
HP XL300 Black	15	HP XL300 Colours	17
Star SJ144 Black paper	6	Star SJ144 Col paper	7
Star SJ144 Black OHP	12	Star SJ144 Col OHP	14

Toners

Canon FC Copier	85	Canon PC Copier	90
Epson EPL4x00	60	Epson EPL8100	119
HP 4L	45	HP IIIsi/4Si/4SiMX	85
HP LJ4	69	HP Mk1 (EPS)	59
HP II/III (EPS)	55	HPIIIP (EPL)	49
MT905	24	NEC S60/2/P	105
NEC 266/290	Call	Panasonic 4420	24
Panasonic 4440/30/10	28	Panasonic 4450/55	23
Qume Cryst.	85		

Original Ribbons

Citizen 120D/Swift 9	4	Citizen Swift 24/240	4
Citizen Swift 24/240 Col	11	Epson MX/FX80	5
Epson LQ100	5	Epson LQ400/570/850	6
Epson LQ860/2550	10	Pana 9 pin KXP-115	5
Pana KXP145 24pin	6	Pana KX-P155 24pin	6
Pana 2123 Colour	15	Star LC10/20	4
Star LC200	6	Star LC200 Col	11
Star LC24 range	5	Star LC24/200 C	11
Star XB24 range	8		

Data Cartridges

DC2000	14	DC2120	10
DC6150	18	DC300XL	16

Opening Hours

MON-FRI 9.00 AM-5.00 PM / SATURDAY 10.00 AM-5.00 PM

How to find us

We are situated 800 yds from Junction 17 of the M62. From the motorway junction head towards Whitefield/Bury. Proceed through 2 sets of traffic lights. 50 yards after the second set of traffic lights turn right into Victoria Lane (Beehive Pub on corner). We are 50yds down Victoria Lane on the L Hand Side.

Carriage

Hardware/Software

Standard GB 1-3 working days	8.00
Next working day	15.00
Saturday GB	30.00
Northern Ireland/Highlands 1-3 days	Call

Small Consumables

Standard GB 1-3 working days	4.00
Next working day	6.50

Leisure Items

Standard GB 1-3 working days	2.50

Prices are per order

All delivery times subject to being in stock & unsold.
Please add VAT to all prices including carriage.

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SMS SHAREWARE

Shareware programs require a separate payment to authors if found useful | CD OF THE MONTH: Over 1000 new and updated programmes each month for ONLY £19.99

SUBSCRIBE TO:
SMS – NEWS MONTHLY & RECEIVE 30% DISCOUNT CARD* ONLY £12 FOR A YEAR**
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* ON SHAREWARE DISK PRICES (excludes P&P) ** UK ONLY. NON UK AT £18 PER YEAR

ANTI VIRUS

- ☐ F-Prot 2.14 (£5) - Scans disks, hard drives and network drives.
- ☐ Integrity Master (£5) - Anti-virus and data integrity system.
- ☐ McAfee Anti-Virus Toolkit (£5) – Includes ViruScan and Clean-Up.

BUSINESS EPA SHAREWARE

This unique collection of programs should be useful for farmers, educators, sanitarians, engineers etc.
Supplied ONLY on 3-5 inch High Density discs at £5 per disc.

- ☐ Septic Waste Disposal ☐ unsewered Communities (4 d)
- ☐ Drinking Water Regulations ☐ Water System Education (2 d)
- ☐ Lead Contamination ☐ Water Conservation ☐ RWaste II
- ☐ Health ☐ Landscape Planner ☐ Groundwater Education
- ☐ Surface Water (2 d) ☐ Soil Erosion (2 d) ☐ Site Evaluation
- ☐ Wetlands Education (2 d) ☐ Pollution Prevention (3 d)
- ☐ Fertilizer Storage ☐ Pesticide Storage ☐ Farm Fuel Storage

DESKTOP PUBLISHING

- ☐ Avagio Lite (£5) – Superb top new shareware DTP program.
- ☐ EnVision Publisher 2.0 (£5) – Excellent WYSIWYG DTP program.
- ☐ GeoPublish (£10) – Stuning newsletters, resumés, letters, etc.
- ☐ Ghostscript 2.6 (£15) – View/print PS files on monitor/printer.
- ☐ PrintPartner 3.02 (£5) - Excellent! Make signs & banners.
- ☐ TEX 3.0 (£26) – Public Domain computer typesetting language
- ☐ UltraDoc – Prints text files in multiple columns.

GAMBLING

- ☐ Bookie Breaker – Assist the prediction of horse racing results.
- ☐ Football Forecast – Pool predfction system has special features.
- ☐ Lottery Sciences (£5) – Various helpful programs.
- ☐ Punter's Pal – Is a UK horse racing analysis program.
- ☐ Pools Check (£5) – British football pools checking program.
- ☐ The Winning Formula – Betting sensation to sweept the UK

GRAPHICS and WORDS

- ☐ Action Designer – A Computer Aided System Engineering Tool.
- ☐ 3D House 4.0 – Model of the inside and outside of a house.
- ☐ Draft Choice – Create very detailed drawings. (Reg £56).
- ☐ Easy Word (£5) – An easy to use word processor. 386+ UK.
- ☐ Flodraw (2 d) – Does general flow charting, org. charts.
- ☐ FractInt 18.2 (£5) – Displays fascinating graphics.
- ☐ Galaxy 2.50 – Fast easy to use word processor.
- ☐ GIF Tools – A collection of programs for GIF files.
- ☐ Graphic workshop 7.0c (£5) – For working with graphic files.
- ☐ Home Plan 2.6 – Draws and prints house plans. VGA.
- ☐ Iconvert – Converts between different file formats.
- ☐ MicroCAD 2.0 – Sophisticated drawing program.
- ☐ MIndreader – The intelligent Word Processor. (Reg £72).
- ☐ PC-DOGS (£20) – Is one of the most advanced computer aided design system currently available, and it is Public Domain.
- ☐ pE (£5) – Converts all major WP formats to ASCII.
- ☐ PC Dutline – The dfinitive outliner TSR. (Reg £37).
- ☐ PC Write 4.15 (£10) – Full-featured word processor. (Reg £71).
- ☐ ProtoCAD 3D 2.00 – Is a fast 3D CAD/rendering program.
- ☐ QEdit Advanced – Very popular, small, fast text editor.
- ☐ RGB Techwriter – WP for scientific/technical writing.
- ☐ T Square (£5) – Truly professional CAD package.
- ☐ Versamap/World Digitized (4 d) – Draws maps from co-ordinates in World Digitized.
- ☐ VPIC – A GIF graphics file viewer for VGA/EGA.
- ☐ Vuimage – GIF/TIF file viewer, printer.
- ☐ NeoPaint 2.2a (£5) – Image editing program, include fonts.

PROJECT MANAGEMENT

- ☐ Easy Project – Extensive project management sys.
- ☐ Estibit Plus (£5) – Is an all-purpose estimating system.
- ☐ PCPM – Easy project management program.
- ☐ Phoebe – Tracks clients, contracts, sales etc.
- ☐ Power Quote 3.0 (£5) – Customer price quotes & invoices.
- ☐ ProDev *Eprice 5.0a – Electrical contractor's pricing sys.
- ☐ ProvDev* Quote 5. 0a (£5) – For large stock inven quotations.
- ☐ Quotation Faster! – To assist in providing quotations.
- ☐ Remodel Estimator – Construction cost estimating.

EDUCATION (Pre-school)

- ☐ Amy's First Primer – Six learning programs for ages 4-8 (CGA).
- ☐ Animated Alphabet (2 d) – Teaches alphabet. EGA.
- ☐ Animated Math – Counting, additional and subtraction.
- ☐ Animated Memory Game – A concentration type game.
- ☐ Animated Shapes – Teaches shapes and colour (640k).
- ☐ Animated Words (2 d) – Spelling program.
- ☐ Brandon's Graphics Lunchbox (£5) – Teaches numbers skills. VGA
- ☐ Pre-School Education (2 d) – A collection of simple tests and games with good reward and lots of colours and sounds (CGA).

EDUCATION (Elementary)

- ☐ Elementary Set (6 d) – 34 excellent programs.
- ☐ The Spellbound! Spelling Tutor – First rate.
- ☐ School Mom (£5) – for children ages 4 to 14. Excellent.
- ☐ Spelling Beez 2.0 (£5) – Spelling program that talks. VGA.

EDUCATION (Junior High)

- ☐ Junior/High Set (3 d) – 18 excellent programs.
- ☐ Fast Map (3 d) – Learn about world geography.
- ☐ Math And Logic – 6 math and logic games.
- ☐ MAPIT (£5) – World map/graphing notepad program.
- ☐ World2P 2.0h – Globe! Learn about cities & countries. (CGA).
- ☐ Europe! Europa! – Challenging European geography. Great!

EDUCATION (High School)

- ☐ Anatomy Of The Skull
- ☐ CALFACTS CGSE Physics V4.0 – CGSE revision 1992-93.
- ☐ CALFACTS Computer Studies V4.0 – CGSE revision 1992-93.
- ☐ CALFACTS CGSE Mathematics V4.0 – CGSE revision 1992-93.
- ☐ CALFACTS CGSE Integrated Science V4.0 –
- ☐ Chemical Study Aids
- ☐ Electronics Tutorial (2 d)
- ☐ High School Set (3 d) – 13 excellent programs.
- ☐ Molecular Modelling

EDUCATION (Other)

- ☐ At Ease With Computer Programming 1.4 (2 d)
- ☐ Fast Typing Teacher ☐ VGA ☐ CGA ☐ Mono
- ☐ Tutor 1-2-3 – Also suitable for learning As-Easy-As.
- ☐ Tutor.Com Hypertext V6.2 (£5) – Is a mini-course in microcom puting and DOS trough MS-DOS 6.2.

ENGINEERING

- ☐ AC analyses – Acana and PC-Ecap.
- ☐ Aciran – Linear AC circuit analysis system.
- ☐ Acnet – Electronic circuit analyser.
- ☐ Angles – Measurements and angles for woodworkers.
- ☐ Beam Stress Analysis – PC Bridge, Plans Frame Analysis etc.
- ☐ BTU Analysis – Heating/cooling unit sizing etc.
- ☐ CNC Talker – Direct numerical control software.
- ☐ Cogo – Coordinate geometry program.
- ☐ Elcut (£5) – A 2-D finite element-based structural analysis.
- ☐ Electronic Calculators – Electron. Intrared and RFS.
- ☐ FINEL – Finite element-based structural analysis.
- ☐ Fire Hydrant Flowest
- ☐ Grape 3D Beam (2 d) – Modelling and analysing structures.
- ☐ Groundwater Knowledge Base (2 d)
- ☐ Hydrollo – Design and validation of hydraulic systems.
- ☐ Hydronet – Hydraulic network analysis.
- ☐ LAYOI (£5) – Vector based PCB design program.
- ☐ LE6 (4 d) – Loads-energy simulation for HVAC engineers.
- ☐ Logsim – Universal digital logic simulator.
- ☐ Metal Calculations – Bend, FlangVol. IndTemp.
- ☐ MetricX – Metric-English-Metric units conversion utility.
- ☐ Motorola Database – Entire discrete device list.
- ☐ NEC Database (2 d) – Electrical reference for design engineers of motors, transformers, conductors etc.
- ☐ Oxy-Acetylene Welding Tutor
- ☐ PCTrace 5.1 (£5) – CAD program for printed circuit boards.
- ☐ QuickRoute – Printed circuit board design system.
- ☐ Reinforced Concrete Beam Design
- ☐ Road Model – Road engineering program.
- ☐ Safety And MTM – Chem, Lifting & TMU.
- ☐ SCRL 3.1 (£5) – Semiconductor cross-reference library of diode, transistor and IC devices. EGA/VGA.
- ☐ Septic System Tutorial (2 d)
- ☐ Structural Analysis (2 d) – PC-Strant.
- ☐ Superbeam PC – Structural design program.
- ☐ Survey – A tool to assist surveyors, realtors, etc.
- ☐ Wastewater Treatment – Programs in BASIC.

HOME & HOBBY

- ☐ ACCU Music System 3.2 – Complete music creation system.
- ☐ Astro 2.82 (£5) – Prepares and analyses astrological charts.
- ☐ Biorhytm – Produces charts that can be viewed or printed.
- ☐ Brother's Keeper 5.1 (5 d) – Full-features genealogy program.
- ☐ Christmas (and Birthday) Stuff – for everyone.
- ☐ Complete Cat Care – A series of text articles and charts.
- ☐ Complete Crossword (2 d) – Frustration relief for addicts.
- ☐ Edna's Cookbook & Fred's recipes (5 d) – With 3500 + recipes
- ☐ Fitness Set (2 d) – Four excellent programs on fitness.
- ☐ Herbaceous Plant Manager/Landscape Plan Manager.
- ☐ Home Inventory 4.0 – Keeps track of everything you own.
- ☐ Hymnal Database (2 d) – Searchable database of hymns.
- ☐ Knitware Sweater Design – Design, designs correctors, & prints patterns.
- ☐ Krazy-Face (£5) – A children's colouring art program. VGA.
- ☐ OWZAT! Comprehensive cricket scoring & generation program.
- ☐ Planoman 4.01 (2 d) – Great to create and play music.
- ☐ Marine Navigation (3 d) – A whole raft of navigation programs.
- ☐ Medpas (3 d) – A medical reference program.
- ☐ Noteworthy – WYSIWYG for editing & printing musical scores.
- ☐ Odyssey (£5) – General purpose comms program. Viewdata.
- ☐ PC-Track 3.0 (£5) – Can track up to 8 satellites in real time.
- ☐ Puzzlex – Kills all known crosswords dead!. Excellent UK product.
- ☐ Robinson's Anima, Genealogy (£5) – for animal breeders.
- ☐ Speakeasy Cocktails – Database of 400 cocktails.
- ☐ SkyGlobe 3.52 – Displays stars, lots of features.
- ☐ Telix 3.22 (£5) – Powerful, fast, full-featured, Comms program.
- ☐ The Better Diet Analyzer – Monitor and analyze your diet.
- ☐ Wildcat! (£5) – Complete popular bulletin board system

UTILITIES

- ☐ A Sample Disk of DDS MONTHLY - new small programs for only £4.
- ☐ Disk Organizer – Hard disk de-fragmenter.
- ☐ Encryption & Security (£5) – Codes for experienced users.
- ☐ Gorbh Desktop (£5) – Graphical DOS shell/menu program.
- ☐ Grabber 3.96 – Capture text/graphics screens 2COM file.
- ☐ NeverLock – Removes copy-protection on 100's of games.
- ☐ On-SIde – Is a sideways printing program.
- ☐ PCXDump – Saves graphics screens on PCX
- ☐ PKZip/PKUNZip 2.04g – To create/extract archives. (Reg £37).
- ☐ Power Menu V6 UK (3d) – Excellent file/menu manager. (Reg £37).
- ☐ Q387 V3.3 – Math Accelerator & Emulator. Great!
- ☐ Screen Blanking Utils – Protect monitor from burn-in.
- ☐ Snooper – Displays your system's configuration.
- ☐ XTree 2.00e – The world's most popular file manager.
- ☐ 4DOS V5 (£5) – Improves almost all the DOS commands. (Reg £48).

PROGRAMMING

- ☐ A86/D86 – Excellent assembler & debugger.
- ☐ ANSI Cobol 7.2 – Compiler with tutorial & source. Req Linker.
- ☐ Basic Compilers – BASIC and TSRBASIC.
- ☐ Basic Tutorials – Basic Tutor. PCBASIC Primer.
- ☐ BC-Fortran 77 – Fortran compiler.
- ☐ C Tutorial – Complete guide to learning C.
- ☐ C++ Tutor – Instructional course for C++.
- ☐ CP/M Emulator and Translator – 22 Nice 1.32 & 22 Disk 1.39.
- ☐ F-PC Complete Forth System (5 d)
- ☐ FST Modula 2 Compiler and Tutorial (3 d) – Excellent.
- ☐ Intel Cross – AMS 8048/51/80/85/96 & Zilog Z80.
- ☐ Motorola Cross – ASMS – 6800/1/2/3/5/8/9.
- ☐ Pascal Compiler
- ☐ Personal C Compiler – Fast & powerful compiler.
- ☐ The PC Assembler (2 d) – A86 tutorial and helper.
- ☐ Xxxpert – Fairly extensive expert system.

LANGUAGE/LINGUISTICS

- ☐ Chinese Dictionary (£5) – English words to Chinese ideograms
- ☐ Chinese Word Processor (£5) – For Chinese script.
- ☐ Cyril & Russ (£5) – Russian word processors.
- ☐ DD-Spell (£5) – English and Dutch spelling checker.
- ☐ English to French Translator (£5) – Excellent.
- ☐ English to Jap (£5) – Displays selected dictionary entries.
- ☐ Gakusei (£5) – Japanese language tutorial for serious students.
- ☐ Japanese Word Processor (£5) – Uses Romaji as primary input.
- ☐ LinguaPro/Spanish (£5) – Multi-faced tutor for serious students.
- ☐ Talking Spanish for Soundcards (£5) – Will teach Spanish words.
- ☐ Transmail (£5) – Common business correspondence phrases in German, French, Dutch, Italian, Spanish and English.
- ☐ Tutors – ☐ Cantonese, ☐ Chinese, ☐ German, ☐ French, ☐ Hebrew, ☐ Italian, ☐ Russian.
- ☐ Word Translator/Dictionary (£5 each) – ☐ Spanish, ☐ Croatian, ☐ Danish, ☐ French, ☐ German, ☐ Portuguese, ☐ Russian, ☐ Czech.

WORDPERFECT 5.0/5.1

- ☐ By Design – Desktop publisher and Graphic Design for WP.
- ☐ Clip Art (£10) – Over 450 graphics WP5 pictures.
- ☐ Super WP (£5) – Can read and write WordPerfect file formats.
- ☐ Thelma Thistleblossom 5.09 (2 d) – Grammar and stylechecker.
- ☐ WordPerfect 5.1 Learning System (3 d) – Learn how to use WP easily and quickly with this great tutorial (WordPerfect is NOT required).
- ☐ WordPerfect 5.1 Macros (4 d) – Over 125-plus a macro turorial.
- ☐ WordPerfect 5.0/5.1 Tools (2 d) – 17+ Fantastic utilities.

OS/2 LIBRARY AVAILABLE

*** Over 3000 files ***
professional development tools documentation, utilities, games CSD's and more
OS/2 Monthly sampler plus catalogue only £4

BUSINESS/SOFTWARE

- ☐ As-Easy-As 5.5 (2d) – Looks/acts like Lotus 1-2-3. (Reg £56).
- ☐ Bar Codes SET (MegaDisk) – Consist of 4 excellent programs.
- ☐ Business Plan Master 2.9 – Create a professional business plan.
- ☐ Broker Management System (2 d) – For insurance brokers. UK
- ☐ Business Plus – Integ invoice & stock control (1.44 @ £5).
- ☐ Casey (£5) – Prints customized calendars.
- ☐ FarmGen/FarmFill (2 d) – Exc form generator & form filler.
- ☐ Herschel Manufacturing Bus. Sys. (£12) – (2x3.5 HD @ £5 each)
- ☐ Illustrated Medical Herbal Encyclopedia – of medical herbs.
- ☐ Income TAX Calculator – Brilliant! Excellent!
- ☐ Invest-Tech Financial (£5) – Easi-Plan, Bank-Plan & Your-Plan.
- ☐ Japanese Business Culture – Helps to do business.
- ☐ JobHunt – The aggressive job hunter organizer. UK. brill!
- ☐ KwikStat (£5) – Allows you to analyze businessw & scientific data.
- ☐ Looking for Work – Interactive guide for marketing yourself!
- ☐ MotelMAX (£5) – Complete Hotel Management system.
- ☐ Mr Label – Powerful & versatile label maker.
- ☐ Page Financial Controller (2 d) – SAGE clone! (Reg £199).
- ☐ Page Cheque Book – Easy to use personal finance manager.
- ☐ PC File 5.5.5 Classic (3d) – Excellent general database sys. (Reg £60).
- ☐ PC File 7.0 (4d) – As above but "graphical" Reg 386+ and mouse.
- ☐ PC-Food II – Is a food costing system for restaurants.
- ☐ POSI-Track (£5) – Is an inventory control/POS program.
- ☐ Property Master: Rental Property Database 4.01 (£5) – Good!
- ☐ Rota-Writer – For managers needing to organize shift-work.
- ☐ SCTA – Stock Charting and Technical Analysis system.
- ☐ Super Stock (£5) – Menu-driven stock control system. UK.
- ☐ Travel Manager – Client/info/dbase for travel agencies.
- ☐ Video Management System 4.13 (£5)– For video rental shops. UK.
- ☐ Wampum 4.50 (2d) – A menu-driven clone of dBASE III.

CLIP ART (PCX)

- ☐ CD-ROM with 5000 Clip Art Images ONLY £21
- ☐ Accent/Dingbats
- ☐ Alphabet Soup (2 d)
- ☐ Animal woodcuts (9 d)
- ☐ Babies (2 d)
- ☐ BCM Priceless People (3 d)
- ☐ Birds (2 d)
- ☐ Business (2 d)
- ☐ Butterflies
- ☐ Cars
- ☐ Cats and dogs
- ☐ Church (4 d)
- ☐ Cooper Cartoons (4 d)
- ☐ Cooper Pictures (3 d)
- ☐ Education (2 d)
- ☐ Family (2 d)
- ☐ Fish
- ☐ Food (2 d)
- ☐ Grin Graphics (2 d)
- ☐ Headlines
- ☐ Health/Medical/Dental (2 d)
- ☐ Holidays (3 d)
- ☐ Homback
- ☐ Houses (3 d)
- ☐ Kids/Cartoons (2 d)
- ☐ Ladies (2 d)
- ☐ Medset 2A (3 d)
- ☐ Men (2 d)
- ☐ Misc (4 d)
- ☐ Months
- ☐ Naval US Art
- ☐ Outdoor Hand Painted (3 d)
- ☐ Did F. banners (4 d)
- ☐ Sport (4 d)
- ☐ Teddy Bears (2 d)
- ☐ Travel (2 d)
- ☐ Wedding (3 d)

CLIP ART (EPS, WP5, CDR)

- ☐ EPS: Postscript. WP5: WordPerfect. COR: Corel Draw

EPS	WP5	CDR	PCX	
☐	☐	☐	☐	(2d) Animals, Plants, Scenery
☐	☐	☐	☐	Cars, Office, Signs
☐	☐	☐	☐	Computers
☐	☐	☐	☐	Food, Home, Hobbies, Sport & Music
☐	☐	☐	☐	Frames
☐	☐	(2d)	☐	Holiday, Parties
☐	☐	☐	☐	Icons, Flags
☐	☐	☐	☐	(2d) Miscellaneous
☐	☐	(2d)	☐	(2d) People: men, women

CGA GAMES

- ☐ Best Arcade Games (2 d) – 18 great games.
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Crushing remarks

The difficulty of transmitting large amounts of data, whether for text, pictures or X-rays, is giving rise to ingenious solutions for squeezing it into more manageable shape. Nick Beard sums up the art of compression.

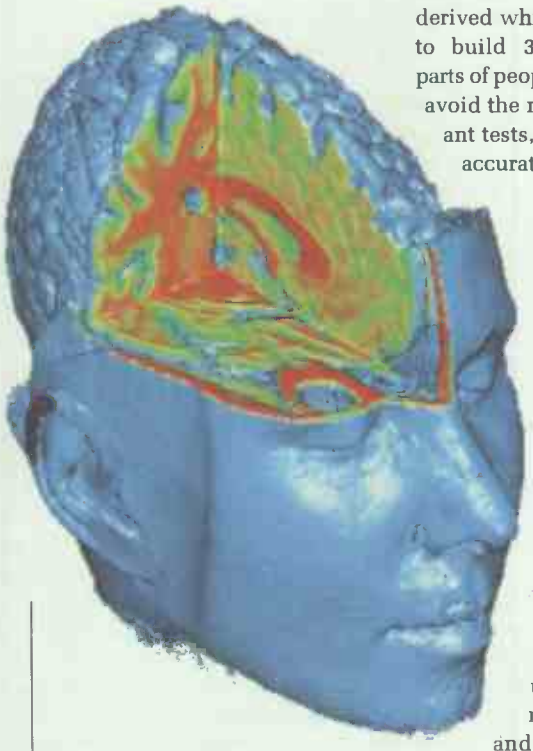
It's hard to find a magazine that has not recently covered the Internet. It is a hot topic, usually generating more heat than light. For some people it is a valuable resource, for others it remains a game or an irrelevance.

One thing the Internet demonstrates well is the difficulty of transmitting images. Rapid transmission of large quantities of data is crucial in remote image access, and conventional data rates are barely adequate.

Multimedia might have been displaced from the top slot of clichéd topics in computing coverage, but it is still popular. Just try combining it with the Internet, and the result is enough to choke all but the most expensive of communications lines. Yet as multimedia resources continue to develop, the gradual growth from plausibility to operability will demand far more than the 80 characters-per-line commonly pushed down phone lines.

Text-only data rates are fine for the more imaginative members of discussion group alt.sex.hamster, but the real perverts want pictures. Accessing a World Wide Web server at the White House and waiting for 10 minutes to download what turns out to be a picture of Al Gore is hardly a high-tech thrill.

So with images eating so much data space, and wire-width remaining a bottleneck in transmission, what are we to do? The answer is: compress. This is a common approach to extracting additional capabilities from a computer. DoubleSpace is now in widespread use, giving more storage without buying more disk surface. Many users of online image databases are regular users of image compression techniques. Large numbers of photos of Nastassja Kinski are downloaded regularly. There are, though, more serious uses of image compression. Among them is the compression of radiological images, such as X-rays, CT-scans (computerised tomography) and MRI (magnetic resonance imaging) scans.



Medical images like this one can need heavy compression for storage or transmission

Around 30 percent of all radiological images recorded in US hospitals are digital. Techniques such as MRI, PET (positron emission tomography) and DSA (digital subtraction angiography) have revolutionised medicine. Images can be derived which enable radiologists to build 3D reconstructions of parts of people's bodies. These may avoid the need for more unpleasant tests, or make surgery more accurate and effective.

The other 70 percent of radiological images are still captured onto film, which remains a far higher-resolution medium than any digital system. Nevertheless, there are many techniques for digitising film-based pictures, and there are many reasons for wanting to use digital representations.

The X-ray dose can often be reduced by using digital techniques. Film is bulky and expensive. Data storage rates are falling fast, and it will soon be cheaper to store radiological pictures on discs than on silver halide film. Also, digital images can be manipulated using digital image processing techniques.

Teleradiology is becoming increasingly common, enabling images to be sent to specialists in particular radiological problems who may be thousands of miles away. Images can be captured directly from CT or MRI scanners,

Nick Beard

or by scanning a plain X-ray film using a scanner much like an ordinary desktop scanner, only with only a much higher resolution (and therefore cost).

Alternatively, there are now X-ray cameras that don't produce film, but instead shine an image directly onto a digitising plate which then squirts the picture to a waiting computer. The growth in these techniques is set to continue, and as it becomes possible to manufacture higher-resolution workstation screens, there will be no image which cannot be interpreted at a workstation rather than on one of the traditional lightboxes used in most hospitals.

The result is that the demand for storage capacity and transmission bandwidth continues to outstrip technology. There is estimated to be over 1,015 bytes of radiological image data captured per year in the US. The amount is also rising every year. So compression is vital: imaging exploits compression because the overall technological application would barely be possible without it. If you think the latest download of StarTrek.GIF was a big one, try a radiological study series: they can easily hit 32Mb. Compression enables hospitals to consider picture archiving and communication systems (PACS) which would otherwise be simply unaffordable.

The real problems, then, are high-resolution images and video. Here are the raw numbers. A medium resolution digitised image (just a normal picture) needs 512 x 480 pixels, though TrueColour takes 24 bits per pixel. This swallows about 720kb. A diagnostic-quality film, such as a chest X-ray, needs a 2,000 x 2,000 resolution, though at least only 12-bit greyscale is needed. However, with a typical examination using four images, we soon reach that ugly 32Mb number. Imagine downloading that at 9,600 baud.

Video sequences are just as bad — a minimum of 720kb per frame. To replay this at 30 frames/sec takes a data transfer rate of over 20Mb/sec. Standalone PCs struggle with such rates, let alone phone lines.

Compression, therefore, is essential. Approaches to compression include logical and physical methods. Logical compression involves good systems analysis and program design: for example, instead of storing dates as text they are stored as digits: 14th February 1943 becomes 140243.

Greater savings can be made by other coded representations. Yet these methods are limited, and data-dependent. Physical compression is required for bigger compression yields. This means finding ways to represent data in ever smaller spaces.

Physical methods are classed as "lossy" and "lossless" techniques. Lossy techniques destroy data on compression, but in a way which enables a reasonable approximation of the original to be recovered. This is fine for images, but not what you want for your bank details. The most elementary lossless technique is null suppression — not storing strings of blanks as strings of blanks. This can enable 30- to 50-percent improvements in throughput — and you can still apply other techniques on top.

Next is run length encoding, where repeating sequences are replaced by a code series: a special symbol, a count of the repeating sequence, and the repeated thing. For example, 1234444444567 could be replaced by 123C47C567. Diatomic coding replaces character pairs with single characters, and a special case of diatomic coding, pattern substitution, substitutes commonly occurring patterns with shorter codes. This is especially effective where the data includes sequences that can be anticipated, such as computer programs. A program has LET, GOTO, IF, THEN, READ and WRITE statements in it. A pattern table lists the expected sequences and the corresponding short-codes. Shorter codes are given to more common, longer sequences, and longer codes to less frequent sequences. This results in only 20-percent reductions, but is easily combined with other techniques such as statistical systems.

Statistical encoding techniques take advantage of known probabilities of occurrence of code sequences. In Morse code, "." represents "E" — the most common letter in English. Statistical approaches work by reducing redundancy. Redundant information is overspecified. It is th hi levl of rdndcy wch maks ths sentnc readbl (well, almost). This improves some modes of communication, but swallows more bytes than necessary.

As we saw in the back-of-the envelope calculations above, images eat bytes at alarming rates. Lossless compression is valuable, but better yields are available if perfect reconstitution of the image from the compressed code is not needed. If the "unpacked" image need only be good enough, then lossy techniques can be used. Lossy techniques allow as much compression as you like — depending on how much data you are prepared to throw away. This depends on your level of concern over the quality of the reconstituted image.

An important lossy coding technique is the discrete cosine transform. There are many such methods, such as sine, Fourier, and Slant-Walsh transforms. The problem for radiologists and doctors who need to interpret X-rays is that the most effective compression techniques, lossy algorithms, may not be suitable for the very high file-size images they need to handle. What if the data lost in efficiently crushing the image is just enough to reduce the effective resolution to the point where important detail is missed? Alternatively, the compression technology may introduce artefacts, which lead to unnecessary further investigations or even treatment.

It is for this reason that the recommended minimum resolution for viewing mammograms (the images produced in breast screening clinics) is a massive 4,000 x 4,000 pixels. In practice, however, there is emerging evidence that carefully selected lossy techniques are tolerable, and that the diagnostic quality of judgements made can be preserved at compression ratios of 10: or even 20:1 in certain cases. This is known as "visually lossless" compression.

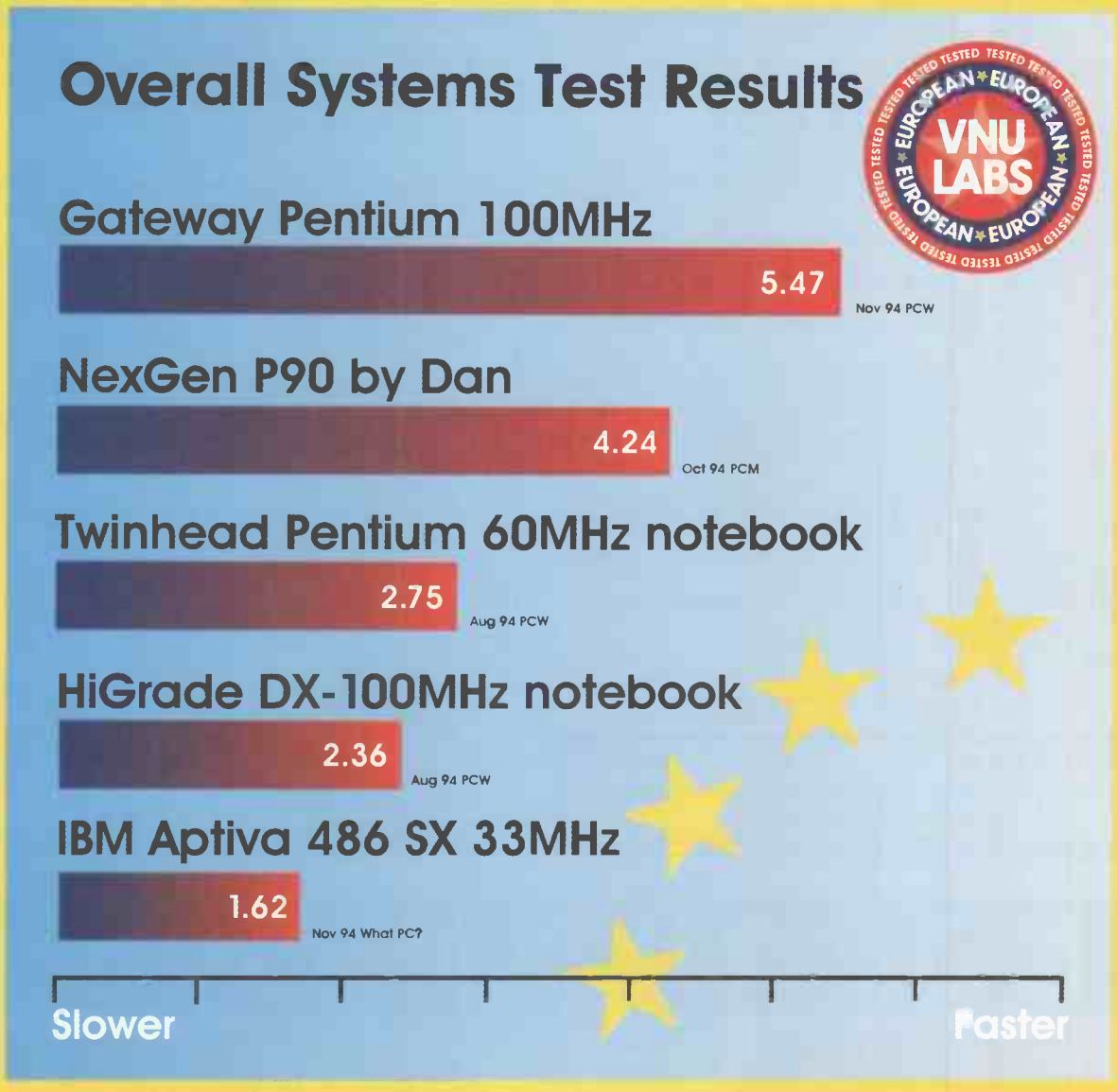
A further approach is to use what is known as "clinical image compression". This means simply having a doctor reduce the number of images, selecting only those which are relevant to the case. This can achieve dramatic reductions in the volume of films — and thus data — required. For example, an ultrasound examination may include many seconds of video image, at 30 images per second. The radiologist may choose to preserve only eight frames and discard the rest.

Image compression is progressing constantly, squeezing more and more capacity out of limited space. It is the nearest we come to getting something for nothing.

PCW Resource guide

Advance in Image and Video Compression Special Illus of Proceedings of the IEEE
February 1995
YQ. Huang, W Li and ML Liou (editors)
A highly authoritative survey of the state of the art in still and moving image compression.

Data Compression: Techniques and Applications, Hardware and Software; Third Edition
Gilbert Held, Wiley.
A thorough and accessible book describing many data compression methods in depth. The emphasis is on alphanumeric data rather than images. Illustrative programs are included which implement the methods discussed. They are also available on disk.



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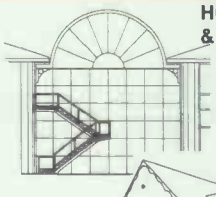

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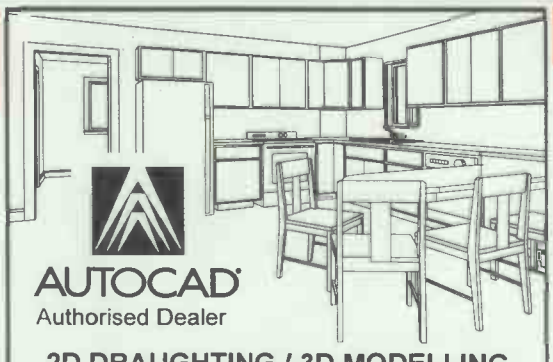

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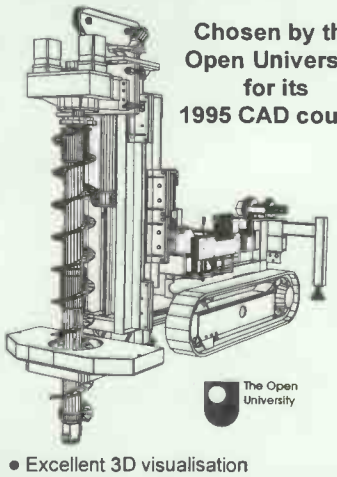

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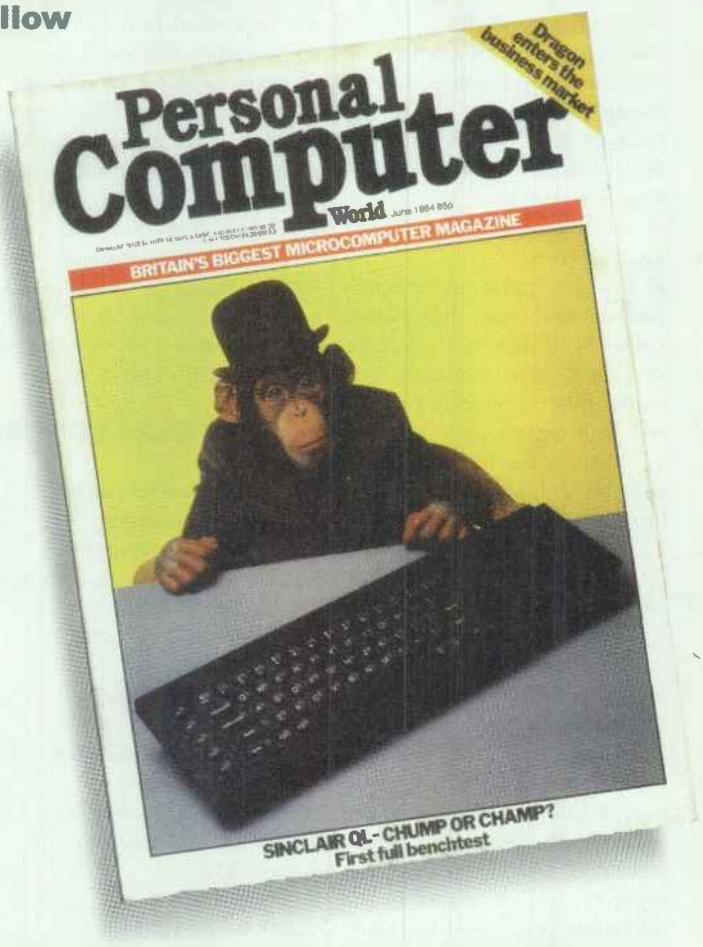
LEONARDO COMPUTER SYSTEMS

A leap in the dark

Things moved faster back in the eighties, says Simon Rockman, who thought the QL was so good he bought several, only to see it flop for lack of fellow purchasers.



I was the first person to buy a Sinclair QL. At the launch the press packs were spread one to a chair and I quickly snaffled a couple. The back of the pack had an order form for the new computer. Anything from Sinclair was such a dead cert that I filled in a form, adding my credit card details and committing myself to the £399 the machine cost. I handed it to a Sinclair marketing man before the presentation even began, and then ordered a second one.

After the launch I called a friend. He wanted one too so the credit card was stretched beyond its limit. This was in February and the machines were delayed for a long time. They finally appeared in May.

It is incredible to think of the rate of change in those early days. Today we see a new CPU from Intel every couple of years but the basic machine remains the same. PCI may be a significant development but it is all softly softly. In the early eighties things were very different.

The QL — the initials stood for Quantum Leap — was code-named ZX83. We'd seen the Spectrum in 1982 and the ZX81 and ZX80 in the two previous years. To move from the ZX80 to the QL in the same amount of time as it has taken to progress from the 486 to the P6 shows how much things are slowing down.

The ZX80 had 1kb RAM, a mono screen, and it had to stop the display when it was doing any processing. The QL had a Motorola 68008 processor, colour, 128kb RAM and a multi-tasking operating system. This was a true multi-tasking system like OS/2 or Windows 95, not a fake like Windows 3.11 or System 7.5. Unfortunately you needed to be a competent programmer to make the most of it. Back then, no computer was worth its salt unless it had a version of Basic; the QL had SuperBasic, which reflected all the current thinking about structured programming. Unfortunately, the 48kb of ROM didn't fit inside the machine when it was launched and early owners were sent systems with a couple of EPROMs plugged into the cartridge port at the back.

The more you look at the specification of the QL, the more you realise how far ahead of its time it was. Networking was built in as standard, and a peer-to-peer serial link worked some of the time and allowed QLs to be networked with Spectrums. The engineers couldn't figure out why the networking worked in the morning and not in the afternoon. Then someone realised that the problem was heat-related. The test machines sat on a bench by a window. In the afternoon, the sun shone on the bench and heated up the machines.

But the networking wasn't the QL's major problem; the microdrives were. As *PCW* pointed out in its June 1984 review, it is difficult to believe that anyone would use the little high-speed tape drives for anything serious. In the end, David Tebbut was won over by the bundled software.

Remember this was at a time when most home users tinkered with programming, and the idea that they might use applications, particularly those as advanced as the Quill word processor or Access database, was progressive thinking. With a QL, a cheap dot matrix printer and a monitor, you could be up and running for £1,000. *PCW* reflected upon what a bargain this was.

As with all the Sinclair machines, the QL never quite lived up to expectations. But the area which really let it down was sales and marketing. There are still a few die-hard users soldiering on but sales predictions of a million machines in the first year turned out to be wildly optimistic. As so often happens, it was the trailblazer that brought the company down. PCW

CUTTING EDGE

BOOKS

Cyberspace for Beginners
Author: **Joanna Buick; illustrations Zoran Jevtic**
Publisher: **Icon Books**
Pages: **173**
Price: **£7.99**
ISBN: **1-874166-24-2**
Rating: ●●○○○ ○○○

Do not, under any circumstances, buy this book. You're still reading? Perhaps you have seen some of Icon Books' other productions. They are well-written and easy-to-digest introductions to fairly complex subjects — Lenin for Beginners, The Universe for Beginners and so on. "How bad could Cyberspace for Beginners be?" you might ask. The answer is: very.

In an introductory guide to cyberspace, I would expect to find an an explanation of what computers are. What I certainly would not expect is page after page of info-tidbits about travel, printing, numbers, clocks, photography, holography and other topics utterly unrelated to the ostensible purpose of the book. Am I being overly narrow in my definition of relevant? Well, would you say this is relevant: "Sunspots and eclipses could be viewed on the floor of a room with a small aperture in the ceiling"? Or this: "In 1546 attempts were made to find El Dorado... and in 1547 Nostradamus made his long-term prophecies"? He may well have done, but so what?

Perhaps no more than a third of the pages have anything to do with the title. Sadly, even these disappoint. The book doesn't tell you what kind of PC, modem or service provider you need to get connected to the Internet, for example. It doesn't have a glossary or index to help you make sense of terms, and when it does provide explanations, they can leave you more confused than before.

Here's just one example: "To use a database, software called Telnet is used — an applications programme just like any other. Once you have logged in with Telnet, the very complex software translates between your machine, the designated client, because you request the services and the remote computer, the server, since it supplies the services." Er, right.

When the book is not irrelevant or inadequate, it is all too often inaccurate. Some inaccuracies are minor but irritating — the assertion that Doom plays in millions of colours, for example. Others are more serious. The author has ISDN confused with high-bandwidth fibre optic cable. It is fine for video-conferencing and transfer of images and text but not, as she suggests, for multi-channel television, and certainly doesn't provide "almost infinite bandwidth".

There is room for a book that discusses the digital future in layman's terms, but this, alas, isn't it.

David Brake

COMPARATIVE REVIEWS: INTERNET GUIDES

All You Need to Know About the Internet
Author: **Davey Winder**
Publisher: **Future Publishing**
Pages: **296**
Price: **£14.95 (with disk)**
ISBN: **1-85870-064-7**
Rating: ●●●●○ ○○○

The Internet Guide for New Users
Author: **Daniel P Dern**
Publisher: **McGraw-Hill**
Pages: **570**
Price: **£24.95**
ISBN: **0-07-016511-4**
Rating: ●●●●○ ○○○

The Essential Internet Information Guide
Author: **Jason J Manger**
Publisher: **McGraw-Hill**
Pages: **515**
Price: **£22.95**
ISBN: **0-07-707905-1**
Rating: ●●●○○ ○○○

Using the Internet, Special Edition (2nd Edition)
Author: **Mary Ann Pike et al**
Publisher: **Que**
Pages: **1,241**
Price: **£37.49 (with CD-ROM)**
ISBN: **0-7897-0077-8**
Rating: ●●●●● ●●○○

The Internet Navigator
Author: **Paul Gilster**
Publisher: **Wiley**
Pages: **590**
Price: **£21.95**
ISBN: **0-471-05260-4**
Rating: ●●●●○ ○○○

The Internet for Dummies, Second Edition
Author: **John R Levine and Carol Baroudi**
Publisher: **IDG Books**
Pages: **427**
Price: **£18.99**
ISBN: **1-56884-222-8**
Rating: ●●●●○ ○○○

More Internet for Dummies
Author: **John R Levine and Margaret Levine Young**
Publisher: **IDG Books**
Pages: **390**
Price: **£18.99**
ISBN: **1-56884-164-7**
Rating: ●●●●○ ●●○○

The Complete Idiot's Guide to the Internet, Second Edition
Author: **Peter Kent**
Publisher: **Alpha Books**
Pages: **367**
Price: **£18.95 (with disk)**
ISBN: **1-56761-535-X**
Rating: ●●●●○ ○○○

The Internet is a particularly ripe area for how-to books: it's a hot topic; there are no user manuals for the Net itself; and there is pitifully little comprehensible documentation for the tools you must use to access it. So Internet books are being released in shoals. This month's collection even includes a few British titles.

The Internet for Dummies is a more or less standard entry in the long-running series: same stupid jokes, same cartoons. But authors Levine and Baroudi have a tough job because the basic technology behind the Internet is so much more complex. They manage fairly well, covering how to get started on the Net, how to use all the main services, and some general resource information.

The book gives instructions on getting started for PCs, UNIX boxes, Macs, and VAXes; it explains about bin hex and GIF formats; and it even gives you a list of the things that people on Usenet never want to hear about. The list is a little shorter than the real one, but that may be dating: this book goes as far as NCSA Mosaic, but obviously went to press before the release of Netscape. The authors also make the unlikely statement that there are no public FTP archives holding pornography.

The positive side of the book is that it guides you through sample sessions with services like Gopher and WAIS, and even gives international information, like the main European and UK service providers (pre-Phone Day number changes). The negative side is that the jokes are worse than usual.

More Internet for Dummies presents the technical side of the Internet, coupled with instructions on using the gateways provided by services like Delphi, America Online, and public Unix providers. The example it uses is the US system World, but a number of other providers use the same commands and programs.

The most useful sections are the ones on setting up a Windows machine, particularly the section on Trumpet Winsock, which includes step-by-step instructions on downloading the software using Windows Terminal and configuring it — normally a tricky, unpleasant, and poorly documented business. The book does the same for other pieces of publicly available software, such as Eudora, WinWAIS and Mosaic.

More Internet for Dummies also goes through how to use Internet Relay Chat, mailing lists and FTP by mail, and closes with about 50 pages of Internet sites to get started with. It's a reasonable, if mainstream, selection: books, magazines, weather, food. A reality check is provided in the form of a three-part urban folklore quiz.

Step-by-step instructions also feature heavily in All You Need to Know About the Internet, one of the new wave of British books. The author, Dave Winder, is well known on CIX and, more recently, on Delphi, where he holds court in his own forum; he has a column in the Sunday Times on net topics. The included disk is a copy of the widely distributed Chameleon Sampler; there are also money-saving offers from most of the British Internet service providers.

Winder explains the basics: what the Internet is, how to get connected to it, and how to use mail, FTP, the World Wide Web, Gopher, IRC, and Archie. Interspersed are carefully culled listings of Usenet newsgroups, mailing lists, and FTP, Gopher, and Web sites. One particularly useful section for British readers is the hands-on look at accessing the Internet via the different service providers, with instructions on downloading the software you need to get started.

All in all, this is a well-rounded guide. The one thing to worry about is that Winder's technical competence leads him to think that Demon's DOS software is "pretty easy to use if you read the documentation". But this is a small point; he gives some very good tips that can save time and money using each service. Unlike American authors, whose outlook is coloured by free local telephone calling, Winder understands the importance of offline readers.

The Essential Internet Guide is a British book, too (and offers a free trial on Pipex), but it seems to be outdated already, even though it came out in 1995. World Wide Web coverage is limited to a couple of pages on using a text-based browser, and the author names the three essential Internet tools as FTP, Telnet, and mail (including Usenet). You get no help with configuring software to run on a Windows machine, although you do get instructions on using online Unix newsreaders and mail programs, unencoding, picture formats, and Internet utilities. Although it's a British book, there's no service-specific information.

The listing of FTP sites is particularly frustrating: it lists sites in alphabetical order, by name, with only a couple of words ("Amiga related", "Perl stuff", "Sci-Fi works") to describe the kind of material stored there. There's no subject reference.

The Internet Navigator was one of the better Internet books of its year, but this edition seems crowded, intimidating, and as technically oriented as The Essential Internet Guide. Part of the reason is that it's aimed at dial-up users accessing the Internet via a Unix interface; even a system like Delphi or CIX doesn't qualify in this category, as they have proprietary interfaces. Therefore, large chunks of the book aren't particularly relevant to most UK users, and a number of things — like configuring Windows-based software — which UK users need to know

about are left out. Gilster's research into UK service providers is unimpressive: he lists Demon and The Direct Connection, but not CIX or CityScape.

This book has a pleasantly broad view of the world, though, even at the beginning, where it tries to whet readers' appetites by listing a variety of online resources, from checking out the weather to a virtual tour of New Zealand. It's also reasonably up-to-date; you get a short section on Mosaic, including complaints that it's slow. The resource list is good and varied, if unfortunately organised by service type (Campus systems, FTP, Telnet) first, with subject headers only within sections.

The Complete Idiot's Guide to the Internet comes with an Access Sampler, which includes a TCP/IP stack for Windows, plus FTP, Ping, and an online newsreader. Instructions for configuring the software for an unlisted service provider are supplied, which is a benefit. Once you've set up the software, you should be able to download any other Windows-based program and slide it right in.

Idiots apparently need fewer jokes to encourage them than dummies, so this book is a little less frenetic than its counterpart. However, the selection of material isn't really as good — there's a bit too much about those Unix-based newsreaders again. However, the sample sessions are handled well. For example, the sample FTP session sends you to Project Gutenberg to retrieve a copy of the CIA World Fact Book rather than some piece of software. International information is extremely sparse; the list of Archie servers doesn't even include London's Imperial College, surely one of the best-known in the world.

The Internet for New Users has been well publicised on the Net by its author, who includes the book's information in his .sig. So it's only logical that he includes a certain amount of his personal experience in the book, such as a listing of a morning's worth of new email. This makes sense if the goal is to give a new user an idea of what the Internet is good for — people who haven't used email tend to think of it as a burden, rather than a useful tool.

The book probably has more information in it than a lot of new users might like, but it's well presented and well chosen. It's meant to be generic, so you don't get specifics on American service providers, but instead get explanations of the different types of service — dial-up, SLIP, UUCP. Similarly, the section on Usenet talks about the generalities of posting articles, but doesn't give you step-by-step instructions for any particular software or service, although Dern does include some information on commercial services.

There's no listings of service providers or resources, but a short chapter lists a few sites to take a look at. None of them are Web sites, though — this book, too, needs updating again.

If you fancy weightlifting, Using the Internet, Special Edition, is also the first book we've seen bundled with a CD-ROM. You get everything, even a couple of HTML editors, several different Web browsers, and so on. For a new user it's probably confusing, but you get a chance to try out a lot of different choices with relative ease. You should be able to install a particular bit of software, and then turn to the relevant section of the text and try out a session.

The book is as up-to-date as anything on the market. It's the only one reviewed here that includes a section on creating your own Web pages, something that will become more common as providers get into the swing of offering subscribers free Web space. It's also a reflection of Que's standard for these big, black books: they are expected to cover all the bases.

This one does, and it's well organised: we like the early chapter that quickly sketches what the main Internet services are. It lets a newcomer identify quickly what service is appropriate and flip quickly to the appropriate section — FTP, Web etc. It's an obvious idea, but no other book does it.

Some of the material in this book is quite specific, such as the chapters on connecting via The Pipeline, NetCom, CompuServe, Delphi, and America Online. International information is sparse, but the resource guide at the back is good and, unusually, well illustrated. Like everyone else, though, the authors seem to have kept the most useful search sites to themselves. After all, to tell someone about Yahoo is to limit their need to buy a resource guide.

Wendy M Grossman

Top ten books: March 1995

Author	Title	Publisher	Price	This	Last
Getz et al	Microsoft Access 2 Developer's Handbook (book/disk)	Sybex	£41.17	1	—
Lemay, Laura	Teach Yourself Web Publishing with HTML in a Week	Sams	£19.50	2	1
Dave Jewell	Instant Delphi Programming	Wrox	£22.99	3	—
Ethington et al	Introducing Microsoft Windows 95	Microsoft Press	£11.99	4	6
Jennings, Roger	Database Developer's Guide with Visual Basic 3 (Book/Disk)	Sams	£41.67	5	3
Minasi et al	Mastering Windows NT Server	Sybex	£40.99	6	—
Adrian King	Inside Windows 95	Microsoft Press	£21.95	7	—
Schulman, Andrew	Unauthorized Windows 95	IDG Press	£28.99	8	4
Gamma et al	Design Patterns: Elements of Reusable Object-Oriented Software	Addison-Wesley	£28.95	9	—
Krol, Ed	The Whole Internet: User's Guide & Catalog, 2nd Ed.	O'Reilly	£18.50	10	5

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John December et al
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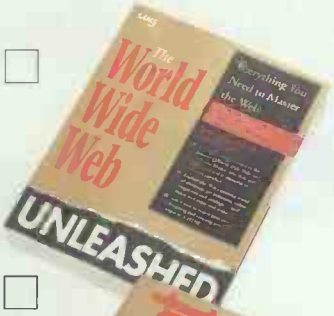

THE INTERNET UNLEASHED ☐
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- Original Microsoft Serial Mouse V2.0
- MS Windows 3.11, MS DOS 6.22 (full manuals and discs)
- One year's nationwide on-site maintenance (extendable)

DABS DIRECT Multimedia Options

SoundBlaster 16, Double Speed CD & Speakers	150
Microsoft Family Pack	230

contains Creative Labs Soundblaster 16, Double Speed CD drive, Active Speakers, Encarta CD, Dangerous Creatures CD, Works for Windows V3.0 CD, Golf CD, Money V3.0 (floppy), Aldus Photostyler CD

486 OPTIONS	
8Mb instead of 4Mb add	99
16Mb instead of 4Mb add	199
VLB system instead of PCI	FOC
Extra 1Mb Video RAM	50
Additional 1.2Mb Floppy add	32
Midi Tower (3 x 5.25" bay) add	10
Full Tower (5 x 5.25" bay) add	20
Adaptec 1542C and SCSI HD	150

PENTIUM OPTIONS	
16Mb instead of 8Mb add	199
32Mb instead of 8Mb add	399
512k cache instead of 256k add	55
1024k cache instead of 256k add	90
2Mb instead of 1Mb Video card add	50
Additional 1.2Mb Floppy add	32
Midi Tower add	10
Full Tower add	20

MONITOR UPGRADE OPTIONS	
15" LR 1280x1024 NI, MPR-II add	80
17" LR 1280x1024 NI, MPR-II add	330
20" LR 1280x1024 NI, MPR-II add	900
21" LR 1280x1024 NI, MPR-II add	1000
Sony CPD-15SF add	150

HARDWARE OPTIONS	
Tape Streamer 420Mb	95
Tape Streamer 850Mb	175
Microsoft Natural Keyboard	50
250/280VA UPS (single PC)	90
Internal USR Sportster 14k4 modem	

These prices only available with systems

MULTIMEDIA UPGRADE OPTIONS	
in addition to the £150 upgrade above	
Creative AWE32 sound card	70
Quad Speed CD Drive add	40
25w Speakers add	10
80w Speakers Bass, Treble add	25

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CD-ROM Drives

CREATIVE LABS

Gameblaster AWE 4x	255	CD Upgrade Kit	105
Discovery	187	Discovery 4x	269
Multimedia Home 4x	299		

Goldstar GCD-R520B Double Speed CD ROM Drive
- Enhanced IDE (ATAPI) Interface
- Intelligent 256K data buffering system
- 250ms access time
- 300KB/Sec sustained transfer rate
- 4.2MB/Sec
- Photo CD Multisession support
- CD-DA, CD-ROM/XA, CD-I support
- Video CD Ready
- High Fidelity audio support
- Motor tray loading mechanism
- 50,000 POH MTBF

£75

GOLDSTAR

GCD-R4 20B	92	GCD-R5 40B	120

MITSUMI

FX400 IDE 4x	125	Secondary IDE i/f	9

NEC

Quad Speed Int IDE	142	3xp+ SCSI External	245
4xi SCSI Internal	235	4xe SCSI External	373
4x Pro SCSI Ext	505	2xc 7-disc SCSI Ext	349

PANASONIC

CR562	89	AT interface	10

PIONEER

DRM-602X 2x SCSI	399	DRM-604X 4x SCSI	879

SONY

CDU55E 2.4x IDE Int	99	CDU55S SCSI Int	115

TOSHIBA (SCSI)

XM5302B Int 4x IDE	140	XM5201B Int 3.4x	130
XM3601B Int 4.4x	229	XM3501B Int 4x	265

Multimedia Kit 4000 £239
Everything you need to create your own affordable entertainment centre
- Quad speed CDROM 600Kb/s access time
- Wavetable upgradable Diamond sound card
- Pair of stereo speakers, microphone, headphones
- Best selling Compton's Encyclopedia '95
- 10 games titles

DIAMOND

CD Recording

Philips CDD522 2x	1499	JVC XR-2001E 2x	1499
Yamaha CDR100e 4x	2489	CDR100i 4x Int	2389
RicohRS1060 2x	1399		
WinOnCD	659	WinOnCD To Go	149
Corel CD Creator	129	Toast Pro 2.5 (Mac)	399

See Consumables for CDR blank media

IDE Hard Discs

Bracketed figure is nominal capacity in Mb.

CONNER

CFS420A (420)	119	CFA540A (540)	145
CFA850AT (850)	164	CFA1250AT (1.2Gb)	248

QUANTUM

LPS270A (270)	102	LPS420A (420)	107
MV540A (540)	145	LT730AT (730)	142

SAMSUNG

3028OA (280)	105	3212A (426)	115
3056OA (560)	145		

SEAGATE

ST3491A (425)	119	ST5660A (528)	140
ST5850AT (850)	182	ST31220A (1.08Gb)	219

WESTERN DIGITAL

AC2420 (420)	130	AC2540 (540)	160
AC2850 (850)	170	AC31200 (1.2Gb)	249

SCSI Hard Discs

Bracketed figure is nominal capacity in Mb

CONNER

CFA540S (540)	209	CFA1060S (1.06Gb)	325

QUANTUM

LPS270S (270)	120	LT365S (365)	135
MV540S (540)	155	E1080S (1.08Gb)	369
E1440S (1.4Gb)	517	EMP2160S (2.1Gb)	628
GP4280S (4Gb)	1402		

SEAGATE

ST31230N (1Gb)	337	ST12400N (2.1Gb)	725
ST32550N (2.1Gb)	757	ST15230N (4Gb)	1099
ST410800N (9Gb)	2495		

User knowledge is assumed when bare hard drives are supplied

Removable Drives

SYQOS - SYQUEST DRIVES

88Mb Int SCSI	249	270Mb Int SCSI	290
88Mb Ext SCSI	310	105Mb Ext SCSI	375
270Mb Ext SCSI	435	88Mb Cartridge	57
105Mb Cartridge	41	270Mb Cartridge	45

O2 - SYQUEST DRIVES

88Mb Ext SCSI	245	200Mb Ext SCSI	395
270Mb Ext SCSI	385	Shark SCSI-Par cable	65

FUJITSU - MO DRIVES

2308Mb Int SCSI	485	230Mb Ext SCSI	585

Macintosh complete systems also available

Monitors

ALL Monitors listed are MPR-II, Low Radiation and Non-Interlaced EXCEPT where marked •

More than Just a Monitor...

ADI

All ADI Monitors Feature...
- 2 year On-Site Swap out warranty
- Energy Star Vesa DPMS Power Saving
- MPRII Low Radiation
- Digital Image Control
- Non-Interlaced flicker free res
- Full Scan Image for up to 15% larger display area.

Prices From £185
Better Monitors at Competitive Pricing

ADI

Microscan 3v	14"	0.28	1024x768	185
Microscan 4v	15"	0.28	1280x1024	255
Microscan 4GP	15"	0.28	1280x1024	269
Microscan 5EP	17"	0.28	1280x1024	469
Microscan 5AP	17"	0.26	1280x1024	483

DAEWOO

1418S 14" •	145	1418SM 14"	155
1420V 14"	175	1501BA 15"	235
1701BA 17"	479	2101BA 21"	1155

DEC

PCXBV-PC 15"	249	PCXAV-EA 17"	699

- 14" XGA Ultra High Resolution
- 0.28mm Anti-Static Non Glare Dark Tr
- 1024 x 768 Non Interlaced
- DPMS Power Management
- MPR II Low Radiation
- Front Controls

£175

GOLDSTAR

GS1462DM 14" •	170	GS1466DM 14"	175
GS1505DM 15"	209	GS1520DM 15"	235
GS1725DM 17"	440	GS2010DM 20"	849

• Plug and Play • Full Scan
• Energy Star
• Low Radiation

NEC
Multisync XV15 £275

NEC

2V 14"	225	Multisync XV15 15"	275
Multisync XE15 15"	385	Multisync XV17 17"	549
Multisync XE17 17"	688	Multisync XP17 17"	899
Multisync XE21 21"	1309	Multisync XP21 21"	1729

NOKIA VALUEGRAPH

44BS090P LR NI 14"	225	449E090P 15"	305
447V090 17"	475	447B090 17"	519

NOKIA MULTIGRAPH

449M092 15"	355	447M090 17"	629
447X090 17"	670	447M092 17"	685
447X092 17"	670	445M090 21"	1299
445M092 21"	1415	445X092 21"	1599

PHILIPS BRILLIANCE

14C 14" LR •	162	14A 14"	195
15B 15"	247	17C 17"	419
17T Trinitron 17"	639	17A 17"	649
20C 20"	829	20T Trinitron 20"	1299
21B 21"	1355		

PANASONIC PRO SERIES

TX-T1537 15"	319	TX-D1732 17"	470
TX-D1751 17"	639	TX-D2032 20"	1119
TX-D2123 21"	1349	TX-D2103 21"	1408

SAMSUNG

CVM4967/P LR 14"	175	CVM4238 NI LR 14"	185
CSQ4387 NI LR 14"	219	CSR5987 15"	250
CST7687 17"	485	CFA7689 17"	570

SONY

CPD-15SF 15"	290	CPD-17SF 17"	559
GDM-17SEI 17"	827	GDM20-SEV 20"	1225
GDM20SE1-T 20"	1419		

TAXAN ERGOVISION

400 LR 14" •	196	410 14"	219
420 14"	240	580 15"	312
880 17"	532	885 17"	634
895 17"	895	1080 20"	948
1095 20"	1459	2100 21"	1532

VIEWSONIC

VS6E 14"	170	VS15ES 15"	245
VS15G 15"	330	VS17G 17"	560
VS17-2 17"	679	VS20G 20"	1030
VS21PS 21"	1380		

Interface Cards

IDE DRIVE CONTROLLERS

2 HD+2 FD+2 serial+1 parallel+1 game ISA	10		
2 HD+2 FD+2 16550A ser+1 ECP par+1 game ISA	23		
2 HD+2 FD+2 serial+1 parallel+1 game VLB	13		
4 HD+2 FD+2 serial+1 parallel+1 game VLB	19		
4 HD+2 FD+2 16550A ser+1 ECP par+1 game VLB	29		
4 HD+2 FD+2 serial+1 parallel+1 game PCI	25		
4 HD+2 FD+2 16550A ser+1 ECP par+1 game PCI	39		

ADAPTEC SCSI CONTROLLERS

1505 kit ISA	45	1515 kit ISA	70
1542CF card ISA	125	1542CF kit ISA	170
2842C kit VLB	179	2940 kit PCI	189
2742 kit EISA	259	2940w kit PCI	259

PORTS ONLY (ISA)

2ser 16550A+par+game	35	2 games only	7
2 serial+1 par+1 game	8	1 parallel only	8

Motherboards

All exclude processor and heatsink.

486/P24C 3VLB/8ISA 256k 72pin ZIF	69
486/P24C 3PCI/4ISA 256k 4x72pin EIDE ZIF	79
Pentium 60/66 3PCI/5ISA 256k 4x72pin ZIF	159
Pentium 75/90/100 3PCI/5ISA 512k 4x72pin ZIF	195
Pentium 75/90/100/120 4PCI/4ISA 256k 72pin ZIF	179

Processors

AMD

486DX2/66	95	486DX2/80	109
486DX4/100	159	486 Heatsink+Fan	5

INTEL

486SX2/50	55	486DX/33	85
486DX2/66	79	486DX4/75	125
486DX4/100	149	Pentium 60	175
Pentium 66	185	Pentium 75	199
Pentium 90	299	Pentium 100	399
Pentium 120	499	Pentium Heatsink	15

INTEL OVERDRIVE

Any 486 ⟶ DX4/100	199	Any 486⟶ DX4/75	160

Simm Memory

	30pin x9	30pin x8	72pin x32	72p x36
256k	10	10	-	-
1Mb	29	29	38	38
2Mb	-	79	65	69
4Mb	89	94	95	115
8Mb	-	-	199	225
16Mb	475	-	299	369
32Mb	-	-	589	690

Memory pricing is volatile - please call before ordering

Network Cards

3COM

3C-509 BNC ISA	65	3C-509TP UTP ISA	65
3C-509 Combo ISA	69	3C-529 BNC MCA	159
3C-589 Combo PCMCIA	149	3C-579 BNC EISA	149

DLINK

DE-220C BNC ISA	54	DE-220CT Combo ISA	60
220CAT Combo+AUI ISA	80	DE-220T UTP ISA	57
DE-820CT Combo Par	129	650CT Combo PCM	129

GENERIC

NE2 BNC ISA	23	NE2 Combo ISA	25

NOVELL

NE2000 BNC ISA	65	NE2000T UTP ISA	65
NE2000+3 Combo ISA	70	NE2/C BNC MCA	159
NE3200 BNC EISA	275	NE200C BNC PCM	165

SMC

PCMCIA			
EliteCard PCMCIA Ethernet Adapter - UTP	120		
EliteCard PCMCIA Ethernet Adapter - Combo	155		
Optional US Power Supply	23		
Optional Euro Power Supply	23		
Optional UK Power Supply	34		
PCI ADAPTERS			
EtherPower PCI Adapter BNC	118		
EtherPower PCI Adapter BNC 5-pack	547		
EtherPower PCI Adapter Combo	132		
EtherPower PCI Adapter Combo 5-pack	609		
16BIT ETHERNET ADAPTERS - PLUG AND PLAY			
EtherEZ Plug 'n' Play Adapter BNC	61		
EtherEZ Plug 'n' Play Adapter BNC 5-pack	287		
EtherEZ Plug 'n' Play Adapter UTP	61		
EtherEZ Plug 'n' Play Adapter UTP 5-pack	259		
EtherEZ Plug 'n' Play Adapter Combo	88		
EtherEZ Plug 'n' Play Adapter Combo 5-pack	328		
TOKEN RING ADAPTERS			
TokenCard Elite 16BIT 16/4 MBS	155		
TokenCard Elite/A MCA	155		
TokenCard Elite Master32 EISA for STP & UTP	247		

XIRCOM

BNC Parallel	185	BNC PCMCIA2	165
UTP Parallel	185	UTP PCMCIA2	155
Combo Parallel	199	Combo PCMCIA2	199

Xircom
Credit Card EtherNet Adaptor PCMCIA2

- Advanced Look-Ahead pipelining
- Power Management
- High performance full duplex support
- MBPS 20 megabit/s

£165

Speakers

0.3w mini passive	3	4 watt passive	6
10 watt Tone	15	12 watt Tone	17
25 watt Tone	25	25 watt Bass/Treble	30
70 watt Bass/Treble	35	80 watt Bass/Treble	41

All active (amplified) except where stated

Cases

Slimline - Not VLB - 2 x 5.25", 2x3.5", 1xHD, 200w	45		
Desktop - 3 x 5.25", 1 x 3.5", 2 x HD, 200w	37		
Mini Tower - 2 x 5.25", 2 x 3.5", 2 x HD, 200w	37		
MIDI Tower - 3 x 5.25", 2 x 3.5", 2 x HD, 230w	68		
Full Tower - 5 x 5.25", 2 x 3.5", 3 x HD, 230w	80		

Display Adapters

CIRRUS LOGIC

5422 1Mb ISA	45	5429 1Mb VLB	47
5434 1Mb VLB	70	5434 1Mb PCI	79

CREATIVE

3DO Blaster	265	TV Coder	110
VideoBlaster SE100	175	VideoBlaster FS200	220
VideoBlaster RT300	259	VideoBlaster MP400	175
VideoBlaster Dev Kit	55	Sharevision 3000	910

DIAMOND

Speedstar Pro SE 1Mb	69	Sp'star Pro SE 2Mb	109
St64 1Mb DRAM	110	St 64 2Mb DRAM	145
St64 2Mb VRAM	235	St 64 4Mb VRAM	340
Viper SE 2Mb	245	Viper SE 4Mb VLB	335
Viper Pro 2Mb VLB	269	Viper Pro 4Mb VLB	390
DRAM 1Mb Upgr	50	VRAM 2Mb Upgr	100

All cards available with PCI or VLB but at same price

ORCHID

Fahrenheit 64 1Mb	125	Fahrenheit 64 2Mb	160
Fahrenheit Pro 64 2Mb	160	FH Pro 64 4Mb	255
Kelvin MPEG 1Mb	229	Kelvin MPEG 2Mb	269
Kelvin EZ 1Mb	99	Kelvin 64 1Mb	109
Kelvin 64 2Mb	135		

All cards available with ISA, PCI or VLB bus at same price

VIDEOLOGIC

928 Movie	170	928 Movie+Sound	219
928 Movie MPEG	409	PCI Movie	299
MPEG Add-on	229	Captivator TV Pro	199

All 928 cards available with ISA or VLB bus at same price

Hubs

3COM LINKBUILDER

3Com
LinkBuilder FMS II
- Stackable
- 12 port
- SNMP Upgradable

£379

FMS II 12port & AUI 379		FMS II 24port & AUI	670

DLINK

DE809TP 8port	130	DE809TC 8port & BNC	130
DE812TP 12port 8dNC &AUI	175	DE816TP 16port & BNC & AUI	235
DE824TP 24port & BNC & AUI	352		
DE1200 12port & BNC & AUI stackable	506		
DE1600 12port & BNC & AUI stackable SNMP	525		

HP ADVANCESTACK

Hub 12	330	Hub 24	510
Hub 48	1065	Hub 12 SNMP	480
Hub 24 SNMP	719	Hub 48 SNMP	1129

SMC

ECONOMICAL WORKGROUP HUBS SMC

TigerHub TP6 6Port WorkGroup UTP	155		
TigerHub TP6B 6Port WorkGroup UTP	170		
TigerHub CX6 6Port WorkGroup BNC	430		
TigerHub FL6 6Port WorkGroup Fiber	971		
TigerHub TP12 12Port WorkGroup UTP	295		
TigerHub CX3 3Port WGroup BNC	210		
Elite 3812TP 12 & 2 port stackable UTP	431		
Elite 3812TP 24 port stack bundle UTP	840		

Mice

MICROSOFT

Mouse V2 IP Serial	38	Home Mouse	29

LOGITECH

Pilot Serial or PS/2	18	Pilot Trackball	25
Mouseman PC or Mac	34	Trackman Portable	54
Mouseman Cordless	61	Trackman Combo	45
Trackman Live	95	Trackman Voyager	45

PRIMAX

3 button serial, white/black/blue/red	7

Mastermouse
Ideal for notebook, laptop,desktop
Handheld or desktop operation
Right or left hand users
Multilingual manual and driver
Cursor enhancement software
Microsoft/Mac compatible
£19 PRIMAX

Components

FLOPPY DRIVES

3.5" 1.44Mb	23	5.25" 1.2Mb	32
3.5" 2.88Mb	59	5.25" 360k Ext PC kit	??
5.25" 1.2Mb Laptop kit	??	5.25" 1.2Mb Ext kit	??

KEYBOARDS

Generic 102-key AT	12	Cherry Click	36
Cherry Non-Click	32	MS Natural	66

Streamers

COLORADO

Jumbo 250Mb Int	92	Jumbo 340Mb Int	103
Jumbo 680Mb Int	165	Jumbo KE-10 Ext kit	69
Trakker 250Mb	189	Trakker 340Mb	205
Trakker 680Mb	275	Controller Card	45

CONNER

Tapestor 420Mb Int	99	T'stor 850Mb Int	190
Tapestor 4Gb DAT Int	440	T'stor 420Mb Par	235
Tapestor 850Mb Par	305	T'stor 4Gb DAT Par	499

HEWLETT PACKARD

Jetstore 2000i bare drive	624		
Jetstore 5000i bare drive	702		
Jetstore 6000i bare drive	795		
Jetstore 2000e 2Gb	741		
Jetstore 2000e 2GbISA inc ArcServe 250u	858		
Jetstore 2000e 2Gb MCA inc ArcServe 250u	1021		
Jetstore 5000e 4Gb	827		
Jetstore 5000e 4Gb ISA inc ArcServe 250u	1527		
Jetstore 5000e 4Gb MCA inc ArcServe 250u	1701		
Jetstore 6000e 8Gb	920		
Jetstore 6000e 8Gb ISA inc ArcServe 250u	1951		
Jetstore 6000e 8Gb MCA inc ArcServe250u	2115		

WANGTEK SCSI

5250ES 250Mb Int	299	5250 250Mb Ext	439
5525ES 525Mb Int	399	5525 525Mb Ext	539
51000HT 1Gb Int	499	51000 1Gb Ext	639

WANGDAT SCSI

3100 2Gb Int	485	3100 2Gb Ext	585
3200 4 - 8Gb Int	685	3200 4 - 8Gb Ext	785
3400DX 8 - 16Gb Int	795	34000X 8-16Gb Ext	895

Terminals

WYSE

WY-35	275	WY-55	249
WY-55ES	269	WY-60	315
WY-120	315	WY-120ES	335
WY-160	365	WY-160ES	385
WY-185	305	WY-185ES	325
WY-285	269	WY-285ES	279
WY-520	269	WY-520ES	280
WY-325	389	WY-325ES	419
WY-370	699		

Available in Green/Amber/White
Prices include ANSI, ASCII or PC keyboard

DEC

VT-510	239	VT-510 LE	249
VT-520	275	VT-520 LE	265
VT-525C System Unit	205		

Available in Green/Amber/White
Prices include Gold ANSI or PC keyboard

Sound Cards

CREATIVE LABS

SB V2.0	27	SB Pro Value	40
SB 16 Pro Value IDE	67	SB16 Pro IDE	90
SB 16 Pro ASP IDE	19	SB Pro 16 ASP SCSI-2	115
SB AWE 32 Value IDE	129	SB AWE 32 Full IDE	165
MIDI Kit	99	MIDI Lead	15
Voice Assist	59	WaveBlaster 2	99

ORCHID

Gamewave 32+	76	Sounddrive 16 EZ	69
Sounddrive EZ SCSI	85	Soundwave 32+	125
Soundwave 32+ SCSI	150	Soundwave 32 Pro	149
Soundwave 32 Pro SCSI	170	Wavebooster 2Mb+CDI	89
Wavebooster 4Mb	119	Wavebooster 4Mb+CDI	139

Joysticks

CH PRODUCTS

VirPilot Pro Flight Yoke	62	Flight Stick Pro	36
Pro Pedal for Flight Sims	65	Mach 3 Joystick	22

LOGITECH

Max Joystick	10	Control Pad Cordless	20
Wingman	30	Wingman Extreme	35

QUICKSHOT

Warrior 5	10		

GRAVIS

Gamepad	20	Phoenix Control Stick	85

UPS

APC

SmartUPS 250	175	SmartUPS 400	199
SmartUPS 600	210	SmartUPS 900	365
SmartUPS 1250i	545	SmartUPS 2000i	910
BackUPS 250	89	BackUPS 400	119
BackUPS 600	160	BackUPS 900	275
BackUPS 1250	345		

UPSONIC

PC Might 50
500VA Back up UPS
VDE Approved
£80

UPSONIC

PC Might140 1400VA	274	PC Might200 2000VA	448
Station 28 280VA	93	Station 40 400VA	136
Station 60 600VA	171	Station 90 900VA	258
Station 140 1400VA	Call	Station 200 2000VA	Call

All prices above include communications interface
The Station series is TUV Approved

System 60
600VA True On-Line
TUV Approved
Up to 8hrs extended run times available
£362

UPSONIC

System 100 1000VA	619	System 200 2000VA	1138
System 300 1000VA	1531	System 500 5000VA	2725

The System series is True On-Line UPS and TUV Approved

LAN series (Line Interactive)

LAN 40 400VA	240	LAN 60 600VA	274
LAN 75 750VA	263	LAN 100 1000VA	426
LAN150 1500VA	672		

All prices above include communications interface

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PERSONAL COMPUTER SYSTEMS

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V34 + Fax — Gold Card PCMCIA Modem

The UK's leading brand of PCMCIA credit card sized fax modems. Comes with :-
- free fax software
- free compuserve introductory kit
- free lifetime technical support

Product	Speed	Throughput	RRP	Dabs Price
Gold Card v34 + fax	28,800bps	115,200bps	£499	£329
Gold Card V.FC + fax	28,800bps	115,200bps	£499	£305
Gold Card v32bis + fax	14,400bps	57,600bps	£299	£199

PSION DACOM

Have the convenience of using PCMCIA cards in a desktop PC with the new Gold Drive from Psion Dacom.
- fits into any 3.5" disc drive bay
- use any PCMCIA device
- hot swap

RRP £129

Dabs Price £110

BRANDED PC's

COMPAQ DESKPRO XE

4/33S M170	809	4/33S M270	880
4/50 M170	863	4/50 M340	939
4/66 M270	965	4/66 M525	1045
4/100 M270	1133	4/100 M525	1213
XE560 M270	1175	XE560 M525	1255
XE560 M720	1318		

COMPAQ PRESARIO

460	788	CDS510	1004
CDS520	1035	CDS633 M200	1145
CDS660	859	CDS724	1003
CDS860	1395	920	1146

COMPAQ PROLINEA

4/33S M1	463	4/33S M200	607
4/33S M340	665	4/50S M1	518
4/50S M200	662	4/50S M340	720
4/50 M1	661	4/50 M200	804
4/50 M340	863	4/66 M1	720
4/66 M200	863	4/66 M340	922
4/66 M525	990	4/100 M1	855
4/100 M200	998	4/100 M340	1057
4/100 M525	1125		

Call for the best prices on the New Prolinea PCI
All 486DX Prolineas have 8Mb RAM

IBM APTIVA

486sx/25 4/170 + Overdrive		DX2/50 + Quicken 2	785
486sx/33 4/270 + Overdrive		DX2/66 + Quicken 2	910
486sx/33 4/270 + M/M Odd		DX2/50 + Quicken 2	1135
486sx/25 4/170 DT	679	486sx/33 4/270 DT	770
486sx/33 4/270 MT	997	486sx2/50 4/270 DT	906
486dx2/66 4/420 DT	1359	486dx2/66 4/420 MT	1269
486sx/33 4/270M/M	996	Pentium 60 8/420DT	1405

PORTABLES

COMPAQ CONTURA AERO

Aero 4/25 M250	850	Aero 4/33C M170	1019
Aero 4/33C M250	1189	410 M250	1271
410C M350	1696	410CX M350	2179

CTX

All CTX models include 3 years OSM

SX/33 4/260 Mono	1009	DX2/50 4/260 Mono	1090
DX4/75 4/260 Mono	1258	DX4/100 4/260 Mono	1342
SX/33 4/260 DSTN	1342	DX2/50 4/260 DSTN	1426
DX4/75 4/260 DSTN	1595	DX4/100 4/260 DSTN	1678
SX/33 4/260 TFT	2015	DX2/50 4/260 TFT	2098
DX4/75 4/260 TFT	2266	DX4/100 4/260 TFT	2350

HP OMNIBOOK

600C DX50 M170	1423	600C DX4/75 M170	1751
600C DX50 M260	1809	600C DX4/75 M260	2122
4000C DX4/100 340	2238	4000CT DX2/50 520	2800
4000CT DX2/50 340	2455	4000CT DX4/100 340	2465
4000CT DX4/100 520	3030		

TOSHIBA

T1910/200	857	T1910CS/200	1288
T1950CT/200	1718	T2100/260 New	1029
T2100CS/350 New	1632	T2100CT/350 New	2234
T2150CDS/260 New	2320	T2150CDS/520 New	2579
T2150CDT/520 New	3440	T2400CT/320	2367
T2450CT/320	2848	T2450CT/500	3056
T3600CT/250	2631	T4600C/200	2235
T4600C/320	2406	T4700CT/200	2579
T4700CT/320	2750	T4800CT/500	3143
T4850CT/500	3821	T4900CT/772	4586
T6600C/510	4330		

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1/200LX Connect Pack	75	1/200LX PC Cable	17
1/200LX Mac Cable	17	HP200LX OSM	34

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32k Rampak	39	32k Datapak	29
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Formatter 256k	17	Mains Adapter	10
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Series 3S 256k	129	PC Comms Link	49
Mac Comms Link	55	Mains Adaptor	12
Parallel Cable	23	Leather Wallet	19
Fax Modem	159	3Flight Manager	58
Psion Money	40	128k Flash SSD	27
128k RAM SSD	37	256k Flash SSD	40
512k RAM SSD	89	512k Flash SSD	65
1Mb RAM SSD	189	1Mb Flash SSD	89
2Mb Flash SSD	139	4Mb Flash SSD	255
3Base	24	3Flight Manager	58
Agenda 3 Win	59	Agenda Link 3a	29
Data Deluxe	49	Datavision	49
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1Mb RAM	129	2Mb RAM	245

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F1128V+ External V.34, 28.8K Bps	189
F1128HV+ Internal V.34, 28.8K Bps	189

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Ultra 24	99	Ultra 96	299
Ultra 144	375	Optima 96 Fax	289
Optima 144 Fax	299	Optima 288 VFC Fax	375

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MT1432BLK Ext	319	MT1432MK Portable	345
MT2834BLK Ext	395	MT1432LTI PCMCIA	205

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Linnet 32+ VFX Ext	239	Linnet 34 VFC Ext	290
Ultralink 32+ Ext	Call	Microlin FX Int	Call
Microlin FX Ext	Call	Microlin FX32+ Int	139
Microlin FX32+ Ext	150	Microlin FX34 Int/Ext	240
Mlin FX NB32+ PCMCIA	197	Mobifax 32+ Ext	95
Ultralink Quad Int	165		

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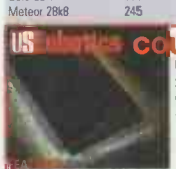
Gold Card V.FC PCMCIA	305	Meteor 14k4	179
Meteor 28k8	245		



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- Fax Class 1 & 2.0, Group 3
- Asynchronous operation
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CommServer 386	940		

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GRX-450 A0	2968		

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HP Designjet OSM	300		

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Swift 240 Colour	178	Swift 240x	215
Swift 330x	Call	Swift 9x	169
Swift 200/240 ASF	65	Swift 9x/24x ASF	119
Swift 90 ASF	80		

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P62	327	P72	385
P90	555		

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320 Parallel	309	321 Parallel	365
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590 Parallel	435	591 Parallel	520
3410	849	Serial interfaces	Call

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KX-P2124	198	KX-P2124 Colour	224
KX-P2135 Colour	126	KX-P1624	199
KX-P3626	272	KX-P3696	272

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LC15	183	LC24-15 MkII	234
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FS5500	3480		

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MANNESMAN TALLY

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SuperScript 660	419	SuperScript 660i	565
ColourScript 3000	640	S102P	945

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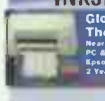

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BJ-10ex/sx ASF	41		

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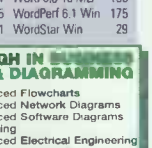

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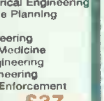

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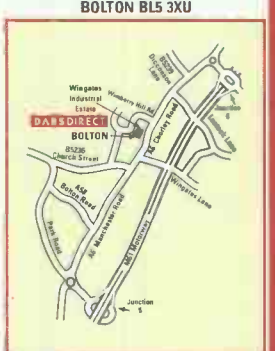

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CUTTING EDGE

CD-ROMs

Culture, cooking and computer equipment feature in this month's disc round-up. We kick off, though, with a compendium of Bob Dylan songs and memorabilia.

Contact Wiener World
0181 954 8777
Price RRP £49.95
Rating ●●●●○

Knocking on Heaven's door

Top *A collage of memorabilia is the main interface to Bob Dylan's CD-ROM*
Above *"I wrote my first song to my mother an' titled it 'To mother'. I wrote that in 5th grade an' the teacher gave me a B+.'"*

Highway 61 Interactive

Keeping up with the changin' times, Mr Robert Zimmerman, alias Bob Dylan, now has his own CD-ROM, a nostalgic multimedia trip through 35 years of rock history. You get 10 full-length songs and 42 short extracts, including many rare and previously unreleased items.

Then there are the lyrics to all Dylan's songs, three full-length videos and numerous clips, a collection of Bob Dylan drawings, hundreds of photographs, and several interactive simulations of key places in Dylan's history. These include New York's Greenwich Village, and backstage at the star-studded 30th Anniversary concert in 1992.

Created with Dylan's co-operation, the full package is reckoned to take 10-12 hours to navigate. The main interface is a scrolling collage of Dylan memorabilia. Click on the harmonica, for example, and our hero plays it for you. Tickets and backstage passes take you to concert events, while a guitar leads to a database of over 300 songs with full lyrics.

What the publicity calls a "hyper-realistic 3-D environment" is not one that any self-respecting games programmer would recognise, being no more than a collection of stills peppered with multimedia hot-spots. It is redeemed by the sheer quantity of archive material, truly a feast for Dylan fans.

But is this an adventure game, light entertainment, or an archive for researchers into Dylan's poetic genius? It straddles all three categories while not fully meeting the needs of any. For example, the database of lyrics can be searched only by title, not by word or phrase, thus neglecting a key advantage of electronic media.

Highway 61 Interactive is a hybrid Windows and Macintosh disc, created primarily by the Apple Media Kit and using Quicktime technology. System demands are heavy — realistically a 50MHz 486 with 8Mb. On the Mac, 8Mb and a screen capable of thousands of colours is required.

Tim Anderson

Great Artists/ Art Gallery

The National Gallery can now boast two CD-ROMs devoted to its collection. Microsoft's Art Gallery has been out for a year and now there's a new offering called Great Artists.

How do they match up? On the most obvious point, the number of paintings covered, there is no comparison. Great Artists contains 40 main works and a measly 1,000 colour images, while there are a whopping 2,000 paintings in Art Gallery. The result is two very different packages, one concentrating on a small area in detail and the other aiming to cover everything.

Great Artists is an educational package for children aged 10 upwards. Its strength lies in an enlargement facility which is invaluable if you are studying technique, as you can see the brushwork and the detailing. However, the facility reduces the number of images that can be stored, and only a few can be seen in close-up. For example, there are five of Van

Gogh's works but only one of them can be enlarged. This is at times disappointing.

The zoom facility is a little primitive, and it is annoying that the close-up view divides the painting into blocks, limiting your selection of what you can see, and you cannot scroll around the painting. You may have to come out of the whole painting and back into close-up four times to see the specific area you want to study.

In contrast, Art Gallery has a vast number of paintings but none can be seen in as much detail. All the paintings can be slightly enlarged, but with mixed results. For example, Crivelli's Annunciation with St Emidius can only be enlarged by about 10 percent, so you cannot see the detail which is vital to understanding the work, especially when demonstrating the principle of linear perspective. Still, some other paintings enlarge well, and given the disk's high resolution, the colours and reproduction quality are excellent.

Both disks organise the contents in a similar way, but their presentation is very different. Great Artists is aimed at children so the interface is brash, bold and fun, and the information does not require any prior knowledge. Art Gallery is very plain in comparison but it goes into more detail, for example devoting an entire four pages to Turner's The Fighting Temeraire. It also moves much faster than Great Artists, which goes at snail's pace.

If you are looking for something for a young child then Great Artists is a good introduction, although they will quickly grow out of it. If you want virtual access to the National Gallery, it will have to be Art Gallery, even if you end up feeling myopic.

Adele Dyer

Great Artists
Contact Attica Cybernetics
01865 791346
Price £49.95
Rating ●●●○○

Picture this

Top ***Great Artists will introduce children to the world of art and artists, but it might not hold their attention for long***
Above ***Art Gallery's interface is plain in comparison, but it will give you virtual access to the treasures of the National Gallery***

Art Gallery
Contact Microsoft
0345 002000
Price around £38
Rating ●●●●○

Computer Equipment & Suppliers CD-ROM

"I'm looking for a V.34 modem but I can't afford to spend more than £200." "When did you last review a Bloggs machine?" "Can you suggest some medium-sized PC manufacturers here in Manchester I could ask for a quote?" These are the kinds of questions we get every day here at *PCW*, and they aren't easy to answer.

Until recently, the first source of information we would turn to was Inside Information, a DOS database on a floppy disk listing products reviewed in a range of magazines, including our own. It covers hardware and software — some 6,000 products from 2,000 suppliers. It costs anywhere from £95 to £270, depending on how often you want it updated; corporate licenses are also available.

It's a very useful tool but it isn't the answer to every problem as it only indexes products that have been reviewed, and it can only search by name of product, category or supplier. It doesn't contain reviews, either, only page references to them, so unless you have back copies of *PCW* and other magazines on your shelves it will take a while to retrieve the article you want.

This is where The Computer and Equipment Suppliers CD-ROM 1995 comes in. It is published by VNU, which also publishes this magazine, and to start with the bad news, it costs £335 just for an index to hardware, so you would have to be a computer consultant or dealer to justify the expense. But for your money you get a database of over 5,700 products including 860 PCs and 1,500 comms products plus 2,600 manufacturers and VARs. It also comes with a Windows search engine which can easily answer the kinds of questions I mentioned above, and 500 hardware reviews from *PCW*.

The Software User's Yearbook is the ideal complement, although its information is slightly older and its search engine is less sophisticated. It costs £285, but you can get the two together for £580.

David Brake
Contact VNU 0171 316 9000 (book sales department) (Codehigh 01734 724905)
Price £335
Rating ●●●●○ (value for money ●)

Art de la Table

If cookery CD-ROMs don't cut the mustard it's because most people don't keep their PCs in the kitchen. Your hollandaise sauce could curdle in the time it takes you to run into the next room and check the recipe. Granted, a CD-ROM doesn't get dog-eared and acquire olive oil splashes, but for the price of a dinner at l'Escargot it ought to be more than a mere cookbook.

Arome Interactive has tried to address the problem with discs that it guarantees will revive a dead duck à l'orange. The first two titles in its Art de la Table series — The Four Seasons of Gourmet French Cuisine and The Art of Making Great Pastry — are more like cookery masterclasses. Each contains 100 recipes supported

by QuickTime demos of everything from chopping basil and coring an apple (yes, really) to melt-in-your-mouth choux buns.

The search engine is pretty thorough. The interface is intuitive enough and you can search for recipes according to ingredients, techniques, alphabetically, or, in the case of Four Seasons, the time of year. You can print the recipe, plus a shopping list and list of utensils, so you don't even need a computer at home: you can plan your dinner party during a dull moment at the office.

Usefully, in each Four Seasons recipe there's an indication of the cost, cooking and preparation time and the degree of complexity. There are recommendations for wine to accompany your meal (all French, of course) and you can adjust the ingredients according to the number of people you're entertaining. But if you want to add panache to your dinner party, I can't help feeling you'd learn more from watching Junior Masterchef. The illustrations are only in 256 colours – a disappointment when you've shelled out for a graphics card which can handle millions – and the QuickTime movies are low-res and limited to a small corner of the screen. And the discs are slow, even on a standard double-speed drive – you could fast-forward a VHS cookery tutorial in the time it takes to load one of the movies.

It's nice to see discs that use most of the 650Mb available on CD-ROM, but there's little here that you can't get from a good book or video or, for that matter, a Prue Leith masterclass. For my money, I'd rather have a disc that handles the washing up afterwards instead.

Nicky Glatter

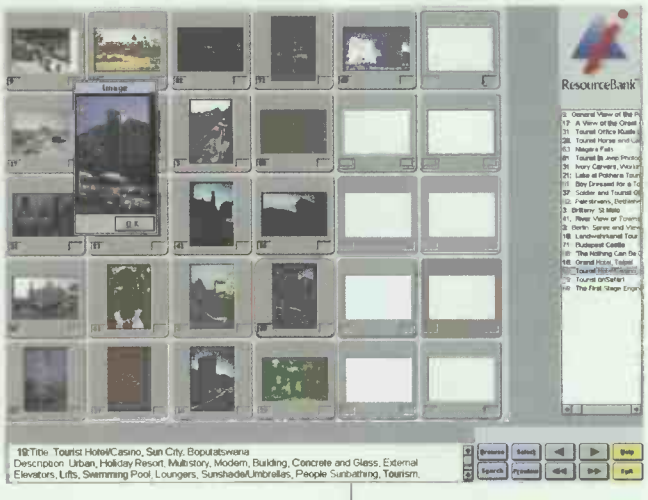
Contact GEM Distribution
01279 822800
Price £39.95, PC and Mac
Rating ●●●○○

You too could whip up a cake that looks this good, but it would help to have your PC in the kitchen with you

Resourcebank

Are you planning to produce a newsletter, a presentation or perhaps even a multimedia CD-ROM of your own? Arranging the text is easy, but producing pictures and sounds can be a headache. Andromeda Interactive, a leading British multimedia developer, has branched out into this business with ResourceBank, a disc indexing more than 15,000 photographs, 3,000 pieces of artwork, 20,000 sound effects and 600 musical themes. Seems like the bargain of a lifetime? Well, the key word here is "index". What you are buying is no more than a vast computerised catalogue: your small investment doesn't buy you the rights to use any of these files. You have to send off an order to Andromeda; the minimum value is £300, so only serious business users need apply.

As a catalogue it works quite well: the interface is easy to use and the material is well indexed. Having found what you want, the software makes it easy to assemble a "shopping list" which you can then print out and post or even email to Andromeda@cix.compulink.co.uk. What you get back is a CD-ROM full of JPEG format images and/or an audio CD containing the music you ordered.



Resourcebank's pictures are extensively indexed, but how can you be sure you have what you want if the thumbnails are so small? This is taking anti-piracy measures too far

As far as I could see, all the pictures and illustrations on offer are of high commercial quality. They cost between £15 and £120 apiece; all the ones I viewed cost £30. Regrettably, in order to protect them from theft, the thumbnails of the images on the CD are occasionally so small that you can't tell what you are ordering.

The situation with the sound clips is even worse: they are indexed by keyword, but you can't hear a thing without paying out. And because these are clips from high class outfits like LucasFilm, Warner Brothers and Universal Studios, they don't come cheap. You buy them in collections costing between £300 and £935.

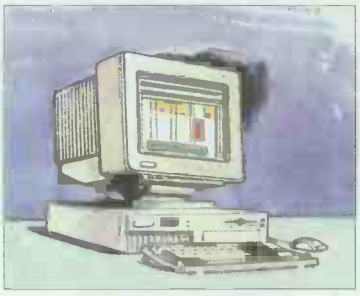
Although the packaging seems to suggest that video clips and maps would be part of the index, they are not yet available. The disc will be updated between two and four times a year, and the second disc should have both.

Andromeda is not stopping at CD-ROM distribution for its archives, either. It expects to put the same collection online on the Web at www.andromeda.co.uk where you will be able to browse through it for free (though you will still have to pay for your phone calls).

If you don't mind spending a few hundred pounds to make your presentation look right, this CD may help you find just what you were looking for.

David Brake

Contact Andromeda Interactive
0181 977 9132
Price £19.95
Rating ●●●●○



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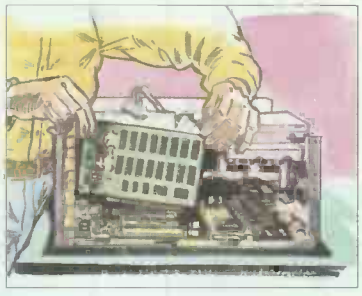

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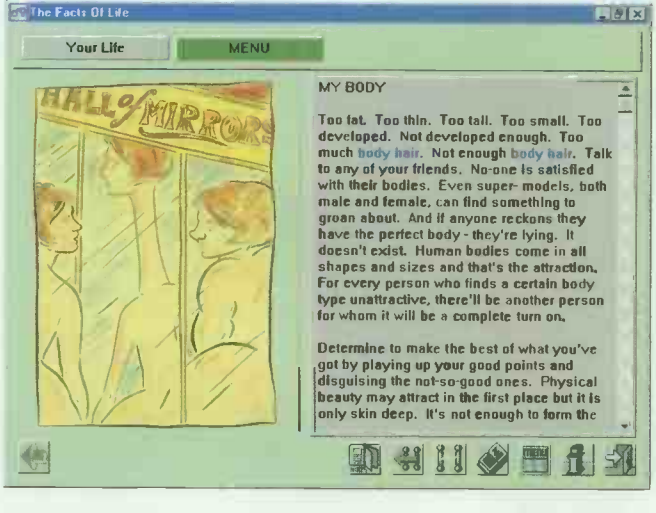
CUTTING EDGE

Kids' Stuff

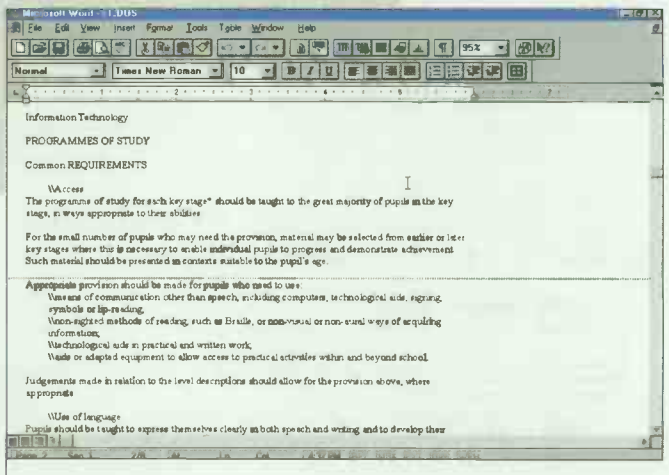
Parenthood is fraught with problems, not least being when and how to explain how babies get into a mummy's tummy. Paul Begg looks at the facts of life, plus the National Curriculum, a sneaky egg thief and a KidBoard for bored kids.

It's been another tough month. So much brilliant software has piled up next to my desk that it's been difficult to know where to start. And not just software either: hardware manufacturers are beginning to realise that computer users start young and little hands don't always manage to use a full-size keyboard or mouse as easily as grown-ups. This month I've taken a look at a keyboard just for kids. First, though, sex.

Sex education is a tough topic for parents and teachers and it isn't easy for children either. The Facts of Life is a new CD-ROM produced by a consortium that includes a team from the London Hospital Medical College, who provided the text and glossary and, under the guidance of Professor JG Grudzinskas, acted as editorial advisors supervising the medical illustrations, diagrams and photographs. Other members of the consortium are The National Society (the educational wing of The Church of England), Projection Visual Communications and Interactive Learning Productions. The professional advice and experience of a large number of individuals and organisations were also called upon, ranging from Femidom to the Terrence Higgins Trust.



The Facts of Life treats a tricky subject with intelligence

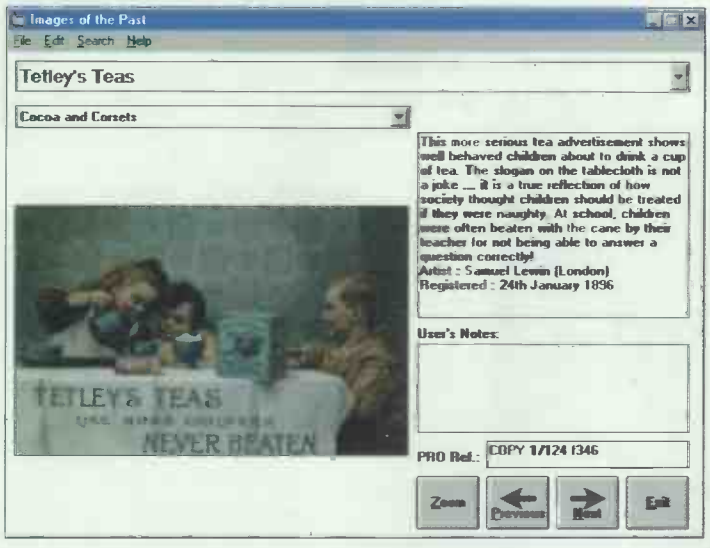


The National Curriculum as a plain ASCII text is here being read in Microsoft Word

This is obviously a serious program, treating a difficult subject with care and responsibility. The depth and breadth of coverage is extensive. There are three sections: The Facts, which is subdivided into three sections, Reproduction, Health, and Growing Up; Your Life, with nine sections — Pregnancy, Abuse, Relationships, Sex and the Law, Sex, Culture, My Sexuality, My Body, Myths; and Other People, which contains 20 male and female case studies ranging from 13-21 years. Each section contains further subsections. For example, Abuse has a general descriptive introduction with highlighted hypertext links to related topics, and then five subsections or chapters covering Sexual Harassment, Malicious Phone Calls, Rape, Sexual Abuse, and Abuse Stories. All the sections are detailed and to my unprofessional eye give sensible advice in a clear and straightforward way, with extensive use of audio, graphics and animation, as well as still photographs.

There's a glossary of short explanations of general sex education related words and terms (including the naughty and offensive words), some of which have an audio track that lets you hear the correct pronunciation. What I especially liked about this CD-ROM was the way it was possible for a child or young adult to learn more about sexual topics that they might otherwise be embarrassed to ask about, and I was especially impressed with the various case histories designed not only to help children understand, but also to explore sexual feelings and experiences. The icon taking you directly to a database of useful telephone numbers and organisations is a good idea.

This is a responsible CD-ROM intended for schools — it covers Key Stages 3 and 4 of the National Curriculum — but also affordable by parents. A Teacher Custom setup enables you to provide access that's in line with sex education policy



● *Wonderful pictures — but beating kids! How times have changed*

and lesson structure. The extensive documentation and exercises are in a large, sturdy ring binder and slip case.

The National Curriculum

I mentioned that The Facts of Life covered Key Stages 3 and 4 of the National Curriculum. But what is the National Curriculum? Most people seem to know that it's some sort of guide for teachers, but little else. Well, the revised National Curriculum for England and Wales is organised on the basis of four key stages (which are defined precisely in section 3(3-6) of the Education Reform Act 1988, as amended by the Education Act 1993) and each stage applies to children in particular age groups. The stages lay down what the children should be studying and indicate what they should have learned by a certain age.

So, okay, the National Curriculum *is* a guide for teachers, but it's also for parents. If you want to supplement your child's education, read it. Now you can get all 11 subjects of the National Curriculum in ASCII text on a 3.5in disk from HMSO Electronic Publishing.

I also received from HMSO Electronic Publishing a curious little disk that is a delight. Called Cocoa and Corsets, it's a selection of Victorian advertising and commercial art from the Public Record Office collection. The pictures and accompanying explanatory text have been chosen for use by teachers of Social History, Media Studies and Graphic Art, and specifically chosen to fulfil the requirements of Attainment Target 3 at Key Stages 2 and 3 of the National Curriculum. The images, which date from 1879 to 1912 and number about 100, will also be useful for anyone taking A-Level Art History and degree-level Art and Graphic Design courses.

I like the disk because when the images are converted to .BMP files they make some of the best Windows wallpaper around, but they can also be used as royalty-free illustrations in non-commercial publications such as in-house journals, club newsletters, parish magazines and so on.

Chadwick and the Sneaky Egg Thief

Chadwick is the latest addition to the growing range of multimedia titles distributed in the UK by Guildsoft and it comes from a new company called KnowWare. I have to say, it's a great little program and KnowWare hasn't missed a trick in making Chadwick an entertaining program children will want to use time and again.

The 20-page story is about a young dinosaur called Chadwick who searches with his friends for a missing egg. The story is aimed at children in the 3-8 age group, though I'd suggest its appeal will be to the lower end of that range, and it's told in a simple cartoon drawn by award-winning Disney animator Mike Bailey.

What makes Chadwick different is that your child can colour the cartoons with an on-screen crayon, paintbrush or marker pen. There are quite a few simple-to-use but powerful drawing tools. You can fill (fill a character or object with the selected colour) or scribble, create effects with patterns and stamps, lighten a colour, erase and undo. And once you have the cartoon coloured, you can print it out.

A nice but not an original idea, you may think. But that's only part of what can be done with Chadwick. Below the cartoon is text that the child can read or can have narrated (one of the voices is June Foray who provided a voice in The Flintstones TV series). Or you can click on characters and objects in the cartoon to

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make something happen. You can also display and hear the name of every character and object in the picture. This helps a child build a vocabulary and learn how to spell (although the pronunciations and spelling are American). And as a final treat, once the story has been coloured you can go to the movie theatre to watch the cartoon — coloured as you have chosen and with your name in the credits!

The Crystal Maze

One of my daughter's favourite TV programmes was The Crystal Maze on Channel 4. Siobán wasn't alone, of course. In fact, so many kids liked The Crystal Maze that Chatsworth Television, who made the series, did some special kids-only episodes. Siobán also developed a passion for a Crystal Maze game we discovered in an amusement arcade. She was determined to beat the various puzzles and I thought at the time that a version for the PC would be a great idea. It would be great because like the TV programme, it forces you to look at problems and consider solutions before taking any action; because it would help develop keyboard skills; and because it would keep Siobán quiet for a while — and anything that keeps Siobán quiet is a prized possession in my house.

Now there *is* a Crystal Maze game. From Sherston Software, it follows the theme of the TV series. You choose six players from a choice of 12. You have to choose them with care because each player has different strengths and weaknesses, making them more or less adept at solving certain puzzles. There are four zones: Aztec, Ocean, Futuristic and Medieval. Each contains a different set of challenges and the challenges themselves fall into four types: mental, physical, skill and mystery.

Players can be "locked in", just as on TV. To release the player you sacrifice a crystal and five seconds off the time you have to complete the final challenge in the Crystal Dome.

What I got to see of The Crystal Maze was good. And it doesn't have to be played alone — up to six can play. And while I haven't had much time to examine it myself, Siobán isn't showing any signs of boredom — which is a good sign.

Negotiating The Crystal Maze

● *Aztec Zone: the PC game is pretty faithful to the TV series*

● *Arrrggghhh! One thing is certain: you'll play The Crystal Maze over and over again*

Chadwick doesn't miss a trick to keep the boredom factor to a minimum

KidBoard

A bit on the garish side, KidBoard is a full-size, fully-functional 101-key keyboard for kids aged three and up. The housing is made of heavy-duty plastic, and there's also a built-in wrist and hand wrest. The number keys are red, letter keys and Enter are Blue, F keys and everything else, including the number keypad, are yellow. Above the letters on the letter keys are little pictures. The pictures coloured yellow are left-hand keys and the letter keys with red characters are right-hand keys.

This colouring is to aid the purpose of KidBoard, namely to help children to identify letters and locate them on the keyboard. To this end it comes with three simple games intended to help children become familiar with the alphabet, the keyboard, and computer operation. The easiest game is Letter Rap. Kick Ball and Clown Bounce become progressively more challenging, and the games talk, squawk, sing and ping.

I liked the idea of the colouring to indicate left and right-hand keys and this led me to look at the Microsoft Natural Keyboard, on which the right and left keys are even more clearly defined. Siobán is getting to grips with this and I'll have her report soon. Otherwise, she liked having her own keyboard and thought the KidBoard was fun. Grownups might find it a bit bilious and not worth the bother of having to change for a more conventional keyboard in those brief moments they can get the family computer to themselves.

PCW Details

The Facts of Life
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The National Curriculum
Price £25 (inc VAT) for all subjects
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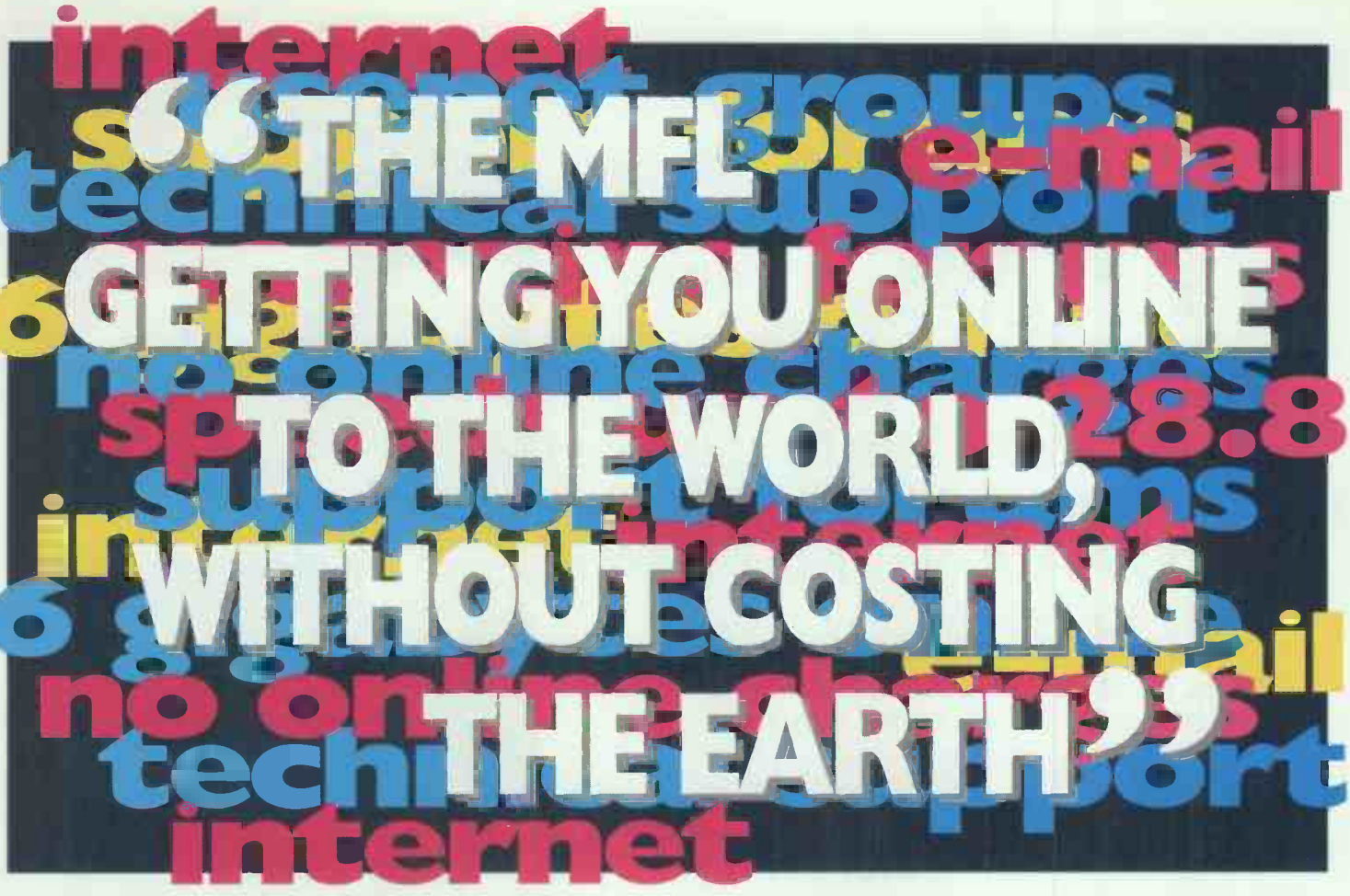

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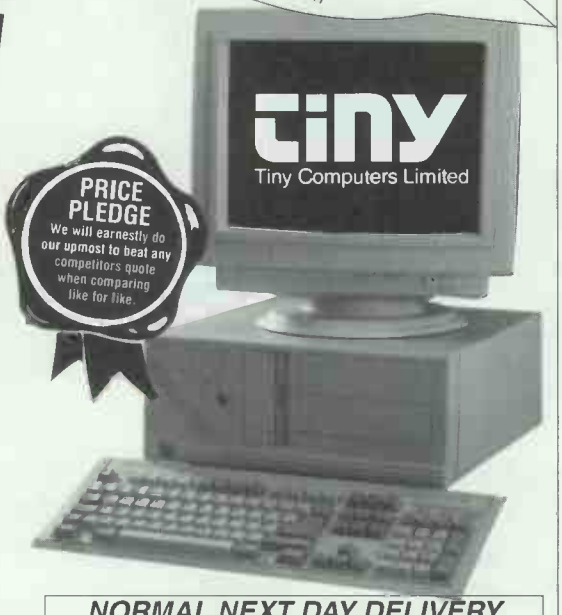

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PCW Competitions

Multimedia Kits

We've got two Aztech Multimedia Kits up for grabs this month complete with the WaveRider 32 sound card, double-speed CD-ROM drive, powered speakers and software. The WaveRider 32 walked away with the Editor's Choice award for best all-round sound card in our April group test. It has a 2Mb WaveTable synth for compatibility with General MIDI and Yamaha's OPL3 chipset for AdLib.

The CD-ROM drive is compatible with CD-i and MPEG standards, and can accommodate audio CDs. To get you started, the package includes ten CD titles including The New Grolier Multimedia Encyclopedia and Macromedia Action.

The WaveRider 32+ Multimedia kit is a steal at just £299 — the cost of the software alone. To win one, simply tell us what IDE stands for. Is it:
(a) Integrated Disk Electronics;
(b) Intelligent Disk Electronics;
(c) Integrated Drive Electronics;
(d) Integrated Digital Electronics?
Please send your entry to the address at the bottom of the page, or telephone **0839 777722** to leave your answer.

Microsoft hardware

Microsoft's Natural Keyboard is the touch-typist's dream. It's ergonomically designed for maximum comfort, and its angled split keyboard reduces the risk of RSI. Microsoft has given us four Natural Keyboards to give away along with 10 stylish Home Mice. The first four correct entries out of the bag will win the Natural Keyboard and Home Mouse; six runners-up will each receive the Home Mouse.

To enter, simply tell us who is the President and CEO of Microsoft. Is it:
a) Bill Sykes b) Bill Gates c) Steve Jobs d) Steve Davis

How to enter

You can enter all three competitions by placing your answers on a postcard or the back of an envelope. Entries should be sent to: June Competitions, *Personal Computer World*, 32-34 Broadwick Street, London W1A 2HG. All entries by post to arrive by 30th June 1995.

Alternatively, call **0839 777722** to leave your answers. Competition entries made by telephone will be charged at 39p per minute cheap rate and 49p at all other times.

Music Software

Have you ever fancied yourself as a hot music producer but don't know the first thing about music? If so, Circle Elements could be right up your street. Each of the two CD-ROMs contain over 1,000 professionally recorded samples of guitar riffs, keyboard sequences, vocals and drum loops. All you need is a sound card and a good ear for what sounds good.

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The first CD, Intergalactic, has samples of analogue instruments, synthesised effects, robot voices and stacks of percussion. The second disc, Planet Earth, has everything from thunder storms and restaurant atmospheres through to gospel choirs.

Thanks to Time + Space, we have ten sets of Circle Elements to give away. To win a copy simply answer the following question correctly and send it to us before 30th June 1995 or call **0839 777722** to leave your answer.

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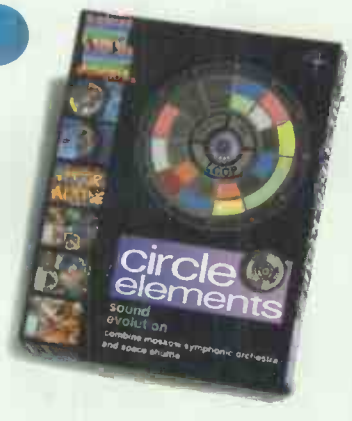

Rules of entry

The competition is open to all readers of *Personal Computer World* except for employees, and their families, of VNU Business Publications, Aztech, Time + Space Interactiv, and Microsoft. All entries to arrive no later than 30th June 1995. The Editor of *PCW* is the sole judge of the competition and his decision is final. No cash alternative is available in lieu of prizes.

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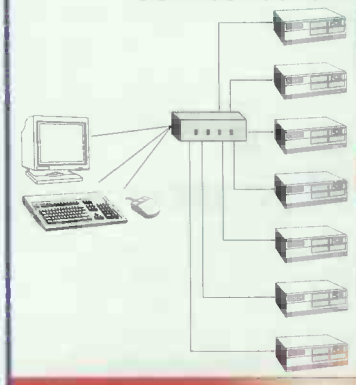

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2	1	£11
2	2	£19
2	3	£50
3	2	£50
1	3	£14
3	1	£14
1	4	£17
4	1	£17
5	1	£30
1	5	£30

AUTOMATIC

PC	Printer	Parallel	Serial
1	2	£45	£50
2	1	£30	£35
2	2	-----	£65
4	1	£45	£60
4	2	£80	£85
5	1	£70	-----
8	1	£90	£96
8	2	£120	-----

Auto Modem Sharer 4 users £ 99

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1	2	£135	-------
1	5	£550	-------
2	1	£140	£140
2	2	£180	£230
3	1	-------	-------
4	1	£180	£180
4	2	£225	£325
7	3	£350	-------
8	1	£250	-------
8	2	£315	£360

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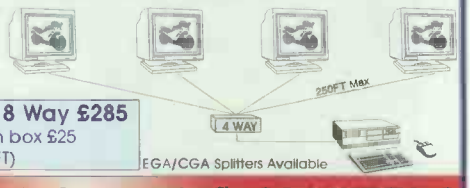

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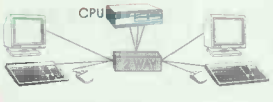

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screenplay NEWS

Origin wings its way to Mac

Continuing the fight against the dark forces of the Kilrathi, Origin's Super Wing Commander II is set to hit the Mac. This enhanced CD-ROM edition of the classic PC shoot 'em up boasts 256-colour 3D graphics and has 68K and PowerMac code on the same disc.

In keeping other games in the series, and just about everything else, Super Wing Commander II casts the player as a space pilot fighting alien invaders. The aim is to progress through the ranks, complete increasingly challenging missions, and get your hands on some of the best hardware in the galaxy.

Super Wing Commander II will cost £49.99 and is published by Electronic Arts on 01753 549442.

The 1995 ECTS Awards

London's Kensington Roof Gardens was the site for the announcement of the all important 1995 European Computer Trade Show [ECTS] Awards to the games and multimedia entertainment industry.

This year's winners were as follows:

BBC Live & Kicking Viewers Award
The Lion King
Game of the Year (Powerplay/Germany)
Magic Carpet
Game of the Year (Micro Mania/Spain)
Doom II
Game of the Year (Zeta & game Power/Italy
Donkey Kong Country
Game of the Year (High Score & Micro Bitti/Scandinavia) Doom II
Game of the Year (Joystick/France)
Magic Carpet
Game of the Year (Power Unlimited/Benelux)
Donkey Kong Country
The WIRED Award/USA Doom II
The LOGIN Award/Japan Wing Commander III
Developer of the Year Bullfrog
Marketing Award
Virgin Interactive Entertainment
Software Publisher of the Year Electronic Arts
Innovation Award Bullfrog
Best Edutainment Microsoft Encarta
Video Game of the Year Donkey Kong Country
Computer Game of the Year Magic Carpet
Hardware Award 3DO
Most Original Title Magic Carpet

Faster than a silver bullet

NovaLogic, author of the bestselling Comanche combat simulation, has announced Werewolf vs Comanche — a first in multiplayer PC software. Two full games in one package, this new title allows users to fight head to head in American or Russian and attack helicopters across a modem or network.

Thanks to the company's new Voxel Space technology, battles are fought over highly realistic terrain (as you can see in the accompanying screenshots). Each simulation has been designed to handle like the real thing, and missions can played standalone if desired. To cap it all there's also a option for up to eight co-operative users — four Werewolf pilots can take on four Comanche ones.

Werewolf vs Comanche is due for release in May 95. NovaLogic is on 0171 607 9707

CUTTING EDGE

Screenplay

Dark Forces

Essentially Doom on board the Death Star, this game impressed David "Darth" Brake for its music, visuals and attention to detail, yet was ultimately something of a disappointment...

● *For a Star Wars fan it's much more satisfying to kill stormtroopers than Doom's flying eyeballs...*

Dark Forces undoubtedly has some striking similarities to Id Software's record-breaking Doom. Anyone who has played Doom (and there can't be many serious PC gamers who haven't by now) should find it easy to get to grips with this new game. Both titles are first-person-perspective shoot 'em ups (though Dark Forces places more emphasis on puzzles) and the default keyboard layouts are similar. But each has its advantages and disadvantages.

While Doom's game engine is more than a year old, Dark Forces' is right up to date, and it incorporates a number of technical improvements that Doom players have been crying out for. It allows you to look (and shoot) up and down as well as left and right. It also lets you crouch or jump, although many times you will still find yourself able to see a hole big enough to fit you that you can't enter. There are nine basic weapons available, and several of them have two different modes of operation (giving even more variety). Best of all, you aren't limited to direct-fire weapons — you can also find and use grenades and mines for killing stormtroopers and other riff-raff without coming into their line of fire. A minor but welcome touch is the addition of a Heads Up Display which allows you to see the map of where you have been while still keeping your eyes out for new dangers.

The scenery in Dark Forces is just as atmospheric as that in Doom, and better detailed — not surprising when you consider that the game is CD-ROM-only and contains upwards of 70Mb of data. There are plenty of interesting surprises, like a sewer you wade through with a perceptible current which tugs you around, and some jokes to reward those who explore levels thoroughly, like a stormtroopers' urinal. Whereas Doom's plot is rudimentary at best, Dark Forces has animated cut scenes between each mission, and the familiar world of Star Wars is a great deal more emotionally involving than Doom's fantasies could possibly be.

Despite all of these advantages, though, Dark Forces is something of a disappointment. Its improved technology comes at a price — it requires a minimum of 8Mb RAM and CD-ROM drive, which will put it out of reach of many players. It lacks the network play features which boosted Doom from a superior shoot 'em up to an

● *The levels can be very complex and detailed. As well as this full-screen map view you can have the map floating in front of your face*

There's only one word for the environments LucasArts has designed — stunning

international obsession, and it has only 14 levels — large ones, it's true, but still less than half of the number you get with Doom II. It also lacks a Save feature — instead, it will save your position at certain pre-set points in each mission. This is fine for those players who can give themselves over wholly to a game for a weekend or two, but it makes it difficult for the rest of us who have to "dip in" to a game over a lunch hour or for an hour or so after work. If you can't figure out a way around a particular problem, you have to quit the game and hope that when you restart you won't have to fight your way through clouds of stormtroopers all over again.

One last warning: Doom had its share of puzzles, but they tended to be fairly straightforward. The puzzles in Dark Forces require more lateral thinking. If you enjoy the kinds of convoluted puzzles which often turn up in adventure games, fine; but if you are in it for the mayhem and bloodshed you may end up frustrated.

System Requirements: 486DX/33 highly recommended, 8Mb RAM, 3.5Mb hard disk space, CD-ROM drive. A Mac version should be available shortly.
Price: £42.54
Contact: Virgin Entertainment Interactive 0181 960 2255

Descent

... as was Descent, yet another variation of Doom, but this time in three dimensions. Again, David Brake thought it looked and sounded great, but it never quite matched the excitement of the original.

Descent can be summed up in one phrase — Doom in three dimensions. There is a plot but it's pretty meaningless. What it boils down to is you flying a spacecraft through a succession of mazes, shooting at robots or up to four fellow human players.

The importance of the three-dimensional element cannot be overstated. Even the most experienced Doom players may find themselves floundering when they go to play Descent. There are walls and doors, but as there is no gravity there are no "floors" or "ceilings" to orient yourself against. Rooms can and often do have doors in every wall, and enemies can spring out of any of them to attack you. To defend yourself you have the usual assortment of weapons — some guns, several kinds of missile, and mines.

The music is excellent and the environments are nicely

● *The scenery is impressive but the flying robots aren't very exciting. They're polygon-based, not bitmapped, and shooting a creature or person is much more... well... personal than a flying blob*

rendered, but you'll need a pretty hefty machine to play it properly. The manufacturers recommend a 486DX/33, but some players on our network felt that a 66MHz 486DX2 was sometimes annoyingly jerky.

When playing against the computer, the objective of the game is to fly around the mazes — there are 30 in all — dodging or destroying guard robots and destroying a central "reactor". You then have 30 seconds to get to the exit (usually close by but hard to find) and escape before the reactor blows up. A map is created as you fly along which you can refer to, but since it is in three dimensions it can be rather difficult to interpret. Despite playing the game for hours I was still unable to use the map effectively, and you can't move around while viewing the map, so you have to try to hold it in your head as you go along.

● *Descent's map is nice to look at, but difficult to learn how to use unless you naturally think in three dimensions*

Although there are lots of different opponents, weapons and levels, playing the game by yourself can get tedious and repetitive after a while. If you are lucky enough to have a network to play across, this makes it more appealing, but even then you will tire of it. Part of the problem is that you can kill your opponent too quickly — you can wander the mazes looking for other players for several minutes, then when at last you meet it's all over in a quick flurry of blaster bolts.

System Requirements: 486DX/33 with 8Mb RAM recommended, 15Mb of free hard disk space. Mac version due this summer
Price: £39.99
Contact: Interplay 01235 821666

Charts

HMV Games LEVEL ONE

PC

1	Disc World	Psygnosis
2	Dark Forces	Virgin
3	Star Trek Final Unity Demo	Microprose
4	Star Trek Interactive	Ablac
5	Descent	Interplay
6	Theme Park	EA
7	Wing Commander 3	EA
8	Alone In the Dark 3	Interplay
9	Little Big Adventure	EA
10	Doom II	Virgin

MAC

1	Marathon (CD)	EA
2	Stalingrad	US Gold
3	SimCity 2000	Maxis
4	Myst	EA
5	Links Pro Golf	Access
6	Peter Gabriel Xplora (CD)	Real World
7	Flying Nightmares (CD)	Domark
8	SimCity Classics	Mindscape
9	3D Atlas	EA
10	Another World	Kixx

Leisure Lines

Brainteasers courtesy of JJ Clessa.

Quickie
A man arranges to pay off a debt of £3,600 by 40 annual instalments which form an arithmetic series. When 30 of the instalments have been paid, the man dies leaving a third of the original debt unpaid. What was the value of the first instalment?

This Month's Prize Puzzle
Not too difficult this month. A farmer spent three equal sums of money in buying cows, pigs and sheep. Altogether, he bought 47 animals. The number of pigs exceeded the number of cows by as many sheep as he could have bought for £9.

The question is: how many animals of each kind did he buy?

Answers on a postcard or the back of a sealed envelope — no letters and no floppy disks, please. Send to: *Personal Computer World* Prize Puzzle — June 1995, P.O. Box 99, Harrogate, N Yorks HG2 0XJ, to arrive no later than 20th June 1995.

Winner of March 1995 Prize Puzzle
Not quite as good a response to our musical prize puzzle as we would have hoped, although the entries came from all over the place, including India, Oman, Helsinki, Mauritius, Belgium and Bradford. Just over 100 replies came in, most of them correctly deducing that ELGAR wrote the chorale. The winner picked at random was Ms CJ Archer of Beeston, Notts. Nice one, CJ, your prize is on its way.

By the way, as a point of general interest, the use of an extra-large envelope is not prohibited, but it doesn't alter your chance of winning since the selection is done by generating a random number R within the range 1 to N where N is the number of entries. The card in Rth position gets the prize (assuming it has the correct answer).

However, those cards which come in with Harrogate spelt as HARROWGATE are automatically disqualified (if you don't know why, ask any Yorkshireman!).

Usual message to all the also-rans — keep trying, it could be your turn next.

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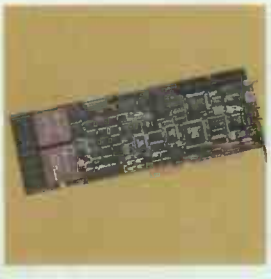

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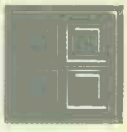

OPERATING SYSTEMS

Windows 628
Tim Nott continues his spring cleaning, tightening up his Windows subdirectory and releasing a few extra megabytes.

DOS 632
Wondering how to back up batch files or make the most of the elusive Winstart? Only Simon Collin has the answers.

32-Bit 634
Chris Bidmead has a peek at Portage, Awk, and Robert the window cleaner.

APPLICATIONS

Word Processing 638
So what exactly have Lotus and Novell been up to? Tim Phillips, detective extraordinaire, investigates.

Spreadsheets 642
Stephen Wells shows how to get the most from arrays, and offers a financial analysis template.

Databases 646
Mark Whitehorn carries on with his look at relational database management systems.

Graphics & DTP 650
Gordon Laing explains the ins and outs of histograms, and explores Quark's latest plans.

Multimedia 656
Want to spice up your presentations? Take a look at Asymetrix's 3D F/X, says Karl Dunkerley.

Sound 660
Steven Helstrip demonstrates how to get hip drum sounds from your setup, courtesy of loops.

PROGRAMMING

Visual Programming 662
Clarion for Windows, Visual Basic, Borland's database engine vs Microsoft's Jet — it's all in this month's offering from Tim Anderson.

Low Level 666
Mike Liardet, *PCW* gamer-in-residence, extends the mini-max method to Go-Moku, a two-person VB game.

Hardly a month goes by without a change to Hands On. Regular readers will have noticed the change in the title of Tim Anderson's Visual Basic column. The Microsoft product used to be so dominant that it justified its own section, but recent developments make the Visual Programming tag more appropriate. We could have called it RAD (Rapid Application Development) but that's too much of a mouthful.

Also new (or newish) to Hands On is our Beginners section, now written by Eleanor Turton-Hill. *PCW* is the sort of computer magazine that a lot of absolute beginners find a mite tricky and Beginners sets out to put that right.

Hands On remains the place where readers can contribute to *PCW*, and as always we'll pay for anything we use. Macros, sections of code and hints and tips will be rewarded with a £20 book or record token (please say which you'd prefer) and we'll pay hard cash for longer, more involved pieces. Please include relevant screenshots in GIF format.

All submissions should be emailed to the author of the appropriate section or snailmailed to Hands On, *Personal Computer World* Editorial, VNU House, 32-34 Broadwick Street, London W1A 2HG. Questions and short hints and tips can be faxed on 0171 316 9313.

Numbers Count 674
Smarandache, permutations, class/student allocation... just another day for Mike Mudge.

AND THE REST...

Networks 676
Stephen Rodda finally installs Carbon Copy, and gives the thumbs up to SoftWindows.

Macintosh 680
Chris Cain looks at the long-awaited System 7.5 Update 1.0, and brings the latest from the world of Mac.

Computer Answers 684
Frank Leonhardt provides his usual forum for your PC problems, hints and tips.

Beginners 686
New to the weird and wonderful world of the PC? Eleanor Turton-Hill takes you through the shark-infested waters.

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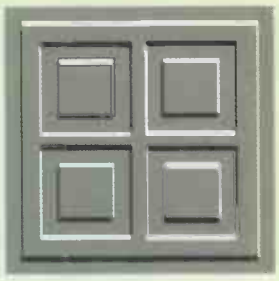


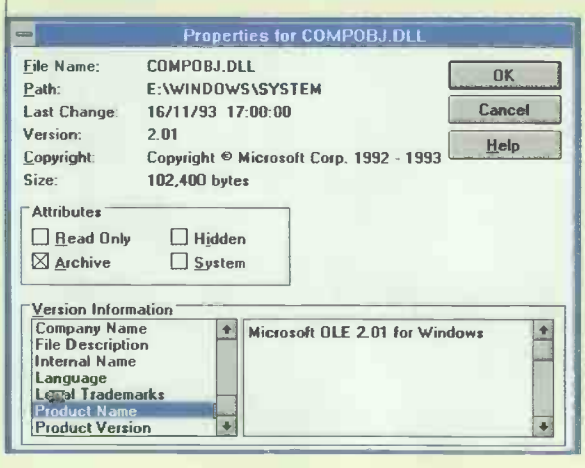
Clean up your act

Mouldy old files gathering dust in your Windows subdirectory? Defunct drivers? Orphaned fonts? Last month Tim Nott began clearing the cobwebs from his hard disk; this month he continues by freeing up a few megabytes.

Last month, we started spring cleaning the hard disk by freeing "lost clusters", deleting old temporary files and backups, getting rid of bits of Windows that aren't used, and doing a search and destroy on duplicate .DLLs. Another set of duplicates to look out for are DOS files. For some reason Microsoft seems to alternate between installing new versions of HIMEM.SYS, SMARTDRV.EXE and EMM386.EXE in the DOS and Windows directory, so if you've recently installed a new version of either DOS or Windows you might find these files in both locations. Check which set are referred to in CONFIG.SYS and AUTOEXEC.BAT, confirm that these are the later versions and delete the duplicates. You might also have a duplicate of COMMAND.COM — usually one in C:\ and one in C:\DOS. Things get a little tricky here, as the SHELL= line in CONFIG.SYS, the COMSPEC system variable and DOSPRMPT.PIF must all point to the remaining copy. If neither of the first two figure explicitly in CONFIG.SYS or AUTOEXEC.BAT then the drive you boot from (usually C:\) is assumed. It's a good idea to make sure you have a bootable floppy to hand in case you delete the wrong one.

The DOS directory itself can contain a lot of files you never use. This, however, is going to vary considerably with both the version and individual users. It's also, I'm relieved to say, beyond this column's brief so you'll have to dig out that manual. Suffice it to say that you may well be able to do without the DOS shell, and the more exotic utilities such as Debug and Exe2bin. Remember that anything with a .DLL or .386 extension will be a Windows file; others, such as HIMEM.SYS and the others mentioned earlier, are essential to run Windows. Other essentials might include DoubleSpace or DriveSpace for compressed drives, and Mscdex for CD-ROMs. No PC first-aid kit should be without utilities such as chkdsk, scandisk, format, undelete, MSD and defrag. None of these lists should be regarded as comprehensive, however, and finally, if you delete QBASIC.EXE, the DOS text editor EDIT.COM will no longer work.

Windows 3.11 File Manager tells you more



Just pretty faces

Getting back to Windows, it's worth taking a long, hard

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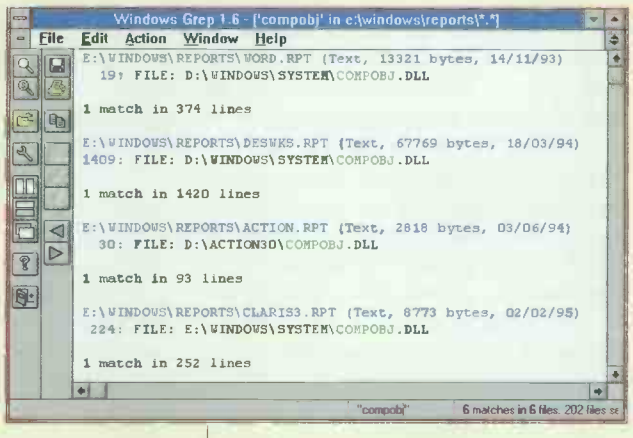
look at your fonts. It's amazing how the list of installed fonts can grow without the user ever doing anything to help it. Windows starts off with a set of screen fonts in .FON files: MS Serif and Sans Serif, Courier, Symbol and Small fonts. These are needed, and if they are deleted, strange things happen to your dialogue boxes, help files and icons. Certain applications will install more, and generally speaking the host application won't run properly (if at all) without them. Obviously, if you no longer use the host application they can go. The easiest method is to use Control Panel/Fonts to remove them, with the Delete Form Disk option checked. Unless you have a plotter installed, or use one of the rare drawing packages that can't use TrueType, you can give Roman, Modern and Script the elbow. Although they take up little disk space they're completely unnecessary, look ugly, and slow down the display dramatically.



Parse that regular expression over here...

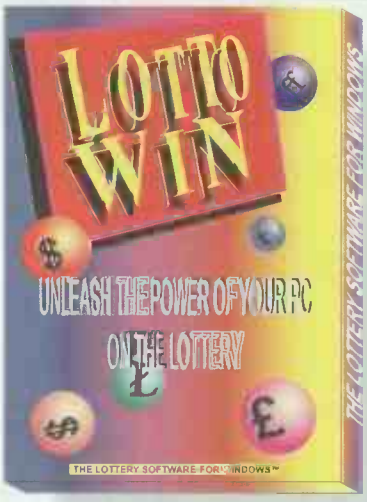
FOT chance

Turning to TrueType, these fonts all have two files. One is the small .FOT file listed in WIN.INI, which points in turn to the .TTF file that contains the font itself. It's an awkward and messy arrangement, and you'll be pleased to hear that Windows 95, at least in its current beta, cuts out the middleman and uses the .TTF files directly. Windows comes with a basic set of 13 — four styles each of Courier, Times, and Arial, with one of the Wingdings symbols. You'll often find that other applications will come bundled with a stack of TrueType fonts. A polite installation routine will ask if you want them; a very polite routine will ask which ones. The normal thing is to assume you couldn't possibly want to turn these freebies down and bung them in anyway. But bear in mind that not only do these take up disk space, but too many fonts slow down Windows. So, once again looking at my own system, I can find a lot that I really don't need, the Arabic, Japanese and Extended Maths being not so much typographic as status symbols. With a few more decorative typefaces that have never been used, that's another megabyte reclaimed from the swamp.

What about other stuff that has been left behind, by long-gone applications or pieces of hardware, and sits growing mouldy in the Windows or System subdirectories? The trouble is, you never really know what is used by which — if at all, if you see what I mean. Old .INI files are fairly easy to recognise. If the name doesn't ring a bell, opening them in Notepad should give some clue.

Although these files are usually tiny, getting rid of any unnecessary files is a Good Thing. Even a one-byte file has an overhead in minimum actual disk space and directory entry, and fewer files leads to less fragmentation and thus faster disk performance. It's also worth editing WIN.INI to get rid of obsolete sections. Although the growing trend is for polite applications to have their own .INI files, many still write their own sections to WIN.INI, which will have an identifying header in square brackets. Look also for defunct lines in the [Extensions] and [Embedding] sections. Again, though the bytes saved may be few, a lean and clean WIN.INI means Windows loads and runs faster. DOSAPP.INI is also worth a look. It stores a log of all DOS sessions and, if you have the Save Settings option checked in DOS boxes, the window size and font as well. It can grow quite large, so if you don't need to save this delete it regularly.

Getting down to the WINDOWS\SYSTEM directory, many support staff feel this should carry a sign saying: "Danger. Do not open. No user-serviceable parts inside." It is true that tampering herein is the best way to bring Windows to its knees, there's still usually scope for pruning. If you *never* use Windows in standard, rather than 386 enhanced, mode, then you can get rid of WINOLDAP.MOD, DOSX.EXE, DSWAP.EXE, KRNL286.EXE, WSWAP.EXE and anything with a .2GR extension. You may well have some orphaned TrueType fonts: those which aren't installed in Control Panel but whose .TTF files are still on the hard disk. For



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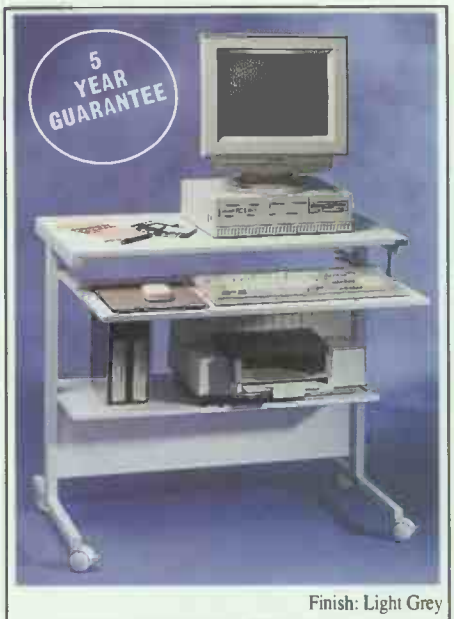

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every .TTF file there should be a .FOT file — any without are just taking up space. It's also possible, as I've just discovered, to have orphaned .FOT files (possibly with a .TTF in tow). The way to check for this is to compare the list in WIN.INI with the files themselves. Don't, by the way, assume any unmentioned .FON files are orphans. Some, like the System font, are needed by Windows as screen fonts but are not installed for general use by applications as they're not really suitable for printing.

Asleep at the wheel

You may have several screen and printer drivers doing absolutely nothing, but again, the problem is which? This is where the detective work starts. To start with, any .DRV file not listed in WIN.INI or SYSTEM.INI is not currently installed. Look in the [devices] and [printer ports] sections of WIN.INI for installed printer drivers, but note the filenames are given without the .DRV extension. The current installed screen driver is to be found in the [Boot] section of SYSTEM.INI, against the entry "display.drv".

Having found an orphaned .DRV file, the first task is to try and identify its antecedents. The first place to look is in the sprinkling of *.inf files that live in the SYSTEM directory. Windows' own installation uses SETUP.INF and others, usually OEM*.INF, come from third parties. Looking at these, you might find a line such as:

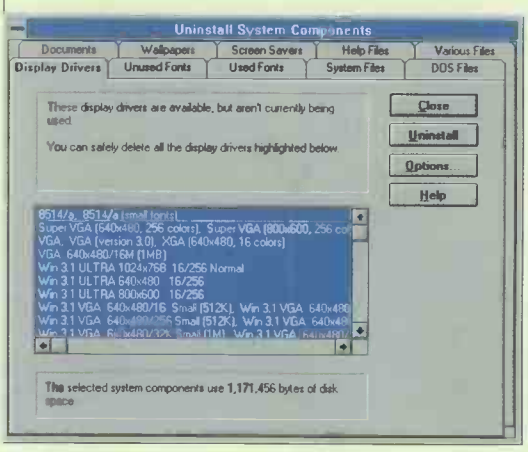
```
ultra  = a:ultra.drv,    "Win 3.1
ULTRA 1024x768  16/256 Normal"
```

which identifies the file ULTRA.DRV with the display description following. You can then make a decision as to whether or not you still need it. Many display cards have different driver files for different resolutions. If you never use certain resolutions, or you've replaced the card, the files can go. Don't, however, delete VGA.DRV: this is an essential part of your Windows first-aid kit, and when things go wrong, one of the first things to try is: "Does it work with the standard VGA driver?"

DLLs are more difficult, but let's start with some obvious ones. MORICONS.DLL, which actually lives in the WINDOWS directory, contains nothing but a load of icons designed for use with common DOS applications. Other .DLLs get more difficult. Whereas there are shareware applications that will tell you what .DLLs are in memory, or are used by a particular application, I've yet to find the converse — one that will point from the .DLL back to the application. Anything with the same date as the main Windows is fairly likely to be essential and others may well be in use by more than one application; see the table for a list of the more common ones. Creation dates are often a useful clue to the parents of a doorstep-abandoned .DLL, as is the extended Attributes command available in the Windows for Workgroups 3.11 File Manager, which gives further information on a file's origins. Note that this isn't as always as helpful as it might be, as many applications come with .DLLs written by Borland, say, or Microsoft. If you don't have this facility, loading the file into a file viewer or Windows Write will usually unearth some clues: look for copyright information near the beginning or end of the file. With both drivers and .DLLs, Nott's first law applies: if in doubt, move the file to a holding directory (or back it up to floppy) and see if life continues as normal before deleting it.

The best cure for orphaned files is (he says smugly) prevention. For the last couple of years I've always used Neil Rubenking's Inctrl and, indeed, banged on about it in this column. It takes before and after snapshots of your hard disk and main .INI files, and saves details of additions and changes in a report. I've now converted to Jason Ozin's Inst-all. Like Inctrl, it's freeware, but offers the advantage that it will recover if the natural order of things is disrupted, for example by a crash or some smart-bloody-alec installation routine that performs a gratuitous restart of Windows. The other difference is that it's not quite as extensive in its enquiries as Inctrl, which searches your entire hard disk. Inst-all confines its attention to the WINDOWS and WINDOWS\SYSTEM directories, figuring that stuff dumped elsewhere will be fairly obvious.

CleanSweep is fast and professional, but not quite as thorough as DIY



What the DLL is that?

Files that don't come with Windows 3.1 but may be used by several applications:

AAPLAY.DLL, AAVGA.DLL	For playing Autodesk Animator (.FLI, FLC) files
BWCC.DLL	Borland 3D dialogue box controls
CTL3D.DLL	Microsoft 3D ditto
MSTOOLS.DLL	MSDOS 6.0 extensions for File Manager.
MSVIDEO.DLL, AVICAP.DLL	For playing Video for Windows (.AVI) files
OLE2*.DLL, COMPOBJ.DLL, STORAGE.DLL, TYPELIB.DLL	Object linking and embedding files used by OLE2-aware applications.
QT*.DLL	For playing Apple QuickTime video clips
TWAIN.DLL	Used by TWAIN-compliant scanners, digital cameras etc
VBRUN*.DLL (*=1,2 or 3)	Visual Basic runtime libraries for versions 1, 2 and 3. Note that these aren't backwards-compatible so you may need all three.
***.VBX**	More files used by applications written in Visual Basic

This makes it a lot faster, although bear in mind that other directories, such as MSAPPS, can contain common files which may be augmented or changed. Unlike Inctrl, which is standalone, Inst-all needs some DLLs and a .VBX file. These may already be on your system so read the readme file carefully. Anyway, you should find both on this month's CD-ROM.

Get a GREP

Having the information for each application installed is all very well, but getting at it is a different matter. What you need, guv, is a Global Regular Expression Parser, or GREP. This is Unix-speak for a utility that searches though a stack of files for a sequence of characters; this could turn out to be a word, phrase or piece of code. In this case, should you find the mysterious ORPHAN.DLL languishing in Windows\System, then "grepping" through all Inctrl's or Inst-all's reports will find those that mention this file, thus giving you the chance, if not to finger the owner, at least to make a short list. You may already have a File Finder in your word processor that will do this. If not, then Hugh Millington's Windows Grep 1.6 is the answer. This is an ocean-going, industrial-grade GREP with more options than a top-of-the-range BMW. It's shareware, costs £10 to register, and is worth a look just for the fun of playing with it. You will find it on this month's CD and it's also in the CIX Windows conference.

If you really can't face any of this, then fork out forty quid and call in the professionals. During that brief period of marginal existence between the deadline for this column and my joining the ranks of the unemployed, a copy of Quarterdeck's CleanSweep landed on my desk. Although installing it undid the good work to the tune of 1.27Mb, I have to admit it's good. So good, in fact, that it could put columns like this out of business, as it does nearly everything I've mentioned in these two months automatically.

CleanSweep will look for duplicates, and indeed it found some 1.8Mb that had accumulated here since last month's purge. It will look for files that you may never use, including old .TMP and .CHK files as well as archive, help and picture files. A tabbed dialogue box leads to a variety of possible redundant system components, ranging from redundant display drivers, through orphaned fonts, system files such as the 286-specific ones mentioned earlier, down to wallpaper and screensavers. Finally, it will uninstall applications and remove all their WIN.INI references. It comes with a panoply of safety devices. You can do a dummy run to see how much disk space a particular piece of cleaning would gain, back up deleted files in a compressed form, log all its actions and opt to confirm each deletion, which is as near as it gets to hard work.

It isn't perfect, and like the advice in this column, needs to be used with some commonsense. It found a load of files with the .PAK extensions that it suggested might be archives; in fact, they were essential parts of a DOS-based game and missed two whole directories that Claris Works had installed. It avoids the tricky subject of the DOS directory completely and doesn't seem to make any effort to search for foundling DLLs. However, it's a lot faster than the DIY methods I've been discussing here.

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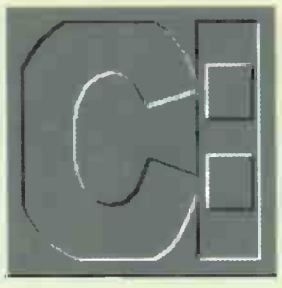

Life in the old **DOS** yet

Down but not out, DOS is still due for a few upgrades later this year. Simon Collin looks briefly at these, and answers your queries on backing up batch files, formatting, and the esoteric Winstart.

Over the last month there's been a trickle of news regarding the versions of DOS scheduled to appear in the near future. Some issues ago, I mentioned that when Windows 95 is launched it won't run on top of DOS but will, instead, be an operating system itself. Windows 95 will still support DOS programs and still has a reassuring DOS icon.

However, MSDOS 7.0, which will be part of Windows 95, was not scheduled to be released as a separate product. Apparently, Microsoft has now decided that it will release DOS 7.0 as a separate product for users who want to upgrade. This will, one hopes, be available at the same time as the official release of Windows 95 which is still down as August of this year.

IBM is also working on the next version of its DOS product. There aren't many details on what will be new in this version, but the Stacker disk compression technology and better memory management will be two of the sections updated. IBM is currently planning to release the new version before this summer, taking some of the thunder from DOS 7.0.

Life's *still* a batch

I have been trying to get to grips with the more advanced batch files you've described over the last couple of months, but find that when I start to make my own changes nothing works. Is there any way of debugging a batch file as it's being developed?

I covered the subject of how to debug batch files using existing utilities over a year ago, so here's a quick reminder of the basics for this very useful technique.

The command that starts the debugging is, rather surprisingly, COMMAND.COM, the standard DOS command interpreter. Type in COMMAND and DOS will start up a new copy of the command interpreter. COMMAND is useful when you consider the options available when you first switch on your PC — after the "Starting DOS..." message you can step through each line of your CONFIG.SYS file using the F8 key. You can use the same trick with your batch file if you use the /Y switch.

For example, if you want to check a simple batch file called TEST.BAT you could just enter TEST at the DOS prompt; the command interpreter that was loaded when you switched your PC on will execute the whole of the batch file. Alternatively, if you enter the following command:

```
COMMAND /Y /C TEST.BAT
```

DOS will load a second copy of the command interpreter and will step through each line in the batch file asking you with a [Y/N] message if you want to execute this particular line. Once all the lines of the batch file are executed, this new, second, command interpreter is unloaded.

For those who want to know a little more about the /Y switch, it must be used together with either the /C or the /K switch. The /C switch I've shown above unloads COMMAND.COM from memory once the batch file (or any other command) has been executed. If you use the /K switch, the new copy of COMMAND.COM stays in RAM taking up extra memory. You can check for the presence of an extra version using the MEM /C command which lists all resident programs. To unload the command interpreter, just type "EXIT" from the DOS prompt.

A quick solution

I use DOS's quick format option because the normal formatting takes too long, but I've been told that this could be dangerous. Can I continue to use quick formatting or should I hang around while the normal format is carried out?

To do the quick format you've described you use the /Q switch after the FORMAT command, for example:

```
FORMAT A: /Q
```

When DOS is carrying out a quick format it's not actually doing very much. For example, it doesn't look through the whole disk, nor does it delete any files which might already be on the disk. The quick format only clears out the FAT and the root directory and removes any entries it finds in these areas of the floppy disk. This effectively means you cannot access any data previously stored on the floppy — unless you use a disk tool such as PC Tools or Norton Utilities.

By default, a normal format command issued with no switches will store information on your hard disk about the contents of the floppy disk that will let you carry out a DOS unformat and recover any files which were on the disk.

By default, the normal format is a good choice if you're not too sure about the quality of the floppy disk. A quick format doesn't carry out any checks to see if there are any bad sectors on the floppy, but if the disk's old or damaged you could be using an unreliable disk.

The third type of format is called an unconditional format. This is the exact opposite of a quick format: it deletes every sector on the disk and, in the process, also checks and marks any bad sectors on the disk. It's carried out with the /U switch. But watch out — with an unconditional format you lose any files that were on the floppy.

Is Winstart any good?

I run MSDOS 6.0 on my PC but usually use Windows 3.1. On looking through the directories, I've discovered a batch file called WINSTART.BAT. Is this of any use

in particular or is it used by Windows for something else?

Congratulations! You've discovered one of the rarer parts of Windows. The Winstart batch file is used to load programs during the Windows startup sequence. It is actually supposed to be used to gain extra memory for DOS applications or to allow TSRs to use the Windows-managed extended memory.

The logic goes like this: if you have a TSR that's only used by a Windows application, then you're taking up precious DOS space if you load it before Windows. However, TSRs loaded after Windows is running will only run in a DOS session (unless they're Windows applications).

This is where Winstart comes in. If you add a line to the Winstart batch file to load the TSR, then it's only loaded when you issue the WIN command to start Windows. This way, you don't lose memory when in DOS and your TSR can be used by all Windows programs.

Space needed

Ever since I upgraded my PC to MSDOS 6.2 it seems to have lost almost 30Mb of disk space. The PC is a standard 486 with a 400Mb hard disk. Does DOS really take up this much space these days, or have I misconfigured it?

It sounds as if you've installed MSDOS's Deletion Sentry software: this, together with the MSDOS files, could easily take up around 30Mb on your size of hard disk. The simplest way to check if this diagnosis is correct is to use a file manager utility such as XTree or PC Tools and look for hidden directories. The File Deletion Sentry creates a hidden directory.

You have two options: either keep the File Deletion Sentry — which would be the safest — or downgrade to the lower level of security provided by MSDOS 6.0. The lower level deletion protection takes up less space on your hard disk, but isn't as good at recovering files.

MSDOS 6.2 has two ways of protecting your files in case you accidentally delete them. The first, which you have installed, is the Delete Sentry system. This is a TSR utility which takes up around 13.5kb RAM and keeps an eye on what you're deleting. If you issue a delete command then, instead of deleting the file, it moves it to a hidden directory. The file is kept for a period of time that varies depending on how many files you delete and how big each file is.

If the Sentry directory contains more than seven percent of the total disk space, the utility really does delete the oldest file. As you can see, Delete Sentry takes up RAM and a not inconsiderable amount of hard disk.

The second option available is the Delete Tracker system. This, too, uses a TSR (also 13.5kb) that tracks files as you delete them. Instead of moving the file to a hidden directory, Delete Tracker keeps a note of the file's starting cluster in a database (called PCTRACKER.DEL) and marks the space on the disk which the file occupies as available.

If you want to undelete the file and you're using Delete Sentry, then as long as it's not too old, the system just moves it back out of the hidden directory. Using Delete Tracker, the utility checks in the tracking database, and provided you haven't already copied another file over the same sections of the disk, your file will be recovered.

If you want to conserve hard disk space, the Delete Tracker system presents far less of an overhead: it's unlikely to grow over 50kb. In fact, you can specify the number of files you want Tracker to monitor (you'll find that 50 files need a 9kb file, 100 a 11kb file) up to a maximum of 999 files. Do this using the /T switch after the UNDELETE command. For example, to enable Tracker on Drive D: and monitor a maximum of 100 files, use:

```
UNDELETE /TD-100
```

If your hard disk space is really tight you could make do with no file delete protection at all. Just use the Standard method provided by DOS. There's no TSR, and you don't lose any disk space. Instead, the undelete utility uses the file's old data in the DOS FAT that carries its starting cluster. It's no good if you deleted the file and have since copied a new file onto the same area of the disk, but it's easy on your resources.

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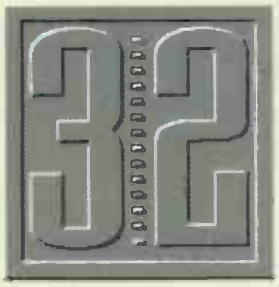

Material world

Chris Bidmead has been wading through the mass of stuff on his desk and come up with some snippets that might be of interest. There's Portage, Awk and Robert the window cleaner, who sees OS/2 in a very favourable light.

Each month when I clear my desk and settle down to write this column, there's always a mass of material that has accumulated since last time — invariably enough to write a complete book. In the past month email discussions about BSD have produced thousands of words of correspondence about the history of the operating system. The beta version of Object Rexx has finally arrived. An Awk expert has contacted me about the modest series of Awk lessons I've been giving here, and when I get his permission I'll pass on his (very polite, in the circumstances) criticisms and suggestions.

IBM's Wally Casey came over to talk about the new peer-to-peer version of OS/2, and to cap it all I'm currently writing this with IBM's new VoiceType for OS/2, which Terence Green reviewed in the April issue. Obviously I want to give you my impressions of that too. Oh, and of course there's my window cleaner...

Portage for NT

I'll try to give you the best of all this over the next couple of months. Meanwhile a Unix vendor, Consensys, has sent me a fascinating package called Portage (pronounce it the French way — it comes from Canada) which adds Unix to Windows NT. This isn't just a set of Unix utilities, it's a full Unix SVR4 with its own kernel. And it integrates into Windows NT, so you don't have to choose whether to run in Unix mode or NT mode.

What's the point of this? You can look at it two ways. The result is either Windows NT with Unix, or Unix with Windows NT. From the Unix user's point of view it looks like a very good way of bringing DOS and Windows (with all those low-cost applications) into the Unix environment.

Coming at it from the other direction you could say that Windows NT needs Unix because something is badly missing. The Consensys people argue that Microsoft did a remarkable job with Windows NT but missed a fundamental lesson from the success of Unix over the past 20 years. The Unix philosophy is to offer general-purpose tools that are open-ended in their design and don't attempt to second-guess how you're going to use them (and of course Awk's a perfect example of this). These tools work together through the simplest possible mechanism: by piping the output of one into the input of the next. Result: "From the earliest days," says Consensys, "the purposes, methods and results discovered by Unix users have astonished the creators of the tools."

Microsoft's approach to tools is in sharp contrast. "Time and time again," says Consensys, "they build special-purpose tools that can *at best* do exactly the task their authors conceived for them."

A salutory distinction. I'm looking forward to installing Portage and seeing how the two cultures manage to mix 'n' match.

Robert graduates from Windows

I was going to tell you about my window cleaner. I don't want you to walk away with the impression that I hand out software to all and sundry — manufacturers entrust literally tens of thousands of pounds worth of software to me each year and I hope I handle it responsibly. But then, Robert isn't all and sundry. And I did have this spare copy of OS/2....

You'll have heard how incredibly easy it is to install the latest version of Warp — according to IBM. According to a lot of other people who've actually tried installing it, it isn't. I told you about the problems I had with it. It's an improvement on version 2.11, but how much of an improvement, and how far has IBM got to go with this until my grandma can install it?

Robert isn't quite my grandma. He comes from Ghana and my grandma came from Bolton in Lancashire. And my grandma didn't have a degree in Computer Science at the Polytechnic of Central London, which happens to be Robert's qualification. I had no idea about this until one day when we were breaking for coffee at the same time down in the kitchen he suddenly said to me: "I really like your column, by the way...."

At the Poly (now the University of Westminster) Robert had been using Unix BSD

What's new in the world of OS/2

Left *The new OS/2 Warp Connect comes with a bunch of new features to do with sharing and connecting*

Right *SimCity for OS/2, one of many offerings on the new IBM CD showcase, 45 Ways to Get Warping*

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4.2. He tells me that he got into Linux through reading this column and has been using the GNU C compiler that came with his Slackware 2.0 distribution to develop software. His machine is a 486DX2/66 with 8MBb of memory, a MediaVision sound card and a CD-ROM. And a tape backup drive: Robert doesn't just like my column, he takes my advice.

So there he was, happily running DOS, Windows and Linux. And then I thrust OS/2 upon him. Was he thrilled?

"I wasn't very keen about installing Warp because I had obtained a CD-ROM version of OS/2 given free on a magazine three months back," he says. "Having tried to install it disastrously — I lost all my DOS Windows setup..." He concluded, rather more restrainedly than I'd have done in the circumstances, that "OS/2 was not for me".

However, lured no doubt by the prospect of international fame as a guinea pig in this column, Robert bit the bullet. Next time we met I asked: "Installation go okay?" "No," he said.

Robert ran into exactly the same problem as I did. Warp probes around to find the interrupts you're using on devices like the MediaVision sound card, and the, throws the information away. Wally Casey (see below) promises me that this is being fixed in the new versions of Warp. So I should hope.

Apart from that little hitch, Robert reckons he's now a permanent OS/2 user. "DOS programs work wonderfully," he says, and he finds he can run most of his Windows programs without any trouble. The Pocket Sound Recorder that comes with the MediaVision sound card is an exception, though: it causes a GPF. But he's impressed by the OS/2 crash-proofing. When a Windows app bombs out he can just close down that session without affecting the rest of the operating system.

Warp gets connected

For a long time people have been saying that OS/2 isn't a proper 32-bit operating system because it doesn't have built-in networking. I've been using the OS/2 NetWare Requester supplied free by Novell to join up my OS/2 workstations to my network, but I agree, it all ought to be bundled. And, more importantly, you shouldn't have to dash around between IBM and Novell looking for support. Well, that's being fixed. Wally Casey, IBM's worldwide director of marketing for personal software products, dropped in on the UK on his way back from the Cebit exhibition in Hanover to give a demo of OS/2 Warp Connect. It's the full peer-to-peer implementation of OS/2, and it should be out by the time you read this.

He brought three ThinkPads along to show us how it worked. The new ThinkPads come with built-in IRDA infrared connections, and he claims that if you're running OS/2 Connect, on a plane trip you can bounce IR signals off the ceiling to network with a colleague sitting six rows away. Six rows! Did I hear this aright? But he confirmed: "It's really cool — it works like a champ." Amazing — and definitely something to try out on my next flight. Alas, he couldn't do this in the IBM demo room because the ceiling was too high, so he used plain old Token Ring to wire his portables together.

Peer-to-peer OS/2 works in the familiar way with a user on one machine being able to publish selected drives or directories so that they can be shared with colleagues on the network. By default the connection protocol is NETBIOS, but you can substitute TCP/IP, which is also bundled. NetWare's IPX is also in there, but only as client services for a NetWare server, so you can't use IPX for peer-to-peer. Novell, who did the NetWare implementation in OS/2 Connect, has always been tight-fisted about IPX being used for anything other than a connection to a NetWare server, so this comes as no surprise.

Wally also introduced the third ThinkPad as a Lan Server machine to demonstrate client-server working. The theory is that you should be able to connect to any kind of network straight out of the box — and this also goes for Windows for Workgroups. The TCP/IP connection gives you something more: a machine with a modem can share its modem across the network. If it's connected to the Internet then any other machine on the network can also get to the Internet through that shared modem.

Demos are, well, demos, and I'm not going to let myself get carried away with the wonder of all this until I've got it up and running here in my own office. I particularly want to try playing video and sound over the network with the source machine also being used to run a Windows application, a directory search, and displaying picture files, all without interrupting the video or noticeably being slugged itself. If it works for me the way Wally demo'd, I'll let you know — next month, if we're lucky.

To make all this clever stuff instantly useful out of the box, IBM also throws in a cut-down version of Lotus Notes called Notes Express. This includes seven preset templates of the kind most commonly

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Fig 1 General form for the Newsbytes input

```
Article: 122 of cix_newsbytes.government
Newsgroups: cix_newsbytes.government
Path: cix.compulink.co.uk!usenet
From: news@cix.compulink.co.uk (mat)
Subject: Fed Govt Slashes Computer Buys 01/03/95
Message-ID: <D1vMqF.GEs@cix.compulink.co.uk>
Organization: Compulink Information eXchange
Date: Wed, 4 Jan 1995 10:35:03 GMT
Approved: by Matthew Sims

WASHINGTON, D.C., U.S.A., 1995 JAN 3 (NB) - The General
Services Administration ...<lots more here.....etc>...

(Kennedy Maize/19950103/Press Contact: Anne Marshall,
202-501-1231)
```

used in small businesses, which means you can set up an email system, a common conference board, a shared whiteboard system and a number of other types of workgroup interaction, very simply indeed. If you want to take it further, the Notes Express shipped with OS/2 Connect can be unlocked with an encryption key to become the full version.

Notes, of course, works as workgroup software over a telephone line. Lan Distance, also bundled with OS/2 Connect, is another way of achieving a similar thing but is more flexible. It enables you to dial up your Lan Server and connect as a client across the telephone line, getting full access to the network services. IBM undertakes to support OS/2 Connect as a single product. The price won't be the same kind of giveaway deal you're currently getting for Warp but it should be less than $200, which sounds to me like a real bargain.

More Awk

A couple of months ago I was explaining how I use the text manipulation language Awk to prepare the documents that go into my text retrieval database. To keep everything simple and portable the documents are all in ASCII, and they all have four key attributes that I don't want to lose sight of: title, source, date and author. All my ASCII files keep this information in their first line in the following form:

```
[<title>][<source>][<date>[<author>]
```

Awk is the natural choice of language to extract this information from the input documents and rearrange it into this standard format. Obviously, various sources store the information in different ways so you will need a set of Awk programs, one for each source type. I'll show you how I convert NewsBytes information for my text retrieval database, and leave you to modify this for the kind of input files you use.

I'm not going to go through all the code in detail, but here are some general points. Awk has user-defined functions which can be called from the body of the code just as in modern versions of Basic. I use these to (try to) keep the code reasonably modular and clean. They're a good way of handling reusable chunks of code, like the dMony routine. In conjunction with the months assignment that's one of the BEGIN routines, this takes US-style mm/dd/yy date patterns and converts them into my standard dd-Mmm-yy style.

Take a look at the patterns that trigger the instruction {next}. These simply ignore that particular line and move on to the next line of the input file without doing anything. Okay, but if I didn't include the pattern at all in the code, wouldn't this happen anyway? No, not quite. Consider a line like

```
/^———/ {next}
```

This is looking for an input line that begins with a string of dashes (the "^" indicates "beginning of the line"). If I find a line like this I know I definitely want to throw it away and exclude it from the output file I'm creating. If I don't explicitly throw it away like this, the dashed input line will continue to fall through the other pattern recognisers in the code and may be caught by a more ambiguously written one further down, for example something like

```
/^.*$/   {do something here}
```

This is catch-all code that defines what should happen to any line that has zero or more characters in it, and it is typically something you might stick at the bottom of your program to act as a sort of OTHERWISE clause. As it happens, I don't have such a line in this version of the code, so the two {next} lines near the top are redundant.

Or are they? Did you notice the line right at the bottom that doesn't have a pattern at all? This is the classic catch-all line. It says: If you're a line that's fallen down to here I don't care what your content is — just do it.

So, the {next} statements aren't as inelegant as you may have thought. Even without a catch-all line down below they could still be a good idea, because they clarify the code and proof it somewhat against silly errors in later modifications lower down. The downside if you don't really need them structurally is that they probably slow down the program in operation by adding two new pattern tests. Frankly, the 32-bit version of Awk I've started using under OS/2 is so much faster than the 16-bit version that I don't care.

The code creates a log file, cix2std.log, which is a list of all the new headers that have been created, stripped of the body text. A visual check on this file after the run is over is a quick 'n' dirty way of making sure that things like dates haven't been mangled in the input text, which can produce serious garbage in your output file. It might be more elegant to put the checks into the code, but as far as I'm concerned Awk is much more about quick 'n' dirty than it is about elegance. If I wanted automatic checking I'd be more inclined simply to run cix2std.log through a second Awk program to test for valid dates and the right number of square brackets.

Fig 1 shows the general form for the Newsbytes input. A typical file will contain a series of articles like this. Obviously you need guaranteed consistency in the input: here you can always expect the title to appear in the heading after the word "subject:". The Awk program in Fig 2 caters for this in the section of the code with "Subject:" as the pattern to be searched for.

You'll notice that we also pick up the date from this line (rather than using the date lower down in the header — this is purely for historical reasons) and the title is passed through a function called "trunctitle". This is to ensure that a very long title gets reasonably intelligently abbreviated.

Apart from requirements like these the Newbytes stream ought to be a reasonably simple form of input to process because the header virtually hands it to you on a plate. But some of the header information, like the message ID, I don't need. And unfortunately one key item of information, the name of the author, doesn't appear in the header at all.

I wrote the original version of this code for a much less tractable input stream, so luckily I was ready for the fact that the author's name doesn't appear until the very end of each article (here it's "Kennedy Maize"). Moving the name from the bottom of the article to the top isn't entirely straightforward in Awk, which mostly likes to check a line, do something with it (or not) and then write it out (or not). The trick here is that once we've extracted as much info as we can from the header, we store that in a set of variables (title, source and date) and start buffering up the whole of the body of the article until we can extract

the author's name. That's what we do with the catchall, no-pattern line at the bottom: `{line[++n] = $0}`

This increments the array variable "line" and sticks the whole of the current input line ($0) into it until there aren't any more input lines. One of the elegances of Awk is that this bit about "until there aren't any more input lines" is taken care of automatically, and you don't have to set up a DO... UNTIL look or check for an error condition.

Once we have the author's name and we've buffered up the whole body of the text, it's time to start writing it all out. The END pattern is triggered automatically at the end of each input file, so we use it to run the "unload" function. The pair of printf statements print out the header to the output file and log file, and then we unload the buffer using Awk's "while" statement. The "{!}" printed is the end of document marker I use for my text retrieval system.

Er... then we delete the array with the "for" statement. Coming back to this code after about a year, this looks really ugly. The array deletion has obviously been stuck in as an afterthought to fix buffered lines being carried over from one Newsbytes item to the next. If I'd thought it through properly there would just be a single loop, erasing it line by line as each line is printed. Looking more closely I can see some other sillinesses in there that make this wee program of mine somewhat unfit for exposure to the public gaze.

But it happens to work, and I use it all the time. If you don't like the way some of it looks, fix it and tell me about it. If this column has a message, it's don't do as I do, don't even do as I say. Do it for yourself, your way. But *do* it. This stuff is exciting...

PCW Contacts

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Fig 2: The Awk program

```
# converts NBYTES input into
[title][source][date][author] form
# NB MAKE SURE this is run with GAWK 2.13 or later, or
the regexps inside
# the split functions won't work
BEGIN   {tlength = 50  # how long are we going to allow
the title to be?
        months =
"xxJanFebMarAprMayJunJulAugSepOctNovDec"
        author="";title="";n=0}
/^==========/ {next}
/^———/ {next}
/^Usenet\/cix/ {next}
/^\(.*\//   {split($0,a,/(^\()|\//)
            author = initials(a[2])
           }

/^Article:/&&title!=""   {unload()}

/^Article:/      {
            ArticleLine = $0
            split($0,s,/newsbytes\./)
            source=substr(s[2],1,6)
            source="nb_" substr(source,1,3)
            title="";author=""
            next}

/^Subject:/&&(title == "") {date = dMony($NF)
                   split($0,t," " $NF)
                   split(t[1],tt,"Subject: ")
                   title = trunctitle(tt[2])
                   n = 0;
                   do getline
                     while ($0 !~ /^[ ]*$/)
                   getline
                   }
/^ *$/&&author!=""  {next}
              {line[++n] = $0}
END            {unload()}
function unload() {printf "[%s][%s][%s][%s]\n\n",
title,source,date,author
     printf "[%s][%s][%s][%s]\n",
title,source,date,author > "cix2std.log"
#      close("cix2std.log")
                m=0; while (m!=n)
                print line[++m]
                print ArticleLine
                for (n in line)
                delete line[n]
                print "{!}"
            }

function dMony(mdy)   {split(mdy,num,/\//)
                    mon= substr(months,num[1]*3,3)
                    return num[2] "-" mon "-" num[3]
                   }

function initials(namestr) {split(namestr,word," ")
                         if (word[2] ~ /\".*\"/)
                            word[2] = ""
                          else
                            word[2] = word[2] " "
                         aa = substr(word[1],1,1)"." word[2]
word[3]
                         split(aa,aaa,/ $/)
                         return aaa[1]
                        }

function trunctitle(tstr) {sub(/(^ +)|( +$)/,"",tstr)
                        tstr = cleanout(tstr, "\\*\\*+")
                        if (length(tstr) > tlength)
                          tstr = cleanout(tstr, "^[ A-Z]*: ")
                        tstr = cleanout(tstr, "^ +")
                        tstr = dropword(tstr,tlength)
                        return tstr
                       }

function cleanout(str1, rgx)  {sub(rgx,"",str1)
                            return str1
                            }

function dropword(line, len)  {if (length(line) <= len)
                            return line
                            else
                      {
                       split(line,bit," ")
                       accum=bit[1]; n=1
                       while (length(accum) +
length(bit[++n]) <  len-3)
                       accum = accum " " bit[n]
                       return accum ".."
                       }
                            }
```

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WORTHINGTON DATA SOLUTIONS

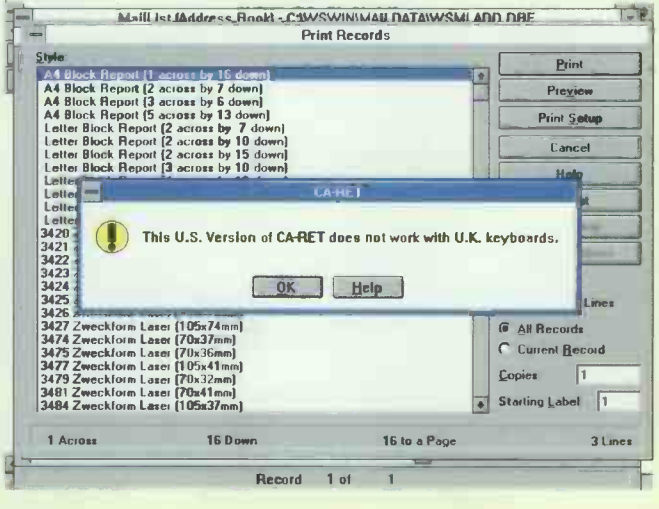
Spare us the details

Nothing is certain in life, especially not the Windows 95 shipping date, so it's hardly surprising to find Lotus and Novell being cagey about their 95-dependent releases. Tim Phillips hunts for clues.

I had rather hoped this month to bring you the inside track on new developments in word processing to take advantage of Windows 95. Unfortunately, we are all suffering from the "Windows effect" by which everything new that relies on features in Windows 95 gets sucked into a big black hole, to be spewed out if Windows 95 ever gets finished.

Recently I've been briefed by Lotus and Novell about their word processors, and I've seen betas that look pretty solid, but both companies refuse to let me see the exciting interesting new features. The reason? Because until they have a definite shipping date for Windows 95, pre-announcing the features has the important effect of telling their rivals what surprises they have planned.

Oh dear, WordStar for Windows isn't perfect after all — but it's still a lot better than version 1.0, isn't it?



Lotus had the greater cheek. The completed menu structure had a dozen items saying "interesting feature". Thanks.

All the major vendors have turned their attention away from the race to add new features in the last few years. Most of the programming effort is now directed towards getting applications to work together and adding ease-of-use changes, and some of these I can review.

Word 2.0, Ami Pro 3.1 or WordPerfect 6.0 users will be well aware of one effect of all the new features that a Windows word processor user is expected to control — dialogue box overload. Word 6.0 solved this by putting all the options into megaboxes, which are more like dialogue filing cabinets. Lotus is enhancing this with the next release of Ami Pro by having "live" dialogue filing cabinets.

In the next release you will not only be able to set all your style features from one dialogue box, but you will see the text changing in the background as you select the features. This means you can toy with all sorts of changes, see the text previewed on the page, and settle for what makes you happiest without having to dive in and out of dialogue boxes all over the menu tree. This also enables dialogue boxes to be "non-modal"; in British,

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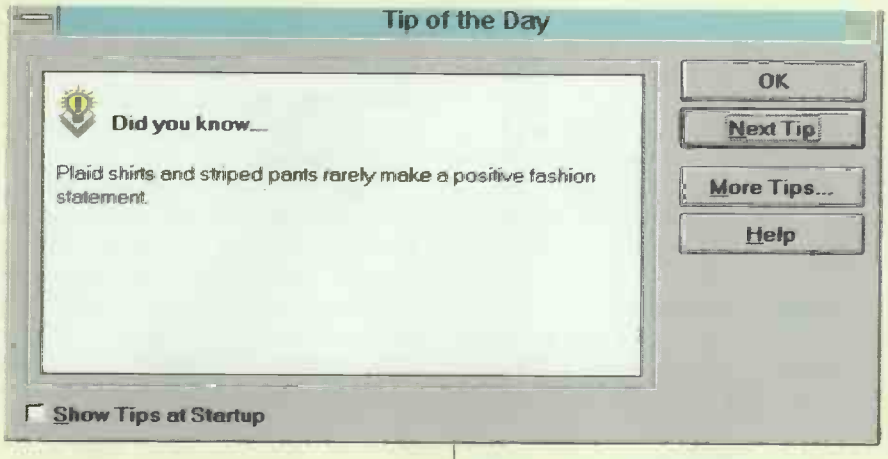

that means they won't have an OK button. There's no need, you already know it's okay because you saw the changes.

Lotus will also be implementing its own Visual Basic clone. Microsoft doesn't license VB, but ha! Lotus has made Ami's forthcoming macro language VB-compatible. It has added some non-VB object-oriented extensions, but that's Windows 95 stuff so they're a secret...

Meanwhile, WordPerfect has grabbed the high ground for suite interoperability following some furious post-merger development. I heartily recommend the new version of Office, although if you just want to run WordPerfect and the "shared" applications you'll need 32Mb of hard disk. For one application! Three years ago I didn't have 32Mb of hard disk for *all* my apps.

WordPerfect Envoy is worthy of more detail at a later date but I recommend you take a look at it. Envoy is a multiple-format file viewer similar to Adobe Acrobat. It is freeware and if you buy Office you can write Envoy documents, including hypertext links.

WordPerfect gets three complements this month; it has also produced the first add-on to write HTML documents. Web fans, go to it — it's available on the WordPerfect Web server. Microsoft's HTML add-on is still in beta as I write, and if you're an Ami Pro user forget it: there's not one due before the next release.

Thanks to Jonathan Sandys for evidence that Microsoft does have a sense of humour. Rumour has it there will be another joke in the next version

DOS

Much of my DOS mail seems to be about PC-Write. I thought to myself, if PC-Write is causing so many problems, can it still be the shareware number one? The answer, from my scouring of the WP shareware vaults, is yes.

There hasn't been a great deal that's new in DOS shareware recently as many developers are playing with Visual Basic and putting out some pretty neat Windows utilities; and with Write coming free in Windows, the last thing we need is a shareware Windows text editor. It is always useful to have a DOS text editor with windows (small "w"), though, which is why I've picked out a couple of programs you might like to look at. You can find them on many bulletin boards, or from the phone numbers given below.

PROword is 1994 vintage and a compact little program, taking up only about 500kb. It is strictly feature-limited, with a menuing system that uses WordStar conventions. It will mark, cut and paste blocks, and it uses a menu bar and a coloured screen to make things visually interesting. Files are written as ASCII.

Apart from the ability to have more than one document window open at once, PROword doesn't have much in the ease-of-use area to offer. But it's a step up from Edit and only costs £15 to register. Contact Jupiter software on 0181 947 4059.

An old favourite that has been doing the rounds for some time offers a smoother look, more functions and the chance to save files with soft returns at the end of each line — ideal for exporting to other word processors. Galaxy ProLite is a useful utility for banging out a few hundred words in the evening on an old PC, or for quick cut and paste jobs. Again, the main incentive is the chance to paste between two windows open on screen, but there's also a dictionary and even a limited macro language.

If you like a clean screen you'll love this, as the menu bar doesn't even show up until you press F10. ProLite has been on version 2.11 for a couple of years, and it's beginning to look its age. Software is moving on at a faster rate than this program, so at £40 it's not cheap. Make sure you try before you buy. It's available from Shareware Publishing, which has an

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Personally, I'll stick to edit when I'm forced into DOS. With WordStar for Windows at £50, DOS lovers are comparatively poorly served by the state of cheap software.

Problems, problems

Michael Levy, who works in a London accountancy firm, has a print to file problem. He writes: "I want to print out my letters from home on the printer at work, but they use a different word processor and I don't want to mess about converting files. How does it work?" He's a WordPerfect 5.1 user.

Print to file is often ignored but it's always there, and pretty useful it is too, especially if you're stealing the office paper, which of course we cannot possibly condone. In WordPerfect you find Print to File by Shift+F7, Select Printer, Edit, Port, Other, then typing a filename. WordPerfect will then print a binary file. Make sure you are using the correct printer driver — that is, the driver of the printer you will eventually print out to — as you can't change this after you have saved the file.

When you are at the local PC you can print from the DOS command line. If you put your floppy in drive A: for example, type COPY A:file_name PRN/B. Don't forget the /B, as it copies until the physical end of the file.

Derek Mackenzie writes from Beenham near Reading with a WordStar problem. "As a result of you singing its praises I purchased a copy," he says. "I was also impressed until I came to print the MAIL LIST. The message displayed on screen was "THIS US VERSION OF CA-RET DOES NOT WORK WITH UK KEYBOARDS". He adds that his call to Softkey has had no response.

New kid on he block shareware WP PROword flies the flag for UK shareware. I'm not convinced it's a step forward, but for £15 it's not bad

Roger Cook-style, I chased down the shamefaced Softkey staff who owned up: it's a bug and, may we say, a pretty big one too. This affects all UK versions of WordStar for Windows 2.0, which is a shame because it's a fine piece of software otherwise. An upgraded version with a bug fix should be on sale by the time you read this, but if your copy is similarly broken, call Softkey technical support and they'll send you a disk with the fix on it.

Apologies from Softkey too about the lack of a prompt response to the query. Apparently the new voicemail system was malfunctioning, so, technically speaking, it hasn't been their month.

Martina Crewe of Islington, London wants to know how to improve her field handling in Word. "I have fill-in fields for addresses but I have to reformat them. Can I put formatting in a fill-in field?"

Yes: in every insert field, using a simple switch. Try this as a format when you insert a field:

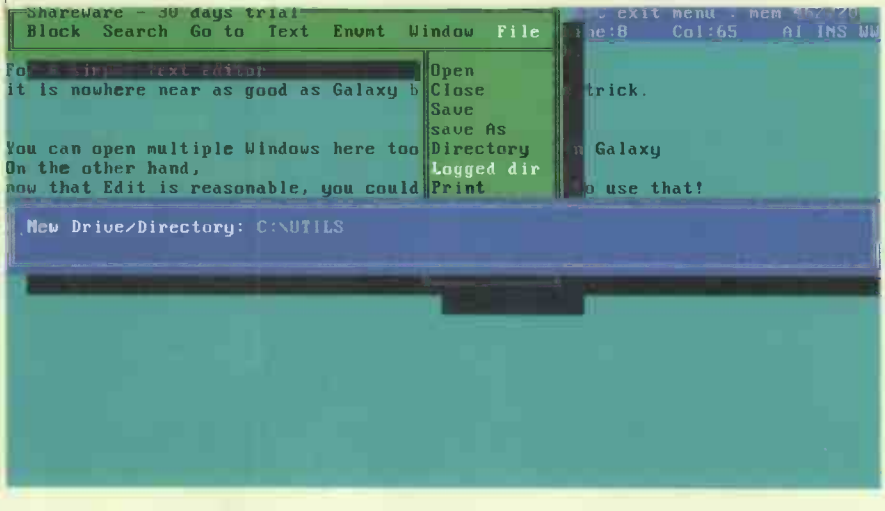
```
{fillin "What is your street
name?"\*charformat}
```

The resulting insertion will pick up the formatting of the first letter of the field command — in this case the "f" of "fillin". Use any insert field for the same effect.

One other useful proofing tool for a fill-in field is the *firstcap switch. It capitalises the reply, useful for first names, last names and titles.

Hints

A couple of months ago Michael Hewitt, my predecessor, now sadly lost to the word processing world after a nasty incident with two unhappy Samoan macro writers and a Microsoft natural keyboard,



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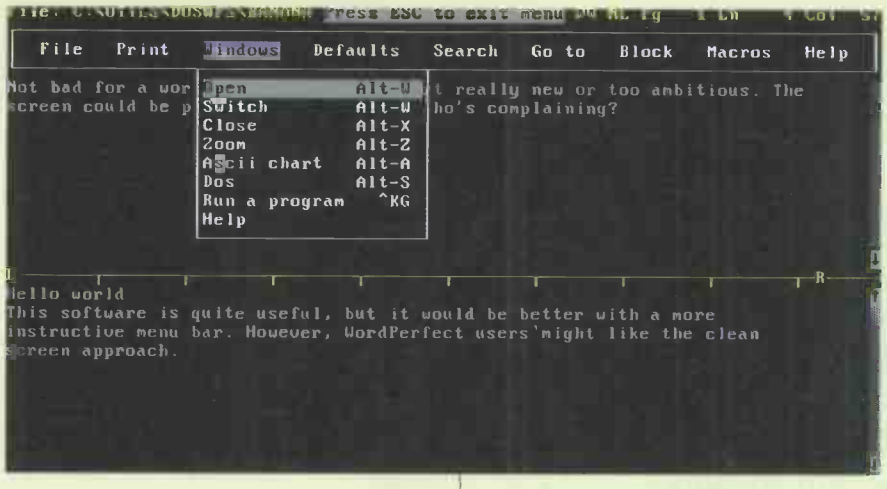

put in an all-points bulletin requesting Easter Eggs — the secret jokes and screens that developers hide in their applications. Here's a digest of the responses I've had. I haven't checked them all because my software is just too damned advanced and Intel-based.

1. Macintosh: Microsoft Word 3.01 and 4.x
Try spell checking the word "childcare" and the only suggestion is "kidnaper". Odd, isn't it? Bad joke, bad spelling.

2. Macintosh: Microsoft Word 4.0
Select "About Microsoft Word" and command-click on the Word icon for a list of beta testers. One hopes that a similar gang screen will not be incorporated into Windows 95 or we'd be there all day.

3. Word for Windows 1.1
Turn Caps Lock on, then Format, Define Styles, Options. In the Based On field, select Normal. There's an error message, click the OK, then Cancel, then Help, About. Make sure your mouse cursor is inside the Help box, then press O,P,U,S at the same time. The result is apparently fireworks with the authors' names scrolling on the screen. Can I confirm this? No. Not because I can't get a copy of 1.1, but who's going to go through all that? Obviously someone did, which makes you wonder how they find these things in the first place? You are sick people.

4. Word for Windows 2.0
In the Tools menu, click on Macro, in macro name, type spiff. Click on Edit, delete the lines Sub Main and End Sub. In the File menu, choose Close and save the changes. In the Help menu, click on About and click on the Word icon to get a gang screen and a nasty WordPerfect monster. Note: this is best viewed in 640 x 480.

In any style-sheet based word processor, you can be sure that straight out of the box it is larded with useless style sheets: four types of invoice and half a dozen fax covers, for example. To speed your work, you need the two or three style sheets you'll ever use to be easy to find in the dialogue box.

Galaxy ProLite is almost 10 years old and is beginning to look it. Like PROword, it offers multiple document windows, though, and a macro language

Either you decide which style sheets you'll need and delete the rest, which is dangerous, as you know that the following day your boss will ask you for six different fax cover sheet styles ASAP, or you rename your favourite styles. The best way to do this is to add the @ character at the front, so they are at the top of a dialogue box.In Ami Pro there's an alternative. Give each style a unique first letter, as the dialogue box "homes in" on styles as you type. Pressing that unique first letter selects the style.

In Word for Windows 6.0 there are a feast of top tips that pop up in a dialogue box at the beginning of each session. This tip-a-day format works well if you don't let it get under your skin and it should gradually make this column redundant. That's it, typical Microsoft software users don't need anyone else's help, oh no. Jonathan Sandys mailed us on CompuServe in an amused fashion when he found a silly tip in the tip a day format. Plaid shirts and striped pants rarely make a positive fashion statement, it said. I'll leave you with this tip: in the Tip-a-day dialogue box, More Tips will give you the full list, including all seven silly ones (You should never dive into murky waters — Win 95 beta testers, take note). Taken together, each section is great primer, so use them as a way to develop fast WinWord skills when you have the odd half-hour.

PCW Contacts

And that's that for this month. Surface or airmail to ***PCW***, otherwise I'm on email at **wong@cix.compulink.co.uk** and **CompuServe 100436,3616**

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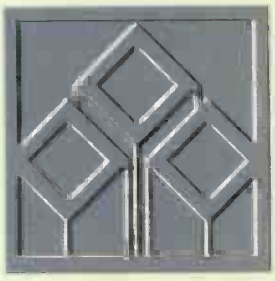

Can I have **arrays**?

By all means, says a benevolent Stephen Wells, if you want to discover a particularly easy way of organising your data. He explains how to make the most of arrays, and also presents a financial analysis template.

A keen reader writes: "We've just made a departmental presentation and resolved to improve on it next time." "Where we need help is in dressing up some simple statistics which are now just bulleted points. We use Excel 4.0."

How about picture charts? If you can find some appropriate clip art, they are easy to make and can look quite dramatic. Let's say you want to illustrate your estimated department costs for health, transport and security costs next year. Assemble your selected clip art in one new word processing document. I happened to have used the pictures of an ambulance, police car and transit van which come with Microsoft Works for Windows.

Open a new worksheet. Enter the labels Health, Transport and Security in cells A4:A6. Enter the estimate for health costs in B4, transport in C5 and security in D6. If you put them all down column B your chart would initially only have one series, which would mean doing a lot of editing work later to avoid having the same picture in all three bars. Select the block A4:D6. Press F11.

In the dialogue box which appears, use the default, First Row Contains First Data Series. Choose Gallery, Bar type 1. Choose Format, Main Chart, Overlap 90%, Gap Width 1%. You should now have three sizeable horizontal rectangles into which you can paste your pictures. As you move around with the mouse, the Reference Area of the formula bar will say S1, S2 or S3 so you'll know which series you're in. Also, if you click a bar a centre marker will appear.

Now switch to your word processing document and copy the ambulance. Switch back to your chart and paste it on the Series 1 bar. Copy the van to the Series 2 bar, and the police car to the remaining bar.

Now double-click any of the pictures to get the Patterns box. The default is Stretch but in this instance I think you'll agree that Stack looks better. This repeats your drawings in their original proportions along the axis until the entered values are reached. Click the Apply To All box. Now all three pictures will be stacked.

If you want to add vertical gridlines, don't go back to Gallery and switch to Bar Chart Type 6 or you'll lose your pictures. Instead, display the Chart toolbar and click the horizontal lines icon. Don't worry — vertical ones will appear. Trust me.

Finally, choose Chart, Attach Text, Value Y Axis (the horizontal axis in this case) and enter the label of your choice in the Formula bar; and, for neatness, choose Chart, Axis, delete X axis. Save the chart.

If all's well you should now have a chart as shown in Fig 1.

Arise arrays

In the March column, I wrote such a long introduction to a reader's problem that there wasn't space for the preferred solution and I haven't had a chance to get back to the subject.

Just to recap, a sister in a hospital, preparing a duty rota, needed to be able to count key letters in a column and total them at the foot. She uses the letters to represent shifts: E for Early; L for Lates; N for Nights; and D for Day Off. I mentioned a tortuous solution using several columns of IF statements, and the COUNTIF command in Excel 5.0. But what I really wanted to get into was the wonderful world of arrays, available in Excel 4.0 or 5.0.

An array can be defined as a table that a program treats as one data item. If you've ever written in Basic, you'll recognise the following simple program which provides the number of days in each month:

```
20 DATA
31,28,31,30,31,30,31,31,30,31,30,31
30 FOR month = 1 to 12
40 READ days(month)
50 NEXT
```

For January, which is month(1), the program reads from the data line and finds that days(1) = 31. Then it goes to month(2), or February, and finds that days(2) = 28, and so on.

Excel uses the concept in what is called an "array formula". It's not often found in financial spreadsheets because accountants like to see a detailed paper trail with no steps left out. But for jobs like a staff rota it's perfect.

When you find yourself entering the same formula throughout a block of cells, and just changing the formula's cell references to match the new row or column, you can save time by entering an array formula. You'll also reduce the amount of memory used by the worksheet.

One other good feature of Excel is that you don't have to write a macro to use an IF statement. That function works just like in Basic, too.

In English, what the sister would really like to state in a cell is: if there are any E's in column A, find them and add 'em up.

Talk about intuitive. Excel virtually lets you put it that way. If you're searching the range A2 to A21, you use the following formula:

```
{=SUM(IF(A2:A21="E",1))}
```

The only thing to remember is that you don't actually enter the braces, {}. You enter the rest of the formula and then instead of pressing Enter, you press Ctrl+Shift+Enter. Mac fans press Command+Enter. Excel will add the braces, just to acknowledge that it will treat the entry as an array formula.

To add up the L's, in another cell you enter, as an array:

```
{=SUM(IF(A2:A21="L",1))}
```

Leaving the hospital rota aside, there are many other uses for array formulae. Let's look at another.

Assume that, in a worksheet, the block A1 to A10 holds a series of numbers. They could be cash amounts. Now, some of the

numbers are positive and some negative. In a cell below, you want to show the lowest positive number.

You can't use the MIN function as is because it will return the lowest negative number. But you can have an array formula combining MIN with an IF statement do the job. In effect, we'll say that if any number in the range A1 to A10 is more than zero, include it in a pile. Go through the pile and find the lowest number.

The formula, entered as explained above, is:

```
=MIN(IF(A1:A10>0,A1:A10))
```

Pretty as a picture chart

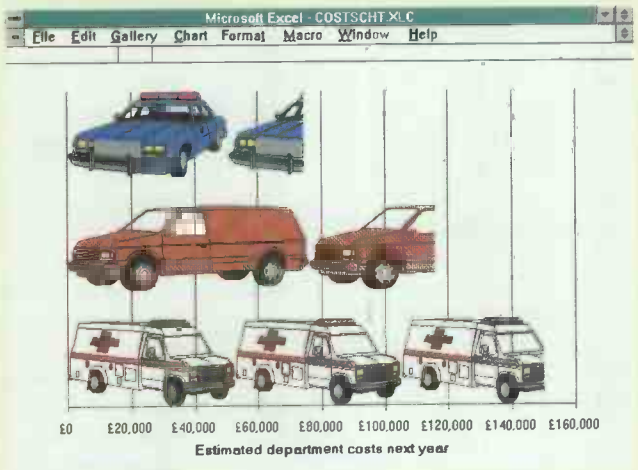

Fig 1 *Dressing up simple statistics with a picture chart*

Microsoft Excel - EXAMPLE.XLS

File Edit Formula Format Data Options Macro Window Help

	A	B	C	D	E	F
82						
83	Assets Line Chart					
84		1989	1990	1991	1992	1993
85	Cash and Securities	41	47	102	17	120
86	Accounts Receivable	91	156	180	153	176
87	Stock	412	698	727	919	1234
88	Other Current Assets	91	135	19	66	59
89	Net Plant & Equipment	53	250	247	252	357
90	Other Assets	11	13	85	26	30
91						
92	Debt & Equity Line Chart					
93		1989	1990	1991	1992	1993
94	Accounts Payable	259	394	424	463	687
95	Other Current Liabilities	95	93	239	166	252
96	Long-Term Debt	51	224	162	96	109
97	Stockholders' Equity	294	389	536	695	928
98						
99	Costs, Expenses & Income					
100		1989	1990	1991	1992	1993
101	Cost of Goods Sold	1822	2712	3051	4018	4680
102	Operating Expenses & Interest	751	1007	1326	1698	2176
103	Income taxes	67	37	157	116	144
104	Net Income	77	95	149	190	233
105						

Ready

Fig 2 *The final results produced by the template listing*

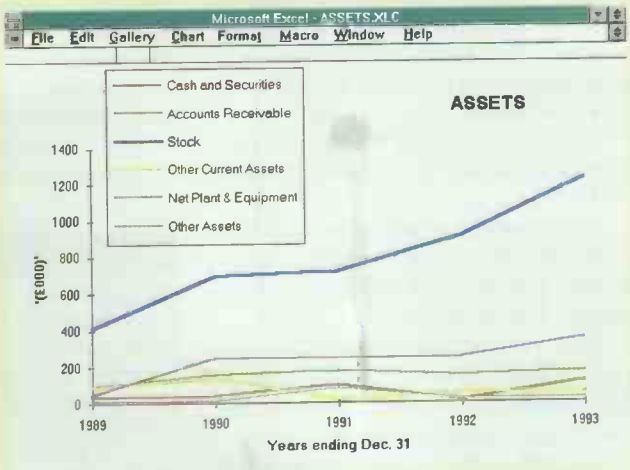

Fig 3 *A chart of company assets from rows 84 to 90 of Fig 2*

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Financial analysis

Financial analysis uses standard ratios. That's because they enable a company to be compared with others in its industry for which the ratios are published; and they provide a feasible comparison of a company's progress from year to year.

But management thinks foremost in pounds. So while I was writing the template to produce the 22 ratios I added a few rows which simplify charting of the principal elements of a company's balance sheets and income statements. The listing shows rows 82 to 104. The purpose of this final block of the template is to enable you to produce three charts which show a five-year picture in pounds. The results shown in Fig 2 are from the sample balance sheets and income statements used throughout the series.

Column A picks up the category names from earlier in the template where possible. Because these financial charts traditionally read from left to right, with the most recent year on the right, the columns are reversed. The most recent year is now in column F, the oldest in column B. To save space, columns C through E aren't shown — you can't drag column C from B. Cell C85, which is supposed to have =E3, would become =G3. Nor can you select columns E and F and choose Shift+File, Fill Left. Cell E85, which is supposed to have =C3, would become =A3. Even Excel has its limitations. But the sequence is clear and you can enter it easily.

In many financial reports, the ups and downs of a company's assets over time are shown in a line chart. So are Liabilities and Equity components. That's why they are shown that way here. But Excel offers several other chart types which you can employ.

Similarly, costs, expenses and income are most typically illustrated in a stacked column chart as shown here. But you could instantly switch to an area chart, 3D ribbons or make a pie chart for each year if you wished.

To make the first chart, select the block A84:F90. Choose Chart Wizard. Drag out a rectangle and choose Next.

On Step 2, choose Line. On Step 3, choose Type 2. On Step 4, choose Data series in rows and accept the defaults of Use first row for labels, and use the first column for Legend Text. On Step 5 just choose OK. Double-click the chart and enlarge to fill the screen.

Press the right-hand mouse button (RHB) and remove all toolbars. Click on the Legend box and move with the mouse to the preferred position.

Results in £'s template listing

	A	B	F
82			
83	Assets	Line	Chart
84		=F1	=B1
85	=A3	=F3	=B3
86	=A4	=F4	=B4
87	=A6	=F6	=B6
88	=A8	=F8+F7	=B8+B7
89	=A10	=F10	=B10
90	=A11	=F11	=B11
91			
92	Debt & Equity Line Chart		
93		=F1	=B1
94	=A14	=F14	=B14
95	=A15	=F15	=B15
96	=A17	=F17	=B17
97	=A19	=F19	=B19
98			
99	Costs Expenses &Income		
100		=F1	=B1
101	=A27	=F27	=B27
102	Operating Expenses & Interest		
	=F29+F31	=B29+B31	
103	=A32	=F32	=B32
104	=A33	=F33	=B33

Choose Chart, Attach Text, Chart Title, OK. It's best to type in the chart title, Assets. That's because you can't drag the title to a preferred position. The only way to move it right is to add spaces in front of the text in the formula bar. And if you get your title by pointing to cell A83 in the worksheet, and then try to insert spaces in front of it, the text on the chart will change from Assets Line Chart to:

```
=EXAMPLE.XLS!$A$83
```

To make the title larger, select it and then choose Format, Font. Then choose Chart, Attach Text, X axis, and type: Years Ending Dec 31. Select Chart, Attach Text, Y axis and type in "(£000)" to show the correct amounts. To thicken the lines on the chart, select a line, press the RHB and choose Patterns, Line Weight. You should now have a chart as shown in Fig 3. Make sure you save it.

The Debt and Equity line chart is made exactly the same way, but using the block A93:F97.

Costs, expenses and income are illustrated as a stacked column chart. Select the block A100:F104. Press F11, RHB, Gallery, Column type 3.

Choose Chart, Add Legend. Drag the new Legend box to the desired location. To make the default colours more descriptive, select a colour stripe on a column, press RHB, Patterns, and change Foreground colour. Then choose Chart, Attach Text and add the x and y axis labels.

To insert the main title, choose Chart. Attach Text, Title and enter an equals sign in the Formula Bar. Press Ctrl+Shift+F6 to display the worksheet. Click on cell A99, press Enter. To make the title larger, select it then choose Format, Font. Save the chart.

The categories in this chart are accumulative, by the way. The top of the columns represent Net Sales in each year.

This month we've completed the template for companies which carry stock. Before we leave it, I want to underline that there are no universally good or bad results for a calculated financial ratio. Not only do industries differ — some traditionally working with more debt than others, for instance — but times in the life of a particular company can result in dramatic changes in a ratio.

When a company is housed in a heavily depreciated old building, and then moves into a brand new, expensive building, this is liable to change the Fixed Assets to Long-Term Debt ratio and the Plant Turnover ratio considerably. That doesn't mean the company shouldn't have made the move. It just means that such a change can cause repercussions which the wise management will plan for.

Financial ratios are an extra eye for management, helping watch over the ebb and flow of the company.

It has been proven time and again that in the long run it is the conservatively managed companies which survive. It is usually better for the changes from year to year to be moderate, rather than fluctuate wildly. Steady consistent growth, with a proper control of costs, shows a firm hand at the tiller.

Some financial analysts suggest that a company need only watch just a few ratios, particularly pertinent to that industry. But by using this spreadsheet template, which automatically calculates all the important ratios, there is no reason for management to limit its view to segments of the complete picture.

Next month we'll examine a template for service companies.

PCW Contacts

Stephen Wells welcomes feedback on spreadsheets via *PCW* Editorial at the usual address or at **stephen_wells@pcw.ccmail.compuserve.com**. For the financial analysis template for companies which carry stock, in Excel 4.0 format, send a formatted 3.5in disk and a stamped, self-addressed envelope.

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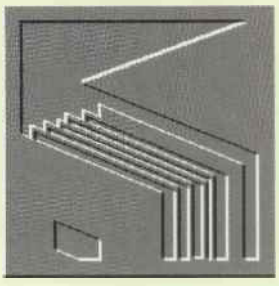


Just Codding

Mark Whitehorn continues our demystification of Codd's rules for relational database management systems with an investigation of Rules 4, 5 and 6.

Dynamic online catalogue based on the relational model

Rule 4: The database description is represented at the logical level in the same way as ordinary data, so that authorised users can apply the same relational language to its interrogation as they apply to the regular data.

An implicit assumption in this rule is that every RDBMS will have a "database description"; Codd apparently believes this to be so fundamental to the whole concept of an RDBMS that he does not actually state it. A database description, more commonly known as a database dictionary (a term which Codd himself uses in his expansion of Rule 4) is an entity which holds a description of the tables in the database, their structure, the relationships between them, the queries and so on.

The rule says that the form in which the information in the data dictionary is held should be the same as that for the tables of data themselves, and that there should be no additional complexity for users who need to deal with data at dictionary level. To put that another way, if you look inside the data dictionary you should find information about how your database is structured, and that information must be held in tables. It all sounds a little incestuous because we end up with tables that define tables, but the concept behind this rule is perfectly sound. Once you have learnt how to drive the RDBMS, you can access all the information that your database contains, even the information about itself, in exactly the same way.

Microsoft Access conforms to this model, though in normal use the data dictionary tables are hidden, presumably because they can be dangerous in inexperienced hands. However, it is interesting (and educational) to play with these tables, and it's perfectly safe to do so provided you make a copy of the entire database and take it somewhere safe first. If you don't take heed of this warning, you have only yourself to blame if your database goes up in a puff of pink smoke.

If you do wish to see these tables (in your copy table), click on View, Options, and under the category General, set the option "Show system objects" to Yes (see Fig 1). The dictionary tables will then appear among those you're used to seeing in the normal list of tables. They all start with the letters MSys which makes them easy to spot. There are quite a few of them — for instance, there are separate tables for relationships, queries and macros, and these can be opened and viewed in the normal way. Certain others, columns and indexes, for example, can only be viewed if you change the security permissions to allow you to do so.

To change permissions, first have a look at how the permissions are set for one of the tables you can see by clicking on Security, Permissions and noting the settings. Then do the same for, say, Columns, and make the settings identical.

Given the importance afforded by Codd to data dictionaries, one might be surprised to learn that several of the big-name RDBMSs with "relational" writ large upon the box fail to meet this criterion. dBase, Paradox, FoxPro and Approach all operate without a database description to their names.

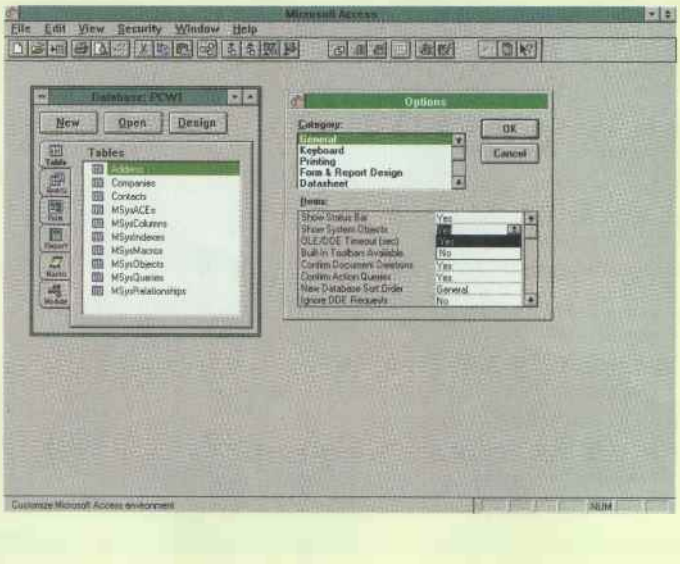
Comprehensive data sub-language rule

Rule 5: A relational system may support several languages and various modes of terminal use (for example, the fill-in-the-blanks mode). However, there must be at least one language whose statements are expressible, per some well-defined syntax, as character strings, and that is comprehensive in supporting all of the following items:

- *Data definition*
- *View definition*
- *Data manipulation (interactive and by program)*
- *Integrity constraints*
- *Authorisation*
- *Transaction boundaries (begin, commit and rollback)*

Looked at in one light, this rule is somewhat anachronistic. It was defined in the days when it was necessary to learn several languages before being able to grapple successfully with a database, with perhaps one language for querying and another for defining the structure of tables and the relationships between them. Codd's aim was to simplify the interface by determining that only one language should be used for controlling all aspects of database work.

This situation simply didn't occur in the early RDBMS software written for the PC, in programs like dBase II and III, because they essentially had only one control language and therefore they conformed to the rule.



Viewing the system tables, which make up the data dictionary, in Access

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If you apply the rule rigorously to the modern Windows products — Paradox, dBase for Windows, Access etc. — some fail to make the grade. Access, for example, while it has a single control language in which it is possible to carry out most database functions, uses a GUI to create forms and queries. Although Access queries can be defined in SQL, whether SQL is actually part of Access basic is highly debatable.

The same is true in Paradox: there is no single completely unifying language. However, while these packages are breaking the letter of the law they are abiding by its spirit; the GUI brings increased simplicity, and it was to simplify it that Codd wrote the rule in the first place.

dBase for Windows, on the other hand, is better than all the opposition in obeying this rule. Tasks, including building forms, can be carried out either with the language or the GUI, and users can swap between these two methods at will. Other DBMSs fall short of Rule 5 by failing to have any control language at all (Lotus Approach, for instance).

Finally, does SQL satisfy this rule? The answer is, "It depends if you are a purist or not." I'm not, so broadly I'd say "Yes."

View updating rule

Rule 6: All views that are theoretically updatable are also updatable by the system.

On the face of it, this is a simple rule: it's short, concise and unambiguous. However, reading Codd's further expansion of Rule 6 rapidly disabuses you of that first naïve interpretation. He says: *"Note that a view is theoretically updatable if there exists a time-independent algorithm for unambiguously determining a single series of changes to the base relations that will have as their effect precisely the requested changes in the view"*. Oh.

Perhaps some definitions might help to shed light on this obfuscation.

Relation

Codd uses the term "relation" to mean effectively a table of data.

Base relation/base table

This is a table which exists within a database, and excludes the more transient tables such as answer tables. Answer tables are considered transitory since their values can change as the base tables are updated.

View

A view is a combination or subset of rows and/or columns from one or many base tables. Stored in a base table of customer information might be customer ID numbers, names, addresses, phone and fax numbers, and a view of that data might show only the names and the fax numbers of all customers in Scotland. A view equates approximately to what we'd call a query.

We can thus rewrite the expansion of Rule 6 as:

Note that a query is theoretically updatable if there exists a time-independent algorithm for unambiguously determining a single series of changes to the underlying tables that will have as their effect precisely the requested changes in the query.

So, have my definitions helped to clarify the clarification? Not entirely, no; but you have to agree that it's a further excellent grounding to help you make headway with Codd's singularly abstruse use of English.

Another way of expressing Rule 6 might be that you should be able to look at data in a query table and update it so long as that updating action (be it modifying, inserting or deleting information) does not break any of the fundamental rules of the database structure. In other words, users should not be obliged to return to the base table before effecting any changes; the system should allow editing from subset views so long as the integrity of the data remains uncompromised.

If you were looking at the view described above (the one showing just names and fax numbers) this rule says that you should be able to correct the spelling of a customer's name (you know full well his name isn't Mr Boring, it's Mr Baring). On the other hand, other actions may be forbidden, not by this rule, but because such changes would affect the overall database integrity. For example, using this particular view, you might well be forbidden from adding a customer. Why? Well, suppose that each customer is required to have a manually entered, unique ID field. Since you cannot even see that field from this view, you cannot possibly enter that data, so adding a customer from this view should be forbidden.

Very few of the current crop of RDBMSs conform to this rule; most simply refuse to allow you to edit via a query. Access is one of the few exceptions, and it can do this because it uses dynasets to generate the answer tables.

We're now nearly two thirds (seven twelfths, to be exact) of the way through Codd's twelve rules; keep practising, there will be questions at the end.

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Questions & Answers

I am getting a lot of questions based on Access, which suits me fine: I think it is an excellent product. However, this may well be boring for users of other products, so I will do my utmost to answer questions generically. This isn't difficult since most of the questions are actually about databases rather than specific RDBMSs. SQL is particularly helpful here, since it is largely transportable, so I will endeavour to show SQL solutions whenever possible.

Splitting up is hard to do

We purchased MS Access in the hope that we could convert all our PC databases from ageing, non-MIS written programs into polished, usable and, above all, maintainable systems. Alas, I was brought down to earth when trying to convert and split up an old database file.

I have a file in Microsoft Access 2.0 which was imported from a Fox database. This is a single flat file which needs to be converted to two related tables:

```
Companies
---------
Company Number
Company Name
Address
Contact Name
etc.
```

There can be more than one contact name for a company at a certain address. I need to split the above file into two. One will hold the company name and address, and the other (connected by a counter field in Address and a number field in Contact Names) will hold the contact names for that company at that address, e.g:

```
Address Table                    Contact Names Table
-------------                    -------------------
Company Number  ---------- Company Number
Company Name                       Contact Name
Address                            Extension
Telephone
```

The relationship is One-to-Many with Referential Integrity with the cascadedelete option set.

I have nearly (sort of) managed to do this with myriad select, update and append queries, but have not had a satisfactory result as yet.

I have set up a (tiny) table which mimics your problem (upper table in Fig 2, right). The problems are:

1. To get an unique list of the companies from this table which can then be converted into the Address table;

2.Tto get a complete list of the contact names (in other words, every record from the Companies table) for the Contact Names table.

Solutions:

1. Set up a query on Companies and include the fields you want to appear in the Address table. Call up the properties box for the query (right-click and select Properties) and set the Unique Values property to Yes, then run the query. If all is well, this will produce a unique list of companies. In practice you may well have duplicated entries. These arise simply because people often make slight errors when entering data multiple times, particularly addresses. However, at least they should be reasonably easy to spot and you can edit the original table to remove them.

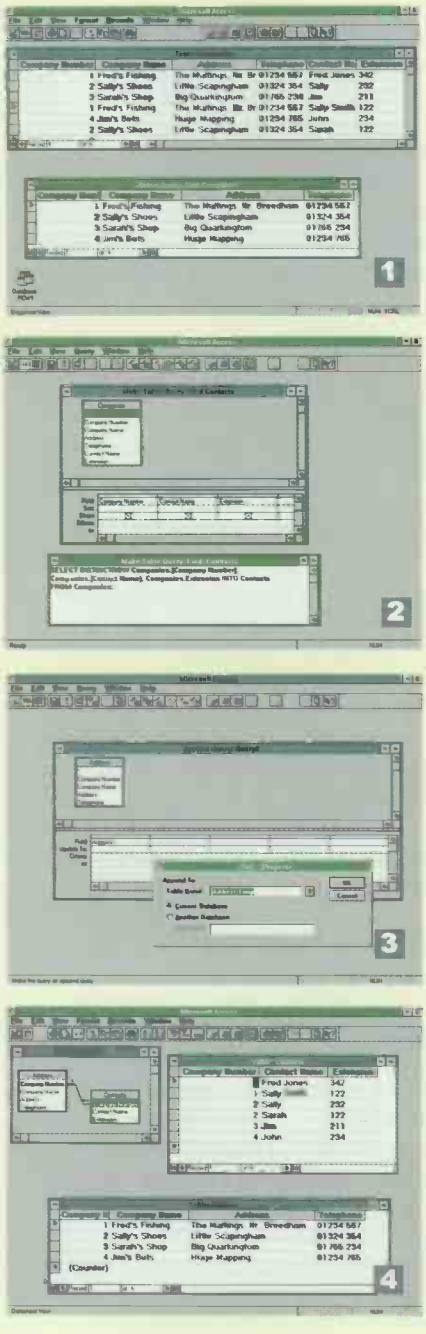
Don't select Unique Records in the Properties box because this will only suppress duplicates which are identical in every way in the original table. Since your records in Companies will vary by contact name, you won't get a unique list of companies.

When you are happy with the result, generate a table called Address from the query (pop down the Query menu, select Make Table, enter Address as the name of the new table and run the query).

2. Set up a new query on Companies, but just choose the fields Company Number, Contact Name and Extension. Again, use the query to generate a table (called Contacts).

So far, this answer has been fairly generic for all RDBMSs since you can use the SQL, but the next bit is peculiar to Access since it involves the Counter field type. How do you turn the Company Number field in Addresses into a counter field? You can't just redefine the field type because Access refuses to make this change. The answer is, from the database window, highlight the newly created Address table and use Edit Copy, Edit Paste to make a copy of it. When asked if you want to copy the structure only, or the structure and data, select only the structure. You will need to give the new table a name, perhaps Address Temp. Since this is an empty table, you can happily change the data type of Customer Number to a counter. Then use an Append Query to add the contents of Address into Address Temp. Rather surprisingly, considering Access's normally defensive attitude to Counter fields, it will let you do this. Finally you can delete Address, rename Address Temp as Address and make Company Number into a primary key.

Assuming that all is as it should be, you should be able to join the tables and establish referential integrity.



1 The query to generate the Address table, together with its SQL equivalent
2 The query to generate the Contacts table, together with its SQL equivalent
3 Running the append query to move the data into Address Temp
4 The conversion is complete

PCW Contacts

Mark Whitehorn welcomes readers' correspondence and ideas for the Databases column. He's on **penguin@cix.compulink.co.uk**

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What other equipment have these cowboys sold us?

At the headhunter's

How long will it take to see who we've got with experience in VB, security and comms?

In the MD's office

What do you mean "we don't know how many fault calls relate to this" - it's on the computer isn't it?

In the PR office

Do we have any contacts in the Belgian press?

In the research section

You mean we can't just look for everything in the database that mentions it?

In the library

I don't suppose you've got any back-ground on [fill in pet hate]?

In customer service

I'm sorry; do you have a part number? Oh... We're stuck then, aren't we?

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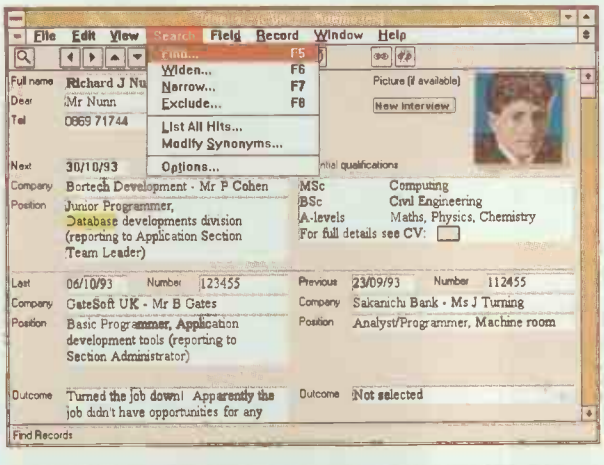

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Making **histograms**

Many paint-program enthusiasts are scared off by histograms, but they shouldn't be. Gordon Laing makes good use of these oft-neglected facilities, reports on the exciting plans afoot at Quark towers, and traces the history of his Font of the Month.

Histograms are one of the most useful but least understood facilities offered by advanced paint and photo retouching applications. But fear not, for there is no longer any need to cower at their mention, as Graphics & DTP spills the beans, dishes the dirt, and explains just what's going on, generally dispelling myths as it goes along — or something like that.

Along with "everything you wanted to know about histograms but were afraid to ask", we've got the traditional Font of the Month and all the hot news from the graphics world.

The latest from Quark

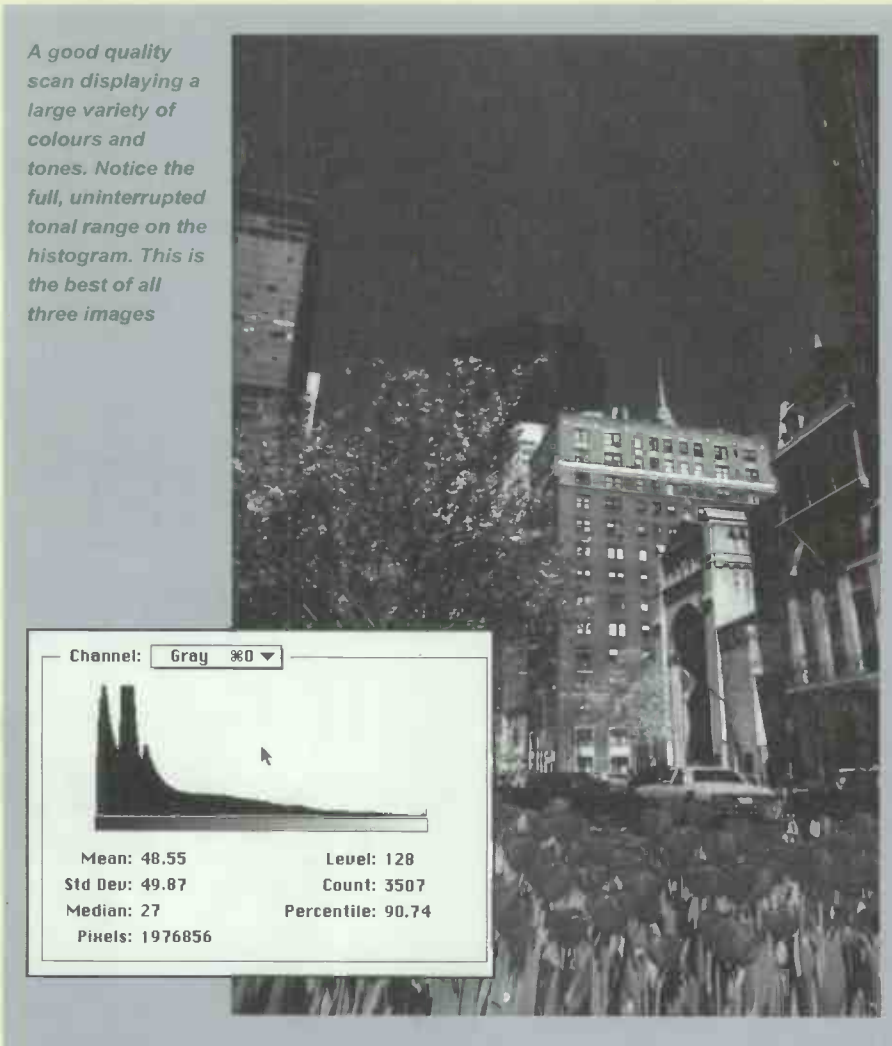
Several months back, Quark implied that it would be either acquiring or creating its own drawing application. At the time many, including myself, speculated that it would eagerly snap up FreeHand, after Adobe returned all rights to the developers, Altsys. MacroMedia ended up taking the initiative and is now responsible for FreeHand, with the recent release of version 5.0, currently only available for the Macintosh.

So what of Quark? Chances are that freehand drawing tools will be available on forthcoming versions, but for now, the shock news is that Quark is soon to announce an image manipulation package to rival Adobe Photoshop around the time you read this.

Quark XPosure, jointly developed by JVC and expected to ship late this year for less than $1,000 on the PowerMac platform, uses concepts similar in many ways to Micrografx Picture Publisher 5.0's LowRez and Command List. The rather sensible approach to manipulating potentially huge and utterly resource-crippling files is to edit a low-resolution version. The application remembers the list of commands and applies them to the original large image at a later time, leaving you free to do something far more important like having lunch — or sleeping, depending on just how big the original is.

The downside is that retouching specific areas on a low-resolution version may not accurately transpose to the original; other fine details or aberrations of the original may not show up on the low-resolution version.

Where this technique really comes into its own is for general mode changes, overall adjustments of brightness, contrast, colour and the like. Any operations are



A good quality scan displaying a large variety of colours and tones. Notice the full, uninterrupted tonal range on the histogram. This is the best of all three images

specified in the command list, which may be edited, offering in effect, unlimited levels of undo. The list can be saved and applied not only to the high-resolution original but to any other files, allowing batch processing.

Also of interest is Quark's use of lenses to apply effects over a specifically shaped area. Along with a set of standard filters, Quark XPosure will be compatible with Photoshop plug-ins. We'll bring you more information as soon as we have it, and look forward to seeing whether it will pose any threat at all to Photoshop, which is about as established as any application in a niche market can be.

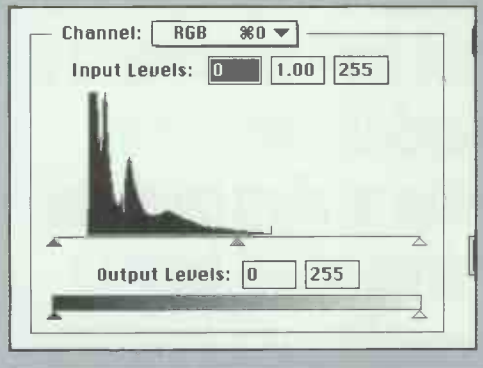
Histograms explained

Take a deep breath, here goes: a histogram is a visual representation of the tonal distribution of an image. The horizontal axis runs from pure black to pure white, with shades of grey in between; there are 256 levels in total. Each of the 256 levels has a vertical bar proportional in height to the number of pixels in the image which are that shade of grey. In a colour image, you may choose from a combined histogram representing overall distribution, or separate ones for the component RGB or CMY and K elements.

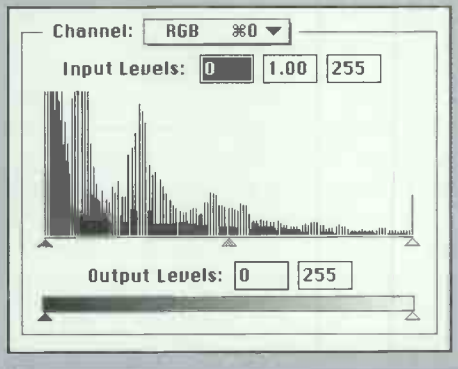
In plain English, histograms show, at a glance, the range and extent of brightness and darkness in an image. If the image has a broad tonal range, the histogram will be complete and uninterrupted, with vertical bars for every level. Dark images show emphasis towards the left side, while bright images will be biased towards the right side. Poor-quality images, or those lacking in contrast, may be immediately identifiable by the lack of values at the extreme black or white ends of the histogram. Gaps in the histogram indicate literal gaps in the tonal range.

Careful analysis and modification of the histogram can be the easiest and most efficient single step in correcting or optimising an image. There is, of course,

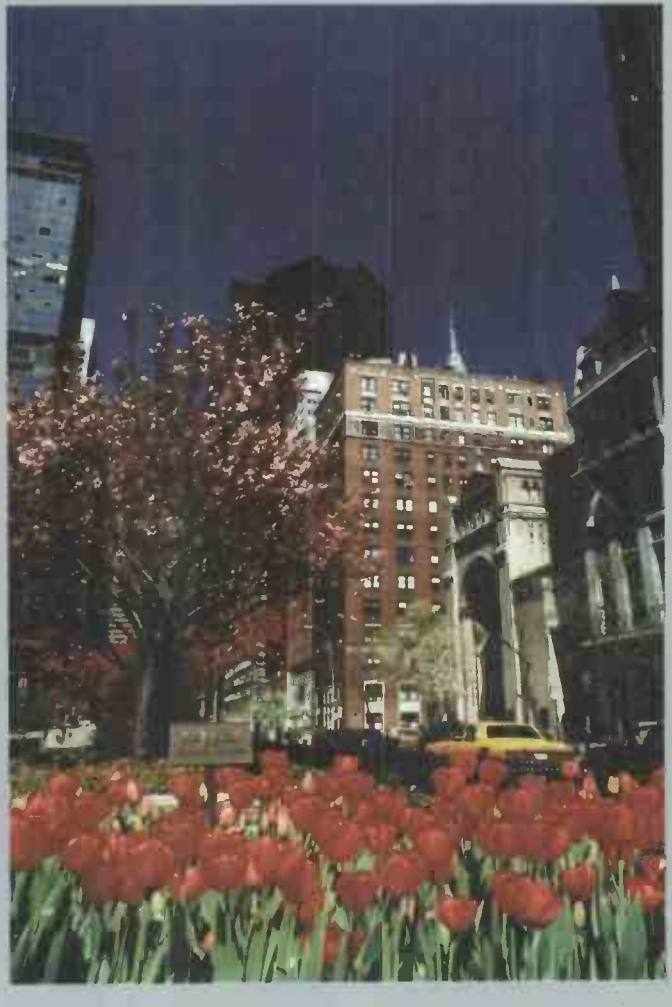
Histograms



The same picture with much reduced contrast. Notice the limited range of tones on the histogram. There are no pure whites or blacks



Here, the middle poor scan has been optimised by stretching the histogram's edges to the full tonal range. This results in gaps, but it's still a considerable improvement



the possibility that an image is deliberately light, or soft, without the need for correction, but displaying the histogram will leave you in no doubt as to the tonal nature. They can also be very useful in testing the quality of an image source or scanner, since any tricky tonal gaps or unintentional bias will immediately make themselves apparent.

The following tips are specific to Adobe Photoshop 3.0 but are equally applicable to earlier versions, or indeed any paint or photo retouching application which offers a histogram facility.

Clicking Histogram from the Image menu displays the tonal distribution for the current image or selection — obviously, the bigger the image size the longer the process will take, although typically you'll only have to wait a few seconds. The combined histogram is displayed by default, either as CMYK for CMYK images, or grey for RGB or indexed images. A pulldown menu offers individual histograms for the red, green or blue, or cyan, magenta, yellow or black channels.

The histogram is displayed above a graduated bar representing each of the 256 levels. The vertical scaling factor may result in some bars going off the range, but the count will always indicate the total number of pixels at the particular level the pointer falls on. In addition to the count at that level, Photoshop's histogram function shows the total number of pixels in the image, the average brightness level, standard deviation and median.

You can immediately spot if the image has a full tonal range by seeing if the histogram extends to the pure white and/or black edges of the range. Gaps in the histogram represent the lack of a particular tone. Simple or indexed images may only consist of tens of shades or colours, resulting in a sparsely populated histogram more resembling a bed of nails. In these cases there is little you can do to correct the image, if indeed any correction is required at all.

Image correction by histogram manipulation really comes into its own for files stored with a large pixel depth, such as 24-bit RGB, or 32-bit CMYK. So how's it done?

Selecting Levels from the Adjust submenu of the Image menu generates the histogram again; as before, it can be set to display individual or combined channels. The histogram is labelled as Input Levels and has three triangular sliders below, one at each end and the third in the middle. From left to right, they represent darkest or shadow value, the midtone value or gamma, and the brightest or highlight value. The slider's positions are indicated numerically above — remember, 0 is black and 255 is white. A gamma of one places the midtone level exactly in between the shadow and highlight.

Below the histogram and its sliders lies the 256-level graduated grey bar, this time labelled Output Levels, and with a triangular slider at each end. These determine the lowest and highest overall output brightness, and effectively control the contrast of the image. Dragging the black slider to the right decreases the contrast of the image.

The point is that all these little triangles are just dying to be dragged around, and tagging the Preview button presents the results without any permanent damage being done. Before trying to understand completely the theory behind histograms, I thoroughly recommend a good wiggle with the sliders to see what they do in practice.

Remember, a full tonal range will have a histogram which extends to both the far left, shadow, and far right, highlight triangles. If your image's histogram falls short on either or both ends, just drag the highlight/shadow triangles to the edges of the histogram, and the application automatically reassigns the tones. Now you'll have true blacks and whites, at the expense of the original histogram being stretched. This may produce gaps between levels, but the overall result is usually preferable. You may have to play about with the middle triangle to reassign the midtone/gamma level correctly. Trial and error along with healthy experimentation is the best advice.

Photoshop does a pretty good job of adjusting the sliders to stretch the histogram itself, by pressing the Auto button. Of course, you can manually tweak them later before committing with the OK button.

If adjusting sliders doesn't appeal, a far more visual option is open to you. To the right of the histogram and below the other buttons lie three Eyedroppers: one (black) representing shadow, another (grey) for midtones and a third (white) for highlights. Select them one at a time, then manually choose which area you believe to corre-

Font of the Month

Runic

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Above *Runic, the digital typeface, as used by PCW*
Right *A 1969 advert for Runic, the hot-metal typeface*

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spond on the actual image. Click on the Shadow Eyedropper, then find the darkest area on your image; next find a typical midtone on your image then click it with the Midtone Eyedropper; finally select a bright area with the Highlight Eyedropper.

This technique requires reasonable judgement and understanding of which are the typical highlights, midtones and shadows in your image. Even with a little experience the results can be slightly unpredictable, but overall, I prefer it to the sliders. You can always re-choose certain areas until you've achieved the desired correction.

Ultimately, bear in mind that the histogram describes the overall quality of an image. A limited range, or gaps within the range, are easily spotted and represent less than perfect quality. It's a worthwhile exercise to look at the histogram of an unmodified file before any manipulations, then check it after each overall change. You should notice gaps appearing left, right and centre, revealing a loss in quality. Consequently, try to make as few contrast, brightness and colour changes as possible to retain optimum quality. In many cases, these adjustments can be made at scanning stage, saving you subsequent processing time and potential quality loss.

Incidentally, users of Photoshop 3.0 for Windows may be experiencing scanning problems. This, I am reliably informed, is the fault of a duff TWAIN file. The file at fault is the obviously titled twain8b.8ba, which resides in the Plugins directory. Get in touch with Adobe or your scanner manufacturer for a replacement, which should be simply copied over the original.

Before I go any further, many of you may be interested in CDs full of stock photography. In the very near future I'll be doing a round-up of any I can get my hands on, but until then check out PhotoDisc, which Faces put me on to.

All PhotoDisc CDs contain between 100 and 352 images stored as RGB TIFFs at several sizes. All the volumes contain 5 x 7in versions at 72dpi (600kb) and 300dpi (10Mb). Certain collections also offer larger images: 8.5 x 11in at 300dpi (28.5Mb) — the 10Mb and 28.5Mb files are JPEG compressed. Some earlier volumes were created with CCD scanners, but PhotoDisc is now systematically rescanning with higher quality drum scanners.

Just my type

"A work of art does not have to be beautiful but it will need to be displayed with some discretion if it is to have the desired impact. Runic Condensed could be seen as belonging to this category. It was not designed as a text face, but although extremely compact, it is surprisingly readable. Used with care it has considerable merit where attention is being courted."

I can't argue with that quote from Agfa's Type Reference book for PostScript Users regarding June's font of the month. Runic Condensed, available from MonoType or Adobe collections through the usual suppliers below, was first designed and marketed in 1936 in hot-metal. It's an in-house design, based on early foundry types from the Caslon foundry, later known as Stephenson and Blake.

Runic Condensed is best used in large point sizes, ideal for headlines. You can see it in action within the hallowed pages of *PCW* since our November 1994 redesign issue. *PCW*'s art editor Darrell Kingsley chose four new fonts specifically for headline use. Runic Condensed made it to the final fab four and finds itself most used on science and technology features. It also makes a refreshing change from your typical weighty sans-serif headline faces.

PCW Contacts

Gordon Laing welcomes any tips, questions or traditional cash bribes. Please write to the standard *PCW* address, or those suitably equipped can email him as **Gordon_Laing@pcw.ccmail.compuserve.com**

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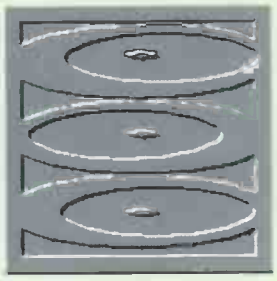


Deep and meaningful

In case you're seeking relief from flat presentations, Asymetrix comes to the rescue with an affordable 3D animation package. Karl Dunkerley leads you through some special effects to bend the mind.

It isn't just the Flat Earth Society that believes we live in a two-dimensional world. Unlike the real 3D world, virtually the whole of the PC world exists in two dimensions. DTP, graphics packages, drawing software and all major applications produce flat output. Even animation packages miss out on the third dimension. This month, though, I'm going to take you into the Z dimension and all the trip will cost you is £150, at most.

There have been 3D packages around on the PC for some time but their prices have been prohibitive. Asymetrix has now come to the rescue with its 3D F/X package.

Most of us will never want to produce our own 3D models so the package ships with a CD full of them. Even better, you can buy more because it lets you import AutoDesk's 3D-Studio libraries. 3D F/X isn't a fully-fledged 3D design package — it is aimed at people wanting to add AVIs to presentations, video clips and documents, and to make their work stand out.

The best aspect of the package is its ease of use. When you fire up the package you see three windows. The most important is the Scene Preview, which is where you do the most work — it acts as your scratch pad and visualiser. The Catalogue window holds all the models, surface textures, paths, lights, backdrops and user-defined models in folders. The Scene Contents window holds a nested diagram of the scene and its components such as the model used, the lighting and angles, or the paths taken by various objects.

The biggest problem initially is that the screen is cluttered, especially on a 14in monitor. The best solution is to close the Scene Contents window, use the View menu to remove the Main Status bar and the ones in the Preview and Catalogue windows. Then use Window and Tile Vertically to show Preview and Catalogue side-by-side. This way you see more catalogue objects on the screen at once.

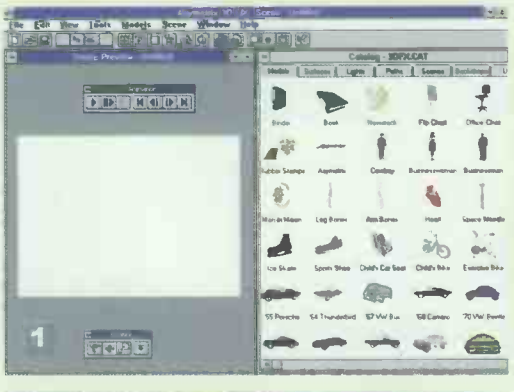
It helps to review the catalogue before you start as there are quite a few objects. Remember before you start that you will only see the best results using a good graphics card with TrueColour.

For this example, I decided to go for a psychedelic effect with a spinning head set against a map of the world and with the globe spinning around the scene. The first task is to choose the backdrop. To add this to the scene you click on the Backdrop folder and find World Map 1. To add it to the scene, simply drag and drop it onto the Scene Preview.

Next, you need to add the head which is found in the Model folder and called Male 2. This time you drag-and-drop it onto the backdrop. If you have a standard graphics card then you may be better off clicking the Wireframe icon (as this will allow you to work faster) and then only rendering the object by clicking on the Solid Models icon when needed.

The head will probably appear larger than the backdrop so you have to reduce it. In the Scene Preview window you should see a floating Position toolbar. The third icon along allows you to resize an object. Click on this and then move the

Redesigning the world



1 Clean up your 3D F/X screens if you want to make life easier

2 The last act in the scene, but in a measly 256 colours

3 Entering a new dimension of the mind in 640 x 480 and TrueColour

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cursor over the head. An outline box containing the head model should appear. The best way to resize the model is to put the cursor just off-centre of the object. Depress the mouse button and move away from the centre, and the model will shrink. Move towards it and it will grow. In effect, you're moving further way or closer to the centre and the object will then appear smaller or larger. Once you're used to it, it's fairly easy to understand in these terms.

The second icon on the Position bar moves the model around the backdrop and alters the viewing angle. The first icon gives you more control over the viewing angle and lets you spin the model in three dimensions, but we want to leave it in place for this exercise. What you have done is to define the end position of the model.

Choosing the right path

You now need to give it a path to follow. Click on the Paths Folder and find the Spin Z-Axis icon. Drag this over the head. You may hear the hard disk thrashing at this point. To see what you have done, you should use the Animation floating toolbar and click the Play icon. You will see the head flip over once. This, however, is boring. Click the head with the right-hand mouse button and a menu will appear. Choose Modify Animation. You will see three folders on the new window. Change the Movement Duration setting to 10 seconds. Click the Spin folder followed by Define Spin and set Number of Turns to two. You should now click anywhere on the little Preview and Define Spin window. Where you click defines the spin style. Try a few until you are happy. You get to see the whole model this way. Click OK and return to the scene window. To see a jerky version of the real effect, click the Play button in the Animation toolbar.

The surface details of the head, though, are hardly psychedelic. This is remedied by adding a new surface texture but the process is not easy because the head has a set of defaults that need to be changed. The first steps are to click on the head and then to select the Surfaces folder and find the Rainbow one. Drag this onto the head which will turn grey.

Click the head with the righthand mouse button and then choose Modify Surface and Colour. In the Surface Pattern folder click Bitmap Pattern and choose Rainbow1.bmp from the Surface Settings box. Click the Effects folder and check that the Use Reflection Map option is unticked. Click OK. The model head should turn turquoise. To check that the surface has changed, click the Snapshot icon and you'll see the rendered effect. The rainbow pattern should cover the entire head.

This is where where things get really mind-bending. Choose Globe 4 from the Models folder and drag it to the Scene Preview. Leave it in the centre but shrink it the same way as before to the size of the skull, not the hair. The head and globe will intersect so that the nose and chin poke out of the globe.

Right-click on the globe and Modify Animation. Change the Duration to four seconds, Start and End Position to Enter Scene and move the Off-Screen Position to the front and bottom-left. Switch to the Spin folder and the Number of Turns to three. Then go back and run the Animation. The globe will spin in from the bottom left and will also intersect with the spinning head.

With the righthand mouse button click on the backdrop. Choose Snapshot and Animation Settings. You can now choose the screen size, rendition quality and number of colours. What you choose depends on your graphics card, processor speed, motivation and patience. Photo-realistic images at high-resolution can take several hours in some cases. Before you start the process, use the Generate Snapshot icon to see the final effect.

In the frame

When ready, click Scene and Generate Animation. Here you need to decide which video CoDec you want to use (this will affect quality).The Realistic setting is excellent and renders. It's fascinating to watch each frame build up, like a picture developing on a photographic sheet.

The first effort lacks a certain something. A little text will do the trick so I create two Text Models using the A icon. The first piece of text is just the phrase "Planet Earth" in Arial 36-point. Any text is automatically treated as 3D but the defaults give a crude image, so using Modify 3D is essential. I then use the options to give it an 18 percent bevel size and thickness of eight and set it to Helicopter in from the top right to the bottom centre. In the Effects folder make sure you switch off Use Reflection Map. Highlighting the Earth theme, I change the text colour to green — the effect is altogether classier — and then set the path to stay where it is in the top left-hand corner and for each letter to spin over the top.

Next, to expand on the psychedelic-green theme, I add the phrase "wrap your mind around it" and modify the surface

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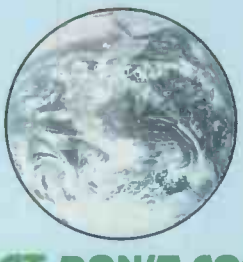

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and colour to a green granite. You need to set the thickness to 10 and add a convex bevel of 18 degrees.

Adding text means rendering the whole file again and even on the P90 took ages — approximately 3.5 hours. Fortunately it went smoothly.

The final result looks very pleasing with few dropouts or jagged edges, even though I haven't used the highest-quality settings. If time were no problem I could set the whole scene to render at 768 x 576 which could then be outputted using a video scan convertor on to normal PAL video tape.

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Hints and tips

Following on from my video capture card group test last month, I've drawn up a list of hints and tips on buying, installing and capturing with a board as well as the kind of video gear needed for top quality results.

Buying a board

1. Make sure your retailer guarantees that you can return the board (or that they will install it for you) if you cannot get it working.
2. Ensure the connectors on your video match those of the card. SCART is often used on video and TV equipment, though composite and S-Video are used on capture cards. Normally you can buy a converting cable, but not always.
3. Save up for a more modern board as they are generally easier to install and give better capture rates.
4. Decide on the editing software you need and buy it as part of a card/software bundle to make substantial savings.
5. Buy a board with an upgrade path if you feel you may want to go further in the future. Find out the maximum size, capture rate etc.
6. Check to see if latest VfW drivers are included. Currently these are version 1.1d which are greatly enhanced. They have elements of Win95 included for the future.
7. Remember that you will probably need to add an audio capture board, which will raise overall cost.
8. True Plug 'n Play doesn't yet exist on the PC. Three elements are needed for P&P: the right BIOS, operating system and add-in cards. Until Win95 appears the triangle is incomplete.
9. For boards with software-only CoDecs, a faster machine will affect performance. Ones with hardware Codecs will be largely unaffected unless the bus is particularly slow.

Installation

1. The order in which you install the software and hardware, and especially the capture drivers, can affect the success of installation and capture. Read the manual very carefully and do not assume a particular order. Each board's installation is very different.
2. Check the README files for the latest information.
3. Check you have the latest drivers and installation software.
4. Check you have the correct cables to hook up the VCRs to the board before you start. Some boards do not come with them.
5. If possible, set the size of the initial capture file first. Most Video for Windows installations and capture/editing packages allow this. If not, save a long clip to a dummy file, capture to this, and then Save As.
6. The BIOS version, bus type and speed, video and other cards, plus the amount of RAM can all affect the way installation is carried out.
7. If you're changing boards, it's best to remove all the drivers and software of the old board or installation may fail. This even applies when adding a daughtercard onto an existing board.

Capturing clips

1. Make sure your hard disk is big enough. If it isn't, buy one that is.
2. Defragment your hard disk to keep frame rates up.
3. For high data rates, ensure that your PC's processor and bus are fast enough.
4. Capture to Memory. This is only useful when you have a large amount of RAM such 16Mb+. Dropout rates will be significantly lower while capturing to RAM, but will rise once this is filled.
5. Upgrade to 32-bit disk and file access using Windows 3.11.
6. Turn off SmartDrv when using Windows.
7. If the board cannot capture at the full frame rate, reduce the rate to one where the dropout rate is acceptable. Trying to capture at too fast a rate leads to unpredictable dropout, whereas a lower rate gives more predictable results.

Video equipment

1. For higher quality pictures, choose S-VHS or Hi-8 equipment.
2. Buy a proper editing deck from a well respected manufacturer.

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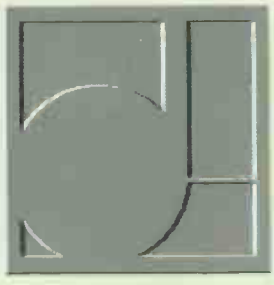

Looping the loops

If you're wondering how to get that "modern" drum sound from your setup, you probably need to get looping. Steven Helstrip explains how to negotiate drum loops, and brings the news from the world of PC-based music.

Over the last month, everybody seems to have been extremely busy writing software upgrades. Musicator has launched an audio version of its Windows sequencing package, Steinberg has released another entry-level product, and there's also a new version of Cakewalk.

Musicator now combines direct-to-disk recording with a 64-track notation-based sequencer which works with any sound card. You can record audio at any resolution supported by your sound card, and as much as your hard disk has room for.

With Musicator, you can combine MIDI sequences with direct-to-disk recording

It comes with a wave editor which lets you create fades/crossfades and has tools for creating audio regions from existing wave files. All editing is non-destructive and sound clips can be arranged in much the same way as MIDI patterns. It's priced at £299 and is available from Arbiter.

Aptly named Cubasis, Steinberg's new product offers 64 tracks, four times that of Cubase Lite, and two further edit pages: Key and List. The score editor has been preserved and now lets you print. Cubasis is supplied with a mixer for General MIDI and GS instruments and has MIDI clock sync. It's yours for £149.

Twelve Tone is releasing new versions of Cakewalk: an entry-level product, called Cakewalk Express, and version 3.0 of Home Studio. Express has all the functions of Home Studio, but doesn't allow you to print scores.

Additions to Home Studio include an on-screen piano which lets you input music with your computer's keyboard, so no external MIDI instrument is required. It now has support for lyrics in its score page and an improved Faders window. Both allow you to trigger MCI clips. Express is supplied with a MIDI adaptor kit allowing you to connect a MIDI device to your sound card, and will cost around £59. Home Studio is priced at £84. Contact Et Cetera Distribution for further details.

Using loops

Drum and percussion loops play a large part (no pun intended) in music production, so this month we'll be looking at techniques for using them, and at ways of squeezing the most from your sampler.

Once you've caught the loop fever, it's hard to shake. You know you've got it when you find yourself listening to every record in your collection over and over until you find that full bar of funky drumming with no instuments in the mix to spoil it. Once you've got the loop, and only then, can you even start to think about writing some music.

There are no hard and fast rules when it comes to using drum loops: if a loop adds something to your music then it has worked. The temptation, though, is to rely on a loop to "lift" the music and have it running throughout the song. Unless it really is a sample of top-notch tub-thumping, try to avoid this.

Making a drum loop work with a given tempo is straightforward if you use a dedicated sampler; just cycle a one-bar section from your sequencer and fine-tune the sample until no glitches occur between bars. If you're working with an AWE-32 or Tropez this becomes slightly more tricky.

In this case the easiest way to perfect the loop is to insert a pitch bend message from the edit page of your sequencer. Altering its value has the same effect as fine-tuning from a sampler. A value above 64 will increase its pitch, so reducing the length of the sample to values below 64 will have the opposite effect. It is important to place the pitch bend from where the sample is triggered, usually on the first beat of the bar.

A metronome will help you get this right. Listen carefully to beats two and four of the bar where the snare drum lands. No flam should occur between the sample and the click. If this happens the final product isn't going to be as tight as it can be.

If the sample seems to loop perfectly but flamming occurs then it's probably the drummer's fault. There are two ways of getting around this. The first, although a tad excesive, is to create a groove quantise map for your sequencer. The other is to use more pitch bend messages.

By inserting a message before the offending beat, it is possible to offset that section of the sample. For example, if the snare drum in the sample falls slightly before beat four, insert a pitch bend message with a value of, say, 50 on beat three and a half. The difference in pitch will go unnoticed, but will tighten up the loop. After beat four, insert another pitch bend message to return the pitch to the original value. This technique can also be used in reverse for adding feel or groove. Try experimenting.

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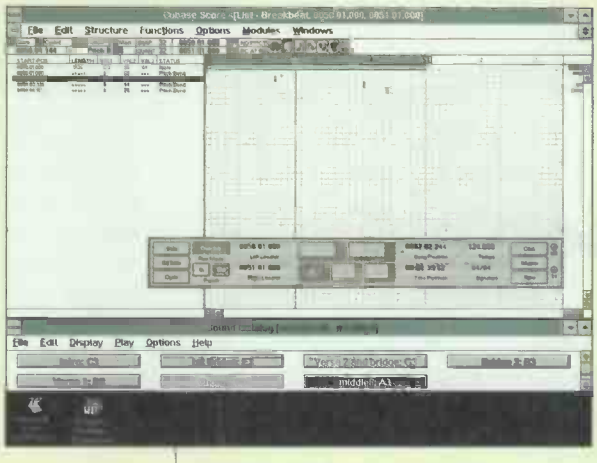
Most drum loops are either one, two or four bars in length, which doesn't provide much scope for rhythmic variation. Try splitting each bar into four sections and assigning them to separate key ranges. This way you can combine, say, the first two beats of bar one with beat three of the third etc. If there are any sections of the loop which repeat, discard them as this will save memory.



Inserting pitch bend messages to fine-tune a one-bar percussion loop

If you have Creative WaveStudio, the fastest way to break up a one-bar loop is to mark the section you want as a separate sample, and while holding down the Control key, type C, N and V. This will copy the marked section to a new file. Do this for each section. For the final region, mark the area and use the Crop to Selection.

Drum loops usually work better when used with other percussion samples. Try adding, for example, a kick, snare and hi-hat pattern over the top. This will result in a unique sound and, to some extent, mask the loop.

Unless you have bags of memory to spare, you can get away with sampling drum loops in mono. Little will be lost in terms of spaciousness as they are generally positioned centrally anyway. There's more to be gained recording percussion samples in stereo as they tend to be panned more drastically.

Despite having a stereo output, the AWE-32 doesn't allow you to download stereo samples. To get around this, record each channel separately and save as separate samples. Using Vienna (Creative's patch manager), you can assign the two samples to the same keyboard range, and pan one hard left, the other hard right. Alternatively, assign the samples to different key ranges and trigger them at the same time from your sequencer. This way you can offset either channel until they sync perfectly.

VindaLoops

This CD brought a smile to my face even before I'd heard it. To get in the mood, I bought myself a chicken Masala from the local Indian and settled in for 72 minutes of listening.

VindaLoops is a compilation of ethnic percussion loops and single-shot samples. The loops have been arranged into groups according to their tempo, groove, and instrument family. A glossary of ethnic percussion and styles is printed in the inlay booklet, although it isn't thorough enough to explain what a *Dhun Chapi Kerwa* Loop is (found on track 5). Tempo listings are approximate, so be prepared to do a little tuning.

Most loops have been recorded over two or four bars, and most are stereo. Many of the shorter samples (fills, for example) appear twice, giving you time to hit the Sample button.

The CD is a real eye-opener to new sounds and its contents can be used with a wide variety of musical styles, not just banghra. There are 60 tracks in total, each containing anything between two and 20 samples. There are 10 samples from VindaLoops on this month's cover CD-ROM. You can find them in the Loops folder. Vindaloops costs £59.95, from Time & Space on 01442 870681.

PCW Contacts

Each month this column will have news of the latest developments, as well as practical advice for getting the most out of music technology. If you have an audio program or utility, any hints or tips, or a topic you would like to see covered, write to our usual address or email **steve_helstrip@pcw.ccmail.compuserve.com**

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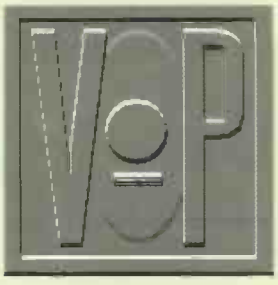


Clarion call

Tim Anderson sounds out Clarion for Windows, helps put Visual Basic back into focus and explains why the Borland database engine is less flexible than Microsoft's JET.

In pursuit of the perfect visual development language, I've been investigating Clarion for Windows from TopSpeed. Like Borland's Delphi, Clarion compiles to native executable code, while also providing a graphical application builder for ease of development. The Clarion language is the brainchild of Bruce Barrington, founder of the company, and he explains its philosophy in a detailed foreword to the language reference.

Clarion combines elements of xBase, Pascal and Modula-2 with its own unique features. As a DOS database development language it was a successful niche product. The company then merged with JPI, creators of the respected TopSpeed compiler. Clarion for Windows combines the Clarion language with a new application generator and the TopSpeed compiler technology.

Clarion claims the performance of C or C++, without the obscure syntax or steep learning curve. It is more like programming by dialogue than visual programming. Primarily for database development, it could be used for any Windows application.

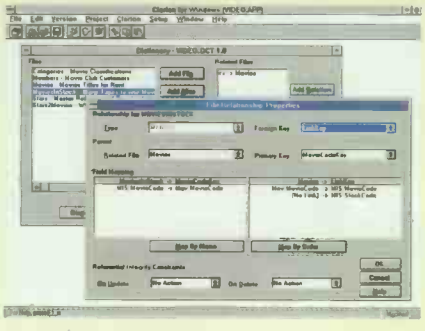
Most Clarion applications begin with a data dictionary, which defines data tables, indexes, relationships, validity checks and more. The functionality is impressive, with 19 data types, support for referential integrity, and the ability to define a view, which is a virtual table based on one or more underlying files. Data can be stored in Clarion's own TopSpeed format for best performance, or a variety of xBase and other formats. ODBC is supported.

Once the initial spadework is completed, Clarion displays what it calls the application tree in a window. This is an outline list of all the procedures in your application. The term "procedure" in Clarion has a special meaning. More than just a chunk of code, a procedure can be a window, a menu, a report, a browse grid, or any program element. At the start, a Clarion application has one procedure, usually called Main, which does nothing. When you double-click, a list of procedure types opens. Choose one, and Main becomes whatever you chose, a window for example. This opens a new dialogue in which you can define all the elements of that window, including the visual design, the data-handling, and the response to Windows events like losing and gaining focus. Of course, one thing your new procedure is likely to do is to call further procedures, which then appear in the application tree in their own right, for defining and customising as required.

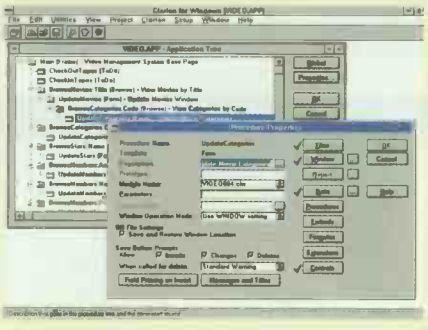
The Clarion approach has several advantages, including easy access to the structure of your application and very rapid initial development. The secret of its power is the use of templates, or pre-defined procedures which can be customised so that frequently used code becomes part of the development environment. The idea is to gain the main benefit of object-orientation, reusability, without using object-oriented syntax. Clarion also supports VBX version 1 controls. The result is a package which creates fast, freely distributable Windows executables which are far smaller than a typical VB application using JET, or run-time versions of FoxPro, Access or Paradox. Clarion also scores over Delphi and its memory-hungry Borland Database Engine. Ironically, it fits the Clipper for Windows niche better than Computer Associates' Visual Objects, a powerful but over-complex product which has not been well received.

It is bad luck for Clarion that Delphi should follow its launch so closely. Nice though Clarion is, it suffers from an individualistic language which many will not bother to learn, and gives sparse support for Windows features. It has not heard of OLE, for example, or recent innovations like tabbed dialogues, tooltips or floating toolbars. It is also the wrong time for Clarion to say that object-orientation is not worth worrying about. Object-orientation is

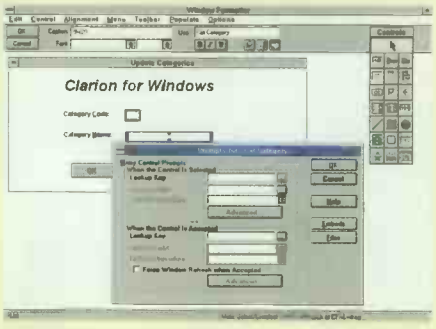
Clarion for Windows



It all begins with a data dictionary, the best approach to managing an application's underlying database structure



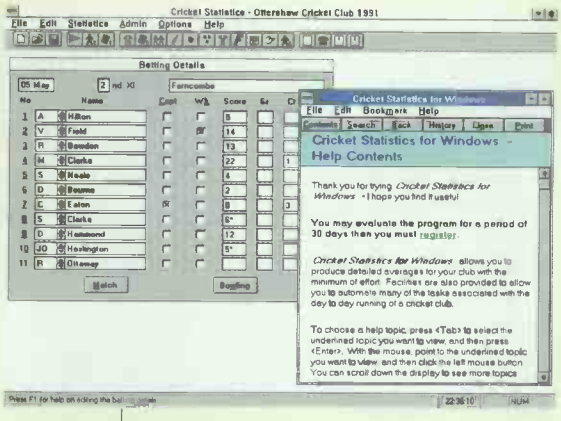
Clarion's application tree shows all the elements of an application in the form of a collapsible outliner. Double-click, and the procedure dialogue opens, allowing the characteristics of the procedure to be quickly defined



Clarion's window designer has only bare functionality by today's standards, but it does support VBX controls for extending its features

coming of age, and seemingly every significant new development tool supports it.

Its bloated database engine aside, Delphi is slicker, tighter and more standard than Clarion, leaving just a small niche for Clarion's rapid development cycle and small, fast executables. That said, Clarion's development environment, with its data dictionary and hierarchical application view, is conceptually one of the best I have seen. If the underlying language and tools were brought up to date, Clarion would be a winner.



VB's GotFocus and LostFocus events caused problems for shareware developer Grahame Giddings

Losing focus in Visual Basic

Grahame Giddings has written a shareware VB program, Cricket Statistics for Windows. He writes:

"I think most of the problems I have had were in the area of data entry and validation. In Cricket Statistics for Windows, I've tried to make sure that invalid entries are detected before moving on to the next field rather than waiting and performing a global check before saving all the data on a particular form. This approach gave me a number of problems due to the GOT_FOCUS event on the field you were moving TO firing before the LOST_FOCUS event on the field you were moving FROM. The situation was further complicated by the interaction between certain fields and my decision to display a message box telling users what they had done wrong."

It sounds bizarre, but to see the effect Grahame is talking about, set up a form with two text boxes and a label. Size the label to display several lines of text. In the GotFocus event of Text1, place the following code:

```
label1.Caption = label1.Caption +
Chr(10) + Chr(13) + "Text 1 got
focus"
Place an equivalent message in the
GotFocus and LostFocus events of
Text2. In the LostFocus event of
Text2, write this code:
label1.Caption = label1.Caption +
Chr(10) + Chr(13) + "Text 1 lost
focus"
Text1.SetFocus
```

Now run the form, and try to tab from Text1 to Text2. As you would expect, the cursor remains stuck in Text1. But look at the label, and you see the following string of text:

```
Text1 got focus
Text1 lost focus
Text2 got focus
Text2 lost focus
Text1 got focus
```

In other words, although you wrote code in the Text1 LostFocus event to prevent the user tabbing out of the field, VB actually gave the focus to the next text box before moving it back to Text1. There is a reason for this, and it relates to the effort Microsoft made to make VB relatively crash-proof. But in effect it is a bug which can leave the program in an endless loop if two text boxes are both trying to claim the focus. It's not an obscure bug either, since this kind of code is exactly what you write when validating data entry, as Grahame discovered.

Here's one way to fix it. You need a routine that will keep track of which text box is current, and only allow a change of focus if the contents are valid. To achieve this, take the following steps:

```
1. In Form1 Declarations:
Dim gFlag As Integer
Dim gCurrentControl As Control
Const CANMOVE = 1
Const NOMOVE = 0

Sub valcheck (chkControl As Control)

If chkControl.TabIndex <>
gCurrentControl.TabIndex Then
' a simple way of checking that
ValCheck is being called
' by the text box the user is actual-
ly leaving
Exit Sub
End If

If chkControl.Text <> "" Then ' it is
valid
```

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```
gFlag = CANMOVE
Else
MsgBox "No way - you gotta type something"
' DO NOT replace with a decision dialog!
gCurrentControl.SetFocus
gFlag = NOMOVE
End If

End Sub

2. In Form1.Load:
gFlag = NOMOVE
Set gCurrentControl = Text1

3. In Text1.GotFocus:
If gFlag = CANMOVE Then
Set gCurrentControl = Text1
End If

4. In Text2.GotFocus:
If gFlag = CANMOVE Then
Set gCurrentControl = Text2
End If

5. In Text1.LostFocus and Text2.LostFocus:
Call valcheck(Text1)
```

This code simply checks that each field contains something. Typically, you would want to vary the validity check from field to field. You can do with a Select ... Case code block, in which case the ValCheck routine will need to know the identity of gCurrentControl. Unfortunately the Name property is not available at runtime, but that can be overcome by putting the name, or another identifier, into the Tag property of each control. Another possibility is to use a control array and identify each control by its index. One final point: ValCheck ensures that gCurrentControl is the same as the control which calls it, otherwise it immediately exits. Otherwise the error message will be displayed twice, since after an invalid entry ValCheck gets called first on the way out of Text1, and again on the way out of Text2.

This needs care because VB has another unexpected feature. If you display a message box in the LostFocus event, the GotFocus event for the next control never fires. In the example given this does not matter. But what if you displayed a dialogue offering the user the chance to continue to the next field despite the invalid entry? The next GotFocus would not get called and gCurrentControl would go out of synch. The way around this is not to call any dialogues from LostFocus. You can simulate the effect if necessary by keeping track of two control variables, gCurrentControl and gLastControl, and calling code in the GotFocus event of each control to validate the entry in the gLastControl, setting the focus back as necessary. It's all rather messy and best avoided.

Learning Delphi

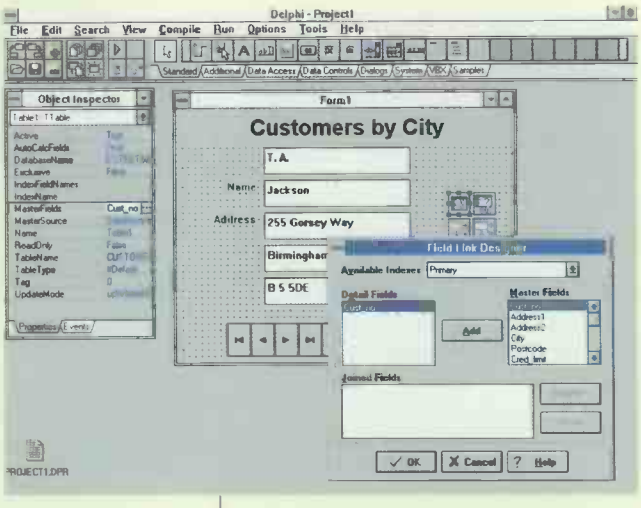
Borland's Delphi has arrived, forcing Visual Basic into a painful re-positioning. VB is no longer the first choice for rapid application development under Windows, at least until the next version is unveiled. But as Delphi beccomes established, its limitations are emerging. While Delphi code runs very well, its native database engine (Borland Database Engine, or BDE) is less attractive than VB's JET. JET's Dynasets, QueryDefs and SnapShots are a delight in comparison. One of the problems is that BDE queries are only updatable in limited circumstances. In the case of local databases (Paradox or dBase), the stringent conditions include involving only a single table, and not having an ORDER BY clause in the SQL statement. Borland's suggested way round it is to bind data-aware components to a TTable object instead, while performing a one-to-one join between a TQuery and the TTable. For example, here are steps which assume you have a CUSTOMER.DB table, and want to perform a SQL query on the table while still allowing editing:

1. Place a TTable component, 2 TDataSource components, and a TQuery component on a form.
2. Set properties for the TQuery component. The DatabaseName must be the directory where the data resides. The SQL string might be something like:

```
select * from customer where
customer.surname >= "J" and
customer.city = "Birmingham" order by
customer.surname
```

Note that this query will be read-only.

3. Set the Dataset property of DataSource1 to Query1.
4. Set the DatabaseName property of Table1 to the data directory, the TableName to CUSTOMER and the MasterSource to DataSource1. Then, click the MasterFields property and set a one-to-one link on the table's key field, for example CUST_NO.
5. Set the Dataset property of DataSource2 to Table1.
6. Place a DBNavigator on the form and point its DataSource property at DataSource1. Finally, add any DBEdit controls you require, and link them to DataSource2 and its fields as required.



Faking a live query in Delphi by joining a table to a query

If you now set the Active property of Table1 and Query1 to True, and run the project, you will have live editing of the table while limiting available records to those in the TQuery. But is this really a good solution? Notice for example that the editing buttons on the DBNavigator control are greyed out, because the query is not really live. If you insert or delete a record, for which you will need additional code, the query must be refreshed to recognise the changes. And where multiple tables are involved, this is going to get messy. It may be worth sticking with VB/JET until a more flexible BDE is available. After all, it is only when there is extensive front-end processing to be done that Delphi's compiled code brings substantial benefits.

Is Delphi working for you? If you're using Delphi, please report on any particular problems or successes for the benefit of other readers using or considering this new development tool.

PCW Contacts

Tim Anderson welcomes tips and suggestions for Visual Programming Hands On. Contact him at the usual PCW address, or by email as **freer@cix.compulink.co.uk.**

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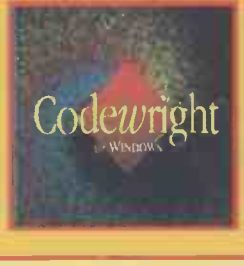

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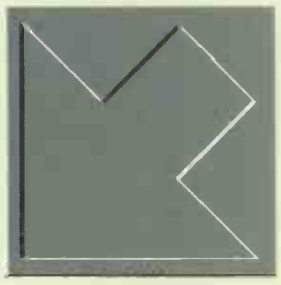


Over the **counter**

Regular readers will know that life is one big game for Mike Liardet. This month the mini-max method resurfaces to help with Go-Moku, a two-person game programmed in Visual Basic.

Go-Moku is a two-person game played on a traditional Go board, a square area ruled in the form of a 19 x 19 grid. Each player plays with his own colour counters (traditionally black or white) and moves are made in turns.

To make a move, a player places one of his counters on any vacant intersection point. The first move (played by black) is always on the board's centre point, but thereafter players can play anywhere. The winner is the first player to make a line of five adjacent counters in his own colour. The line can be in any direction — horizontal, vertical or diagonal. A draw is also theoretically possible, although it rarely happens in practice: a game is drawn if the board is filled with counters, with no side making any line of five.

Fig 1 shows a win for White with five white counters arranged in a diagonal. White's last move, the counter placed at the bottom of the line, is marked with highlighting to distinguish it from counters played earlier. Notice that Black could win on the next move by adding to either end of the horizontal row of four black counters, but this is just too late.

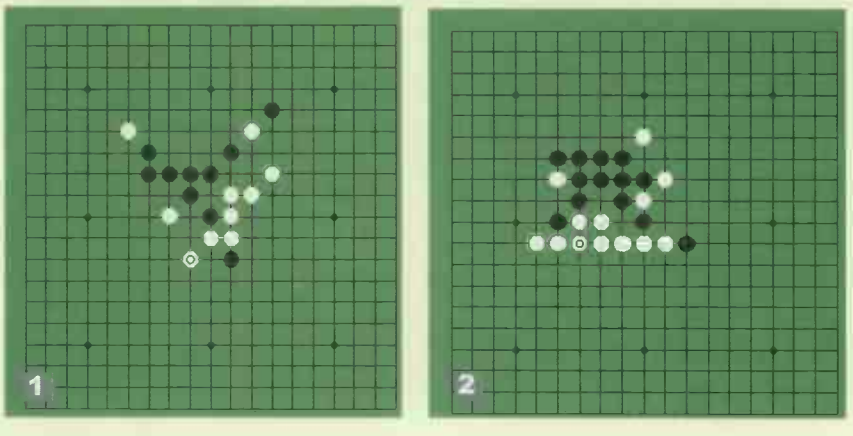
There is a subtle point in the wording of the rules, which can easily be missed by a newcomer to the game. The rules state that the winning line must consist of five counters and it is important to realise that this means exactly five counters. A line of six or more would be no good. Fig 2 shows a move by White that creates a horizontal line of seven white counters, but this is not a win. In fact, Black can win on the next move by placing a counter at either end of the horizontal row of four blacks.

The mini-max method

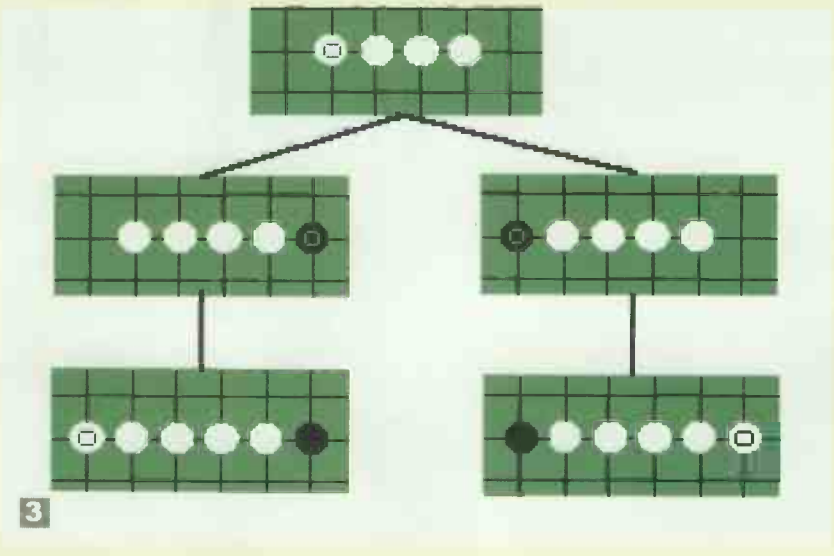
The mini-max method can be used for generating the computer's moves in cognitive games as diverse as chess, bridge and Go. The basic idea is to generate all the moves that can be made from a given game position, consider all the replies that might be made to all these moves and then all the replies again, and so on down to some depth of analysis. At this cut-off depth the resulting positions can be scored in some way. These scores can be systematically propagated back up the analysis tree to the original position, where the computer chooses the move with the best score attached to it.

Even at computer speed it is surprising how quickly the mini-max method can run out of steam. Most implentations rarely go to an analysis depth of more than five or six moves ahead. In order to make it more efficient there are several refinements

The game of Go-Moku

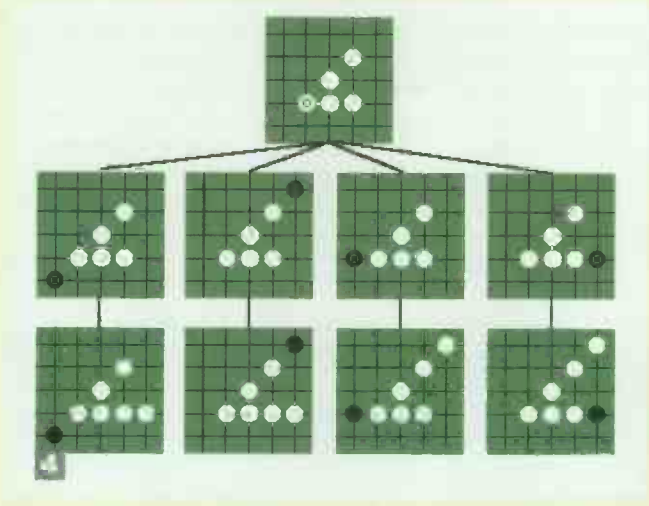


A win for White *Not a win for White*

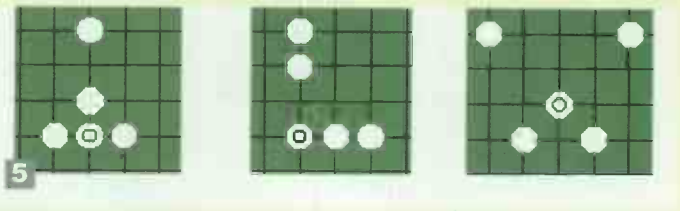


A forced win for white in three moves

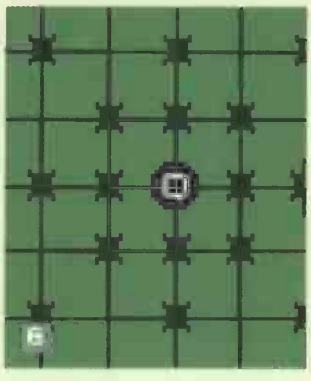
The game of Go-Moku



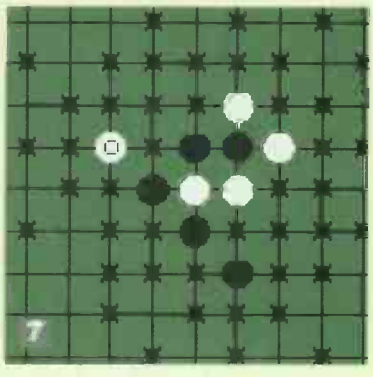
Another forced win for White, this time in five moves. The last two moves are essentially the same as in Fig 3



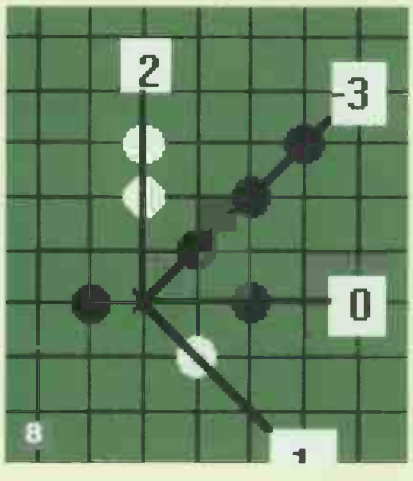
A selection of positions from the many possible ways of forcing a win, by creating two lines of three simultaneously



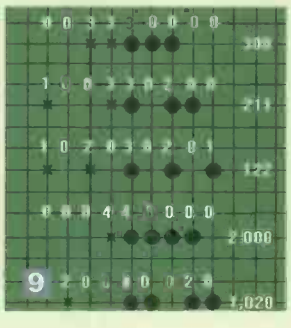
Possible replies to the opening move



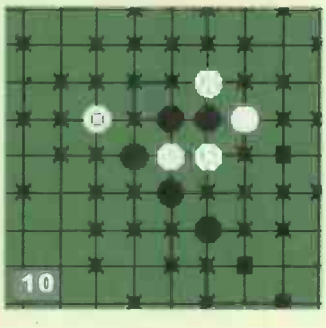
44 possible replies after the game has been going for ten moves



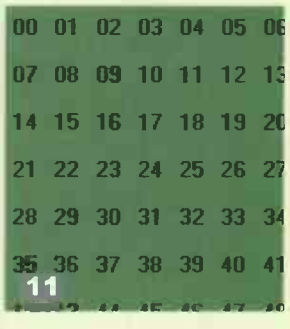
Scoring for one of the points in a typical game position



Scoring for various configurations of black points, in an "Easterly" direction only



The scoring system identifies the best moves to try (marked with a black square)



Mapping a 7 x 7 board into a one-dimensional array

which are often used. Principally there is the "alpha-beta cutoff" which can cut out a lot of unnecessary computation without jeopardising the accuracy of the analysis. The immediate rejection of seemingly implausible moves also helps, although this can sometimes miss powerful "sacrifices". It can also be beneficial to order the more powerful moves so that they are dealt with earlier in the analysis, possibly rejecting weaker moves out of hand. See Low Level in *PCW* June 1994 and July 1993 for more information.

There are a considerable number of two-person games which require a player to get counters, tokens or symbols arranged into a line before his or her opponent. Noughts and Crosses (or Tic-Tac-Toe as it is also known) is perhaps the best known, but most people consider it a rather boring game because after only a few rounds have been played it becomes apparent that a fairly obvious playing strategy always results in a drawn game.

Related games like Connect-4 and Nine Mens Morris are more interesting than Noughts and Crosses, as they are fought out on larger play areas which offer greater scope and variety. There is also a three-dimensional variant of Noughts and Crosses, called Fours, where the object is to make a line within a 4 x 4 x 4 cube. All these games can be challenging and interesting to play, but perhaps the best of the bunch is Go-Moku.

Go-Moku is a traditional game which is played on a Go Board, with the same counters that are used in Go. Go-Moku games are often finished fairly quickly and serious Go players tend to look down on the game in much the same way as Chess players will sneer at Draughts. But for most players Go-Moku offers ample scope for exploring different strategies and tactics. In this month's Low Level we will show how to develop a Visual Basic program to play Go-Moku.

The rules of Go-Moku are given in the side panel. From the computerisation viewpoint the good news is that the rules are very simple. There is only one type of piece (a counter) and one type of move. The playing area is simply a square grid with no distinguished areas or other complications and the winning position is equally straightforward. All this means that it could not really be easier to implement code to input a user's move, validate it and determine when the game is won or lost.

Unfortunately, although the rules are

simple, the playing strategy is complex and lots of complications arise when trying to generate sensible computer moves. Of course, the computer could just choose a vacant grid-point at random — a valid approach when debugging the user interface for example, but this would not amount to a very challenging opponent.

Before proposing a method for generating computer moves it can be instructive to look at some of the tactics that are commonly adopted in play. Although a line of five finally wins the day, it soon becomes obvious that a common way to win the game in practice is to get a line of four counters, with a vacant point at each end. Fig 3 shows a winning sequence for White. If there is a vacant point at each end of the line of four then Black cannot prevent a line of five from being built, no matter where he plays. The situation is analogous to a "fork" in chess, where a piece must be captured no matter how the opponent replies.

Fig 12 *Type and Variable declarations for representing the Go-Moku board and state of play*

```
Option Explicit
'Possible returns from GameMoveXX functions
Global Const ILLEGAL = 0
Global Const LEGAL = 1
Global Const DRAW = 2
Global Const HUMAN_WIN = 3
Global Const COMPUTER_WIN = 4
Const WIN = 5  'a win by the current mover
Const LOSS = 6 'a loss by the current mover
Dim gameOver As Integer 'can be 0 or HUMAN_WIN, COMPUT-
ER_WIN or DRAW

'Values for contents of each point
Const BLACK = -1
Const EMPTY = 0
Const WHITE = 1
Dim colour As Integer     'Colour that is about to move:
BLACK or WHITE

'Values for directions used in scoring
Const NUM_DIRNS = 4
Const NORTH = 0
Const NORTH_EAST = 1
Const EAST = 2
Const SOUTH_EAST = 3
Const LAST_DIRN = NUM_DIRNS - 1

'Structure of a point - upper case fields are, in
effect, constants
'which are initialised in BoardInit
Type pt
    Contents As Integer          '=EMPTY, WHITE or BLACK
    NUMCLOSE As Integer          'number of squares that
are close: 0 to 16
    CLOSETO(0 To 15) As Integer  'index of squares that
are 'close'
    avail As Integer             'number of close
squares that are occupied
    PrevAvail As Integer         'index to previous
available point
    nextavail As Integer         'index to next
available point
    numPoints(NORTH To SOUTH_EAST) As Integer  ''score'
= -5 to +5 = number of points held in next 'five'
    NUMAFTER(NORTH To SOUTH_EAST) As Integer   '0 to 4,
4 unless pt near edge
    NUMBEFORE(NORTH To SOUTH_EAST) As Integer  'ditto
    LINEAFTER(NORTH To SOUTH_EAST) As Integer  'index
to point five along, or -1 if off edge
    LINEBEFORE(NORTH To SOUTH_EAST) As Integer 'index
to point five before, or -1 if off edge
End Type

'Classic Go Board has 19 by 19 points
Const N_SIDE = 19
Const NN = N_SIDE * N_SIDE
Dim board(0 To NN) As pt
'(board(NN) is not a visible point - only used for ring
pointers)
Const WIN_LENGTH = 5  'length of a winning line
Dim SC(-5 To 5)       'scores for lines containing 0 to
5 points, both colours
Const INFINITY = 99999999# 'bigger than any possible
total score

'Values for moving from one point to next, in various
dirns
Dim DIFF(0 To LAST_DIRN) As Integer

'Structure for saving old scores, so they can be
restored
Type score
    pSaved As Integer          'index of point where
move made
    dirnsaved As Integer       'posn in Score()
    numPointsSaved As Integer  'previous value there
End Type

Const MAX_PLY = 10
Const LAST_PLY = MAX_PLY - 1
'Each move can change a maximum of WIN_LENGTH + 2 scores
in each direction
Const LAST_OLDSCORE = (WIN_LENGTH + 2) * NUM_DIRNS * NN
- 1
Dim oldscore(0 To LAST_OLDSCORE) As score
Dim scoreTop As Integer
Dim totScore As Long

'Structure for holding moves, so they can be undone
Type stack
    scoreTopSaved As Integer   'scoreTop before move
made
    totScoreSaved As Long      'totScore ditto
    PMoveMade As Integer       'index of point where
move made
    colourPlayed As Integer    'colour placed there
BLACK or WHITE
End Type
Dim stack(0 To NN) As stack    'up to NN moves are pos-
sible
Dim stackTop As Integer

'Details held on picture box
Dim gridsize As Single
Dim picGame As Control
```

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Having recognised the importance of an open-ended line of four, we can go back another stage and see how two lines of three can force a win. Fig 4 shows a typical situation. By playing at the intersection point of two lines of two, White creates two lines of three simultaneously. No matter where Black plays it is impossible to prevent White from creating an open-ended line of four on the next move, and this ultimately leads to a win.

There are many positions from which it is possible to create two lines of three simultaneously, and Fig 5 shows some of them. It is part of the charm of the game that these configurations can be quite difficult to spot in actual play, especially when there are many other counters around.

Of course, none of the above tactics will work unless the game is going to continue for long enough to secure a win. It is pointless for White, say, to make a neat move that creates two lines of three, if Black can immediately reply with a move on some far region of the board that creates an open-ended line of four. The correct move for White under these circumstances would be to block Black's line in some way. Similarly, it is pointless to make an open-ended line of four if the opponent is about to make a line of five elsewhere.

As with many cognitive games there is the possibility of using the mini-max method to generate the computer moves, and certainly mini-max should play a part in any solid implementation of the game. We won't go into the details of mini-max itself here as we have covered the method before in this column. To achieve a practical implementation of mini-max for Go-Moku it is necessary to overcome one or two special problems relating to the game, so instead of covering mini-max in any extra detail we will go over these special difficulties.

Most obviously, there are an enormous number of possible moves available at each stage in Go-Moku. Following the opening move in the middle, White can play on any of the other 19 x 19 points, giving 360 possibilities. Then for each of these moves there are 359 possible replies from Black, followed by 358 replies from White etc. With most other games the choice of moves at each stage is limited to a handful or no more than 20 or 30, say, but with Go-Moku the numbers are much larger. With even the most powerful processor it would not be feasible to use mini-max to analyse these moves exhaustively to any great depth, so it is essential to find a way of cutting down this analysis space to manageable proportions.

Fortunately, there is a reasonably obvious heuristic that can be put to work: in practice it is generally a bad idea to play a counter at any distance from the existing counters. For example, the first player (Black) holds the initiative and White should reply defensively to the central move with a counter placed nearby. If Black then plays at some distance from these two counters the initiative will inevitably pass to White if he plays near his existing counter. This line of reasoning extends throughout the game, and in general all the strong moves (which are the only ones we really want to analyse) tend to be near existing counters.

Thus for our implementation we will only consider moves that are one or two points away in a straight line from any occupied point. For example, in Fig 6, after the single opening move has been made, the only replies that will be considered are for the points marked with an "X". This reduces the number of opening replies to be considered from 360 down to a more manageable 16. More generally, after the game has progressed a few moves (Fig 7) we can see that only a few of the total number of vacant points are considered feasible moves. Notice that we do not distinguish between black and white counters when generating the plausible moves in any given situation.

How to score

In any non-trivial game application the mini-max method rarely completes its analysis down to a clear win, loss or draw result for a game, so it requires some scoring mechanism to determine how well or badly the game is progressing for a given side, even if the game is not actually finished at that point. We have already seen that two lines of three or an open-ended line of four can force a win (if the opponent does not have something better on the go already), so this suggests that a scoring system should be based, in some way, on the number of lines of given lengths available to each player.

For each point on the board we need to consider if it can be made into a line of five in any direction, and how many points are already in place to help the line of five be completed. Fig 8 shows how we can score for just the one marked central point. Moving Northwards from the point there are two white counters already in place so we can assign a count of plus two for this. In the North Easterly direction there are three black counters in place. Being the opposite colour to White we assign a count of minus three there.

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In the Easterly direction there is one black counter available, but immediately to the left there is also a black counter. This means that a winning line of five Black counters could never be made from this point in the Easterly direction (because inevitably we would actually have six in a line) so the score is zero here. Finally, in the South Easterly direction there is one white counter in the line, so we assign minus one to the count in this direction.

Notice that for scoring purposes it is only necessary to consider these four directions, as lines in the other directions will be covered by other points. For example, the line to the South of our point will be considered by the point five below when analysing its scoring possibilities in a Northerly direction.

It might be supposed that to score a position it is only necessary to add up the counts. If we were to do this for the one point we have considered its score would come to + 2 - 3 + 0 - 1, which equals zero. However, this is not a fair reckoning. Black has one line of three emanating from this point which is worth considerably more than White's line of one and line of two. If it were Black's move at this juncture then Black could force a win by playing at this point, resulting in an open-ended line of four, whereas White does not have very interesting possibilities in this area at all.

A more realistic scoring system is to give, say, one point to a line of one, 10 for a line of two, 100 for three, 1,000 for four and 10,000 for five. This gives an overall score for this point of +200 -3,000 + 0 -10, which comes to -2,790, reflecting a superior position for Black.

In practice this scoring system seems to work fairly well. Fig 9 shows various configurations of black counters and how they are scored for various sequences of points, considering scores in the Easterly direction only. The open-ended line of four scores the highest number of points (2,000). It gets this score by tallying 1,000 points twice, because there are two points from which it can participate in a line of five. In contrast, the broken line of four scores only 1,020 points in total. There is only one way in which it can be used to make a line of five (and also two ways that its components can contribute just two points to a line of five).

The difference in scoring correlates with the obvious fact that an open-ended line of four can be used to force a win, whereas a broken line of four is merely threatening a win but can easily be blocked. Similarly, the scoring system allocates a higher score to an open-ended line of three (300) than it does to three points with breaks. Again, an open-ended line of three constitutes an immediate threat, which can be converted into an open-ended line of four. A broken line of three is a much weaker configuration.

An important point is that the scoring system can not only be used to evaluate terminal positions for the mini-max method, but can also be used to select the most powerful moves for evaluation at

Fig 13 *Data Manipulation Routines*

```
Sub DataInit ()
'One-time initialisation of board(). Should be called
in Form_Load
'   For each point..
'1. Computes the index of points which are 'close' to
it
'For example for the point marked '*' below, the
points marked 'X'
'are considered close (but in general some of these
points might
'be off the edge)
'   X . X . X
'     X X X
'   X X * X X
'     X X X
'   X   X   X
'2. Computes the number of points after it in each
direction. Anything
'more than four is taken as four
'3. Ditto points before it
'4. Computes the index of the point five points after
it in each dirn
'Set to -1 if no such point exists
'5. Ditto the point five before it
'
'Also sets up DIFF and SC()
Dim i As Integer
Dim row As Integer   'row being visited
Dim col As Integer   'column ditto
Dim dist As Integer  'distance of a point from current
point
Dim r As Integer     'row of neraby point
Dim c As Integer     'column ditto
Dim count As Integer 'number of close points
accumulated
Dim pp As Integer    'index of current point
Dim dRow As Integer  'vertical increment
Dim dCol As Integer  'horiz increment
Dim dirn As Integer  'direction


  'Set up DIFFs - the index increments needed to move
from one point
  'to another in the appropriate direction
    DIFF(NORTH) = -N_SIDE
    DIFF(NORTH_EAST) = -N_SIDE + 1
    DIFF(EAST) = 1
    DIFF(SOUTH_EAST) = N_SIDE + 1

    SC(0) = 0
    SC(1) = 1
    SC(2) = 10
    SC(3) = 100
    SC(4) = 1000
    SC(5) = 10000
    For i = 1 To 5
        SC(-i) = -SC(i)
    Next i

  'Visit each point on the board..
    pp = 0
    For row = 0 To N_SIDE - 1
        For col = 0 To N_SIDE - 1
          '..and set it up with index of points which
are 'close' to it
           count = 0
          'At a a distance of one or two from our
point..
           For dist = 1 To 2
             '..in the row above, same row, and row
```

each stage. Fig 7 showed that once the game has got going there are still a considerable number of possible moves that might be considered at each stage (44 in this case) but we can use the scoring system to identify the most likely ones. Any move that lengthens a line, or blocks one of the opponent's longer lines, is more likely to be considered first.

Fig 10 shows the highest scoring moves of the 44 possible ones (marked with a black square). Two of them create a line of four which must be defended immediately by White and one of them defends against a fairly strong possible move by the opponent. In the long run these may not be the best moves available, but the mini-max analysis is in any case likely to find the alternatives. In the meantime these are good moves to be considered very early on.

Although the game rules are fairly simple it is worth devoting a little bit of effort to arriving at a reasonable underlying representation of the board, moves and pieces. A two-dimensional 19 x 19 array could be used to represent the board, but this is inefficient for a number of reasons. Firstly, two-dimensional arrays are slower to access (as the programming language has to compute a multiplicative expression to locate any given array element). This may not matter so much now that PC processors commonly have powerful arithmetic built in, but the more important reason for avoiding a 2D array is that every move or reference to a board grid point needs to have two numbers, and it complicates the program to store and retrieve two numbers when one will do the job equally well.

It is fairly straightforward to arrange for the board to be represented as a one-dimensional array. Fig 11 shows how a 7 x 7 board can be mapped into one dimension by assigning a number to each point in a fairly obvious fashion. The principle is exactly the same for larger boards.

It is difficult enough with a 2D array to detect when a point is at the edge of the board, but it is even more tricky with a 1D representation. The solution is to precompute all the edge conditions for the board, so that each point's distance to the edge is predetermined. Fig 12 gives the Visual Basic type and data declarations for the board structure and Fig 13 gives the code for setting up and manipulating them.

Next month we will show how to tie everything together with some neat graphics effects and an elegant user interface.

PCW Cover Disk

The full code for this month's Low Level is on the cover disk given with this issue of *PCW*.

PCW Contacts

Mike Liardet is a freelance programmer and writer. He can be contacted via the *PCW* editorial office or on email as **mliardet@cix.compulink.co.uk**

```
below..
              For r = row - dist To row + dist Step dist
                '..in the col to left, same col, and col
to right..
                 For c = col - dist To col + dist Step
dist
                   'ignore points off the edge, and our
point itself
                    If 0 <= r And r < N_SIDE And 0 <= c
And c < N_SIDE And (r <> row Or c <> col) Then
                      'Set this point as being close
                       board(pp).CLOSETO(count) = r *
N_SIDE + c
                       count = count + 1
                    End If
                 Next c
              Next r
           Next dist
          'Record the number of close points
           board(pp).NUMCLOSE = count

        'Deal with the direction-orientated stuff
          For dirn = NORTH To SOUTH_EAST
            'Set direction increments
             Select Case dirn
             Case NORTH
                 dRow = -1
                 dCol = 0
             Case NORTH_EAST
                 dRow = -1
                 dCol = 1
             Case EAST
                 dRow = 0
                 dCol = 1
             Case SOUTH_EAST
                 dRow = 1
                 dCol = 1
             End Select

            'Find how far forward we can go without
dropping off the edge
             r = row
             c = col
             For dist = 0 To WIN_LENGTH - 1
                 r = r + dRow
                 c = c + dCol
                 If r < 0 Or r >= N_SIDE Or c < 0 Or c
>= N_SIDE Then Exit For
             Next dist
             If dist >= WIN_LENGTH Then
                board(pp).NUMAFTER(dirn) = WIN_LENGTH
- 1
                board(pp).LINEAFTER(dirn) = pp +
WIN_LENGTH * DIFF(dirn)
             Else
                board(pp).NUMAFTER(dirn) = dist
                board(pp).LINEAFTER(dirn) = -1
             End If

            'Find how far backward we can go without
dropping off the edge
             r = row
             c = col
             For dist = 0 To WIN_LENGTH - 1
                 r = r - dRow
                 c = c - dCol
                 If r < 0 Or r >= N_SIDE Or c < 0 Or c
>= N_SIDE Then Exit For
             Next dist
             If dist >= WIN_LENGTH Then
                board(pp).NUMBEFORE(dirn) = WIN_LENGTH
- 1point
```

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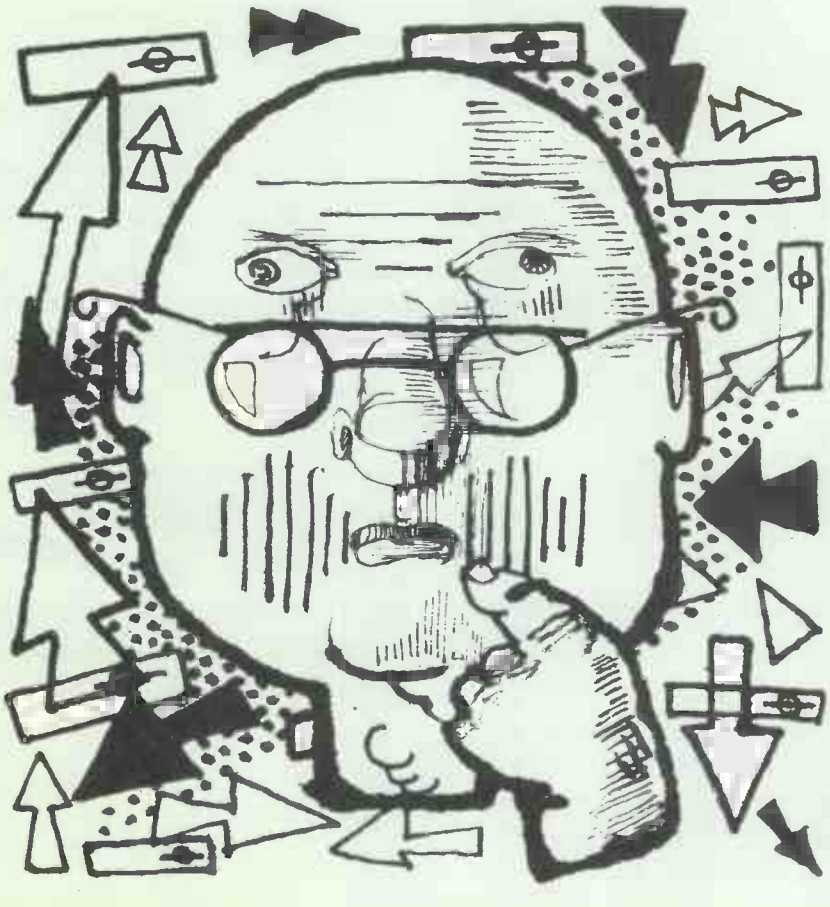
Top of the class

Some sequences of Smarandache contrasted with a permutations problem relating to class/student allocation; presented by Mike Mudge.

Some Sequences of SMARANDACHE... contributed by J Yan of Tucson, Arizona.

(1) The Smarandache Consecutive Sequence

1, 12, 123, 12345, 123456,... What fraction of this sequence is prime? Generalise this problem to any number base B. References: Student Conference, University of Craiova, Department of Mathematics, April 1979, "Some problems in number theory" by Florentin Smarandache. Arizona State University, Hayden Library, "The Florentin Smarandache papers" special collection, Tempe, AZ 85287-1006, USA, tel: (602) 965-6515 (Carol Moore librarian), email: ICCLM@ASUACAD.BITNET.



(2) The Smarandache Digit Sequences

General Definition: in any numeration base B, for any given infinite integer or rational sequence S1, S2, S3,... and any digit D from 0 to B - 1 we define a new integer sequence which associates with S1 the number of digits D of S1 in base B, with S2 the number of digits D of S2 in base B etc.

e.g. Considering the prime number sequence in base 10, then the number of digits, says 1, of each prime number following their order is: 0,0,0,0,2,1,1,1,0,0,1,0... (The Smarandache digit-1 prime sequence, the penultimate entry in the sub-sequence quoted corresponding to the one 1 in "31").

Similarly, the Smarandache digit-0 factorial sequence begins: 0,0,0,0,0,1,1,2,2,1,3... whilst the Smarandache digit-5 n*n sequence begins 0,0,0,1,1,1,1,0,0,0,... the last 1 in this subsequence representing the 5 in 7^7 = 823543. References include: Florentin Smarandache, "Only problems, not solutions!", Xiquan Publishing House, Phoenix-Chicago, 1990, 1991, 1992, 1993; ISBN: 1-879585-00-6, Unsolved Problem 3, p.7.

(3) The Smarandache Construction Sequence

General Definition: in any numeration base B, for any given infinite integer or rational sequence S1,S2,S3,... and any digits D1,D2,D3,...Dk (where k is less than B), we define an integer sequence such that each of its terms Q1 less Q2 less Q3... is formed by these digits D1,D2,D3...Dk only (all these digits are used) and matches a term Si of the previous sequence.

e.g. Consider the base 10 prime number sequence starting 17, 71,... called the Smarandache digit-1-7-only prime sequence. The Smarandache digit-0-1-only multiple of three sequence begins 1011, 1101, 1110, 10011, 10101, 10110, 11001, 11010, 11100,... References include Arizona State University cited above, and "Only problems, not solutions!"

(4) The Smarandache Symmetrical Sequence

11, 121, 1221, 12321, 123321,..... 1234567891011121312111098765432 1.. Florentin Smarandache asks, how many prime numbers are there in this sequence? NOTE: In its most general form the Smarandache Symmetrical Sequence is considered in base B (Radix B arithmetic). Reference: "The Encyclopedia of Integer Sequences" by NJA Sloane and S Plouffe, Academic Press, 1995; on email: superseeker@research.att.com

Photography by Jake Abrams

(SUPERSEEKER by NJA Sloane, S Plouffe, B Salvy, ATT Bell Labs, Murray Hill, NJ 07974, USA).

Problem Y (an.) (a) Investigate the Smarandache Consecutive & Smarandache Symmetrical Sequences in a general number base, say B, examining the occurrence of both PRIMES and indeed any other special types of integer that may be considered appropriate, e.g. Fibonacci, Triangular, Binomial Coefficients etc.

(b) The Smarandache Digit & Smarandache Construction Sequences are clearly (very) open-ended. Implement the examples given, in the first instance, and carry out a frequency count of entries in the associated sequences. Consider the possibility of modelling this algebraically. Then extend the philosophy (i.e. the general definition of these sequences) in any way that appears to be either natural or interesting and repeat the analysis. The above problems appear to me to be of a most abstract and in some sense unnatural type (COMMENTS ON THIS OBSERVATION PLEASE!). While realising that today's Pure Mathematics may be tomorrow's Applicable Mathematics, I wish to contrast with a CLASS/Student allocation problem posed by Neil Charlton.

A PERMUTATION PROBLEM from the real world

If I have S unique items and I wish to group them in G groups, how many possible combinations are there? For example, if I have 5 items (S=5) called a, b, c, d, e some permutations for three groups (G=3) are

a b cde; a bc de; abc d e;

(Note: a b cde is strictly equivalent to b a cde and is only counted as one permutation.) Assuming that it is possible to calculate P as a function of S and G, Neil asks for an (efficient) algorithm which would generate all of the sequences. (He suggests the use of for-next loops.) Typical output he suggests for the above example are 12333 — implying that A is in the first group, B in the second etc.

This appears to be a straightforward application of permutation theory, but since it originates in a "real world" situation we ask:

Problem NC Design and implement an efficient algorithm for the solution of the above problem; particular attention needs to be given to the format of the final output... and, to relate this to the typical difficulties with Numbers Count problems, specify the integer limitations on the algorithm supplied for a given integer length arithmetic implementation. Can the count, P, be represented asymptotically for large S and/or G? Is there any known practical application of this asymptotic situation? Responses to either or both of the above problems may be sent to: Mike Mudge, 22 Gors Fach, Pwll-Trap, St Clears, Carmarthen, Dyfed SA33 4AQ, tel 01994 231121 to arrive by 1st August 1995.

Any complete or partial solutions received will be judged using suitable subjective criteria, and a prize in the form of a £25 book token, or the equivalent overseas voucher, will be awarded by Mike Mudge to the "best" solution arriving by the closing date. Such contributions should contain a brief description of the hardware used, details of coding, run times and a summary of the results obtained, all in a form suitable for publication in *PCW*. Additionally, readers' comments upon the general, or specific, nature of this month's column would be most welcome. In particular, the contrast between between the applied and the abstract problem... which type do YOU prefer? References to any recent work on the Smarandache Type Sequences (either published or unpublished) would be greatly appreciated. Please note that material can only be returned if a suitable stamped addressed envelope is provided.

Feedback from readers

The introduction of the BEGINNERS START HERE feature has not, at this time, generated a significant response. Is this what readers want? Is there a different format of "beginners" articles which would be likely to prove popular? Please suggest any subject areas, or specific problems that you would respond to...

There has been pressure from several quarters to write something about the National Lottery. In the writer's opinion there is more than sufficient information and misinformation already available. However, if this topic is of interest and felt to be relevant to Numbers Count please let me know.

Following up on Leisure Lines, *PCW* April 1995, Alan Cox requests the most efficient algorithm for establishing that all of the digits of a given integer are distinct. This is easily done by eye, but "How do we do that?"

Review of Numbers Count -140- December 1994: A Christmas Miscellany

As expected, a wide variety of problems attracted a wide variety of responses, including a creditable one from Lahousse Gustaaf of Grimbergen in Belgium using Turbo-Basic on a PC 1512 Amstrad (6MHz) with 640kb and a hard disk of 20Mb. Lahousse attempted the G_1 problem with an array size limitation of 8000. He devoted about three hours "to writing two programs, for testing and running them" and came up with some valuable output. He goes on to say, regarding H_1: "I cannot buy manufacturer's packages (they are not cheap) so I wrote programs for multiplying and dividing two numbers with more than 4,000 digits, and they are to extend to 10,000 and more digits for a bigger PC." He also goes on to observe $29 = 3.11 - 2^2$...

Problem H_1 has attracted much interest. Gordon Bird of Street obtained the required factorisation in three hours on an Amstrad 1640 using version 3.0 of Derive. Michael Cohen used Maple V on a 486DX/33 and solved it in nine minutes, while Alan Cox used UBASIC's MPQSX program on a 12MHz machine and obtained the answer in less than two minutes. Very extensive solutions were received from Henry Ibstedt in Paris and Nigel Hodges in Gloucester; the latter using a remarkable mixture of theory and practice and fining among many other things the first non-trivial solution of $y^2 - 1549 - x^2 = 1$ where y has 71 digits and x a mere 70.

However, the very worthy prizewinner this month is David Broughton, of 17 Golden Ridge, Freswater, Isle of Wight, PO40 9LE. Using an IBM PC compatible with a 386DX/33MHz CPU without a maths co-processor, running Desqview under PCDOS 6.1 and using a 4DOS version 4.0 as the command line interpreter, David concentrated his efforts on Problem N_2: finding delay taps on a shift register; although he concludes that "An efficient solution to the converse problem of determining the delay from a given tapping pattern has not been solved". Technical detail including the overcoming of the absence of a parity funciton from high-level languages are discussed in precise terms, full listings are supplied. Details on request from David... I hope!

PCW Contributions Welcome

Mike Mudge welcomes readers' correspondence on any subject within the areas of number theory and computational mathematics, together with suggested subject areas and/or specific problems for future **Numbers Count** articles

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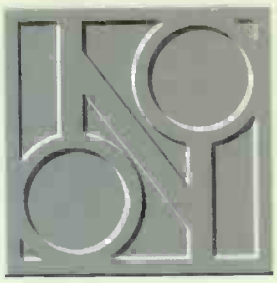


Taking the **soft** option

If you've a burning desire to run Windows on a Mac, SoftWindows could be the answer. Stephen Rodda gets to grips with it, finally installs Carbon Copy, and settles a memory debate.

A while ago I wrote part of my column on the Tube. This month I'm using a Macintosh. No, not a Macintosh word processing program, I'm using Windows — SoftWindows for the Macintosh. Jeff (regular readers of this column will know that Jeff is my business partner and a designer), whose machine I'm using, is a little put out, since my Macintosh, an elderly SE, isn't up to the job, so I'm using his Macintosh IIci. SoftWindows' minimum recommended hardware is a Macintosh with a 68040 processor or a PowerPC and 12Mb RAM.

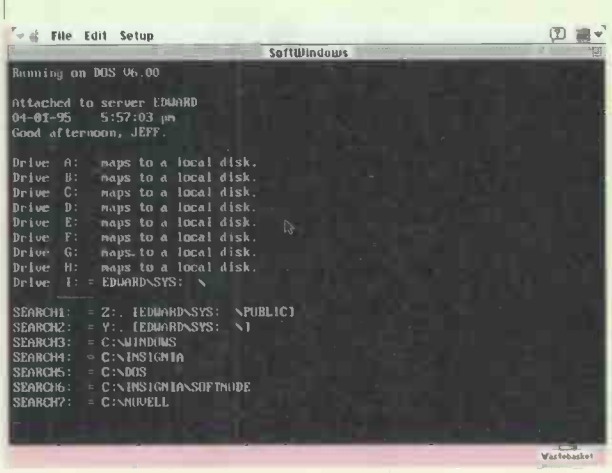
Although SoftWindows isn't supposed to run very well on this machine, it's got 32Mb RAM and I've allocated a reasonable amount of memory to iti, so it runs like a reasonably fast AT. Now, I appreciate that an AT won't run enhanced mode Windows, and I've now realised why I prefer Windows for Workgroups 3.11 to Windows 3.1 (the fact that it supports more than one network at a time being one reason) but I'm sure that once Jeff gets used to the fact that he's got Windows on his machine he'll come around to the idea. I'm missing being able to access the NetWare server and the Windows for Workgroups PCs at the same time. I'm still thinking of converting everything to TCP/IP for complete interchangeability.

Jeff's initial reaction was hostile. "Why did you do that?" he asked. "I'm quite happy with my machine as it is. You know I hate DOS and Windows."

"So that you don't have to grab my second PC when you want to use Ventura," I replied.

SoftWindows is really only a 286 emulator for the Macintosh with a few cleverly written drivers for Windows; the rest of the code for Windows is exactly the same as it would be if you went out and bought a Microsoft shrinkwrapped version. There are special video, network, keyboard and mouse drivers. Although the only special network driver is the MLID (the device-dependent portion), LSL, IPXODI and NETX all run unmodified. I even tested the DOS implementation (like an ordinary PC, SoftWindows loads DOS before Windows) with 4DOS, a shareware COMMAND.COM replacement also partly included

A SoftWindows screen showing the NetWare connections



in Norton DOS. It worked perfectly. Just to add insult to injury, I created the icon for one of Jeff's least favourite programs in Program Manager, and now he can run WordStar on his Macintosh.

SoftWindows isn't just a gimmick. Clients of mine are using it quite successfully. Their output bureau is mainly Mac-based, and at one office they have an NT server which successfully deals with queueing of print jobs and so on. At their second office, which is smaller, they felt they couldn't justify the expense of a server so they decided to try SoftWindows as their file exchange method. From their reports and my own experience, SoftWindows seems to be just the product for this sort of application.

The great advantage of SoftWindows is that a Mac will join a Novell network without the need to load the AppleTalk NLMs at the server. Other advantages are that it incorporates the AccessPC technology to allow it to recognise PC file extensions correctly across a NetWare LAN, for instance, allowing Word for Macintosh to see files with the DOC extension as native Word files.

SoftWindows also allows a gateway to be installed; this allows a machine attached both to Ethernet and LocalTalk to bridge from one network to the other in the background, allowing any machine without an Ethernet card to access the network, albeit somewhat more slowly.

Questions & answers: memory problems

We have just put together a specification for a network server to be used on our existing Windows for Workgroups network. We intend in future to move to a Windows NT network. However, we specified that RAID 1 disk mirroring based on two SCSI 1Gb drives be included as part of this machine. We have been informed that rather than hardware mirroring based on the SCSI controller, we should go for software mirroring based on a proper network OS such as Novell NetWare.

Would you agree? We have also been informed that we need 16Mb RAM to run such a system. Is this true? We had originally specified 8Mb.

Andy, ah@eu.net

Firstly, 16Mb is only just enough memory. I'd be inclined to go for 24Mb or 32Mb RAM. Remember (and this applies to either NetWare or NT) the more memory you throw at the machine the better the network's performance will be. In the case of NT, this would probably peak at around 32Mb in a simple server situation.

NetWare will just carry on using the RAM up to the maximum installed. The rule of thumb is more difficult, but I'd say that a rough approximation is 4Mb for the operating system and 1Mb for every 250Mb of extra disk space. Add another 2Mb if you're using NetWare 4.0.

From the tone of your letter, it seems you're not quite sure whether you should use Novell NetWare or NT. In the first case (that is, for smaller networks) NetWare uses less in the way of hardware than an NT network. Having said that, once you add disk space to a Novell network you start having problems with memory — NetWare needs memory based upon the amount of disk space installed in the server. NT, on the other hand, needs no more than the memory required to run the server and to cache file writes for the users. This means that with a NetWare server with, say, 4Gb of disk space, you will probably end up with the same specification of machine as you would originally have needed for NT. Larger disks will increase the difference between the NetWare server and the NT one.

Of course, both NetWare and NT allow both disk duplexing and mirroring. The difference between these two forms of reassurance is that mirroring involves holding a copy of the server's data area on another section of disk surface, while duplexing is a description of mirroring which involves making sure the disk surface referred to is on another physical disk unit. Carried to its logical conclusion duplexing also demands a separate SCSI controller card for the separate disk unit(s).

Put more simply, then, mirroring means having a complete copy of the data, and duplexing means having it on another disk. Obviously, duplexing represents a far more reliable solution, since it would be extremely unlikely for a pair of disks and controller cards to fail at the same time, unless you were struck by lightning. If you were just mirroring and the data resided on the same hard disk (say it were divided into two identical partitions), the drive electronics or mechanics might fail and you wouldn't be able to access either copy of the data.

As far as the choice of network operating system (NOS) is concerned, you say the client machines have Windows for Workgroups. These make the ideal NT client. Remember that under NetWare, printer sharing to and from a Windows workstation can be problematic to say the least.

For ease of use, since you already use and know the Windows networking system, I would suggest that you go for Windows NT as many of the administrative jobs are fairly similar between the two operating systems.

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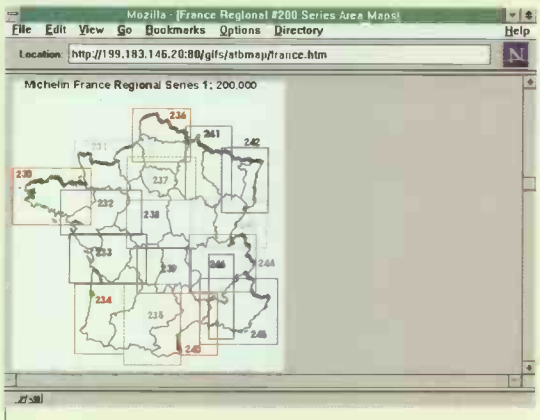

Internet access on the LAN. Does it carry a security risk?

Carbon Copy

Last month I was berating Microcom for its Carbon Copy for Windows, and Traveling Software for LapLink for Windows. This month I've managed to get them installed. Carbon Copy didn't like my video driver, but once I'd replaced it with ordinary VGA it all worked. Well, at least it didn't crash. The only problem was that I couldn't connect the machines together. I found the problem was that although NetWare and Windows for Workgroups were working, the network wasn't defined precisely enough for Carbon Copy. I ended up removing the NETBEUI protocol, allowing all communication over IPX/SPX, and Carbon Copy worked perfectly.

I'm often asked about connecting modems to networks, sharing modems, Internet access and so on. The main questions are: Can I share a modem over the network? If I connect a modem to the network or to the workstation, can people dial in? If I connect a faxmodem to my network how does it work?

The first question is easily answered. Yes, you can share a modem over the network. The answer to how you do it is not so simple. There are a variety of methods, from Novell's own NACS through to pcANYWHERE. The main variants on this theme are whether the modem is shared over the LAN as a resource (NACS and so on) or whether you are going to take over the machine with the modem connected (Carbon Copy *et al*).

As for whether people can dial in if you connect a modem to the network, the answer is both yes and no. They can if you want them to. Related to this is the question of whether a modem on a network will allow people to hack the network or the machine. The answer is that it will only if it is configured to answer incoming calls. The fact that you want some (authorised) people to be able to use the machine, and others not to, is easily dealt with. Simple precautions like issuing unusual passwords, changing them regularly, setting up callback (when the remote machine hangs up and calls the user back) where applicable, and ensuring proper network security, should defeat all but the most determined hacker. This level of security should prove adequate for most applications.

How does a faxmodem connected to a network work? The answer is that such a faxmodem may be shared outwards only, the fax files being manually routed to their recipients by an operator, or the faxes may be recognised by optical character recognition (OCR) and their destination arrived at by reading the "To:" entry on the cover page. Of course, manual intervention would also sometimes be required.

Some people worry that a faxmodem attached to the network will also allow a security breach; it won't. Most fax software in receive mode will allow the modem to receive only fax-type transmissions and not other data or commands. An outsider might just as well try to connect to the office coffee machine.

It is also possible to connect your network to the Internet. Remember you'll have to use TCP/IP over the whole LAN or have a means of routeing data from the LAN to the Internet. Another item on your shopping list will be either a demand connection to the Internet, or a direct Internet feed. If you have a direct Internet feed you will have to have an Internet address assigned to you — not just like steve@bear.co.uk, but a four-byte number (usually represented in decimal notation) like 197.0.2.45. It is this number to which your address will be translated whenever a message or file is sent to bear.co.uk.

Of course, if you have an Internet feed you will have to consider the necessity of firewalls. Firewalls are machines on the network which decide what commands to allow from the Internet and which to disallow. You wouldn't want people to link to your server and download a copy of your diary, although you might well want them to be able to download your latest sales brochure.

PCW Contacts

Stephen Rodda is an independent computer consultant specialising in DTP and networking. He may be contacted as **the_bear@cix.compulink.co.uk**

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Health and safety

Apple's latest update can bring all-round improvement to your machine's performance. Chris Cain looks at this and other ways to stay away from crashes and keep your Mac in top shape.

The hot news in the Mac world at the moment is the launch of affordable PowerMac Performas. Fitted with the new 75MHz PowerPC 603 processor, these look set to finally deliver RISC power to the people. And about time too. All we can hope now is that dealers will get the prices right. For a full review of the new systems see page 402.

This month's Hands On Macintosh takes a look at the new System 7.5 Update 1.0. A must-have for all Mac users who want to keep their machines on track, this brings improvements and bug fixes to just about every area. Read on too for some tips for fine tuning the way you work, rest and play, and a peek at possibly the best CD-ROM ever.

Patch and mend

Every so often Apple releases extensions to the Mac operating system that increase performance and mop up any stray bugs. These small files are distributed online as disk images for users to download: you can pick them up on eWorld or from Apple Web sites on the Internet.

The latest major patch is System 7.5 Update 1.0 which comes, alarmingly, on four high-density floppies. To help minimise file sizes and phone bills Apple has posted the images in a highly compressed BinHex format. Once downloaded they need to be uncompressed using an application such as DropStuff, and then turned into floppies using Apple DiskCopy. Both DiskCopy and DropStuff should also be available for download at eWorld.

When you have your disks the next stage is to close down any active applications, or restart the machine, then run the Installer from disk one.

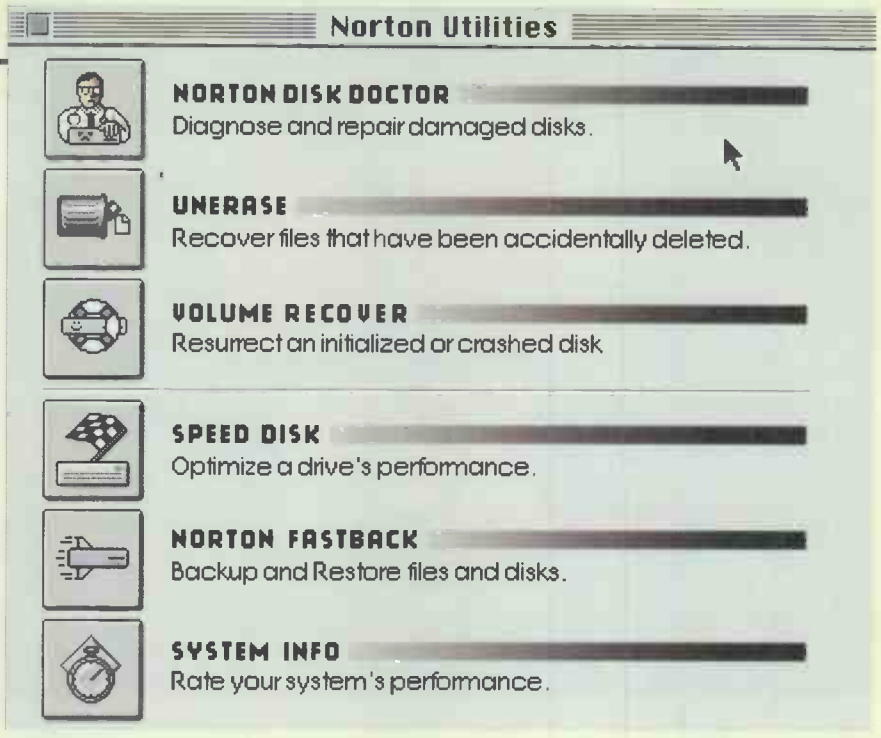
Apple's Installers are normally smart enough to install only the relevant parts of the update software for your particular Mac. When I accepted the Easy Install option everything went smoothly, but if you have problems, try re-installing with the manual Custom Install option. It's easy enough to work out which bits you need, then just check the box next to them and click OK.

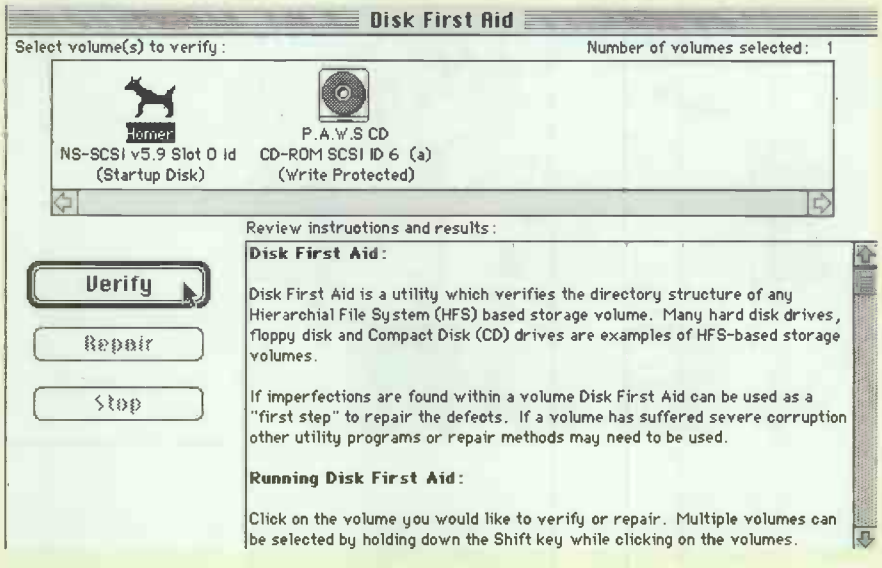
So what does Update 1.0 give you? The most obvious, though minor, change is that when you next start your machine you'll be greeted by a new Mac OS logo while the software boots up. This demonstrates, if nothing else, the company's commitment to cloning and producing generic code that will run on non Apple ASICs. As you can see from the picture below, it looks attractive too.

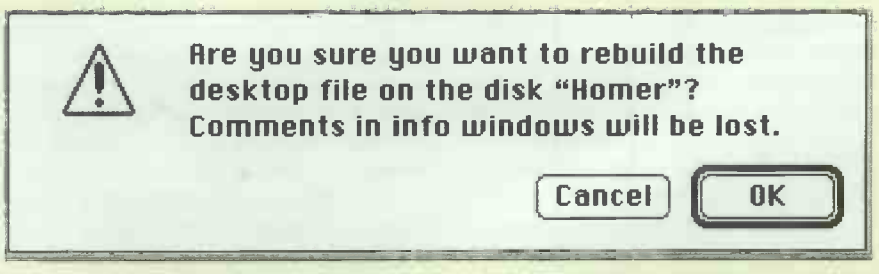
More important is improved memory management, especially in low-memory situations. Update 1.0 helps prevent those annoying crashes that occur when you have multiple applications open and are down to your last 200kb. WindowShade's memory handling has also been tweaked, and there's a fix to a potential crash situation which can occur while pasting large amounts of data (how many times has your machine frozen in Quark when you've been doing just that?).

The first sign of a change with System 7.5 Update 1.0

Performing regular maintenance is essential for a healthy Mac







Another instantly noticeable change is the ability to turn your Mac off using the Power key on the keyboard. Pressing this with the system on now results in a dialogue box offering the option to Restart, Shutdown or Cancel — nothing special, but it saves switching from the active application to the Finder. Users of PowerBooks will be offered the chance to put the machine to sleep.

Update 1.0 has a number of specific improvements for PowerMac. Top of the list is more native code in QuickDraw, the part of the operating system that handles graphical operations such as line draw, pattern fill and scrolling. Increased native code makes these faster, and I've noticed the improvement even on simple desktop window activities.

The PowerMac Serial Driver has been adjusted to avoid a potential crash in certain circumstances, and new video software puts an end to the occasionally scrambled startup screens some users have reported. The ever helpful Apple Guide now runs more smoothly in native mode and an update system maths library (MathLib) gives even faster performance.

Other general improvements worth noting are changes to the SCSI Manager, a new LaserWriter driver, an internally enhanced version of SimpleText and a Launcher with Drag and Drop support.

There are far too many small but important updates for different Mac models to discuss in detail in this column. My recommendation is to just download and install this latest update, making sure that you get the correct localised version for you. The only problem I've found with Update 1.0 is that it doesn't work with Newer Technology's CPU accelerator, at least not on 7100s.

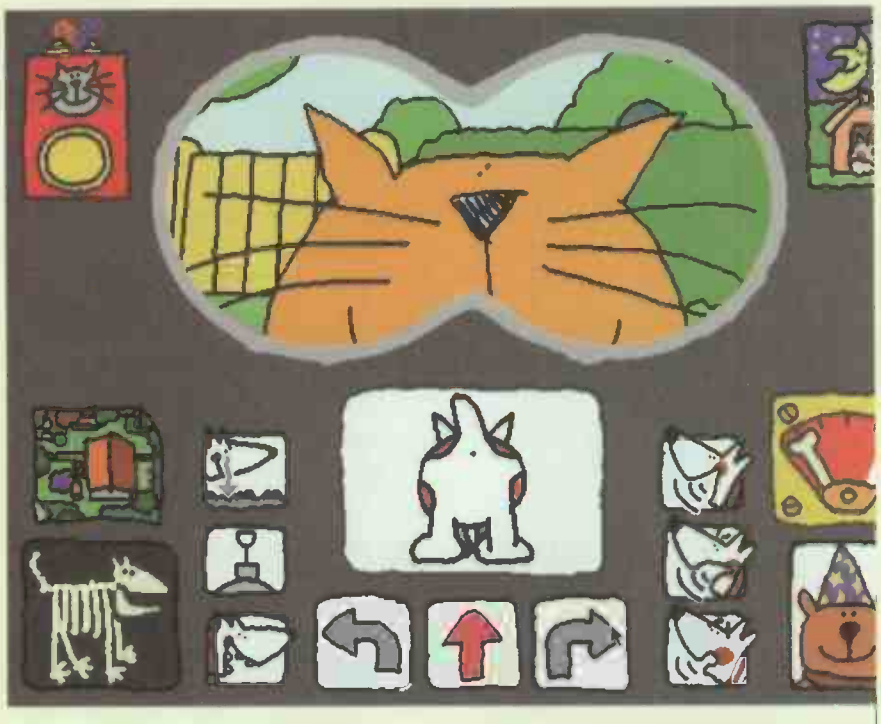
Anti-crash course

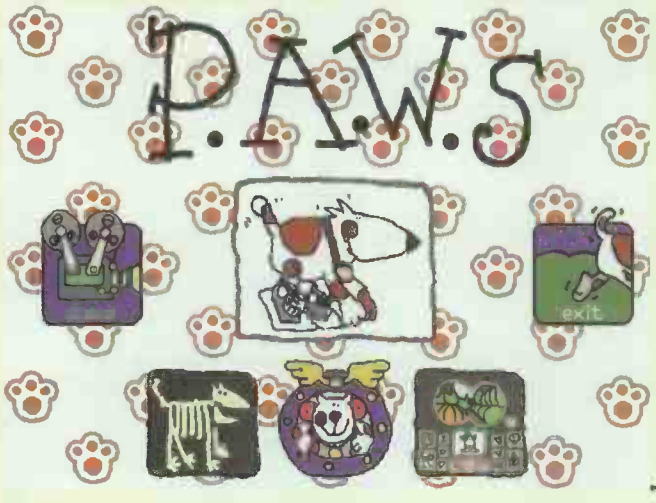
If there's one thing about computers that can drive you mad it's losing important data due to a system crash. You may think your colleague's 10-second error beep is annoying, but it's nothing compared to half a month's work suddenly going up in smoke. To avoid this and other potential nightmares it pays to run a few periodical checks and maintenance routines on your Mac. Prevention is better than cure.

Perhaps the easiest way to boost your Mac's health is to rebuild the desktop regularly. This simple operation takes no more than a couple of minutes and helps keep a file called the desktop database in shape.

The desktop file is something users don't normally interact with: it's purely for the Mac's own use. It's a database of information about every icon the Finder ever sees — what they look like, which program they belong to, which package created them, and what comments are in the Get Info boxes.

The Mac uses this to manage its window displays. Unfortunately, with around nine individual pictures for most programs (one for each possible view), the database





A close encounter of the furred kind

PAWS lets you explore the wonderful world of dogs

can become bloated and corrupted. It may contain masses of information about data that isn't on your hard disk anymore, and as it has to search the database every time it's asked to show an icon this can slow the machine down. Rebuilding the desktop clears the database and makes the Mac build a new one from current data. It also clears any comments you've entered in a program's Get Info box.

To rebuild the desktop all you have to do is boot the system while holding down the Option and Command keys, until a dialogue box appears asking you if want to rebuild. Contrary to popular belief, if you're already using your Mac and want to rebuild you don't have to restart. Just quit all open applications and press Option, Command and Esc together. A dialogue box will pop up asking you if you really want to quit the Finder. Say OK, then quickly hold down the Option and Command keys.

Common problems cured by rebuilding the desktop include icons that have mysteriously gone generic and slow system or application startups. It's generally recommended by Apple that you rebuild the desktop at least once a month.

The next best way to keep your Mac in check is to make sure the hard disk is in tip top condition. Investing in a diagnostic application such as Norton Utilities is thoroughly recommended, but if you don't have one you can use Apple's Disk First Aid, which can be found on the Disk Tools system disk that came with your Mac.

Disk First Aid will scan your hard drive for bad blocks, problems with the directory structure and general disk disorders. If it finds anything amiss it will give you the option to repair it, and to save a report to disk as a text file. Should the problem be on your startup disk, you'll need to boot the system from another hard disk or a bootable floppy to correct the situation.

Disk First Aid is simplistic compared to commercial packages, but used regularly it can nip potential problems in the bud.

Other programs recommended for a healthy Mac are Norton Speed Disk, to keep your hard disk defragmented, Symantec Anti Virus (SAM), and the shareware virus killer Disinfectant.

A dog's life

Simulators that let you fly planes and build cities have always proved popular with Mac users. People all around the world love to play with dials, navigate with the help of maps and make sure the trains run on time. Everyone, that is, except me. I can't stand them. At least I thought that until those nice people at Softline sent me a copy of the ultimate simulation: PAWS, from Domestic Funk Products.

PAWS, the Personal Automated Wagging System, is a dog simulator. Based on the prize-winning children's book, How Dogs Really Work by Alan Snow, the program casts you as a cartoon canine and lets you explore the world from a dog's perspective.

Being a dog isn't a simple as you might think. There's so much to do. You've got to bury bones and dig them up again. Find cats. Chase cats. Growl, bark, sniff and whimper. Check your bowl for food, snooze, and dream doggy dreams. It could well be too much for some people.

As well as the simulation, this CD-ROM has a section on anatomy which shows exactly what goes on inside the average pooch. You can play games to build mouse to eye co-ordination and watch a movie that shows how the whole thing was put together. Domestic Funk has done a sterling job and produced a disc you'll want to play over and over again.

PAWS is ideal for anyone aged 4-103. If you have a spare £35, buy it now.

PCW Contacts

Apple is on 0181 569 1199

PAWS costs **£29.78+VAT** and is available from **Softline 0181 401 1234**

Norton Utilities 3.1 for the Mac costs £99+VAT and is available from **Symantec on 01628 592222**

Chris Cain loves to hear from Mac users and can be contacted via email as **chris_cain@pcw.ccmail.compuserve.com**, on eWorld as **Cain** or simply by writing to *PCW*.

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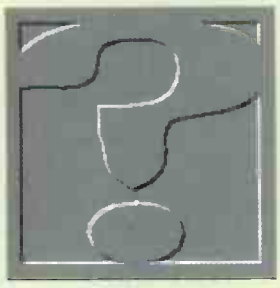


Any questions?

If you've got a PC problem or think you could help other readers out, contact Frank Leonhardt.

Putting law in the picture

I am currently working in a department which is interested in setting up a bulletin board to enable people to download our drawing files for a fee. Could you please inform us of laws governing this type of bulletin board, and any literature or software available to aid the initial setup.

A Blazey, Hull

I am not aware of any laws governing the operation of a bulletin board system, but you might be breaking an agreement with your telephone provider by using the line for anything other than telephone calls. But such contracts were devised before modems and it is hard to imagine a telephone company objecting to an enterprise which makes them money.

There are a few odd laws which you could fall foul of. The Obscene Publications Act is one which springs to mind — it depends on the nature of your drawings. It could also be argued that you should be registered under the Data Protection Act because you may be storing information about your account holders.

There are several shareware bulletin board packages you could experiment with. The simplest might be Telix from Exis, an excellent DOS terminal emulator with a host mode for allowing remote users to transfer files. At the other extreme, Mustang Software's shareware Wildcat! BBS system has just about any feature you can think of (including multiline operations). Telix, Wildcat! and numerous other packages are available through normal shareware channels.

It just growed and growed

While I was looking through my hard disk using Windows File Manager, I checked the box in the By File Type dialogue marked Show Hidden/System files. This revealed a number of files, especially in the root directory, with a red exclamation mark as the icon. On closer examination of one of these files, named 386SPART.PAR, I noticed it was well over 20Mb long. It seems to be growing in size and I am unsure of its use.

As my hard disk becomes more cramped I am hoping that something can be done about this to free some space.

D Khanna, Northwood

The file you have found is the permanent Windows swap file and you certainly shouldn't delete it. This file covers the area of the disk used by Windows for virtual memory — the process where hard disk is used to supplement RAM for running large programs.

386SPART.PAR is set up under the "Enhanced" icon in the control panel. If you select the Virtual Memory button on the resulting dialogue you will have the option of changing the swapfile size and location. To find out how much memory you are currently using, select the About.. option under Help in File Manager or Program Manager. You will see an amount in kilobytes for free Memory and a percentage remaining for System Resources. In general, if you get down to 1Mb of memory or 20 percent of resources you will have trouble running any more programs. Unfortunately, there is no way to increase the amount of System Resources, however much RAM or hard disk you have allocated to Memory.

In my experience there is little point in having more than 16Mb-20Mb of total memory (RAM+virtual) available for Windows 3.1 — you tend to run out of other system resources long before the memory is exhausted. This should change with Windows 95, whenever it appears, but until then you are better off limiting swapfile sizes to 12Mb with 4Mb of RAM and 8Mb with 8Mb of RAM: anything more is a waste of disk space.

Backup and restore

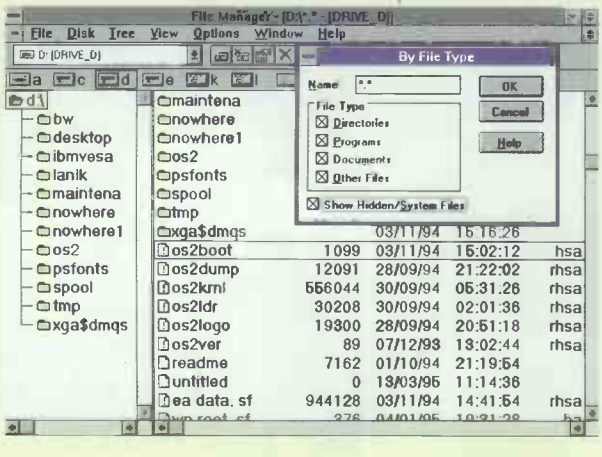
In addition to carrying out a full backup to QIC tape, from which I can execute a full restore with no problem, I also back up using MSBackup or PCTools to an external SCSI hard disk. However, a full restore from either the hard disk or the compact disc to which I have transferred the backup file produces an unbootable system unless I subsequently reinstall MSDOS 6.22. I have narrowed the problem down to the root directory and suspect that it is something to do with the relocation of hidden files which does not occur with a tape restore. Is there an easy solution?

Roger Tully, Penrith

There are some things found on a bootable hard disk which won't normally be saved and restored during a file backup. Files which form part of the operating system (MSDOS in this case) are deliberately kept hidden in order to stop users messing about with them. Your tape backup software is probably treating them as a special case.

In addition to the critical system files in the root directory, there is an area at the start of each disk called the boot sector.

Here all hidden files are displayed



Communications breakdown under Windows

We have recently opened an Internet account with Demon and received the DOS version of its DIS program. This works fine, and we can FTP and mail people without any problems.

We then decided we would like to use Gopher, WWW, Telnet etc. and downloaded Demon's DISWIN program for Windows. Although our modem works fine in DOS and did work fine in Windows last year when we had a CompuServe account for a short time, we are unable to dial out in Windows.

We have tried every different combination of settings in Terminal, but nothing works. Any ideas?

Aidan@beeson.demon.co.uk

Communications under Windows has always had a bad reputation, though the situation has been much improved since version 3.1. Demon's DISWIN is actually a compilation of the standard Trumpet Winsock, NetScape and other utilities and should require no special configuration. However, it is worth checking again to make sure that you are using the correct cable and modem configuration.

A common problem with Windows is a hardware clash. For example, if you have a mouse plugged into COM1 you can't connect a modem to COM3 because they both share the IRQ3 interrupt. The same applies to COM2 and COM4 sharing IRQ4. The PPP protocol used to talk to your Internet provider demands proper hardware flow control between the PC and the modem — this would not have been necessary for using Windows Terminal.

You may find that, in spite of the hardware flow control, your PC just can't keep up with the flow of data. The solution, in this case, would be to fit a fast serial port in place of the standard unbuffered fitting — or buy a 486+ machine.

If the modem just refuses to dial, it may be unhappy about your telephone line. You will need to examine your modem manual and the initialisation strings used in Trumpet Winsock to solve this properly, but exchanging ATX4 with ATX3 forces the modem to ignore the dial tone and get on with dialling.

Most Internet providers, including Demon, have a technical support department for dealing with this sort of problem.

When the computer is turned on, a piece of code in the BIOS ROM called a bootstrap loader will read the boot sector into memory and attempt to run it. This will start loading the rest of the operating system from the hidden files described above, which eventually run MSDOS and the programs in the AUTOEXEC.BAT file, up to and including Windows. Each stage is more elaborate than the last.

There are several advantages to a multi-stage boot process, the most relevant being that it keeps the operating system apart from the hardware. As the bootstrap loader makes few assumptions about what it will find on the boot sector, you can easily upgrade or change operating systems without modification of the hardware. To switch from DOS to OS/2 you just install it on the hard disk with the appropriate OS/2 boot sector: the bootstrap loader remains unchanged.

Returning to the question, MSBackup won't handle the boot sector for you, though it will optionally do the hidden and system files. Fortunately, it is not difficult to back up the boot sector and system files the official way.

MSDOS is shipped with a utility called SYS.COM which does exactly this. Just put a disk in the A: drive and type SYS A:. This transfers IO.SYS, MSDOS.SYS and COMMAND.COM together with the boot sector. For the IBM version of PCDOS, the names IBMDOS.SYS and IBMBIO.SYS are substituted, and since MSDOS 6.0 you will also get the DBLSPACE.BIN or DRVSPACE.BIN (6.22+) disk compression drivers.

You would be well advised to copy SYS.COM, FDISK.EXE, FORMAT.COM and XCOPY.EXE onto the floppy disk, together with the appropriate file-backup restore program (for example RESTORE.EXE or MSBACKUP.EXE) in order to get you started in the event that your hard disk was lost.

If the worst happens you will be able to boot from the floppy disk and reformat the hard disk. Then use SYS C: to copy MSDOS back to the hard disk to make it bootable, and proceed to restore everything else from tape, CD-ROM or wherever else you've stashed it.

If memory serves

How reliable is modern computer memory? With my 1980 personal computer I had two memory failures in the 16kbit RAM chips. With my 1993 486SL I have now had the following error message on five occasions while booting:

05.05 The computer has a memory problem and needs to be serviced.

Error address: 01:3000:0000. Found FFFFFFFF. Expected 00000000.

On each occasion the system loaded correctly on a second attempt. One of your advertisers promotes parity checking memory. Does this mean that other memory is usually not parity checking?

Richard Ellis, Cheltenham

In general, memory found in IBM-compatible PCs does have parity checking. The check is made by the memory controller and not the chips; all that is needed from them is that they are 9 bits wide instead of 8 bits. You will sometimes see SIMMs advertised as 8-bit or 9-bit as appropriate.

In a parity-checking system the ninth bit is used as a check that the other eight bits have remained unchanged since being stored. This does nothing to improve the reliability of the system because once the RAM is corrupted you have lost the contents. However, having parity error detection does give you the opportunity of spotting the problem so you can have your computer serviced.

Mr. Ellis also wrote:

"Printer manufacturers seem correct in warning about careful choice of consumables. I recently tried a ribbon from an independent (EU) manufacturer in a Japanese dot-matrix printer. This was practically unusable.

"The replacement ribbon is probably not the correct thickness and the printer is a sensitive word-processing type. In addition, the replacement has an inferior plastic moulding and seems less inky."

Using the right printer consumables can make an enormous difference to output quality. Inkjet printer paper is another example: if you haven't tried using the paper recommended by your manufacturer, you could be in for a pleasant surprise. Of course, proper inkjet paper is much more expensive.

PCW Contacts

Frank Leonhardt is an independent computer boffin who can sometimes be contacted on **0181 429 3047** or via email as **frank@dircon.co.uk** or **leo2@cix.clink.co.uk**. Letters may be sent to *PCW* at VNU House, 32-34 Broadwick Street, London W1A 2HG, but individual replies are not normally possible. Please do not ask about cover disks or CD-ROMs!

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Databasics

Many IT novices are somewhat wary of databases, but they shouldn't be — if you can work a filing cabinet, chances are you can use a database, as Eleanor Turton-Hill explains.

There was a time when the only access people had to a database was via their company's mainframe. Most users were resigned to the fact that the only kind of interface a database could offer consisted of a luminous green menu with an unfriendly command line. Users of large corporate databases were at the mercy of IT departments who had ultimate control over how the system looked and what facilities it provided.

Since that time, databases have made their way slowly but surely onto the PC, and more recently, onto Windows. With Windows' graphical user interface (GUI), databases have become easier to design, use and understand. If you're new to computers, databases can seem complex and daunting, but they're easier to learn now than ever before, and once you've got to grips with a few basics you'll realise how simple it is to put your own personal database together.

Getting started

A database is simply a computerised record-keeping system. If you've worked with a manual filing system then you'll already understand most of the basic concepts — that is, you know how to add a new file, throw away an old one, and update an existing one. You'll also have some kind of indexing system which allows you to retrieve files and some key information which allows you to cross-refer from one filing cabinet to another. You're already half way towards understanding how to create a database.

There have been many different ideas about how data should be organised so that it can be accessed most efficiently. At the moment, the relational model is the most popular, and the vast majority of database management packages on the market are based on this.

Records and fields

Each unit of information you create on your database is called a "record" and each record is made up of a collection of "fields". Typically, a single record consists of a set of field names like:

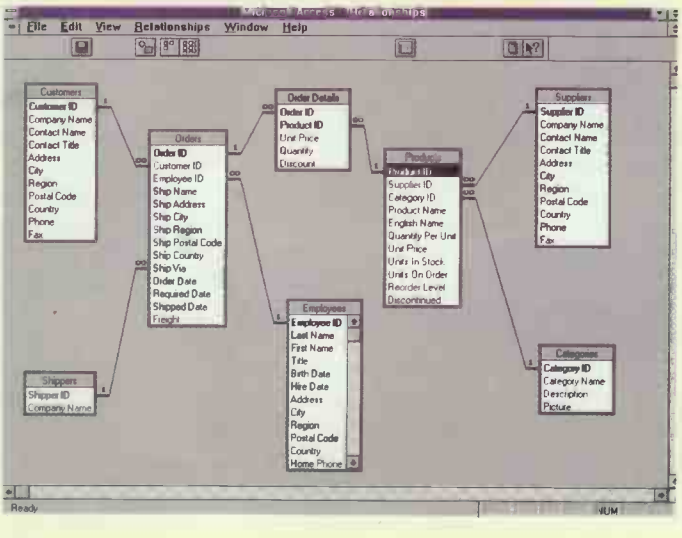
Title
FirstName
Surname
Job Title
TelNo.
TableNo.

When you've filled in all the relevant information for each field and saved it, a new record is added to the file. Some database management systems such as Lotus Approach come with a selection of fields already set up, but most systems require you to define your own fields. First, you have to specify the length of each field — some fields will contain far more data than others. Next, you must decide on the type of field you want to create. There are many different data types, but the basic two are "text" and "numeric". Text fields can hold letters and numbers whereas numeric fields can only hold numbers.

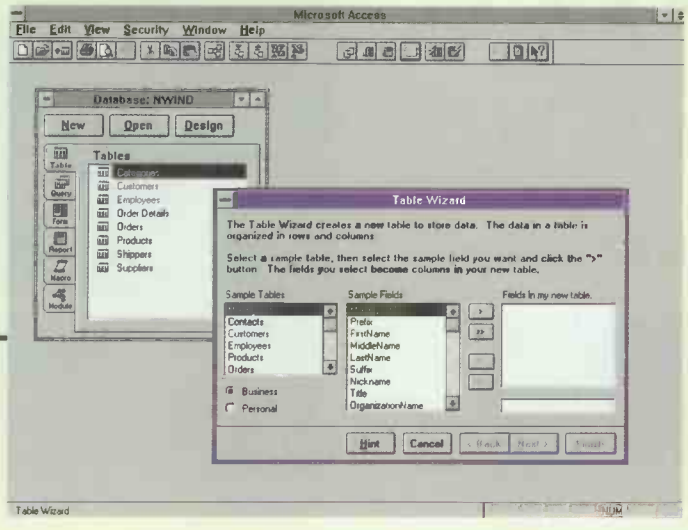
This may seem slightly strange. After all, if you can store numbers in a text field, what's the use of a numeric data type? The answer is simple. Many numbers stored in a database are not used as numbers at all — that is, they aren't used to perform calculations. Telephone numbers are the obvious example. They sit on your database next to a particular name or company, and are referred to in the same way as textual information. Lists of accounts figures, on the other hand, may well be used in calculations and reports. Numbers used in this way must be stored in numeric fields.

Other types of fields include memo, graphic, data, and binary. A memo field is a long text field which allows you attach additional notes to a record. Date fields can be used to pick up the current date from your system at the time the record is created. Most interesting, though, are graphic and binary field types for storing pictures and sound. These field types have been around since the first Windows database came onto the market but have not been widely used until now because of the heavy demands which sound and graphics make on your system resources.

The need for increasingly powerful and flexible data models to support non-business applications has led to



Microsoft Access allows you to view the relationships which you've created between different files. Here, the key fields are shown in bold type. All tables are linked in some way to the "products" or "orders" files in a one-to-many relationship



When creating a new table in Access, the Table Wizard appears with dialogue boxes to talk you through each step of the process

extended relational data models in which very different types of data can be stored such as programs, text, or any kind of unstructured data in the form of binary large objects (BLOBs).

Indexes

Once you've defined fields in each table, indexes must be created to help the database find specific records and sort records faster. An index in a database performs the same function as in the back of a book or in a library. The fields you choose to index should be those you use repeatedly to search for data. For example, if you regularly search your database by surname, the index should be defined on this field to speed up the searching process. As well as commonly searched fields, there should also be at least one index in each database file which is set up on a unique field, i.e. a field in which the data stored, for example a serial number, is different to all other records. That way, you will always have a way of identifying a record uniquely.

Linking tables

Identifying records uniquely is essential when it comes to linking files. Two database files can be related or joined if they hold a piece of data in common. A file of employee names, for example, could include a field called "DEPARTMENT NUMBER" and another file containing details of the department itself could include the same field. This common field can then be used to link the two files. Most database packages allow you to link two files provided the chosen fields are of the same length and the same type.

Queries

Extracting information from a database is known as performing a query and most database management systems feature a separate query program which allows you to design intricate queries and see the results on-screen or on paper. On an employee database, a query program provides a facility to extract any selection of records, for example all the employees in a certain department, or all employees with salaries over a certain amount. Most packages also allow you to perform queries which link together data from different files and perform calculations.

Database integrity

The word "integrity", when applied to databases, relates to maintaining the correctness and consistency of the data. Some integrity checking is made possible by the simple specification of a field's data type. If an identification number, for example, is specified to be five digits long, then updates which attempt to lengthen the stored data will be rejected.

Referential integrity, or the way records from different files are dependent on each other, is also essential. For example, one department may be linked to many employees. If the department is deleted, then each employee will hold a DEPARTMENT NUMBER which is no longer valid, and this will leave the database in a state which is no longer valid. Microsoft Access deals with this by including a checkbox in the file definition which allows you to "enforce referential integrity". This means that when a department number is deleted or changed, all the child records follow suit.

Learning more...

Most database packages have become more sensitive to the needs of the ordinary user by including learning tools. Microsoft's Wizards, for example, take you through common database tasks, step-by-step on your own live data. Most also have comprehensive help facilities to explain every aspect of database design.

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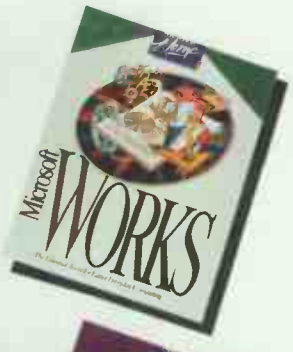

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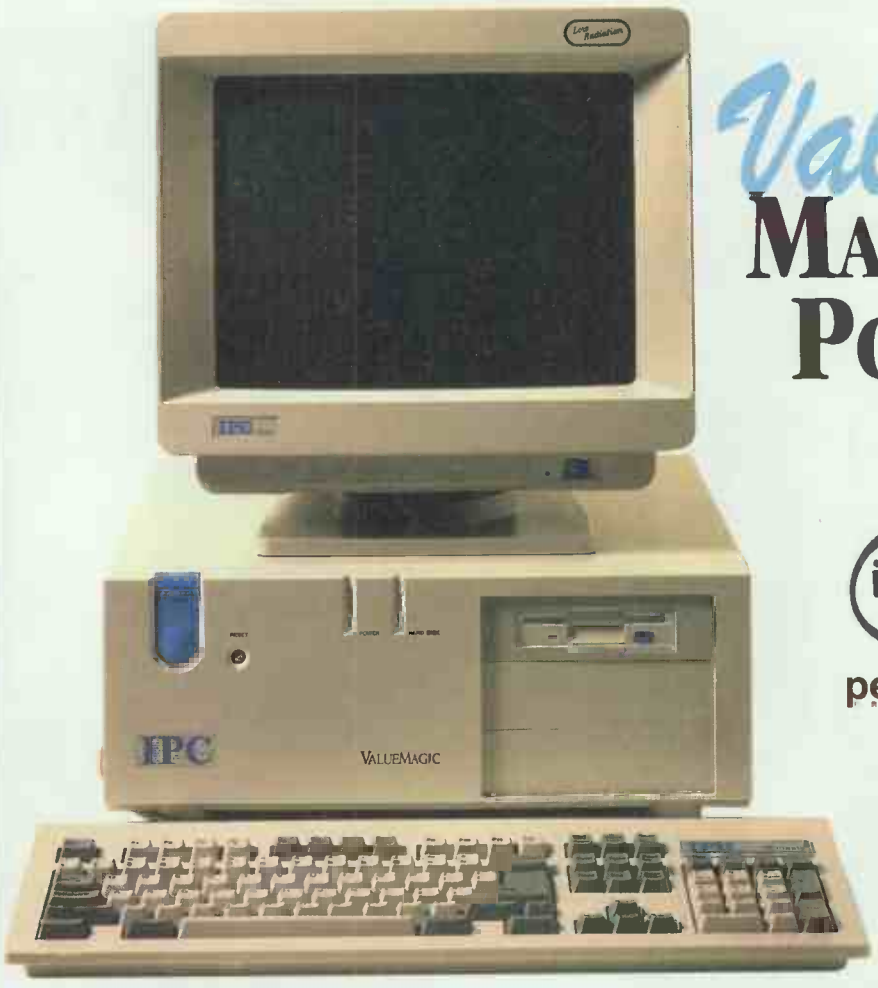

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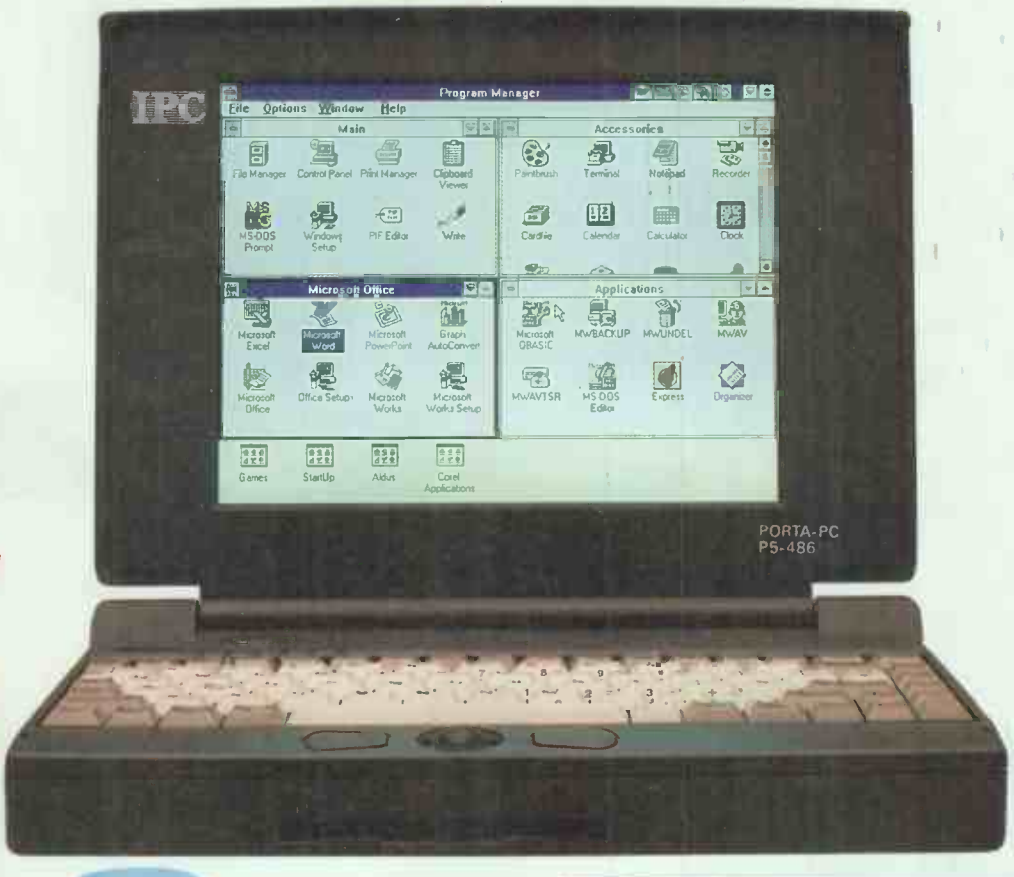

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Memory	8Mb RAM, 1Mb PCI VGA 256Kb Cache
Display	14" SVGA colour screen
Drives	540Mb Hard Disk Drive 3.5" 1.44Mb FDD
Accessories	102 key UK keyboard & Mouse Mini Tower case only
Software	MSDOS 6.22 Windows 3.11
Warranty	1 year warranty

£1249 exc VAT

For detais of your nearest IPC Dealer see page 8

Buy now upgrade later

Multimedia deals with built-in extras...

MULTIMEDIA

POWER MULTIMEDIA

Processor	Intel Pentium® 75 MHz Processor, PCI bus
Memory	8Mb RAM, 1Mb PCI VGA 256Kb Cache
Display	14" SVGA 0.28 colour screen
Drives	540Mb Hard Disk Drive 3.5" 1.44Mb FDD Dual Speed CD ROM drive
Accessories	102 key UK keyboard & Mouse ISP 16 Amplified Sound Card Twin Stereo Speakers, Mini Tower case only
Software	MSDOS 6.22 Windows 3.11 5 Microsoft CD Bundle
Warranty	1 year warranty

£1399 exc VAT

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The multimedia release of this best selling integrated programme. With spreadsheet, wordprocessor, database, and communications.

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Typical example: Cash price £949 + VAT	£1115.08
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AFTER 6 MONTHS FREE CREDIT Pay the balance in full	£1000.00
OR YOU CAN CHOOSE To pay by fixed monthly direct debits of	£42.00

(exc. Payment Protection Plan and no change in the rate of interest)

Total credit amount payable* *£1506.89

(when paid by direct debit)*Variable by Lombard Tricity Finance at any time by notice as required by law. Credit for Northern Ireland residents subject to 2% surcharge*.

...but with nothing built-onto the price

Personal Computer World

Buyer's Charter

(MAIL ORDER PROTECTION SCHEME)

Hello, I'm Anthony George, your Customer Services Manager. My job is to assist you when things go wrong or when you have a complaint in relation to the advertisements which appear in this publication. If you encounter such a problem, write to me with details of the exact nature of your complaint and I will contact you accordingly.

IT IS IMPORTANT THAT YOU FOLLOW MY TEN GUIDELINES, BELOW, AND RECORD DETAILS OF ALL TRANSACTIONS, ESPECIALLY IN THE EVENT OF CLAIMS UNDER THE "BUYER'S CHARTER".

1. Your Rights

1.1 Under the rules that control buying and selling of goods through the post, mail order customers are protected partly by law and partly by codes of practice drawn up by advertising agents and publishers.

1.2 By Law, advertisements or catalogues inviting people to order goods by post must include the supplier's name and operating address.

1.3 If money is sent with an order, it must be returned as soon as possible if the order is not accepted. A customer can sue if there is an unreasonable delay.

1.4 No contract exists until the supplier accepts an order. So the customer has no right to demand goods if the supplier chooses to reject his order and no right to compensation if he then has to pay more to buy the goods elsewhere.

1.5 But once the goods are sent, there is a binding contract. The customer is entitled to his or her money back if the goods do not correspond with their description. If their quality proves unsuitable for their normal purpose, the customer has the right to demand a replacement or refund.

1.6 In addition to any legal requirements the Advertising Standards Authority adminlsters a code of practice which requires MAIL order suppliers who ask for any money in advance to:

Provide samples of their goods at the address shown in the advertisement so that callers can examine them.

Refund payment in full if goods are returned UNDAMAGED within SEVEN days of receipt. (It is not necessary for the customer to give any reason for this.) The customer is entitled to try the goods during that period, unless the supplier has previously made it clear that a trial is not permitted — for example, when any use of the goods would make them unfit for sale to anyone else.

Send goods within TWENTY EIGHT days of receiving an order — or notify the customer within TWENTY EIGHT days, with a reply-paid postcard and the offer of a refund. If the customer prefers to wait for the goods he should be sent progress reports every FOURTEEN days.

2. The Product

Before placing an order, shop around and consider the software and configuration you need. If possible, test the product at a dealer's or at an exhibition, or read magazine reviews of current products. Don't be afraid to speak to manufacturers about parts and accessories, their compatibility with any equipment you already have and the possibility of expanding or upgrading in the future. There is no point buying hardware which will soon be obsolete or is incompatible with your own equipment and requirements. Check the manufacturer's maintenance or service contracts, in response times and any third-party involvement. Many companies offer a one-year maintenance contract, but who will be responsible when it runs out?

3. The Supplier

Make some enquiries about the company: you are entitled to check its financial status, trading record and customer references. Look at the returns and refund policy, warranty agreements, after-sales service and stock availability. Check its means of delivery and how soon it can dispatch. "ARE THERE ANY HIDDEN EXTRAS?"

4. Payment

You should not be charged for any goods until they are despatched and therefore whenever you can, always endeavour to pay on delivery or, failing this, collect them when you buy.

If this is not possible, consider carefully your method of postal payment. By far the greatest protection is afforded by a PERSONAL CREDIT CARD, for in the event of the supplier/advertiser ceasing to trade, or failing to deliver the goods, you are automatically covered under the credit card company's insurance scheme for all transactions in excess of £100.

Should you consider making a postal payment by "CHARGE CARD" you must check carefully with the CHARGE CARD COMPANY to ascertain if they operate a protection scheme similar to that offered by the PERSONAL CREDIT CARD company. INVARIABLY THEY DO NOT.

There is considerable confusion between a credit card and a charge card. Perhaps it would be as well before using a card which will be employed to make the payment to check with the issuing company whether you will be using credit card or a charge card.

If you pay by cheque, cross it, endorse it "Account Payee Only" and fill in all the details on the counterfoil, or payment list, in your cheque book.

If you pay by Postal Order, cross it, fill in the counterfoil and keep it with your record of the advertisement.

If a purchase has to be made with cash, always ensure that such a transaction is only undertaken in person, by you, at the supplier's/advertiser's address and that you take immediate possession of the goods you've paid for.

NEVER SEND CASH THROUGH THE POST

5. Ordering Goods

Do not place an order until you are sure that both the product and the supplier are reliable. Be precise about what you want: quote the model's make and number, the memory specifications and the hard disk size. With software, state the disk format

and support details you require. Check the total price of the goods (including VAT, postage and packing) and make sure there are no hidden extras. Use the Order form on the reverse side of the "Buyer's Charter" to record those items ordered, and your dealings with a supplier/advertiser.

6. Delivery

As defined under "YOUR RIGHTS" paragraph 1.5. The customer has a legal right to expect that the goods delivered correspond with the description advertised and in accordance with the order taken.

On delivery, check that the goods received do correspond accordingly, and if not, to notify the supplier/advertiser immediately.

7. Purchasing from Overseas Companies

The risks involved in buying from overseas nearly always offset the advantages. Don't consider it unless you cannot buy the product in the UK, or the price advantage is so great it outweighs all other considerations. If you still decide to purchase from overseas, make sure the product is suitable for use in the UK. Hardware has to be adaptable to 240 volts (in the US, 110) and hardware and software have to be configured correctly. It is essential that any software is supported by the manufacturer in the UK: most international versions are not. You should also know the supplier's exact terms of trade and what kind of support to expect. Returning hardware to the US, for example, can be expensive, time-consuming and risky.

Finally, you have to arrange for your goods to be shipped to the UK. Work out how and when they will be delivered, the cost of the exercise and who should insure the goods in transit. You will have to pay duty and VAT whether you clear them through Customs yourself or via a shipping agent.

8. Problems

In the case of even the smallest problem, CONTACT THE SUPPLIER FIRST. If you are dissatisfied after several attempts to get help, write to me, Anthony George, Customer Services Manager, at the address shown on page 8. If you paid by credit card, the card company should also be able to assist.

9. Price Fluctuations

Whilst every endeavour is taken to ensure that goods ordered correspond to the prices advertised, there are occasions when, due to unforeseen circumstances, such as increases in manufacturing costs occurring during the period that copy was received and subsequently printed (6 to 8 weeks), a fluctuation in prices may be experienced.

Customers should always obtain from the advertiser/supplier a guarantee that the price advertised still applies to any goods from which an order is to be placed.

10. Help Line

Always ensure when purchasing a PC or related equipment that you are fully protected and have access to a "HELP" line service.

Personal Computer World Buyer's Charter

1. Private Individual Reader's Protection

When you purchase goods as a Private Individual Reader from a Great Britain Supplier's advertisement in PERSONAL COMPUTER WORLD and pay in advance of delivery to that Supplier who subsequently goes into receivership administration liquidation or bankruptcy or ceases to trade prior to delivery of the goods you may under the Buyer's Charter qualify for compensation from PERSONAL COMPUTER WORLD provided that you have:-

(i) not had your money returned by the Supplier;

(ii) have followed the PERSONAL COMPUTER WORLD guidelines when placing your order and have taken all reasonable steps to effect delivery or refund;

(iii) have retained as proof and for verification purposes:-

(a) a copy of the original advertisement

(b) a copy of the PERSONAL COMPUTER WORLD Order Form

(c) comprehensive proof of payment

2. Claims

(a) Claims must be submitted in writing to the customer services manager of PERSONAL COMPUTER WORLD with full details of the claim not earlier than 28 days and not later than 3 months from the official sale date of the relevant issue of PERSONAL COMPUTER WORLD.

Claims received outside this period will not qualify under any circumstances for compensation under the Buyer's Charter. The official sale date of PERSONAL COMPUTER WORLD is the first Thursday of each month.

(b) Once a Supplier has become subject to insolvency proceedings or has ceased to trade, PERSONAL COMPUTER WORLD guarantees to process as expeditiously as possible any private individual reader's claim properly made and submitted.

(c) If there are insufficient tangible assets available processing of claims under the Buyer's Charter will commence immediately.

(d) If there are assets available and it has been confirmed that a dividend will be made then pending payment of a dividend claimants under the Buyer's Charter will receive compensation for any shortfall existing after the payment of such a dividend.

(e) Payments by PERSONAL COMPUTER WORLD will take into consideration and reflect on the rights the Private Individual Reader might have against third parties such as credit card or insurance companies.

(f) PERSONAL COMPUTER WORLD reserves the right to take an assignment of any claim made by a Private Individual Reader as a condition of making a payment under the Buyer's charter.

3. Limitations

(a)PERSONAL COMPUTER WORLD's Liability under the Buyer's Charter will not exceed £2,000 in respect of any claim submitted by any one Private Individual Reader and in any event will not exceed £100,000 in respect of claims submitted by any Private Individual Reader against all Suppliers in any one calendar year. Any additional payments by PERSONAL COMPUTER WORLD will be made entirely at the publisher's discretion.

(b) The Buyer's Charter only applies to advance payments made by Private Individual Readers and as a direct response solely to goods itemised in display advertisements in the magazine; it does not include goods purchased from classified advertisements, loose inserts, catalogues or other sales material obtained from any relevant advertiser.

(c) The Buyer's Charter is designed to safeguard the Private Individual Reader not companies, societies, organisations, unincorporated bodies or any other commercially orientated outlet of any description. There is no protection for goods purchased from outside Great Britain or goods purchased for resale.

ORDER FORM

Personal Computer World

Use this form when you order by phone, fax or post.

ALWAYS KEEP A COPY !

SUPPLIER'S DETAILS

COMPANY .....

SALESPERSON'S NAME .....

ADDRESS .....

.....

.....

..... POSTCODE .....

DATE OF TELEPHONE ORDER ..... / ..... / ..... TIME .....

ORDER REFERENCE NUMBER (IF QUOTED) .....

DISPATCH REFERENCE NUMBER .....

CUSTOMER DETAILS

NAME .....

COMPANY .....

ADDRESS .....

.....

.....

..... POSTCODE .....

DATE OF TELEPHONE ORDER ..... / ..... / .....

ORDERED BY: ❑ TELEPHONE ❑ FAX ❑ POST

ADVERT APPEARED IN PCW:

ISSUE DATE ..... PAGE .....

QUANTITY	DETAILS OF ORDER	UNIT COST £	TOTAL £

METHOD OF PAYMENT

❑ PERSONAL CHEQUE ❑ PURCHASE ORDER ❑ CREDIT CARD

❑ C.O.D ❑ CHARGE CARD ❑ OTHER (SPECIFY) .....

CREDIT CARD COMPANY ..... START DATE ..... / ..... / .....

CHARGE CARD COMPANY ..... START DATE ..... / ..... / .....

CARD NUMBER EXPIRY DATE ..... / ..... / .....

❑❑❑❑ ❑❑❑❑ ❑❑❑❑ ❑❑❑❑

SUB TOTAL	
DISCOUNT	
CARRIAGE	
SURCHARGES	
VAT	
TOTAL	

DELIVERY DETAILS

DELIVERED TO (ADDRESS)
(IF DIFFERENT FROM ABOVE) .....

.....

..... POSTCODE .....

AGREED DELIVERY DATE ..... / ..... / .....

❑ TERMS OF WARRANTY ❑ MONEY BACK

❑ RETURNS POLICY ❑ COST OF EXTENDED WARRANTY

❑ HELPLINE

Details: .....

.....

SIGNED ..... DATE ..... / ..... / ..... DAYTIME TELEPHONE NUMBER .....

CAST IRON BACKUP

Service

Specialists to assist in your selection - identify and match your requirements - ultimately this will save YOU time and money.

Technical Support

Dedicated technical staff to assist in installation and after...

The 3 e's Proven Track record

Experience and expertise in processing orders efficiently is reflected in our solid client base comprising of Universities, Government bodies, Financial Institutions, etc.

Full Manufacturers Warranty

All products are authorised UK versions and carry a full manufacturers warranty.

Overnight Delivery

All stocked orders are dispatched the same day. Delivery charged at £8 plus VAT.

You Are The Final Judge

We have chosen with care, and we guarantee, you will be happy when you order from us. If you are not satisfied with your purchase for any reason, just return it to us within 14 days, and we will promptly exchange it or send you a refund as you request. Please contact our sales office.

Managing Director
Computer Bits & PCs Plc

COMPUTER BITS & PCs PLC

INVESTING IN SERVICE

Optical Drives

		INT	EXT
FUJITSU			
12512	230MB 3.5" Bare Drive	£430	£494
HEWLETT PACKARD			
1716T	1.3GB MultiFunctional Drive	£1440	£1622
PANASONIC			
F-7300	1.5GB MultiFunctional Drive	£1510	£1590

IBM XYRATEX

Includes SCSI terminator, software installation, user guides for the appropriate operating system and includes a free medial

IBM Xyratex

3000	230MB Unix version	£667
3000PP	230MB Parallel Port Kit	£667
3000DOS	230MB DOS/OS2 Kit	£583
5000UN	1.3GB Unix Version	£1783
5000DOS	1.3GB DOS/OS2 Kit	£1698

CD-ROM

		INT	EXT
HITACHI			
CDR1950S	SCSI-2 5MB/s transfer, 235ms access 256kb buffer bare unit	£225	
CDR1950SY	Specs as CDR1950S, includes ISA Bus Kit cables and software	£367	
CDR1950SZ	Specs as CDR1950S, includes MCA Bus Kit cables and software	£440	
CDR1950PP	Parallel Port Version	£375	
CDR6550	SCSI300kb/s 270MS access bare drive	£135	£199

PIONEER

DRU-104X	614kb/sec 190MS access bare drive	£195
DRM602X	Six Disk Magazine system with double speed drive	£390
DRM604X	Six Disk Magazine system with quad speed drive	£795

Hard Drives

SEAGATE 3.5" IDE (2 year warranty)			
ST3660A	540MB	14MS	£142
ST3780A	730MB	12MS	£199
ST31220A	1.08GB	12MS	£274
3.5" SCSI (2-5 year warranty)			
ST5660N	545MB	12MS	£219
ST31230N	1.05GB	9MS	£375
ST32430N	2.15GB	9MS	£745
ST32550N	2.15GB	8MS	£795
ST1515ON	4.29GB	8MS	£1258
ST15230N	4.3GB	10.5MS	£1057
ST410800N	9.0GB	10MS	£2440
CONNER 3.5" IDE (2 year warranty)			
CFA850A	850MB	12MS	£223
CFA1275A	1.27GB	12MS	£316
3.5" SCSI (2-5 year warranty)			
CFP1060S	1.06GB	9MS	£399
CFP2105S	2GB	9MS	£793
MICROPOLIS 3.5" SCSI (5 year warranty)			
MIC3221	2.05GB	8.5MS	£671
MIC3243	4.2GB	8.5MS	£1030
5.25" SCSI			
MIC1991	9.1GB	12MS	£1905
AUDIO VISUAL DRIVES 3.5" SCSI (5 year warranty)			
MIC3221AV	2.05GB	8.5MS	£735
MIC3243AV	4.2GB	8.5MS	£1103
5.25" SCSI (5 year warranty)			
MIC1991AV	9.1GB	12MS	£2010
HITACHI 3.5" SCSI (5 year warranty)			
DK326	1.GB	10MS	£372
5.25" SCSI (5 year warranty)			
DK537	2.9GB	12MS	£1411
HEWLETT PACKARD 3.5" SCSI (5 year warranty)			
C3323A	1.05GB	9.5MS	£375
C2490A	2.1GB	9MS	£709
QUANTUM 3.5" IDE (2 year warranty)			
MV540AT	540MB	14MS	£144
LGT730AT	730MB	11MS	£186

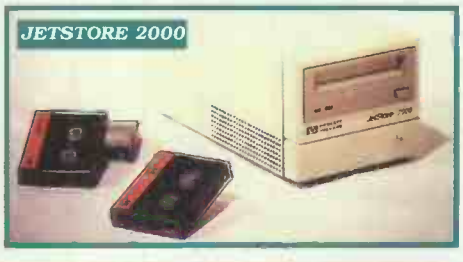
3.5" SCSI (2-5 year warranty)			
LGT540	540MB	11MS	£169
LGT730	730MB	11MS	£195
ATL2150S	2.1GB	8.6MS	£716
GPX4280S	4.28GB	8.6MS	£1129
WESTERN DIGITAL 3.5" IDE (3 year warranty)			
AC2700	730MB	10MS	£180
AC2850	850MB	10MS	£190
AC3100	1GB	10MS	£270
MAXTOR 3.5" IDE (3 year warranty)			
7420AV	420MB	11MS	£129
7540AV	540MB	11MS	£155
7850AV	850MB	11MS	£235
71260AV	1.26GB	11MS	£299

Tape Back Up

		INT	EXT
DIGITAL AUDIO TAPE BACKUP (DAT)			
WANGDAT			
3100	2GB 4mm DAT	£599	£699
3200	2/8GB 4mm DAT	£650	£750
SONY			
SDT5200	4GB 4mm DAT-DDS 2	£575	£649
SDT5000	4/16GB 4mm DAT-DDS 2	£620	£705
EXABYTE			
8205	2.5 - 5GB 8mm	£875	£975
8505XL	7 - 14GB 8mm	£1450	£1550
HEWLETT PACKARD			
HP 35470	2GB 4mm DAT	£525	£625
HP 35480	8GB 4mm DAT	£620	£720
C1533A	4-16 GB 4mm DAT-DDS 2	£738	£827
C1553A	48GB Autoloader	£1525	£1625

HEWLETT PACKARD JETSTORE - EXTERNAL KITS

2000	2GB DAT System & Cheyenne Arcserve/solo software and ISA Host Bus Adaptor	£881
5000	4GB DAT System & Cheyenne Arcserve 4.0 Software (250 User Version) & ISA Host Adaptor	£1495
6000	8GB DAT system & Cheyenne Arcserve version 5.1 software (250 user version) and ISA host adaptor	£1993



HEWLETT PACKARD JETSTORE - BARE UNITS

2000	2GB DAT Drive	£616	£755
5000	4GB DAT Drive	£705	£805
6000	8GB DAT Drive	£850	£950

TAPE BACKUP

COLORADO

Trakker	340MB Parallel Port Drive	£225
Trakker	680MB Parallel Port Drive	£315

TANDBERG DATA

The range below includes Drive, Adaptec 1510 Controller, Data Cartridge (appropriate capacity) Firstserve Software, Cables and Installation Manual.

FS250	250MB Tape Drive	£532	£646
FS525	500M Tape Drive	£673	£787
FS1200	1.2GB Tape Drive	£797	£910
FS2000	2.5GB Tape Drive	£890	£976

Removable Storage

MINISTOR PCMCIA - HARD DISKS

MP130P	130/260MB	£216
MP340P	171/340MB	£320
Cardwize	Docking Station	£205

(Docking Staion enables migration of data between portables & desktops easily)

MOUNTAINGATE - REMOVABLE HARD DISKS

Passport		
QP170	170MB	£422
QP240	270MB	£530
QP525	525MB	£1045

Internal & External Kits available for the Above.

TEL. 0171-359 8898 FAX. 0171-359 1812

COMPUTER BITS & PCs PLC

133 UPPER STREET, ISLINGTON, LONDON, N1 1QP.

E & OE - prices are subject to change. All prices exclude VAT.

ADVERTISERS INDEX

Personal Computer World

A

AJP Business Computers Ltd 18
ATT Corporation (UK) Plc 17
Ace Multimedia 350
Acer (UK) Ltd 396/397
ACI Ltd 19
Adams Technology 41/45
Admincure Ltd 68/69
Admincure Ltd 70/71
Allgem 453
Alternatives 157/161
Amstrad Consumer Electronics plc (*plus insert*) 485/488
Apricot (UK) Ltd (*plus insert*) 388/389
Apricot (UK) Ltd 460/461
Artisoft 439
Aztech (UK) Ltd 437

B

Best Buys Office Equipment Direct Ltd 56/61
Blackwell Science Publications Ltd 649
Budget Workstations 490
Business Data and Communications Sy 90/91
Byte Direct 511/517
Bytewise Ltd 144/145

C

C&T Group 146/147
CAE Office Supplies Ltd 39
CD Revolution Ltd 625
CD Revolution Ltd 654/655
Canon Europe MV 400/401
Cherry Microschalter GmbH 168/169
Compaq Computers Ltd 344/345
Compaq Computers Ltd (*insert*) 452/453
Compu-Sys 32/33
CompuServe 429
Computer Bits and PC's plc 699
Computers Unlimited 416
Computers By Post (*Look for red/black chevrons*) 123/134
Computers By Post – Toshiba Portables & Accessories NEW MODELS 123
Computers By Post – Compaq Presario CDS 524 – NEW 124
Computers By Post – Portable Sound Speaker System 124
Computers By Post – Portables & Desktop PC's 124
Computers By Post – ADI Monitors – NEW 124
Computers By Post – Uninterruptable Power Supplies 124
Computers By Post – The Total Business PC – SPECIAL OFFER 125
Computers By Post – Aztech Quad CD ROM Drive AWARD WINNER 126
Computers By Post Sound Galaxy WaveRider 32 AWARD WINNER 126
Computers By Post – Summagraphics Digitisers & Plotters 126
Computers By Post – USR Sportsters – VOUCHER OFFER 126
Computers By Post – Win/TV Celebrity & Prisma VIDEO GRABBERS 126
Computers By Post – Texas Instruments m'media notebooks AWARD WINNER 127
Computers By Post – Epson EPL Laser Printers 128
Computers By Post – Brother HL-630 Laser Printer – GO GDI 128
Computers By Post – HP Printers – NEW 128
Computers By Post – Texas Instruments Printers 129
Computers By Post – Kyocera FS-400 NEW/LOW RUNNING COST 129
Computers By Post – Corel's latest software 130
Computers By Post – Globalink Language Assistants 130
Computers By Post – Visio 3 for Windows 130
Computers By Post – Spellwrite & Bubblehelp for Windows – NEW 130
Computers By Post – Epson Scanner Range 131
Computers By Post – Novell Perfect Office – BEST SELLER 132
Computers By Post – Microsoft Software 132
Computers By Post – STAC Reachout BRAND NEW COMMS SOFTWARE 132
Computers By Post – FastCAD, NEW, NEW PRODUCTS 132
Computers By Post – Mice & Keyboards 132
Computers By Post – IBM OS/2 WARP with Win OS/2 & STAC bundle 133
Computers By Post – Software 134
Computing Plus 535
Corel 349

D

Dabhand Computing Ltd 595
Dabs Direct 606/609
Dakota Computer Solutions Ltd 36
Dan Technology 23/29
Datapath 339
Dataplex 483
Dell Computer Corporation 2/3/5
Dell Computer Corporation IFC
Dell Computer Corporation 444/445
Digital Equipment Co Ltd 364/365

E

EQ Consultants 600
Electrone Ltd 590
Elite Software Products Ltd 197
Elonex 384/385
Epson (UK) Ltd 341
Epson (UK) Ltd 377
Euro Asia Systems 142/143
Evesham Micros 200/213
Evesham Micros 683
Express Technology 580

F

Farnell Tandberg Data Ltd 354
First Choice Computer Centre 122

G

Gateway 2000 Europe (*plus insert*) 37
Graphics Direct 586/587
Greymatter 701

H

Hewlett Packard 10/11
Hi-Grade Computers Ltd 72/74
Highmead Technologies Ltd 135/141

I

IBM (UK) Ltd 332/333
ICL Fujitsu 443
ICL Fujitsu 456
ICL Fujitsu 470
Ilyama UK Ltd 440
Intuit Software Ltd 375
Intuit Software Ltd 522/523
Intuit Software Ltd 525
IPC Direct 688/695
Indi Direct/Calculus Stores 154/156

K

Kewill Systems Plc 371
Keyzone Computer Products Ltd 620
Kyocera Electronics (UK) Ltd OBC
Kyodai Electronics 187/195

L

LG Electronics UK Ltd 430/431
Lantec Information Services Ltd 105/107
Lapland UK Ltd 34/35
Leaf Distribution LTd 580
Leonardo Computer Systems Ltd 600
Lexmark International Ltd 379
Loadplan Ltd 544
Logitech SA 521
Logitek Distribution Ltd 536/537

M

MPC International UK Ltd 356
Marktech Systems Ltd 535
Mr PC – Systems 148/149
Mr PC – Systems + Peripherals 150/151
Mr PC – Software 152/153
Mr PC – Compaq Presario 196
MJN – Pentium 170
Memory Bank 282/321
Micro Warehouse 557/569
Micro-Rent Plc 613
Microfield 228
Microfield 40
Microsoft (UK) Ltd 373
Microsoft (UK) Ltd 425
Microtechnics 678
Mikrotek Electronics Europe GmbH 473
Mitac Europe Ltd 22
Monitors Direct 391
Morgan Computer Company 335
Morgan Computer Company 337
Morgan Computer Company 415
Multimax Ltd 229

N

Netland (UK) Ltd 20/21
Nexgen 434
Novatech 75/79

O

Obodex Computers Ltd 448
Olivetti Systems & Networks Ltd 392/393
Opti International Ltd 506/507
Optimum Technology Ltd 16
Opus Technology Plc 404/405
Opus Technology Plc 406/407
Orchid (Europe) Ltd 433
Orion Technology Ltd 576

P

P&P Micro Distributors plc 101/104
Panasonic Ind (UK) Ltd (*insert*) 324/325
Panasonic Ind (UK) Ltd 381/382
Paradigm Technology 360
Paragon Computers Ltd 38
Patriot Computers 465/467
Peripheral Warehouse – MS Mouse 197
Peripheral Warehouse – Peripherals 198/199
Pico Direct T/A DIP Systems Ltd 66/67
Portable Computers Ltd 478/479
Powermark plc 282/321
Powermark plc – Memory Feature 282/285
Powermark plc – Laserprinter Memory Feature 286
Powermark plc – Cyrix Feature 287
Powermark plc – Intel OverDrive Feature 287
Powermark plc – Seagate Feature 288
Powermark plc – Hard Disk Feature 288
Powermark plc – Conner Hard Disk Feature 289
Powermark plc – Xyratex Storage Feature 289
Powermark plc – Syquest Storage Feature 290
Powermark plc – HP – Colorado Feature 290
Powermark plc – Iomega Tape Backup Feature 291
Powermark plc – Future Domain Feature 291
Powermark plc – MicroSolutions Feature 291
Powermark plc – Conner Backup Feature 292
Powermark plc – WangDAT/WangTEK Feature 292
Powermark plc – Cheyenne Feature 292
Powermark plc – Verbatim Feature 292
Powermark plc – Trust Scanners Feature 292
Powermark plc – HP Scanners Feature 292
Powermark plc – Multitech Modem Feature 294
Powermark plc – Dynalink Modem Feature 294
Powermark plc – DFI Modem Feature 295
Powermark plc – US Robotics Modem Feature 296
Powermark plc – Pace Fax Modem Feature 296
Powermark plc – Lasat Modem Feature 297
Powermark plc – Trust Modem Feature 297
Powermark plc – Hayes Modem Feature 298
Powermark plc – Psion Modem Feature 298
Powermark plc – Zoom Modem Feature 298
Powermark plc – Racal Modem Feature 299
Powermark plc – Artisoft Feature 300
Powermark plc – 3COM Feature 301
Powermark plc – Novell Feature 301
Powermark plc – Xircom Feature 301
Powermark plc – SMC Networking Feature 302
Powermark plc – Fiskars UPS Feature 302
Powermark plc – Intel Networking Feature 303
Powermark plc – Trust Networking Feature 303
Powermark plc – Network Accessories Feature 303
Powermark plc – Kyocera Printer Feature 305
Powermark plc – OKI Printer Feature 306
Powermark plc – Canon Printer Feature 306
Powermark plc – Citizen Printer Feature 306
Powermark plc – Brother Printer Feature 307
Powermark plc – Video Training Feature 307
Powermark plc – CD ROM Drives, Sound Cards and Speakers Feature 308
Powermark plc – Trust Multimedia Feature 309
Powermark plc – Goldstar CD ROM Feature 309
Powermark plc – Creative Labs Feature 310/311
Powermark plc – NEC CD ROM Drive Feature 311
Powermark plc – Toshiba CD ROM Drive Feature 311
Powermark plc – Taxan Feature 312
Powermark plc – Miro Video Feature 312
Powermark plc – VideoLogic Feature 313
Powermark plc – Diamond Multimedia Feature 313
Powermark plc – PC Guardian Feature 313
Powermark plc – Microsoft Feature 314
Powermark plc – CD ROM Feature 315
Powermark plc – IBM OS/2 Warp Feature 316
Powermark plc – Dr Solomon's Feature 316
Powermark plc – Gold Disk Feature 317
Powermark plc – Compuserve Feature 317
Powermark plc – Software 318/321

R

R & D Technology Ltd 162/163
RTM Systems 496
Reflex Ltd 544
Richnight Limited 164
Rock Computer Corporation 492/493
Roldec Systems Ltd 165/167

S

S&S International Ltd 533
S&S International Ltd 535
SMC Computers for SCSI hard disk drives 80
SMC Computers for IDE hard disk drives 81
SMC Computers for Removable drives 82
SMC Computers for Parallel port hard & floppy disk, CD ROM and tape drives 82
SMC Computers for Tape Drives 83
SMC Computers for DAT Drives 83
SMC Computers for Memory Modules 84
SMC Computers for SIMM Memory 85
SMC Computers for Motherboards 85
SMC Computers for CPUs 85
SMC Computers for Sound cards from Sound Blaster Orchid and Gravis 86
SMC Computers for CD ROM drives from Panasonic, NEC Toshiba, Orchid, Creative Labs and Pioneer 87
SMC Computers for Personal Computer Systems – last 88/89
STAC Electronics (UK) Ltd 529
Sage Systems Ltd 358/359
Sareen Software 421
Scanner Technologies Ltd 576
Semaphore Systems Ltd 98/99
Shapeware Corporation 352
Simply Computers – Systems DPS 46/47
Simply Computers – DIY Hard Drives 48/49
Simply Computers – DIY CD Rom Kits 50/51
Simply Computers – DIY VGA Cards 52/53
Simply Computers – DIY Accounts 54/55
Software Warehouse – Novell Wordperfect (L) 214
Software Warehouse – Intro (R) 215
Software Warehouse – Accounts 216
Software Warehouse – CAD 217
Software Warehouse – Databases 218
Software Warehouse – Forms 219
Software Warehouse – Graphics 220
Software Warehouse – Home 221
Software Warehouse – Operating Systems 222
Software Warehouse – Utilities 223
Software Warehouse – Business Plan Builder 224/225
Software Warehouse – Lotus Smartsuite 226
Software Warehouse – First Aid 227
Solidisk 702
Solwise Ltd 544
Super Money Savers 596
Syquest Computers 324
System Science (Systematika) 540
System Science (Systematika) 645
System Science (Systematika) 665

T

TEC Computers Ltd 100
Taxan 459
Tech Direct 62/65
TechnoWorld – IBM, Compaq and HP Computers & Printers
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TechnoWorld – US Robotics Modems, Microsoft Software
New Compaq Presarios 742, 942
Technomatic Ltd for HP Laser Printers 230
Technomatic Ltd for HP Laser Printers 231
Technomatic Ltd for HP Computers 232
Technomatic Ltd for HP Network Servers 232
Technomatic Ltd for HP Computers 232
Technomatic Ltd for HP Peripherals 232
Technomatic Ltd for Compaq Computers 234
Technomatic Ltd for IBM Computers 234
Technomatic Ltd for US Robotics 235
Technomatic Ltd for Taxan Monitors 236
Technomatic Ltd for Genius Network Products 236
Technomatic Ltd for Multitech Modems 237
Technomatic Ltd for Cyrix 238
Technomatic Ltd for 3 COM 238
Technomatic Ltd for Xircom 239
Technomatic Ltd for Hayes 239
Technomatic Ltd for Nokia 239
Technomatic Ltd for Psion Dacom 239
Technomatic Ltd for Laser Printers 240
Technomatic Ltd for Inkjet Printers 240
Technomatic Ltd for Dot Matrix Printers 240
Technomatic Ltd for Plotters & Tablets 240
Technomatic Ltd for A4 & Hand Scanners 241
Technomatic Ltd for Printer Accessories 241
Technomatic Ltd for Modems 241
Technomatic Ltd for OVERDRIVES & Memory Upgrades 242
Technomatic Ltd for Networking Products 243
Technomatic Ltd for Monitors 244
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Technomatic Ltd for Overhead Projection Panels 244
Technomatic Ltd for Keyboards 244
Technomatic Ltd for Mice 244
Technomatic Ltd for Hard Disk Drives 245
Technomatic Ltd for Tape Backup Solutions 245
Technomatic Ltd for PC Accessories 245
Technomatic Ltd for Multimedia CD-ROM Drives 246
Technomatic Ltd for Multimedia Sound cards & kits 246
Technomatic Ltd for CD ROM Titles 247
Technomatic Ltd for Creative 248
Technomatic Ltd for Hauppauge WIN TV 249
Technomatic Ltd for Technoserve 250
Technomatic Ltd for E-IDE 250
Technomatic Ltd for IBM Voicetape 250
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Technomatic Ltd for Pressworks 251
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Technomatic Ltd for Microsoft, Compaq, Sage Special Offer 253
Technomatic Ltd for Textbridge OCR Simply 3D, Alpha 5 254
Technomatic Ltd for Norton Utilities, Norton Anti-Virus 254
Technomatic Ltd for PC Anywhere, PC Tools, XTree Gold 4 254
Technomatic Ltd for Novell Perfect Office 3.0 255
Technomatic Ltd for Accounting 256
Technomatic Ltd for Spreadsheet Software 256
Technomatic Ltd for Integrated Software/Office Suites 256
Technomatic Ltd for Database Software 256
Technomatic Ltd for Word Processing Software 256
Technomatic Ltd for OCR 256
Technomatic Ltd for Contract Management 257
Technomatic Ltd for Project Manager 257
Technomatic Ltd for Charts and Diagrams 257
Technomatic Ltd for Desktop Publishing 257
Technomatic Ltd for Graphics and Design 257
Technomatic Ltd for Upgrades 257
Technomatic Ltd for Coreldraw Products 257
Technomatic Ltd for Visio 3 257
Technomatic Ltd for Leisure 258
Technomatic Ltd for Language Translators 258
Technomatic Ltd for Development 258
Technomatic Ltd for Maths and Statistics 258
Technomatic Ltd for CAD 258
Technomatic Ltd for Mouse and Keyboards 258
Technomatic Ltd for Antivirus 258
Technomatic Ltd for Memory Management 258
Technomatic Ltd for Limited Offers 258
Technomatic Ltd for Maps and Routes 258
Technomatic Ltd for Delphi 258
Technomatic Ltd for Utilities Software 259
Technomatic Ltd for Operating Systems 259
Technomatic Ltd for Networking 259
Technomatic Ltd for Unix 259
Technomatic Ltd for Electronic Mail 259
Technomatic Ltd for Communication 259
Technomatic Ltd for Datatalk, Winport 259
Tektronix Inc 427
Texas Instruments (*insert*) 356/357
The Electronic Frontier Ltd 474
Time Catalogue – Buyers Guide 171
Time Catalogue – Intro 172/173
Time Catalogue – IBM Aptiva 174
Time Catalogue – Multimedia 175
Time Catalogue – Aptiva Solution 176
Time Catalogue – MM Power PC 177
Time Catalogue – Compaq 178/179
Time Catalogue – Mitac 486 & 586 180
Time Catalogue – Mobile Comms 181
Time Catalogue – Lotus S/W 182
Time Catalogue – Bussss S/W 183
Time Catalogue – Education S/W 184
Time Catalogue – MM S/W 185
Time Profile 94
Time Direct – Compaq 108/109
Time Direct – Toshiba 110/111
Time Direct – IBM Thinkpad 112/113
Time Direct – Desktop & Networking 114/115
Time Direct – Hewlett Packard 116/117
Time Direct – Notebooks & Software 118/119
Time Direct – Texas Instruments & Kyocera 120/121
Tiny Computers Ltd 552
Tiny Computers Ltd 618
Tiny Computers Ltd 658
Tiny Computers Ltd 672/673
Toshiba Information Systems 328/329

U

UK Flex Ltd 95/97
Universal Control Systems 169

V

VNU Business Publications 452
VNU Business Publications 599
VNU Business Publications 617
Viglen Computer Supplies IBC, 704/711
Vine Micros Ltd 613
Vossnet Communications Ltd 395

W

Watford Computers Ltd 546/549
Watford Electronics – Universa PCs 260
Watford Electronics – Universa PCs 261
Watford Electronics – New Perfecta Notebook 7000 262
Watford Electronics – Networking 263
Watford Electronics – Genius/Syquest 264
Watford Electronics – Scanners 264
Watford Electronics – Modems 266
Watford Electronics – Aries/Panasonic Monitors 267
Watford Electronics – Videologic/Software 268
Watford Electronics – WordPerfect 269
Watford Electronics – Software Listing 270
Watford Electronics – Software Listing 271
Watford Electronics – Software Listing 272
Watford Electronics – Software Listing 273
Watford Electronics – Microsoft 274
Watford Electronics – Brother/OKI/HP Printers 275
Watford Electronics – Multimedia CD Offers 276
Watford Electronics – Creative Labs 277
Watford Electronics – Multimedia Listing 278
Watford Electronics – Printer Listing 279
Watford Electronics – Monitor/Video Listing 280
Watford Electronics – Last Page Misc Listing 281
Wearnes Thakral (UK) Ltd 411
Wearnes Thakral (UK) Ltd 413
Western Systems (Europe) Ltd 498/501
Westlakes 592
Wolfram Research 540

X

Xerox Imaging Systems (UK) Ltd 504
Xing 536/537
Xitec Elite Corporation Europe Limited 30/31

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There are five new games with full source code - Turbo Meteors (an Asteroids-like game), Turbo Blocks, Turbo Cribbage, Turbo 21, and Turbo Mah Jongg, and several free VBX's including a deck of cards, dice, gauges, & sliders.

Elements from Borland C++ include the full IDE with integrated GUI debugger, BRIEF-based editor, C++ object browser, and multi-target project manager, plus their application framework OWL 2.5 and OCF (Object Components Framework) for OLE 2.0 support. Plus all the latest C++ features like templates, exceptions and RTTI (run-time type information).

AppExpert & ClassExpert make it easy to create new programs. Users simply select program options such as OLE support, print preview and toolbars. AppExpert generates full source code for the new app, then ClassExpert can modify it by creating & editing classes, and responding to Windows messages. Call for full details (no pricing yet).

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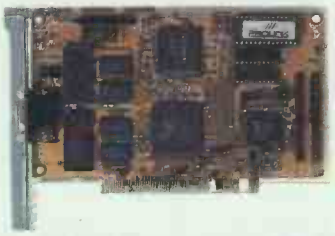

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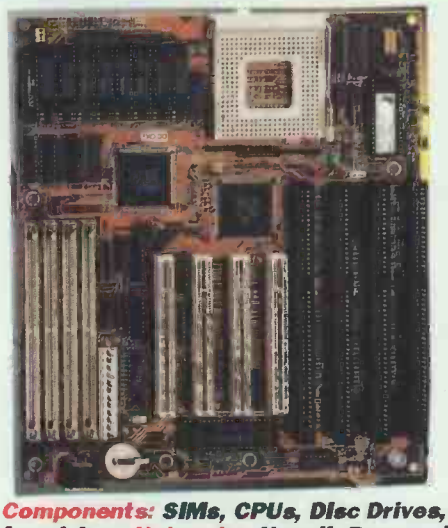

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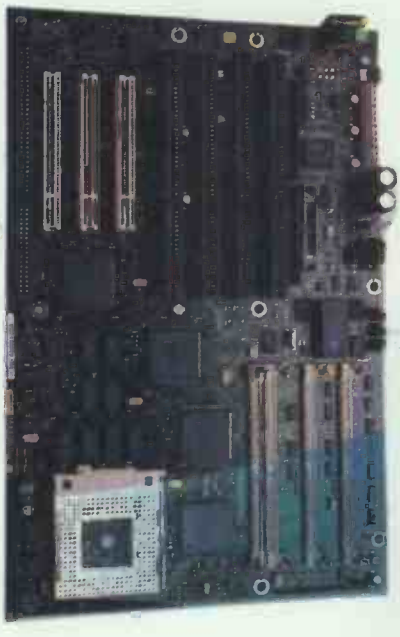

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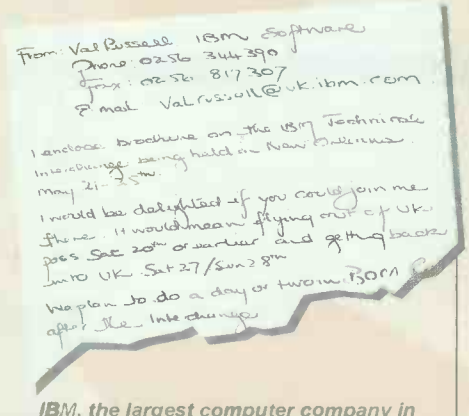
Chipchat

• Microsoft recently unveiled its new product testing environment — a 2,000-square-foot living space complete with a freezer full of ice cream, dog-eared paperbacks on the shelves, old photos on the fridge, and a pot of hot coffee on the burner. The idea is to test new products in an environment more similar to the one in which they'll end up. "When you sit in a soft chair with a drink in one hand and a remote in the other, it becomes a more realistic experience," says Microsoft's consumer division VP. Presumably you use your third hand to control the mouse...

• If you're one of the many PC users still worried enough about Pentium bugs to consider replacing yours, don't expect the chip to slide easily out of its ZIFF socket. As reported in sister magazine *PC Week*, it appears that Intel has started glueing its processors *in situ* following a series of disappearances from its warehouses.

Luckily, there's an easy way to get round this. Just remove the heat sink and keep the machine running for a while. The Pentium runs so hot it melts the glue...



IBM, the largest computer company in the world, produces mainframes, operating systems, PCs — practically everything. Of course, you'd expect people from a company at the vanguard of technology to use the technology. Surprising then that Val Russell from IBM Software, despite being surrounded by thousands of PCs running OS/2, prefers to rely on a pen and paper

• A puzzled reader who works for a company in Cirencester has recently been receiving vast quantities of mail addressed to Intel Corporation — based some 15 miles away in Swindon. The address on all of these parcels is exactly the same but totally wrong for Intel — and, according to the post office, the post code doesn't exist.

Rumours that Royal Mail has just standardised on Pentium PCs are, of course, totally unfounded...

• Computer theft is not the most amusing subject, but we had to laugh at an article spotted by a reader in a Hampshire local paper which mentioned that in a recent robbery, as well as hard disks and motherboards, thieves had made off with "four Rams". Truly a bit of baaad luck...

• Games magazine *PC Zone* recently redefined the term 3D action when it gave away a cover CD boasting over 1,000 WAD files for the popular shoot 'em up Doom. The files, gleaned from various public domain libraries across the globe, are designed to enhance your fun with new levels, graphics and sounds.

Unfortunately, its quality control team didn't spot the subtly named XXXWAD which texture-maps the walls of the game with pornographic images. Some people were not amused. Goodness knows what it does to the rocket launcher...

• We always knew those designers at IBM had a wacky side, and this month it was confirmed when a reader spotted a suspect instruction in a PowerPC programming manual:

```
Opcode: Enforce In-Order Execution of I/O – eieio
```

• Bill Gates is shifting the goal posts for the launch date of Windows 95 yet again. At a recent press conference he announced: "August is likely, but it's not guaranteed and it's not the highest priority." *PCW* has also heard rumours that big G is pushing a further name change to ease development problems. Apparently, the new version of the OS is now called WinEver...

• We got a letter from Intel last month pointing out that the name Pentium is a trademark and should bear a ™ sign, followed by the word "processor". Naturally we resisted, pointing out that this would in all probability lose us at least half a page of editorial, and that if every other company followed suit we would lose about six pages an issue — and also, that those pages which remained would be festooned with ugly signs like they are in the US, where lawyers make huge sums drawing up and enforcing daft rules. The British way, we said, was to be sure to capitalise those trademarks like Hoover and Tannoy that have become part of the vernacular. "Oh," said the lady from Intel, "we have trademarked Pentium with a small 'p'."

Looking for a new computer desk? Why not combine the benefits of new technology with the beauty of antique furniture, and invest in an Albert Plumb original. Who could resist?

The DOSSIER® Range ADVANCED SOUND

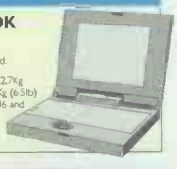
THE NOTEBOOK PC THAT OFFERS POWER, FLEXIBILITY AND MULTIMEDIA SOUND

YOUR CHOICE OF CASE STYLE

NOTEBOOK

Dimensions (W x H x D) mm: 279 x 43 x 216 closed.

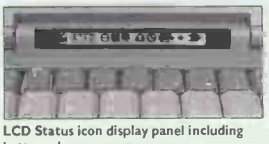
Weight with battery: 2.7kg (6lb) for mono, 2.95Kg (6.5lb) for colour Dossier 486 and 3.09Kg (6.8lb) for colour Dossier P5.



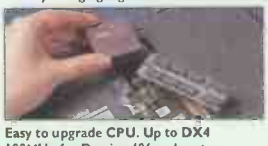
The Viglen Dossier® ADVANCED Sound is a range of portable notebook sized PCs that offer flexibility and power for people on the move. This range provides many advanced features that rival even the most powerful desktops. It is available in two main processor ranges, the Dossier® 486 processors ranging from 486SX 25MHz to 486DX4 at 100MHz, and the Dossier® P5 for Pentium processors from 75MHz to most powerful 90MHz. There is a choice of exceptional colour screen types for each range (Dual Scan or a high contrast fast TFT) and a Mono screen for 486 models. In addition to the features shown on the left, the Dossier® ADVANCED Sound includes sound hardware compatible with SoundBlaster and Microsoft Sound system allowing you to manipulate sound and music to enhance your productivity. Plus there is a whole range of accessories and upgrades including a docking station, PCMCIA cards, external speakers, car battery adaptor and many more, making the Dossier® ADVANCED Sound a notebook that needs to be seen and heard to be believed!

MICROSOFT WINDOWS READY-TO-RUN

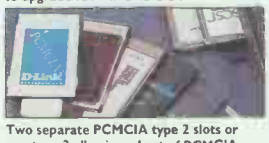
MS-DOS 6.22



LCD Status icon display panel including battery charge gauge.



Easy to upgrade CPU. Up to DX4 100MHz for Dossier 486 and up to Pentium 90MHz for Dossier P5. Also easy to upgrade RAM and hard disk.



Two separate PCMCIA type 2 slots or one type 3 allowing a host of PCMCIA cards (for modems, networks, storage and more) to be used.

Docking station accessory option. Just slip the Dossier ADVANCED Sound into the docking station to transform it into an instant desktop system.

LOOK AT THIS SPECIFICATION

Dossier® 486:

- Intel SL enhanced 486SX 25MHz, 486DX2 50MHz, 486DX2 66MHz, 486DX4 75MHz and 486DX4 100MHz.
- 4MB RAM, upgradeable to 20MB.
- 170MB HD upgradeable to 720MB.
- Choice of Mono (9.5" STN), Colour DSTN (10.3" Dual Scan STN), or Colour TFT (9.5" TFT) screen.
- Battery Life: 5.5 hours on 486SX mono with full power management, 4 hours without, 4 hours on 486SX colour with full power management, 2 hours without. (high processor speeds will reduce battery life).

Dossier® P5:

- Intel Pentium processor 75MHz and 90MHz.
- 8MB RAM, upgradeable to 40MB.
- 540MB PCI IDE HD, upgradeable to 720MB.
- Choice of Colour DSTN (10.3" Dual Scan STN), or Colour TFT (10.4" TFT).
- Battery Life: 2 hours on Pentium 75MHz colour with full power management, 1.5 hours without. (high processor speeds will reduce battery life).

For both the Dossier® 486 & P5:

- 3.3 volt technology.
- Comprehensive power management with doze, sleep, suspend and resume.
- 8K internal cache. (486) and 16K (Pentium processor).
- 3.5", internal 1.44MB floppy drive.
- Local bus accelerated Super VGA Graphics with 1MB Video DRAM (PCI local bus graphics for Dossier® P5).
- 1 Serial, 1 Parallel, 1 PS/2 port, 2 PCMCIA type 2 or 1 type 3, 1 expansion socket for docking station.
- Infra red wireless link control Windows (Dossier® P5 only).
- 85/86 key keyboard.
- Ergonomic large tracker ball with arm rest to reduce wrist fatigue.
- NiMH battery.
- Audio with built in speaker and microphone and socket for external speakers and line in (16-bit stereo for Dossier® P5).
- Ability to record, compress, store and playback voice, sound and music.
- LCD Status Icon display.
- MS-DOS® 6.22, Windows 3.11, Works for Windows™ ready to run and Lotus Organizer.
- User-friendly manuals
- 12 Months **parts and labour** collect and return warranty. Low cost on-site option up to **5 years.**
- Free lifetime hotline technical support
- Option for competitive application software bundles.

EASY2OWN™

Easy to Own payment scheme From **£46.08** per mth over **36** mths **19.9% APR** 10% deposit. See *"Order page"* for typical example.

Organizer Working Together

Supplied as standard

WORKS

TAKE ADVANTAGE OF THE SOFTWARE BONUS WITH EACH VIGLEN PC

SEE 'SOFTWARE BONUS' PAGE FOR DETAILS.

THE PRICE YOU PAY

NEW LOWER PRICES

DOSSIER 486 — INTEL SL ENHANCED 486SX 25MHz

MODEL NAME	DISPLAY	HARD DISK	RAM	PRICE
DOSSIER 486 SM	MONO 9.5" LCD	170MB	4MB	£999
DOSSIER 486 SD	COLOUR 10.3" DUAL SCAN	170MB	4MB	£1399
DOSSIER 486 ST	COLOUR 9.5" TFT	170MB	4MB	£1999

DOSSIER 486 UPGRADES

CPU UPGRADE TO:	486DX2 50MHz £39, 486DX2 66MHz £89, 486DX4 75MHz £119, 486DX4 100MHz £149
HARD DISK UPGRADE TO:	260MB £49, 340MB £85, 540MB £219, 720MB £399
MEMORY UPGRADE TO:	8MB £149, 12MB £299, 20MB £639

DOSSIER P5 — INTEL PENTIUM PROCESSOR 75MHz

MODEL NAME	DISPLAY	HARD DISK	RAM	PRICE
DOSSIER P5 SD	COLOUR 10.3" DUAL SCAN	540MB	8MB	£2449
DOSSIER P5 ST	COLOUR 10.4" TFT	540MB	8MB	£3399

DOSSIER P5 UPGRADES

CPU UPGRADE TO:	Pentium Processor 90MHz £220
HARD DISK UPGRADE TO:	720MB £129
MEMORY UPGRADE TO:	16MB £309, 24MB £679, 40MB £1359

ALL PRICES EXCLUDE VAT AT 17.5%

PRAISE INDEED!

WHAT PC? — August 1994 — Dossier 486 AM

WORTH a Look — What to buy for Business — February 1995 — Dossier P5

PC MAGAZINE — March 1995 — Dossier 486 Highly Recommended

GOOD Value — What to buy for Business — February 1995 — Dossier 486

Personal Computer World — March 1995 — Viglen Dossier 486 Advanced Sound

"...the Viglen is a 'no nonsense' machine at a competitive price."

"...this hot-rod: it's very, very quick."

March 1995 — Viglen Dossier P90

CHOOSE YOUR OPTIONS

The following are only some of the options available. For a full list of other items look at the 'Options page' or for a free copy of the Direct Guide please call our sales department.

N4ADXDK0	Docking station for Dossier 486	£309	
N4XDELUX	Delux padded carrying case	£49	
N4XPSXDC	Universal car battery adaptor	£69	
NXXMA013	130MB PCMCIA Hard Drive	£219	
NXXMA017	170MB PCMCIA Hard Drive	£269	
CMDP0T2F	9600/2400 PCMCIA Fax/Modem	£135	
CMDP0T3F	14400/14400 PCMCIA Fax/Modem	£185	
PAMSPS01	External amplified speakers	£23	

intel inside pentium PROCESSOR

RING 0181 758 7000 Viglen® FAX 0181 758 7080

YOU'LL NEVER LOOK BACK

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Viglen Limited. Viglen House, Alperton Lane, Alperton, Middlesex HA0 1DX.

The NEW Contender® PCI LOCAL BUS Range

A VALUE RANGE OF PCs WITH LEADING EDGE PCI TECHNOLOGY

YOUR CHOICE OF CASE STYLE

CONTENDER PCI PROFESSIONAL

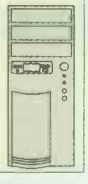
Dimensions (W x H x D) mm: 380 x 150 x 415

Two free 5.25" drive bays.

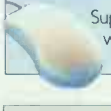
CONTENDER PCI MEDIUM TOWER

Dimensions (W x H x D) mm: 170 x 380 x 420

Three free 5.25" drive bays and two free (one internal) 3.5" drive bays.



MICROSOFT® ERGONOMIC MOUSE



Supplied as standard with the Contender® PCI Range.

Now all Contenders comply with **EPA** *energy saving specification.*

The Contender® PCI is a new value range of personal computers providing the performance edge and future proofing of PCI local bus technology as well as the ease of use of Plug and Play software. It is one of the lowest cost PC investments you can make without compromising quality, reliability or support. And you won't be disappointed when it comes to performance either.

The Contender® PCI is available in a choice of two case styles (see inset box) and in a 486 and Pentium processor range. It offers amazing value for money and is ideal for most office applications such as word processing, accounts and spreadsheets.

With a host of options including multimedia, the Contender® PCI makes the perfect PC for everyday use.

LOOK AT THIS SPECIFICATION

- Choice of processor, memory and enhanced IDE drives.
- 8K (16K for Pentium Processor) Cache RAM built into CPU plus 128K (256K for Pentium Processor) second level external cache.
- 3 ISA, 2 PCI and 1 PCI/ISA shared bus slots.
- One 3.5" floppy drive.
- 2 Serial, 1 Parallel printer port (EPP), 1 PS/2 mouse port.
- Choice of case styles either **Professional** for desktop use or **Medium Tower** for desktop or floor standing use.
- 486 models CPU upgradeable to 486DX4 100MHz and Intel Overdrive processors based on **Pentium™ technology.**
- High Performance PCI bus Windows accelerated Super VGA card with 1MB (upgradeable to 2MB) video DRAM. Option for even faster performance.
- Viglen ENVY 14P, 14" Super VGA Colour Monitor.
- 102 Key compact ergonomic keyboard.
- Genuine Microsoft Mouse.
- MS-DOS® 6.22 and Windows™ 3.11 and Works for Windows™ pre-installed and ready-to-run.
- User friendly manuals.
- 12 months **parts and labour** collect and return warranty. Low cost on-site option up to 5 years available.
- Free lifetime hotline technical support.
- Options for competitive application software bundles.

THE PRICE YOU PAY

		THE CONTENDER PCI 486 RANGE			THE CONTENDER PCI PENTIUM RANGE		
COLOUR SUPER VGA		PCI 4DX250	PCI 4DX266	PCI 4DX475	PCI P560	PCI P575	PCI P590
HARD DISK	RAM	486DX2 50MHz	486DX2 66MHz	486DX4 75MHz	Pentium 60MHz	Pentium 75MHz	Pentium 90MHz
270MB	4MB	£889	£939	£959	-	-	-
420MB	8MB	£1019	£1059	£1089	£1209	£1259	£1459
530MB	16MB	£1269	£1309	£1339	£1459	£1499	£1699
730MB	16MB	£1309	£1359	£1379	£1499	£1549	£1749

The prices above are for complete Contender PCI **Medium Tower** and **Professional** systems ready to run with MS-DOS 6.22 and Windows 3.11. To order please quote the relevant model along with the hard disk and RAM capacity required and **PLEASE DO NOT FORGET** to specify the case style required.

ALL PRICES EXCLUDE VAT AT 17.5%

CHOOSE YOUR OPTIONS

The following are only some of the options available. For a full list of other items look at the 'Options page' or for a free copy of the Direct Guide please call our Sales Department.

ZSM12NBD 12 Months On-Site Maintenance **£39**
VTC15PXL 15" Colour monitor instead of 14" as supplied **£90**
VTC17PXL 17" Colour Monitor instead of 14" as supplied **£410**

MULTIMEDIA OPTION

Why not add Multimedia to the system of your choice?
See 'Viglen Options' page for details.

PC2

TAKE ADVANTAGE OF THE SOFTWARE BONUS WITH EACH VIGLEN PC
SEE 'SOFTWARE BONUS' PAGE FOR DETAILS.

intel inside pentium PROCESSOR

MICROSOFT WINDOWS READY-TO-RUN

MS-DOS 6.22

ENHANCED IDE

CPU UPGRADEABLE

WINDOWS ACCELERATION

PCI LOCAL BUS

PLUG and PLAY Includes software for easy configuration of add-in cards

EASY2OWN™ Easy to **Own** payment scheme From **£36.38** per mth over **36** mths **19.9% APR** 10% deposit. See *"Order page"* for typical example.

RING 0181 758 7000 Viglen® YOU'LL NEVER LOOK BACK FAX 0181 758 7080

Viglen Limited. Viglen House, Alperton Lane, Alperton, Middlesex HA0 1DX.

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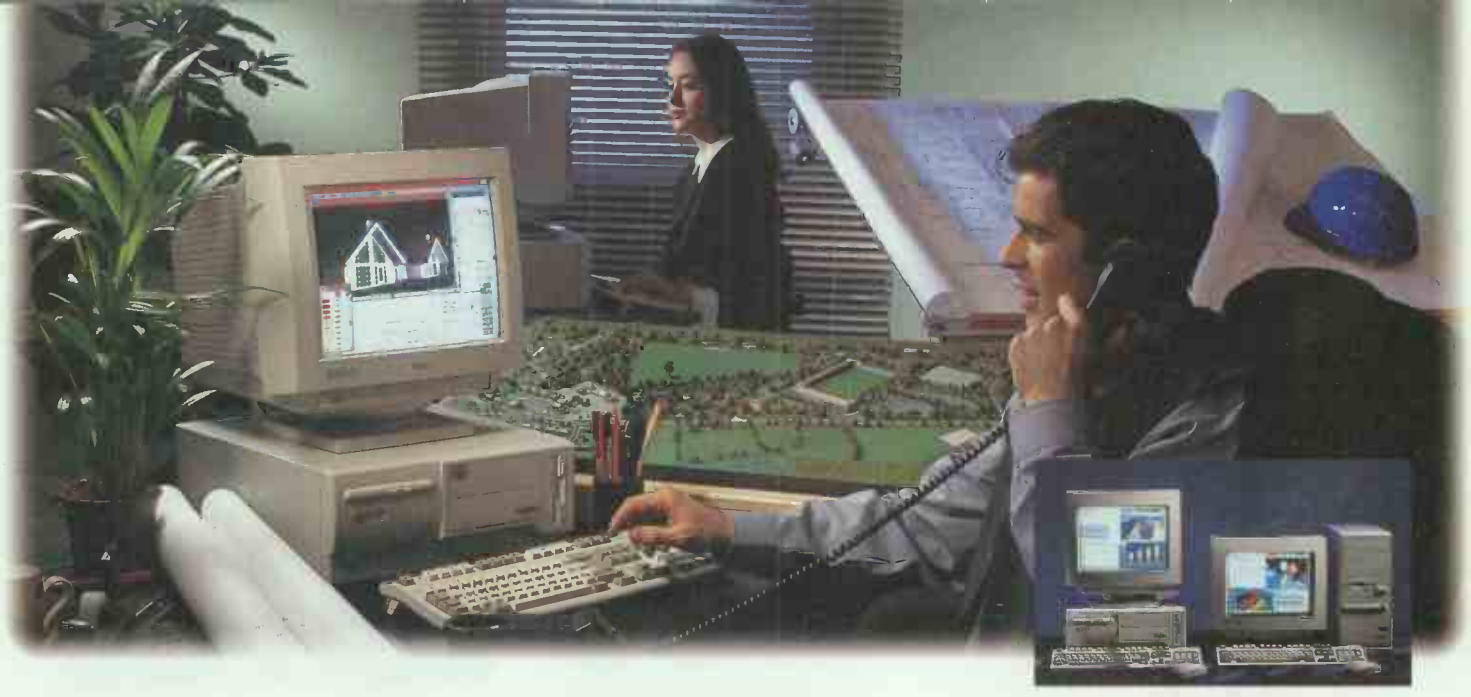


The genie® PCI LOCAL BUS Range

LEADING THE RACE FOR PERFORMANCE AND NEXT GENERATION TECHNOLOGY

YOUR CHOICE OF CASE STYLE

GENIE PCI PROFESSIONAL
Dimensions (W x H x D) mm: 380 x 150 x 415
Two free 5.25" drive bays.

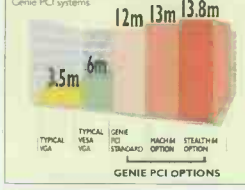
GENIE PCI MEDIUM TOWER
Dimensions (W x H x D) mm: 170 x 380 x 420
Three free 5.25" drive bays and two free (one internal) 3.5" drive bays.

MICROSOFT® ERGONOMIC MOUSE

Supplied as standard with the Genie® PCI Range.

GENIE PCI PERFORMANCE

VGA Performance in New Winmarks 95
Figures based on Pentium based Genie PCI systems



PRAISE INDEED!

- Sept 1994 Windows Users
- June 1994 Which Computer
- June 1994 Computer Buyer
- April 1995 Genie PCI P5/90
- August 1994 Genie PCI P5/90
- January 1994 PC magazine
- January 1995 Genie Pro P5/60
- Feb 1995 PC Today

The Genie® PCI is the flagship of the Viglen range of personal computers, providing the highest performance systems which are in the forefront of leading edge technology. The Genie® PCI was one of the very first systems to incorporate the new PCI local bus architecture with all its performance advantages as well as the easy to configure plug and play software-thus eliminating the guesswork of yesterday's technology. PCI local bus has now become the industry standard for PCs. The Genie® PCI has carried on incorporating the advances of new technology and currently provides one of the fastest PCs yet, available with incredibly fast PCI graphics cards, enhanced IDE hard disks and the highest specification 15" Monitor. If performance is your requirement, then the Genie® PCI is the choice for you.

LOOK AT THIS SPECIFICATION

- Choice of processor, memory and hard disk capacity.
- 3 ISA, 2 PCI, 1 PCI/ISA shared slots.
- Enhanced IDE support.
- 256K secondary WRITEBACK cache.
- One 1.44MB floppy drive.
- 2 serial, 1 parallel printer port (EPP).
- Choice of case styles, either **Professional** or **Medium Tower.**
- 486 models CPU upgradeable to 486DX4 100MHz and Intel Overdrive processors based on **Pentium™ technology.**
- High Performance PCI bus Windows accelerated Super VGA card with 1MB (upgradeable to 2MB) video DRAM. Option for even faster performance.
- Viglen ENVY 15P Super VGA 15" FST colour monitor.
- 102 key compact ergonomical keyboard.
- Microsoft mouse with Microsoft Mouse Manager software utilities.
- MS DOS® 6.22, Windows™ 3.11 and Works for Windows™ ready-to-run.
- User friendly manuals.
- 12 months **parts and labour** warranty with option for low cost **parts and labour** maintenance for up to **5 years.**
- FREE lifetime hotline technical support.
- Option for competitive application bundles.

THE PRICE YOU PAY

THE GENIE PCI 486 RANGE		PCI 4DX266	PCI 4DX4100	THE GENIE PCI PENTIUM RANGE Pentium			
COLOUR SUPER VGA HARD DISK	RAM	486DX2 66MHz	486DX4 100MHz	PCI P5/75 Pentium 75MHz	PCI P5/90 Pentium 90MHz	PCI P5/100 Pentium 100MHz	PCI P5/120 Pentium 120MHz
420MB IDE	8MB	£1229	£1309	£1359	£1559	£1659	£1909
530MB IDE	16MB	£1479	£1559	£1599	£1799	£1909	£2159
730MB IDE	16MB	£1519	£1599	£1649	£1849	£1959	£2209
1GB IDE	16MB	£1609	£1689	£1739	£1939	£2039	£2289
1GB SCSI 2	16MB	£1779	£1859	£1909	£2109	£2209	£2459

The prices above are for complete Genie PCI **Professional** and **Medium Tower** systems ready to run with MS-DOS 6.22 and Windows 3.11. To order please quote the relevant model along with the Hard Disk and RAM capacity required and **PLEASE DO NOT FORGET** to specify the case style required.

ALL PRICES EXCLUDE VAT AT 17.5%

CHOOSE YOUR OPTIONS

The following are only some of the options available. For a full list of other items look at the 'Options page' or for a free copy of the Direct Guide please call our Sales Department.

ZSMI2NBD 12 Months On-Site Maintenance **£39**
PDDXPAT4 High Performance ATI Mach 64 SVGA card with 2MB of VRAM and 64bit graphics engine instead of standard card. **£135**
PDDXPST4 Ultra High Performance Stealth 64 SVGA card with 2MB of VRAM and 64bit graphics engine instead of standard card. **£145**
VTC17PXL 17" Colour Monitor instead of 15" as supplied **£320**

MULTIMEDIA OPTION

Why not add Multimedia to the system of your choice?
See 'Viglen Options' page for details.
PC2

TAKE ADVANTAGE OF THE SOFTWARE BONUS WITH EACH VIGLEN PC
SEE 'SOFTWARE BONUS' PAGE FOR DETAILS.

15" MONITOR SUPPLIED AS STANDARD

SAVE £60 VGA NON-INTERLACED 75Hz AT 1024 X 768
A 14" colour Super VGA monitor can be provided instead of the 15" standard for £60 less.

Intel Verified: for the Pentium™ Overdrive™ Processor

intel inside pentium PROCESSOR

MICROSOFT WINDOWS READY-TO-RUN

MS-DOS 6.22

ENHANCED IDE

CPU UPGRADEABLE

WINDOWS ACCELERATION

PCI LOCAL BUS

yes NetWare Tested and Approved

PLUG and PLAY Includes software for easy configuration of add-in cards

EASY2OWN™
Easy to Own payment scheme From £53.37 per mth over 36 mths 19.9% APR 10% deposit. See "Order page" for typical example.

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TURN OVER FOR MORE

RING 0181 758 7000 Viglen® YOU'LL NEVER LOOK BACK **FAX 0181 758 7080**

Viglen Limited. Viglen House, Alperton Lane, Alperton, Middlesex HA0 1DX.

Take advantage of the Software Bonus

Get the WORKS with Viglen!

In addition to MS-DOS® 6.22 and Windows 3.11, all Viglen systems are now supplied with Microsoft® Works for Windows™ an easy to use integrated package comprising of a word processor, spreadsheet, database and electronic communication software; the ideal tool to run a small business. **Works for Windows™** manuals and disks are not included but *these can be provided at small additional cost.*

Please quote the following:

Order code **WAPCMD10** Works 3.0 for Windows Manual and disks **£9.99**

...and Software Bonus Upgrades...

The additional software bonus obtained from Viglen gives you a choice of upgrading to further powerful applications from Microsoft at very competitive bonus upgrade prices. These bonus upgrade prices are only available when ordered with a Viglen PC at the time of purchase. The following applications are available. Please add the relevant order code when ordering:

Microsoft® Office 4.2

This is the latest version of the most popular and powerful integrated software package from Microsoft featuring the technology of Intellisense. The package includes Word for Windows™ 6, Excel 5 and Powerpoint 4 as well as a licence to use MS Mail. Supplied pre-installed with full manuals and disks. Order code **WAPMMX30 Bonus Upgrade Price (Floppy Disk version) £169** or **WAPMMR30 Bonus Upgrade Price (for CD version) £159**

Microsoft® Office Professional 4.3

This is the same as Microsoft® Office 4.2 with the addition of the latest version of Access 2.0 - the powerful yet simple to use Windows based database. Supplied pre-installed with full manuals and disks.

Order code **WAPMMX50 Bonus Upgrade (for Floppy Disk version) Price £249** or **WAPMMR50 Bonus Upgrade Price (CD version) £229**

Viglen Consumer Bundle

Microsoft® Publisher 2.0, the easy to use desktop publishing package, plus Microsoft® Money 3.0 for money management made simple. Both these packages are fully pre-installed and supplied with full manuals and disks.

Order code **WAPMMX60 £49**

Software may be supplied in Viglen OEM packaging

ALL PRICES EXCLUDE VAT AT 17.5%

COMUNICATE WITH THE WORLD

Why not add a fax/modem to your system and join the information super highway. The Viglen FM1414 Fax modem provides you with 14,400 baud fax and data facility with **Internet** and **Compuserve** access software. All this and the ability to recieve and send faxes within Windows for only **£89** + VAT

Order code **CMDN0VGF** when ordering.

Upgrade your Monitor

The Viglen desktop and tower systems are supplied with either a 14" or 15" Colour Monitor as standard. To enhance your viewing further, you can upgrade to one of our superb 17" Colour Monitors the ENVY 17P or the even more enhanced ENVY 17PE.

Upgrade from:	Upgrade to:	Price to add:
Contender Range	ENVY 17P	**£330** + VAT
Contender Range	ENVY 17PE	**£410** + VAT
Genie Range	ENVY 17P	**£240** + VAT
Genie Range	ENVY 17PE	**£320** + VAT

Experience the excitement of CD ROM and Multimedia

Why not add a CD ROM drive or indeed a full multimedia option including CD ROM drive and a 16 bit sound card to the system of your choice? You can choose from one of the following two new exciting and cost effective options. Remember, all options are factory fitted, installed, fully tested and ready to run.

CD ROM Drive Option

ONLY £99 + VAT

Take advantage of the ability to use all the new software that is being supplied on CD ROM format and add an IDE CD ROM double speed photo CD compatible drive to your system for **only £99** + VAT.

Please quote **order code DCDDNP01** when ordering.

Multimedia Option PC2

For a complete multimedia solution including both CD ROM drive and a sound card, choose our new **Multimedia Option 1** to be fitted in your system. This provides a genuine 16 bit Soundblaster card along with an IDE CD ROM drive as well as all the accessories to get you started. The Multimedia Option 1 can be added to your system for **only £195** + VAT.

Please quote **order code UCDM01N1** when ordering.

Multimedia option 1 fitted to a Genie Professional system.

The multimedia option 1 includes:

- Genuine Soundblaster 16 bit card.
- Soundblaster Creative Ensemble software and more.
- Double Speed Photo CD compatible IDE CD ROM Drive.
- Pair of Amplified Speakers
- Microphone.
- 3CD ROM Titles from Microsoft: Musical Instruments, Encarta '95 and Golf.
- Microsoft Works and Money.

ONLY £195 + VAT

Support for you

Unlike many PC manufacturers, Viglen puts equal emphasis on its after-sales service - that means not only a comprehensive standard warranty on every product but a choice of service packages that offer total cover for up to five years.

12 MONTHS COLLECT AND RETURN WARRANTY

All Viglen PCs are supplied with a 12 months collect and return warranty (UK only). This covers your Viglen PC and any other options that are factory fitted, covering parts and labour. In addition to these standard warranty terms, which provide a better and quicker response than some of our competitors, Viglen offer a choice of additional low-cost on-site options to meet specific user requirements - See to the right.

Do not forget, when you compare our services with our competitors, please read their small print. With Viglen, you have a choice and your choice is clear.

ADDITIONAL ON-SITE OPTIONS For complete peace of mind choose one of the additional low-cost on-site warranty options.

THE STANDARD ON-SITE NEXT DAY RESPONSE

This option converts the standard Viglen warranty into a next business day on-site response for 12 months covering parts and labour. Order code **ZSM12NBD £39** - for all desktop and Tower models. Order code **ZSM12DSS £149** - for Dossier portable range.

THE PREMIUM ON-SITE 4 HOUR RESPONSE

This option converts the standard Viglen warranty into a 4 hour on-site response for 12 months covering parts and labour. Please call for details of this individually tailored package.

FOR A FULL RANGE OF THE UPGRADES AND OPTIONS AVAILABLE WITH YOUR VIGLEN PC, CALL NOW FOR YOUR FREE COPY OF THE VIGLEN DIRECT GUIDE.

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SPECIAL CONFIGURATIONS!

DIRECT....TO YOU

Viglen produce a wide range of PCs and options to give you the ultimate choice. We have also designed a number of special configuration packages offering an abundance of software applications to suit specific needs and budgets.

For education, entertainment, personal accounting, business management or high performance computing, we have the package to fit your needs. We also have the latest multimedia systems combining sound, text, animation and video into one easy to use system. There is a Viglen Special Configuration that's just right for you.

All Viglen PCs are supplied as a complete package and ready to use. However, the software installed will vary according to the special software configuration package you choose. Here, we've briefly outlined each software package to help you decide which special configuration is right for you.

MICROSOFT® WORKS Five essential tools for easier everyday computing. Word processing, spreadsheet, database, graphics and communications tools.

MICROSOFT® PUBLISHER This desktop publishing software is the key to producing professional quality output, layouts and clip art.

MICROSOFT® MONEY A complete set of financial management and planning tools to manage your investments and expenditure.

Multimedia Titles

MUSICAL INSTRUMENTS Features 200 instruments – many rare and exotic – from around the world. Hear and play 1,500 authentic sound samples of instruments and jazz, classical and rock ensembles.

ENCARTA® '95 The complete interactive Multimedia Encyclopedia. This best selling and award winning title condenses 28 volumes into one CD. Maps, charts, sound and pictures bring information to life!

GOLF Rise to the true-to-life challenge of Microsoft® Golf. Realistic graphics and sounds combine with true golf ball flight paths, accurate swing control and a choice of courses.

MS-DOS 6.22

Windows Acceleration

Microsoft Windows Ready-to-Run

Software Bonus Upgrades

All the special configurations shown can be further upgraded to include one of the following professional integrated software applications from Microsoft at a very special bonus upgrade price. If you require pre-installation please specify and allow extra delivery time for these options.

Microsoft® Office 4.2

A popular and powerful integrated software package from Microsoft featuring the technology of Intellisense and including Word for Windows™ 6, Excel 5 and Powerpoint 4 as well as a licence to use MS Mail. Supplied pre-installed with full manuals and disks.

Order code **WAPMMR30 Bonus Upgrade Price £159 (for CD version)**

Microsoft® Office Professional 4.3

This is the same as Microsoft® Office 4.2 with the addition of the latest version of Access 2.0 the powerful yet simple to use Windows based database. Supplied pre-installed with full manuals and disks.

Order code **WAPMMX50 Bonus Upgrade Price £229 (for CD version)**

Please note some software may be supplied in Viglen OEM packaging

17" Monitor Upgrades

Upgrade your special configuration Business System with one of our superb 17" Colour Monitors, the ENVY 17P or the even more enhanced ENVY 17PE.

Upgrade from:	Upgrade to:	Price to add:
Home/Professional Business	ENVY 17P	£330 + VAT
Home/Professional Business	ENVY 17PE	£410 + VAT
Performance/Power/Ultimate Business	ENVY 17P	£240 + VAT
Performance/Power/Ultimate Business	ENVY 17PE	£320 + VAT

HOME Business MULTIMEDIA PC

£999
+ Delivery and VAT = £1191.45

486DX2 50MHz

- **4MB RAM**
- **270MB HD**
- **14" SVGA Colour Monitor**
- **Double Speed CD ROM Drive**
- Viglen Contender® Professional PC with 486DX2 50MHz Processor
- Fast Local Bus Accelerated Graphics 1MB Video DRAM
- 2 serial, 1 parallel, 1 PS/2 port, 1 games port
- 3.5" Floppy Drive
- Ergonomic Compact Keyboard
- Genuine Microsoft® Ergonomic Mouse
- MS-DOS® 6.22 and Windows™ 3.11 Ready To Run

Plus

- Genuine 16 Bit Soundblaster Sound Card
- Stereo Amplified Speakers
- Microphone
- **Microsoft® Works for Windows™**
- **Microsoft® Publisher**
- **Microsoft® Money**
- **Multimedia CD Titles** from Microsoft®: Encarta® '95, Musical Instruments and Golf

only £43.50 per month APR 19.9% EASY2OWN monthly payment scheme

Sound Blaster

Local Bus Video

PROFESSIONAL Business MULTIMEDIA PC

£1199
+ Delivery and VAT = £1426.45

PCI Local Bus

486DX2 66MHz

- **8MB RAM**
- **420MB HD**
- **14" SVGA Colour Monitor**
- **Double Speed CD ROM Drive**
- Viglen Contender® PCI Professional PC with 486DX2 66MHz Processor
- Fast 64 bit PCI Local Bus Accelerated Graphics 1MB Video DRAM
- 2 serial, 1 parallel, 1 PS/2 port, 1 games port
- 3.5" Floppy Drive
- Ergonomic Compact Keyboard
- Genuine Microsoft® Ergonomic Mouse
- MS-DOS® 6.22 and Windows™ 3.11 Ready To Run

Plus

- Genuine 16 Bit Soundblaster Sound Card
- Stereo Amplified Speakers
- Microphone
- **Microsoft® Works for Windows™**
- **Microsoft® Publisher**
- **Microsoft® Money**
- **Multimedia CD Titles** from Microsoft®: Encarta® '95, Musical Instruments and Golf

only £52.08 per month APR 19.9% EASY2OWN monthly payment scheme

Sound Blaster

Plug and Play — Includes software for easy configuration of add-in cards

708

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TURN OVER FOR MORE

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PERFORMANCE Business MULTIMEDIA PC

PCI LOCAL BUS

Pentium PROCESSOR 75 MHz

£1499
+ Delivery and VAT = £1778.95

Sound BLASTER

only £61.30 per month APR 14.9%
EASY2OWN monthly payment scheme

Medium Tower case option available, please allow extra delivery time.

Plug and Play — Includes software for easy configuration of add-in cards

- 8MB RAM
- 530MB HD
- 15" SVGA Colour Monitor
- Fast 64 bit PCI Graphics Card
- Double Speed CD ROM Drive

- Viglen Genie® PCI Professional with Pentium 75MHz Processor
- 2 serial, 1 parallel, 1 games port
- 3.5" Floppy Drive
- Ergonomic Compact Keyboard
- Plug and Play Software for easy upgrading
- Genuine Microsoft® Ergonomic Mouse
- MS-DOS® 6.22 and Windows™ 3.11 Ready To Run

Plus

- Genuine 16 Bit Soundblaster Sound Card
- Stereo Amplified Speakers
- Microphone
- **Microsoft® Works for Windows**
- **Microsoft® Publisher**
- **Microsoft® Money**
- **Multimedia CD Titles** from Microsoft®: Encarta®'95, Musical Instruments and Golf

NEW Ultimate Business MULTIMEDIA PC

Pentium PROCESSOR 100 MHz

£2349
+ Delivery and VAT = £2777.70

only £95.72 per month APR 14.9%
EASY2OWN monthly payment scheme

PCI LOCAL BUS

Sound BLASTER

APPROVED for connection to telecommunication systems specified in the instructions for use subject to the conditions set out therein.

Plug and Play — Includes software for easy configuration of add-in cards

- 16MB RAM
- 1GB HD
- 15" SVGA Colour Monitor
- Fast 64 bit PCI Graphics with 2MB
- Quad speed CD ROM Drive
- 14400/14400 Fax Modem with Internet Access Software

- Viglen Genie® PCI Medium Tower with Pentium 100MHz Processor
- 2 serial, 1 parallel, 1 games port
- 3.5" Floppy Drive
- Ergonomic Compact Keyboard
- Plug and Play Software for easy upgrading
- Genuine Microsoft® Ergonomic Mouse
- MS-DOS® 6.22 and Windows™ 3.11 Ready To Run

Plus

- Genuine 16 Bit Soundblaster Sound Card
- Stereo Amplified Speakers
- Microphone
- **Microsoft® Works for Windows**
- **Microsoft® Publisher**
- **Microsoft® Money**
- **Multimedia CD Titles** from Microsoft®: Encarta®'95, Musical Instruments and Golf

This PC configuration is one of the fastest available and to take advantage of it's full potential, you may wish to enhance it with an upgrade to one of the Microsoft office applications (see "software Bonus" section).

POWER Business MULTIMEDIA PC

Pentium PROCESSOR 90 MHz

£1699
+ Delivery and VAT = £2013.95

Sound BLASTER

PCI LOCAL BUS

only £69.40 per month APR 14.9%
EASY2OWN monthly payment scheme

Plug and Play — Includes software for easy configuration of add-in cards

- 8MB RAM
- 530MB HD
- 15" SVGA Colour Monitor
- Fast 64 bit PCI Graphics Card
- Double Speed CD ROM Drive

- Viglen Genie® PCI Medium Tower with Pentium 90MHz Processor
- 2 serial, 1 parallel, 1 games port
- 3.5" Floppy Drive
- Ergonomic Compact Keyboard
- Plug and Play Software for easy upgrading
- Genuine Microsoft® Ergonomic Mouse
- MS-DOS® 6.22 and Windows™ 3.11 Ready To Run

Plus

- Genuine 16 Bit Soundblaster Sound Card
- Stereo Amplified Speakers
- Microphone
- **Microsoft® Works for Windows**
- **Microsoft® Publisher**
- **Microsoft® Money**
- **Multimedia CD Titles** from Microsoft®: Encarta®'95, Musical Instruments and Golf

PROFESSIONAL Business PORTABLE PC

486DX2 66 MHz

£1759
+ Delivery and VAT = £2131.45

LOCAL BUS

only £71.83 per month APR 14.9%
EASY2OWN monthly payment scheme

- 8MB RAM
- 340MB HD
- 10.3" Dual Scan Colour LCD Screen
- 14400/14400 Fax/Modem

- Viglen Dossier® ADVANCED Sound notebook sized (6.5lb) portable PC with 486DX2 66MHz Processor
- 1 serial, 1 parallel, 1 PS/2 port
- 2 PCMCIA ports, socket for docking station option
- CPU Upgradeable
- 3.5" Floppy Drive
- Built in speaker and microphone for multimedia sound
- Built in large tracker ball
- MS-DOS® 6.22, Windows™ 3.11 Ready To Run and Lotus Organizer

Plus

- **Microsoft® Works for Windows™**
- **Microsoft® Money**

SPECIAL 3 DAY DELIVERY

We will do our utmost to deliver the special configuration models shown here within 3 working days from clearance of payment. Any upgrades or additional options will require extra time up to 10 working days.

intel inside
pentium PROCESSOR

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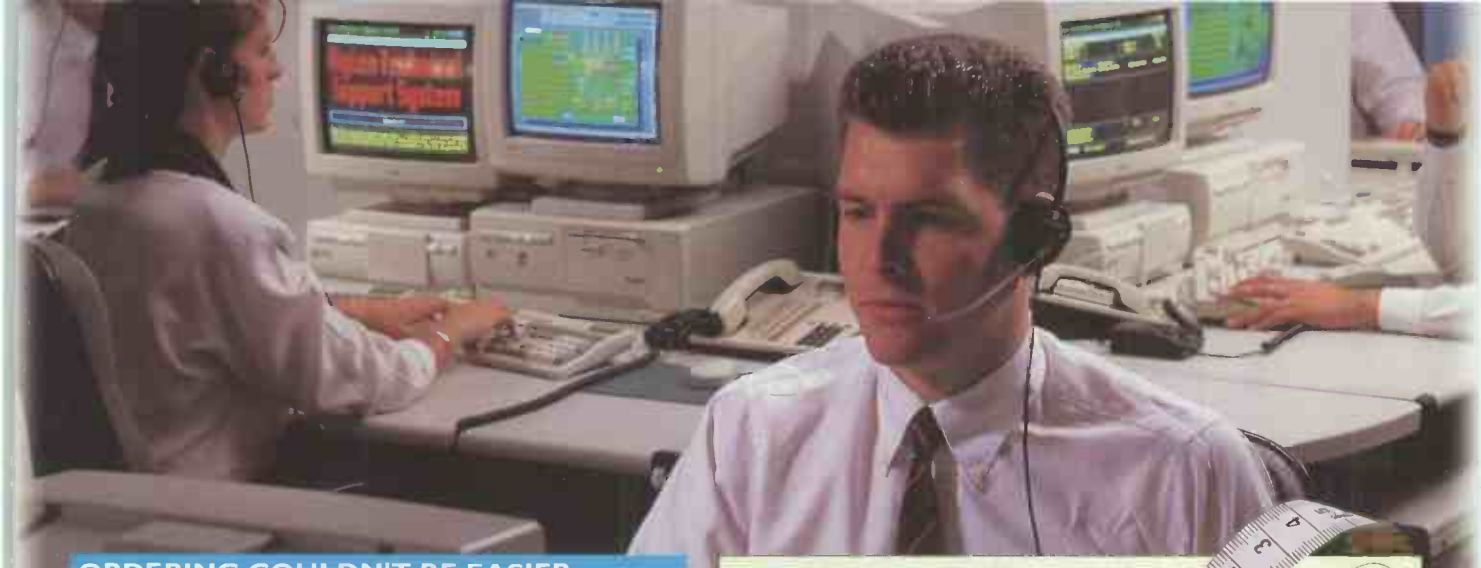

ORDERING COULDN'T BE EASIER

If you require any help or advice on choosing a system to suit your requirements please call our Sales Department. To help us identify your requirements please state the product code, description and price of items required.

When you have decided on your system please fax or phone your orders. You will need to add £15.00 per system for courier delivery, add 17.5% VAT on top. Collections may be made by prior arrangement. Please allow 7-10 working days for delivery, except for Viglen special configuration models which we will do our utmost to deliver within 3 working days from clearance of payment.

BY PHONE: 0181 758 7000

Credit card, Switch, Connect or American Express card holders can order by telephone. Just call us and ask for our Sales Department.

BY POST OR FAX: 0181 758 7080

You can place your order with our Sales Department by post or fax to the address or number shown below. We will require a cheque for the full amount by return post. Credit card, Switch, Connect or American Express card holders may authorise payment by quoting the credit card number and expiry date.

Official orders from educational establishments, government departments and PLCs accepted.

Very competitive Lease Rental arrangements are available for bona fide businesses, educational and government establishments.

EASY2OWN monthly payment scheme is available to private purchasers subject to status. Typical example of payment calculation of PC costing **£799** ex VAT: £799+£15 (delivery) +17.5% VAT = £956.45 total cash price. 10% **deposit of £95.65** required followed by 36 monthly payments of **£31.27 (APR=19.9%).** For finance over £1499 exc VAT, APR drops to **14.9%.** Additional payment protection insurance is available. Viglen Ltd is a licensed credit broker.

EDI. Purchase orders via electronic data interchange accepted using INS Tradanet service.

Public sector customers may also purchase at special prices through the HMSO.

Please ring 01603 694153

HMSO APPROVED

COME AND VISIT US

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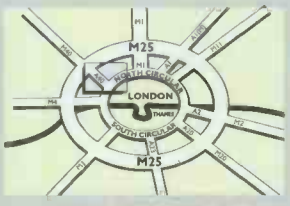

Showroom open

Monday-Friday	9.00 - 5.30
Saturdays	9.00 - 1.00

Showroom closed

Public and Bank Holidays. Also Saturdays preceding a Bank Holiday Monday

Viglen systems are exclusively distributed in Eire by Lendac Data Systems, Unit 31, IDA Enterprise Centre, Pearse St., Dublin 2, Ireland. Tel No: Dublin 710796 Fax No: Dublin 710135. Prices in Eire differ from those quoted in this advertisement.

Customer First Awards 1994

The Daily Telegraph and first direct

SERVICE & RELIABILITY PC MAGAZINE READERS' CHOICE

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CUSTOMER SATISFACTION

At Viglen, PC also means Pleasing Customers. Our customer first philosophy ensures every aspect of our business is geared to customer satisfaction. In recognition of this the 1993/4 Computer Weekly Datapro Survey consistently rated Viglen first for reliability, sales support and overall satisfaction. Viglen were also highly commended in The Daily Telegraph and First Direct Customer First Awards 1994.

PC DMA

£ VALUE

The entire Viglen product range provides the best value for money available. Viglen topped the price performance ratings in the 1993/4 Computer Weekly Datapro Survey.

TECHNICAL SUPPORT

Widely regarded as the best support in the industry, each Viglen product purchased gives **FREE lifetime access to our technical support** telephone service and bulletin board.

HELP!

Our sales staff will gladly guide you through the jungle of computer jargon with help on the ideal system for you. Technical **specialists are always available** for more specialised advice.

ON SITE WARRANTY MAINTENANCE

Each Viglen system has a 12 months parts and labour warranty, including collection from and return to you at our expense (mainland UK only). For complete peace of mind there is also a further choice of low-cost on-site service packages for up to 5 years. With mission critical systems, such as a fileservers, our 4 hour response premium on-site service is available.

Remember to carefully read the small print of our competitors when comparing services. At Viglen we believe in giving you a choice and making that choice crystal clear.

Service

Our pedigree is impeccable, with over 19 years experience in providing quality manufacture and support services.

COMPATIBILITY GUARANTEED

Don't worry about compatibility - Viglen's PCs are guaranteed to run all software that operates on equivalent IBM PC/AT. Viglen is licensed under the relevant IBM patents.

MADE IN THE UK

Viglen's desktop systems are made in the UK to exacting quality control procedures to give you added confidence in our products.

SERVICE AND UPGRADING

Extremely competitive repair and upgrade services are always available from our service department.

Novell Authorised NetWare OEM

NETWORKS

As a Novell authorised OEM Viglen take the work out of networking by providing the very best in network solutions and support - for 2 to 250+ users. In-house Novell certification labs and the availability of more than two Certified Novell Engineers at all times mean that Viglen are a networks supplier to rely on.

VOTED No 1 FOR QUALITY

Our quality and reliability standards are second to none, thanks to the latest design and manufacturing processes approved to BS5750 quality standard. The Datapro survey rated Viglen first for reliability.

BSI REGISTERED FIRM — NATIONAL ACCREDITATION OF CERTIFICATION BODIES

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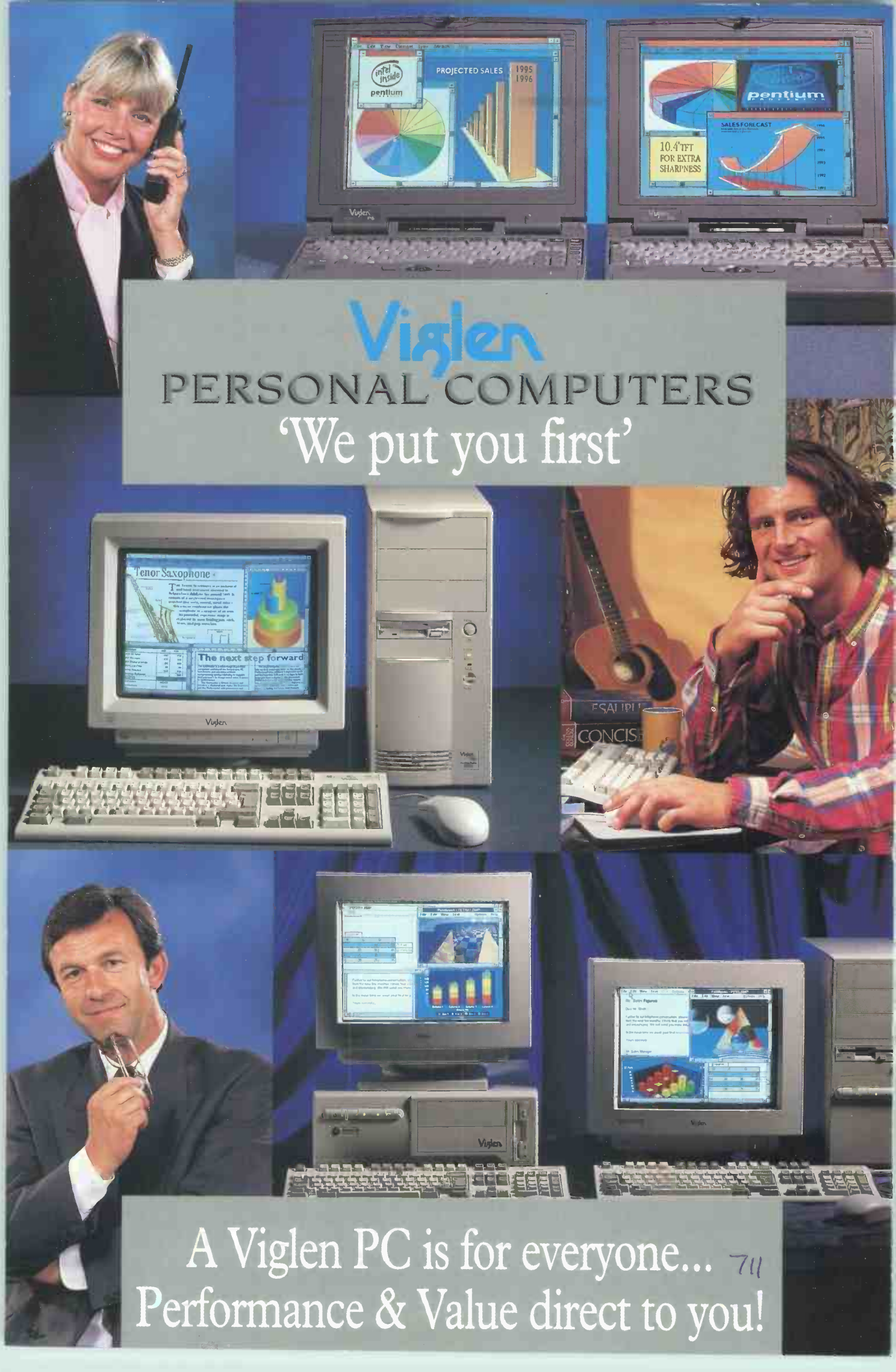
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'We put you first'
Tenor Saxophone
The next step forward
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A Viglen PC is for everyone...
Performance & Value direct to you!

HP LASERJET 4 PLUS

£2,737 MORE ON THE BUDGET.

ECOSYS FS-1600

£2,737 MORE IN THE BANK.

When do two very similar printers become very different?

When you look at their consumables costs.

New research* shows that, ECOSYS over 300,000 pages, *you could be paying almost £2,800 more than you need.*

And that's on top of the purchase price.

Multiply the consumables costs by the number of printers in your organisation, and it could mean adding hundreds of thousands of pounds to your overhead.

The ECOSYS FS-1600 from Kyocera, on the other hand, can cut your consumables costs by around 80%.

Which keeps nearly £2,800 in the bank for every one you use.

The ECOSYS range offers a choice of 10 and 18 ppm speeds, 300 or 600 dpi resolution, and LaserJet and Postscript emulations. There are duplex and networking facilities, and a wide range of high capacity paper-handling options.

ECOSYS. No printers cost as little to run.

And you can bank on it.

Use the coupon – or telephone for more details. Today.

KYOCERA

To: Kyocera Electronics (UK) Ltd, 8 Beacontree Plaza, Gillette Way, Reading, RG2 0BP. Fax: (01734) 311108.

Please send me full details on printers and printing costs.

Name

Position

Company

Address

Postcode Tel no.

PCW 68

01734 230700

PRINTING COSTS. STOP PAYING THE PRICE.

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*Source: Independent research carried out by Pira International, using European Printer Manufacturers and Importers (EPMI) guidelines and prices at RRP ex-VAT. All prices correct at time of going to press.