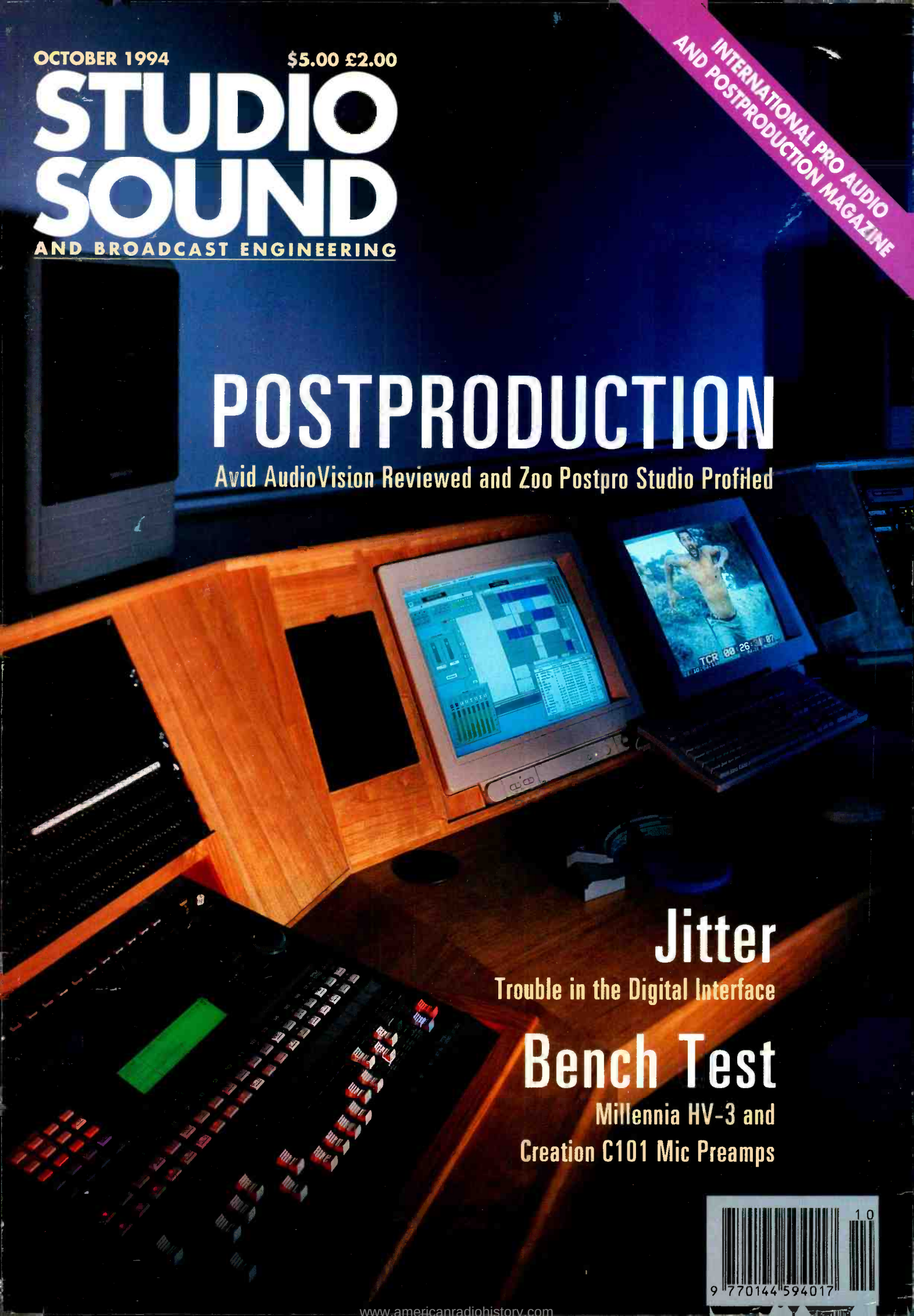
OCTOBER 1994 $5.00 £2.00

STUDIO SOUND

AND BROADCAST ENGINEERING

INTERNATIONAL PRO AUDIO AND POSTPRODUCTION MAGAZINE



POSTPRODUCTION

Avid AudioVision Reviewed and Zoo Postpro Studio Profiled

Jitter

Trouble in the Digital Interface

Bench Test

Millennia HV-3 and
Creation C101 Mic Preamps

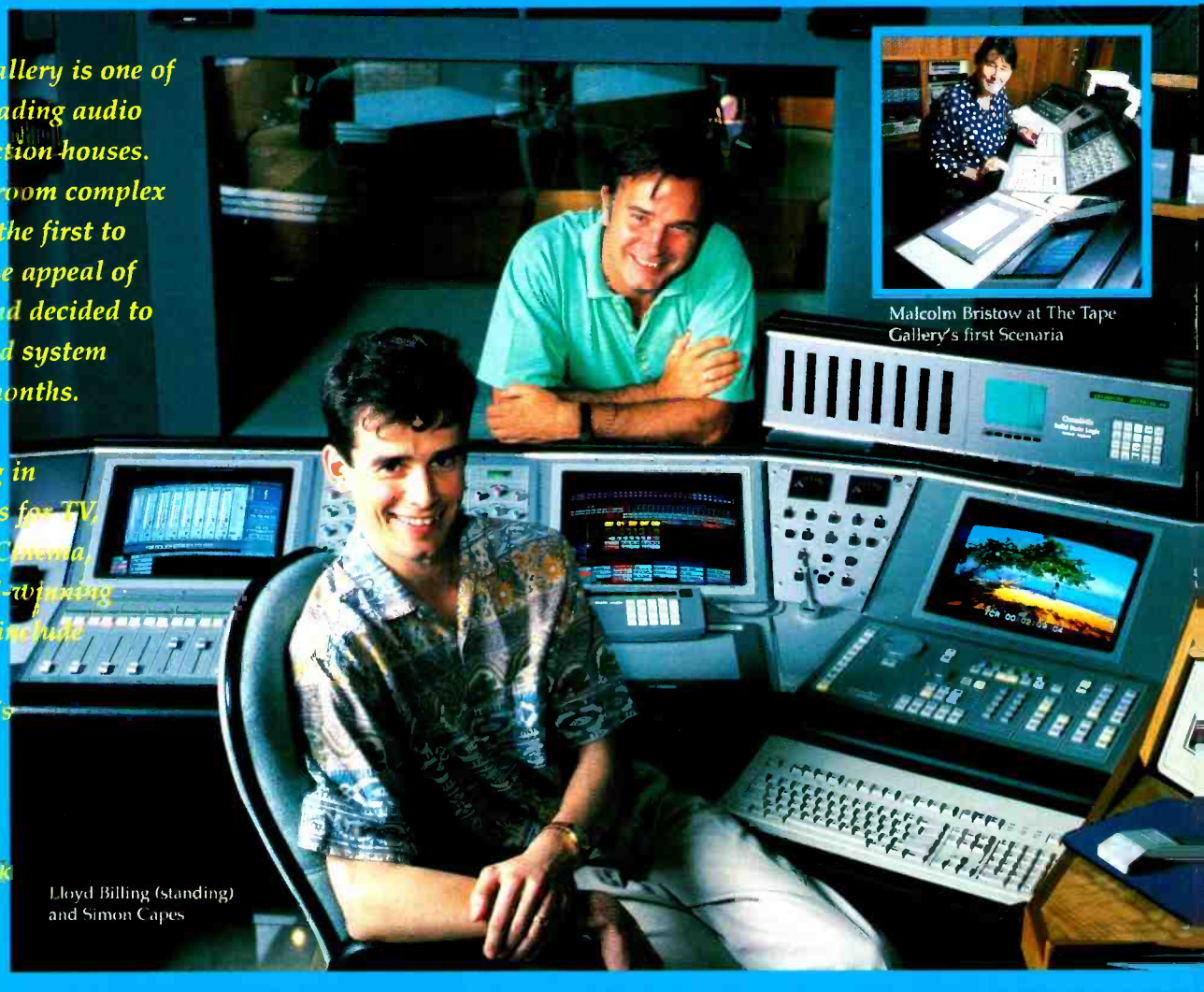
9 770144 594017 10

"Scenaria is a Brilliant Concept! It Combines Instant Access Audio and Video in One System"

Lloyd Billing, Managing Director, The Tape Gallery, London

The Tape Gallery is one of London's leading audio post-production houses. This multi-room complex was one of the first to recognise the appeal of Scenaria, and decided to add a second system within 12 months.

Specialising in commercials for TV, Radio and Cinema, their award-winning campaigns include those for:
John Smith's
Michelin
Adidas
Texaco
Lloyds Bank



Lloyd Billing (standing) and Simon Capes

Malcolm Bristow at The Tape Gallery's first Scenaria

"We regard ourselves not just as mixers, but as our client's sound design team. We pride ourselves both on the quality of our work and a fast turnaround. Scenaria's ability to recall previous mixes in their entirety makes for consistency and a considerable time saving in the production of multiple versions and re-mixes.

"With the increased level of bookings generated by our first system, we needed a second Scenaria within a year. Both are now upgraded to OmniMix standard to work in surround sound."

Solid State Logic

SSL DIGITAL

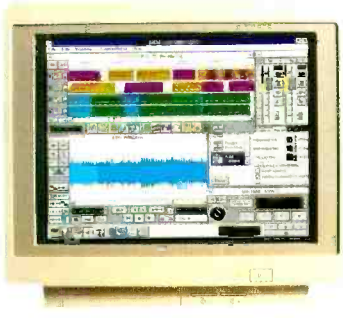
International Headquarters:- Begbroke, Oxford, OX5 1RU, England. Tel: (0865) 342300
Paris: (1) 34 60 46 66 • Milan: (2) 262 24956 • Darmstadt: (6151) 93 86 40 • Tokyo (3) 54 74 11 44
New York (212) 315 1111 • Los Angeles (213) 463 4444

STUDIO SOUND
AND BROADCAST ENGINEERING

CONTENTS

STUDIOS & MASTERING

SADiE™ is the leading PC based digital audio editor from UK company Studio Audio and Video Ltd. Over 2 years have elapsed since **SADiE™** made its debut and although a relatively new entry in the field of fully featured digital editors, over 550 systems have been sold in the last 12 months. **SADiE™**'s market remains wide and varied, attracting sales from audio and video post production, broadcast and music & mastering studios. Although it's main competitors continue to charge for software modules on top of the base price, **SADiE™** has resolutely maintained its *"all in one software philosophy"* and all customers from the very first to the latest have received free lifetime software upgrades. The **SADiE™** Disk Editor price is still £5,995.00 (plus local tax, duty and delivery where applicable) for a complete turnkey system, to include a 486/33DX PC, 1.2 Gbyte SCSI drive, 2 in: 4 out **SADiE™** (digital/analogue/SMPTE timecode reader-generator) and breakout box (for 17" monitor and 2Gbyte drive add £800.00). A 3 year extended hardware maintenarice contract is £995.00 and software upgrades are free for the life of the product.



- EQ, DYNAMICS, TIMESTRETCH, SRC PROCESSES
- FULL SMPTE TIME CODE SUPPORT
- AUTOMATED DIGITAL MIXDOWN
- MULTITRACK EDITING AND LAYERING
- 9-PIN MACHINE CONTROL
- 16, 20 AND 24-BIT EDITING
- PQ TO 1630, CD-R, EXABYTE (DDP)
- HARDWARE CONTROLLER INTERFACE

" I used SADiE™ on The Who's boxed set - it was great! I initially worked on the system at Metropolis and made many suggestions, some of which were implemented within days. Fantastic! They're a clever team at Studio Audio"

Jon Astley, Producer/Engineer

FOR FURTHER INFORMATION CONTACT:

Studio Audio & Video Ltd
The Old School, Stretham, Ely,
Cambridge CB6 3LD. UK
TEL: +44 (0)353 648888
FAX: +44 (0)353 648867

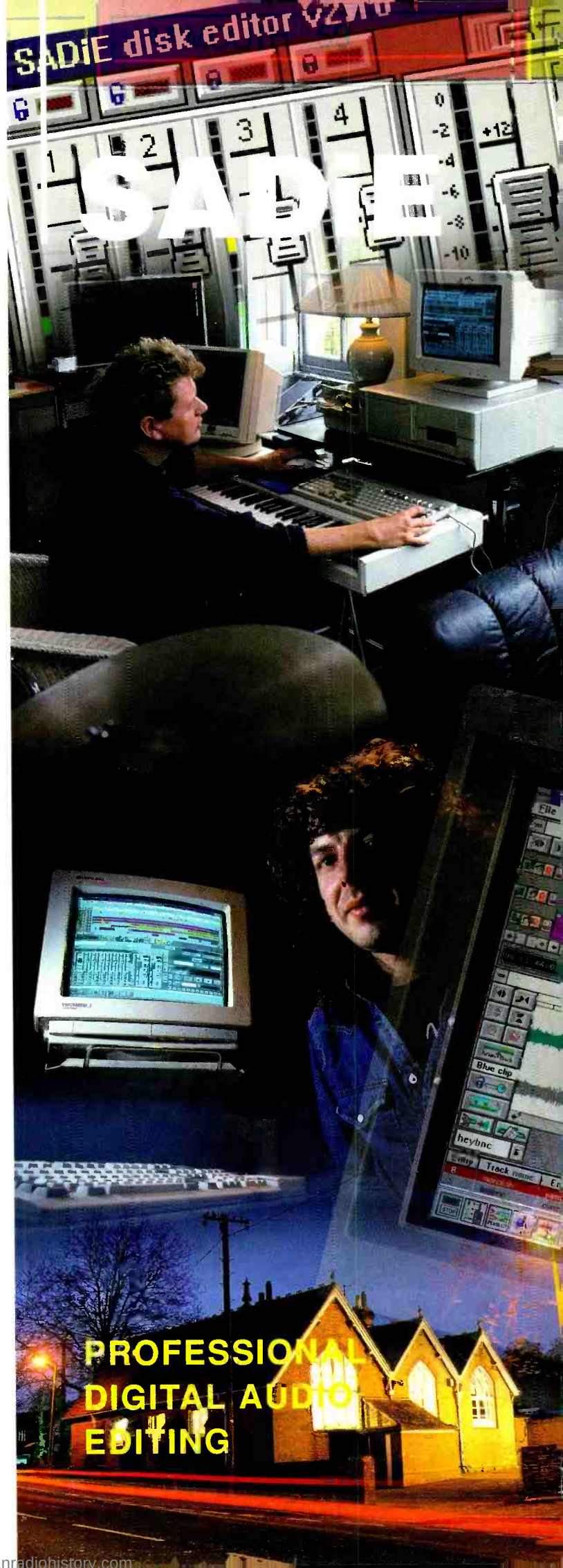
USA

Studio Audio Digital Equipment Inc.
1808 West End Avenue
Suite 1119
Nashville, Tennessee 37203 USA
TEL: +1 615 327 1140
FAX: +1 615 327 1699

SADiE DISK EDITOR

SADiE™ DISTRIBUTORS WORLDWIDE

Argentina Kappa **T** 081 31 0818 **F** 081 31 1493 • **Asia Pacific** VW Marketing **T** +44 372 728481 **F** +44 372 724009 • **Australia** TVC **T** 09 249 6688 **F** 09 249 6858 • **Canada** JSGS Ltd. **T** 416 751 7907 **F** 416 751 7975 • **Denmark** SC Sound **T** 43 99 88 77 **F** 43 99 80 77 • **Finland** oy HedCom AB **T** 90 682 866 **F** 90 682 8489 • **France** Coach Audio **T** 87 77 00 00 **F** 87 77 01 21 • **Germany** Stefan Mayer Audio Engineering **T** 0 6851 6519 **F** 0 6851 6519 • **Israel** Sontronics Electronic Equipment **T** 03 5705223 **F** 03 6199297 • **Japan** Otaritec **T** 03 3332 3211 **F** 03 3332 3217 • **Korea** Avix Trading Co. Ltd. **T** 02 565 3565 **F** 02 565 3561 • **New Zealand** Videx **T** 09 444 6085 **F** 09 444 3837 • **Philippines** Tracks **T** 2 631 3277 **F** 2 631 3267 • **Poland** Unico **T** +44 223 63025 **F** +44 223 301488 • **Singapore/Malaysia/Indonesia** Edit Point **T** +65 338 1826 **F** +65 337 7156 • **South Africa** Tru-fi Electronics SA (Pty) Ltd **T** 011 462 4256 **F** 011 462 3303 • **Spain** Lexon **T** 93 203 48 04 **F** 93 280 40 29 • **Sweden** Tranzicom **T** 08 730 3710 **F** 08 730 5125 • **Switzerland** Media Solutions **T** 064 41 57 22 **F** 064 41 00 35 • **Taiwan** Acesonic **T** 2 716 8896 **F** 2 719 2065 • **Thailand** KDM Trading **T** 2 318 2724 **F** 2 318 6186 • **USA** SADiE inc **T** 615 327 1140 **F** 615 327 1699 •



STUDIO SOUND
AND BROADCAST ENGINEERING

October 1994
Volume 36 Number 10
ISSN 0144 5944

EDITORIAL
Editor: Tim Goodyer
Production Editor: Peter Stanbury
Editorial Secretary: Mary Walsh
Consultants: John Watkinson; Sam Wise
Columnists: Barry Fox; Kevin Hilton; Martin Polon
Regular Contributors: James Betteridge; Simon Croft; James Douglas; Ben Duncan; Tim Frost; Philip Newell; Terry Nelson; Dave Foister; Francis Rumsey; Yasmin Hashmi; Zenon Schoepe; Patrick Stapley

ADVERTISEMENTS
Executive Ad Manager: Steve Grice
Deputy Ad Manager: Phil Bourne
Business Development Manager: Georgie Lee
Advertisement Production: Carmen Herbert
PA to the Publisher: Lianne Davey

CIRCULATION
Assistant Circulation Manager: Diana Rabot

Managing Director: Doug Shuard
Publisher: Steve Haysom

EDITORIAL AND ADVERTISEMENT OFFICES
Spotlight Publications Ltd, 8th Floor, Ludgate House, 245 Blackfriars Road, London SE1 9UR, UK. Tel: 071 620 3636. Fax: 071 401 8036.

NEWSTRADE DISTRIBUTION (UK)
UMD, 1 Benwell Road, London N7 7AX, UK. Tel: 071 700 4600. Fax: 071 607 3352.

Origination by Craftsmen Colour Reproductions Ltd, Unit 1, James Street, Maidstone, Kent ME14 2UR.

Printed in England by St Ives (Gillingham) Ltd, 2 Grant Close, Gillingham Business Park, Gillingham, Kent ME8 0QB, UK.

Studio Sound and Broadcast Engineering incorporates Sound International and Beat Instrumental.

Studio Sound is published monthly. The magazine is available on a rigidly controlled requested basis, only to qualified personnel.

Subscription Rates:
UK annual subscription: £24.00
Overseas surface mail: £30.50/US:$89
USA airspeeded delivery: $70

Subscription Enquiries
UK: Subscription Dept, Studio Sound Magazine, Spotlight Publications Ltd, Royal Sovereign House, 40 Beresford Street, London SE18 6BQ.
USA: Studio Sound Magazine, 2 Park Avenue, 18th Floor, New York, NY 10016.
US Postmaster
Please send address corrections to: Studio Sound Magazine, c/o Mercury Airfreight International Ltd Inc, 2323 Randolph Avenue, Avenel, New Jersey NJ 07001.
US second class postage paid at Rahway, NJ.

ABC
MEMBER OF THE AUDIT BUREAU OF CIRCULATIONS

PPA PERIODICAL PUBLISHERS ASSOCIATION

Total average net circulation of 18,834 issues during 1993. UK: 7,357. Overseas: 11,477. (ABC audited)

un A United Newspapers publication

Defending the old standard

The old adage 'Standards are wonderful, that's why we have so many of them' has ceased to be amusing. The point is not that there are so many standards, but that they carry increasingly less weight in an age when the sheer number of options offered us at every turn threatens every innovative and creative effort.
Let's try another: 'Rules were made to be broken'. Dispense with the rules and this too fails to serve.

Looking more closely at the reference points that govern our business, we find that they break down into areas of technical consent (such as those concerning digital interfacing and CD standards), artistic values (everything from musical theory to popular trends in production) and sources of information and information exchange. Perhaps the easiest of these to discuss are those of technical orientation, although they provide a valid model for all discussions on 'references'.

We can all agree that the adoption of technical standards is in our general interest —where, for example, would the CD be without the *Red Book* or the project studio be without MIDI? Yet no sooner is a standard agreed than people start to buck it or revise it; you can strike terror into the heart of MIDI users by breathing the words 'MIDI 2' but the odds are that they have already gained abundant grey hairs over incorrect file formats, devices illegally drawing power from the MIDI line or inappropriate uses of SysEx. Why is it that we all recognise the need for a digital interface standard and then employ its domestic variant in the professional studio? Nobody said we had to agree to it, or that we have to adhere to it—the logic behind the standard is irrefutable but having done the right thing on paper, we often do the wrong one in practice.

The examples are too numerous even to consider, but looking through this issue of *Studio Sound* you will see that our regular columnists are having trouble with the future of CD, after-sales service and broadcast distribution—all issues challenging the relevant standard or its lack of use.

Even the magazine you are now reading represents a standard. After 36 years in the service of the pro-audio industry and with distribution to over 100 countries, Studio Sound has come to be recognised for its editorial independence and authority to over 100,000 readers. There is no obligation on the audio community to afford any magazine this status, but it serves everyone well to know and to trust at least one voice of the pro-audio press.

And that is the key: trust. If you know that a CD has been manufactured to the *Red Book*, you can trust it to play in your CD machine. If the digital interface is professional, you can trust the equipment to slot painlessly into your studio. But if you cannot trust your standards, the world can be a very difficult place.

Tim Goodyer ■

Cover: Avid *AudioVision* at The Tape Gallery, London, UK.

Walter Afanasieff's personal-use studio

WE'RE KNOWN FOR THE COMPANY WE KEEP.

There are good reasons why over 7,000 of the world's leading audio professionals have made Digidesign Pro Tools™ their digital audio production system of choice.

One reason is Pro Tools' unique, open-ended system architecture, which welcomes a host of powerful options, including innovative and award-winning products such as PostView™, DINR™, MasterList CD™, Sound Designer II™, and SampleCell II™. Another is Digidesign's ongoing commitment to providing timely, professional solutions with products such as PostConform™, our soon-to-be-released EDL/autoconform package, and the Digidesign ADAT Interface™. Best of all, there's the unrivaled flexibility that comes with products from over sixty Digidesign Development Partners.

So join the industry's best. Call us today at one of the dealers listed below to discover what Pro Tools can do for you. You'll be in good company.

WALTER AFANASIEFF
(Mariah Carey, Kenny G., Michael Bolton)

DANE TRACKS
(Forever Young, Romeo Is Bleeding)

RHETT LAWRENCE
(Paula Abdul, Mariah Carey, the Winans)

BOB CLEARMOUNTAIN
(Brian Ferry, Bruce Springsteen, INXS)

STEVEN LIPSON
(Annie Lennox, Simple Minds)

HARRY SNODGRASS
(Alien 3, Robin Hood Men in Tights)

HANS ZIMMER–MEDIA VENTURES
(The Lion King, I'll Do Anything, Cool Runnings)

WEDDINGTON PRODUCTIONS
(Aladdin II, Basic Instinct)

JONATHAN WOLFF
(Seinfeld, Married With Children)

Now with TDM

- A virtual digital mixing environment seamlessly integrated into Pro Tools with up to 16 busses, 5 unity-gain inserts, 5 effects sends and automatable inputs, subs and masters
- Session snapshot of DSP settings/volume & pan automation
- DSP Plug-Ins from Digidesign and Third-Party Developers
- Third-Party hardware cards such as the Lexicon NuVerb™
- Easy integration of external analog equipment
- 22-bit SampleCell II playback through TDM

- Audio Engineering - Dublin 010-353-1 671 7600
- Boomerang - Manchester 061-873 7770
- MediaSpec - East Kilbride 03552-29084
- MAX: Music and Video -London 071-700 3060
- Music Corporation - Hants 0425-470007
- Syco - London 071-625 6070
- Systems Workshop -Shropshire 0691-658550
- TSC Professional - London 071-724 8327
- Turnkey - London 071-379 5148

DIGIDESIGN-U.K. OFFICE
081-875-9977

digidesign®

• 1360 WILLOW ROAD • MENLO PARK • CA • USA • 94025 • 415.688.0600
EUROPE (LONDON) • 44.81.875.9977

SAN FRANCISCO • LOS ANGELES • SEATTLE • NEW YORK • CHICAGO • NASHVILLE
PARIS • LONDON • MELBOURNE • EINDHOVEN • LIVORNO

International News

In-brief

● AMS Neve single distributor for Japan

General Traders Ltd will take over all responsibility for sales, repairs and maintenance services on new and existing AMS Neve equipment in Japan. Based in Tokyo, General Traders have represented Neve for nearly 20 years, and have been responsible for establishing Neve's present Japanese market position.

General Traders Ltd.
Tel: +81 3 3291 2761.
Fax: +81 3 3293 5391.

● Penny & Giles

Following on partly from their appointment as a Digidesign Development Partner, Penny & Giles have introduced a new Workstation mode on their *MM16 MIDI Management System*. The new mode allows the *MM16* to operate as an automation control surface, with its 16 E-Belt controllers performing the same role as motorised faders, for users of hard-disk recording systems such as *Pro Tools*, *SADiE* and Sonic Solutions.

Penny & Giles Studio Equipment Ltd.
Tel: +44 1495 228000

▼ David Reitzas with *Spatializer*

● Streisand Spatialized

The album of Barbra Streisand's Madison Square Garden concert, highlight of her first tour in 27 years, has been mixed by Dave Reitzas at Record Plant Recording Studios, LA, using the *Spatializer* to bring forward not only Streisand's vocals but the piano, seen as the foundation of the tunes. The unit was also used on synthesisers to broaden the image and spread them out to avoid interference with the orchestra.

Desper Inc.Tel: +1 310 268 2700.

● Focusrite Far East distribution

Focusrite have appointed new distributors in the Far East in addition to their representation in Japan by Otaritec. Focusrite products will now be handled in Taiwan by Frank Wang, Advance Technology, Taipei, in Korea by OS Park, Best Logic Sound Co, Seoul, in Singapore by Lawrence Tay, Electro Systems, Geylang, and in Hong Kong and China by Clement Choi, Digital Media Technology in Kowloon.

Focusrite Audio Engineering Ltd.
Tel: +44 1628 819443.

Canadian Digital Radio

Canada's Task Force on the Introduction of Digital Radio has released its recommendations to guide the development of detailed digital radio coverage areas. The recommendations, in the form of seven guiding principles, are contained in a report to the federal government, presented to John Manley, Minister of Industry, responsible for spectrum issues affecting digital radio, and Michel Dupuy, Minister of Canadian Heritage, responsible for the overall broadcasting policy for Canada.

'The report is another key step in the orderly transition to digital radio,' said Peter Kruyt, Chair of the Task Force and President of Power Broadcasting Inc. 'We have recommended principles which ensure an orderly implementation process with a minimum of bureaucratic procedures, and which permit all broadcasters to provide CD-quality digital radio services to their listeners.'

The principles advocate digital replacement coverage for AM and FM stations in the new digital L-Band frequency (1452MHz–1492MHz). They also recognise that there are opportunities for some stations to correct deficiencies in their present coverage, subject to normal regulatory approvals.

'The recommendations have been fully tested,' said David Garforth, Chair of the Task Force Working Group which developed the report over the last 18 months. 'We commissioned a Spectrum Capacity Study, which concluded that the principles are achievable and practical within the available 40MHz allocation of L-Band spectrum for digital radio.'

Task Force on the Introduction of Digital Radio. Tel: +1 613 990 4890

GP1 at G7

The recent summit of G7 leaders in Naples saw 15 Soundcraft Broadcast *GP1* location on-air mixers pressed into service by RAI, providing broadcast facilities for the international press corps. RAI recently bought 30 of the compact *GP1*s, the largest order to date for the new desk.

Finnish First for *MSL-2As*. Tampere's leading congress and concert hall, Tampere Talo, has recently taken delivery of Finland's first Meyer *MSL-2A* system from local dealer Studiotec. The system comprises 6 *MSL-2A* compact high-power loudspeakers, supported with *S-1* controllers, in a Left-Centre-Right configuration. The 2,000-seat venue stages a wide cross-section of events, including musical entertainment, short film festivals, chamber music concerts and large congresses. Meyer Sound. Tel: +1 510 486 1166.

They were used in 15 small broadcast workstations available to radio journalists. Each booth contained both reel-to-reel and cassette recorders, plus a microphone; RAI further provided all the technical backup required for journalists to send live reports all around the world.

'This may not be the most demanding role for a desk like the GP1,' said Rocco Brozzoniti of RAI, 'but it was ideal. Compact, easy to use, and high audio quality.'

Soundcraft Electronics.
Tel: +44 1707 665000.

ASL *M802* record preamplifier

Audio Solutions Ltd have identified a potential problem when using new high-output tapes on the venerable Studer *A80*, long discontinued but still the most popular multitrack ever produced. It is no surprise that the overload margins of the machine's record amplifiers are on the modest side, but with the new generation of tape formulations such as Ampex *499* and Scotch *996*, ASL point out that the output drive required to saturate the tape is considerably more than the Studer amplifier can produce, giving serious clipping some 2dB–3dB before the 3% distortion level on the tape is reached.

ASL already manufacture a replacement card for the *A80*, designed to give a phase response the inverse of the replay amps thus producing linear phase through the machine. The card also has an extra 6dB of overload margin compared with the Studer circuit, which is sufficient, say ASL, to overcome the problems of the new tapes. Other claimed benefits are greatly reduced distortion near clipping, about 8dB less noise, and low cost compared with a replacement Studer card.

ASL are concerned that *A80* owners may be unaware of the reasons for the distortion they may be getting, even blaming the new tape itself, or that they may consider abandoning 'these otherwise fine machines'.

Audio Solutions Ltd.
Tel: +44 181 998 8127

Russian in stereo from Audix

Audix Broadcast Ltd have been awarded a contract for the supply of an ALB-Series console which will be used by the BBC World Service to provide stereo broadcasts throughout Russia. The console will be installed at Bush House and will be dedicated to the BBC's news service now being broadcast via the RTR Russian network following an agreement between the BBC and RTR. The BBC is the first Western broadcast organisation to be given uncensored access to a national network in

Eastern Europe.
Audix Broadcast Ltd.
Tel: +44 1799 541248

Yamaha *DMC1000* v3

Yamaha have announced new software for their standard *DMC1000* console that will offer virtually all the features from the *DMC1000 Stereo* while retaining the original console structure.

Yamaha Pro Audio Manager Terry Holton says, 'The new version 3 release is in direct response to customer requests and makes the system a lot more flexible. By retaining different configurations in both the standard *DMC1000* and the *DMC1000 Stereo*, I feel we are able to offer our customers the optimum choice'.

Version 3 allows any adjacent pairs of inputs or monitors on the *DMC1000* to be configured as stereo pairs, with linkable parameters. The *DMC1000 Stereo* on the other hand configures individual channels as either a stereo input or dual input, and in so doing requires certain controls to function differently and be relabelled.

Other major v3 features include M-S decoding for the main stereo input pairs, and simultaneous channel and monitor path routing to the eight buses and Stereo bus.

Further enhancements have been made to automation and MIDI functions, and four Operational levels have been included that lock-out various functions of the desk.

'This is a brand new feature which has been installed to prevent inexperienced users from accidentally adjusting fundamental setup characteristics,' explains Holton. 'In its most extreme the whole console is operationally locked, and this is useful in situations, such as live applications, where you want to make sure that nobody can change anything.'

A charge will be made for v3 which Yamaha say will be 'substantially less' than the *DMC1000 Stereo* software. The new software will be launched at next months AES.

Systems Workshop takes on Icicle

Systems Workshop in Oswestry have been appointed UK pro-audio distributor for the Icicle range of computer storage devices, set to cause a stir because of their low price structure. Systems Workshop believe that although media costs have been dropping continuously, the benefits are not being handed on to the end-user, and they intend to redress the balance. Examples are 540Mb, 1Gb and 4Gb Icicle external drives for the *Mac* retailing at £425, £650 and £2899 respectively, with a 1.3Gb M-O drive at £1975 (UK).

Icicle is a storage distribution company working in the *Mac*-user environment which was set up a year ago to supply everything from raw mechanisms to external drives. Their portfolio is split into two different types of product, those that are fast enough for A-V use such as the fast range of Micropolis products right up to 9Gb, and a range of economical products for backup purposes.

Systems Workshop.
Tel: +44 1691 658550.

Uptown surfaces in Bavaria. Made internationally famous by its wartime submarine drama, *Das Boot*, Bavaria Film have recently added a 36-channel *Uptown 2000* motor fader automation system to the Neve console in the sound dubbing theatre. Installation took just one day, and the system was immediately put to use on a new German production. Audiomation Inc. Tel: +1 508 881 7903. Audiomation Systems (UK). Tel: +44 1207 282880.

THE SEASON

October 1994
● October 11th–15th. **Audiovideo-94**, Lenexpo Centre. St Petersburg, Russia. ● October 12th–15th, **NAB**. Los Angeles, USA. ● October 21st–23rd. **Broadcast India '94**. World Trade Centre. Bombay, India. ● October 29–31. **Broadcast Sri Lanca '94**, Marriott Hotel, Colombo, Sri Lanka.

November 1994
● November 3rd–4th. **Magnetic & Optical Media Seminar**. Nikko Hotel, Atlanta. Georgia, USA. ● November 3rd–6th. **Reproduced Sound 10**. Hydro Hotel, Wyndermere, UK. ● November 10th–11th, **SBES**, Birmingham, UK. ● November 9th–11th, **Inter BEE**, Makuhari, Japan. ● November 10th–13th. **97th AES Convention**, Moscone Centre, San Francisco. USA. ● November 15th–18th, **Tonmeistertagung**, Stadthalle, Karlsruhe. Germany.

December 1994
● December 1st–4th. **13th International AES Conference**. Dallas, Texas, USA.

January 1995
● January 5th–7th. **Showbiz Expo East**, New York, USA. ● January 24th–27th, **ITA Information SuperHighway '95 Conference & Exhibition**, Santa Clara Convention Centre, USA. ● January 27th–29th. **Preserving Our A-V Heritage Conference**. NFT. London, UK. ● January 30th–February 3rd. **Midem**, Palais des Festivals, Cannes. France.

February 1995
● February 7th–9th, **ISDN User Show**, Olympia 2. London, UK. ● February 28th–March 3rd, **98th AES Convention**. Palais de Congrés, Paris, France.

March 1995
● March 8th–12th, **Frankfurt Pro Light & Sound**, Messe Frankfurt, Frankfurt, Germany.

April 1995
● April 4th–6th, **REPLItech Europe**, Austria Centre, Vienna, Austria. ● April 26th–29th, **Broadcast Technology Indonesia**, Jakarta. Indonesia.

May 1995
● May 5th–7th, **Theatre World**, Business Design Centre, London. UK. ● May 23rd–25th. **Midem Asia**, Hong Kong. ● May 9th–12th, **Pro Audio, Light & Music China '95**. Beijing Exhibition Centre, People's Republic of China.

June 1995
● June 10th–12th, **12th ShowBiz Expo**, Los Angeles, USA. ● June 13th–15th, **REPLItech International**. Santa Clara Convention Centre. Santa Clara, USA.

July 1995
● July 12th–14th, **Pro Audio & Light '95**, World Trade Centre. Singapore.

August 1995
● August 25th–28th, **Beijing International Radio & TV Broadcasting Equipment Exhibition '95**, World Trade Centre. Beijing. People's Republic of China.

September 1995
● September 14th–18th. **IBC '95**. RAI Centre, Amsterdam. Holland.

October 1995
● October 5th–8th. **99th AES Convention**. Jacob K Javits Centre, New York, USA. ● October 24–26. **REPLItech Asia**, Singapore International Convention and Exhibition Centre. Singapore.

Contracts

● Dutch DASH for Sony
Recent Sony DASH sales include several in Holland: two *3324*s for Bullet Sound Studios, *3324*s for Zeezigt Studios and Dureco, and *3348*s for Golden Earring —still going strong—and Ad Kraamer, who has upgraded from a *3324*.
Sony Europe. Tel: +44 1256 55011.
Sony US.Tel: +1 201 930 1000.

▲ George Kooijmans of Golden Earring (left) and Ad Kraamer with *PCM-3348*

● Fifth DAR Delta at Twickenham
UK film sound postproduction company Twickenham Sound Station have taken delivery of their fifth DAR *Delta* digital audio workstation. The 16-track *Delta Plus* was immediately put to work on *Interview with the Vampire*.
DAR. Tel: +44 1372 742848.

● *OmniMix* in New York
East Side Audio and Video recently took delivery of New York's first SSL *Scenaria OmniMix* digital surround sound audio-video system. A new, larger relative of the established *Scenaria* system, *OmniMix* is configured for postproduction control.
SSL. Tel: +44 1865 842300.
SSL, US. Tel: +1 212 315 1111.
SSL (Japan). Tel: +1 3 5474 1144.

● API to MCA in LA
After an absence of over ten years in the Los Angeles console market, API have announced the delivery of the first *Legacy*-series console in LA to MCA Music Publishing Studios. The 32 by 24-channel console featuring the all discrete 550L equaliser and 212L mic preamp was installed in early August, following other Legacy deliveries to Squid Hell Productions, Boston, and Southpoint Studios, Miami.
API Audio Products Inc.
Tel: +1 703 455 8188.

● Qing up for Calrec
Further sales of Calrec *Q-series* consoles to various BBC sites: a 36-channel chassis to BBC World Service Television; 20 channels to BBC World Service at Bush House; and a second console, with 48 channels, to BBC Midlands at Pebble Mill. A 40-channel *Compact-series* has been delivered to Birmingham-based 021 Television.
Calrec Audio Ltd.
Tel: +44 1422 842159.

"Obviously, These Guys Are Serious About Audio."

—D&P. Orion Reftew, Mix Magazine

If you weren't aware of how popular D&R consoles have become, we understand. After all, we're not very good at making a lot of noise.

As thousands of D&R owners know, however, it takes more than our 20-bit-ready- noise floor to sound good. It takes more than our acclaimed Hi-Def™ EQs, and our RFI-killing, welded-steel chassis and stargrounding designs.

It also takes attention to a spec few console manufacturers are willing to discuss. We're talking phase coherency—which we tackle head-on by meticulously phase correlating each and every audio stage in every module in every console we craft. The result? Virtually no audible phase shift.

Is all our trouble worth it? Yes. You see, if we settled for "industry standard" phase specs, your music and audio could suffer up to 300% more phase shift. So thanks to our trouble your D&R will deliver sonic ecstacy. Not sonic smear.

Like the magazine said, we're serious. True, maybe we'd have to settle for industry standard performance if we stopped handcrafting consoles, and started assembling them. But we assure you that's another phase we won't be going through.

D&R

EUROPE'S LEADING HANDCRAFTER OF HIGH-PERFORMANCE CONSOLES

D&R Electronics B.V., Rijnkade 15B, 1382GS Weesp, The Netherlands

D&R West: (818) 201-5855 • D&R Nashville: (615) 661-4892 • D&R Southwest: (309) 756-3737

D&R North America: (309) 588-3411 • D&R Latin America: (713) 350-2569

D&R crafts remarkably affordable consoles for music, audio, broadcast, post production, and sound reinforcement. Call us for a free reprint of the 2/94 Mix Magazine Review.

Quested *Q205* 2-way close-field monitor

Yamaha EQs

Yamaha's *YDG2030* is a new 2-channel, 30-band digital graphic equaliser offering 40 memory locations and MIDI control. The unit may also be controlled remotely via QS1 software-IFU485 hardware —available for MS *Windows* and *Mac* platforms—which allow a maximum of 31 units to be managed over the proprietary Y-485 serial bus.

The second of Yamaha's new EQs is the *YPD2006* 2-channel, 6-band (or single-channel, 12-band) digital parametric equaliser. This shares control options with the *YDG2030*, including the facility for mixing *YPD2030*, *YPD2006* and established units in the form of *DEQ5-DEQ5E* and *D2040* digital crossovers.

Yamaha-Kemble Music (UK). Tel: +44 1908 369269.
Yamaha Corporation of America. Tel: +1 714 522 9011.

Sonifex Audio Logger and Editor

The Sonifex *Sentinel*, to be shown at the SBES, allows radio stations to log their broadcasts on to DAT. By using two data DAT drives in a rackmount unit, up to eight channels of audio can be continuously logged. Searches can be made for prerecorded audio on one drive while the other is still recording, and logging can be switched automatically from one drive to the other. The tapes are time and date-stamped by being synchronised to an external MSF Rugby or DCF Mainflingen clock, and logged audio can be searched for by entering the date and time of broadcast.

Audio bandwidth is selectable between 3kHz and 16kHz. The lower bandwidth allows 14 days of logging on one tape, while the higher option allows the retransmission of logged material.

Sonifex point out that although most station managers do not wish to put a great deal of energy into logging, they have a legal obligation to do so and can be severely punished if they do not, citing a recent case in which a community station was unable to provide a tape of a news item which was the subject of a complaint, and was fined £1,000 by the UK Radio Authority. Sonifex see DAT logging as taking over from the conventional use of video or open-reel loggers.

Also new from Sonifex is the *News Room Tools NRT2000* digital audio editor, a *Windows* package designed to bring audio editing directly to the journalist's desk. It is not intended to offer the most sophisticated multitrack editing, but to allow a journalist to get recorded audio to air as quickly as possible with the minimum of fuss. It allows multiple cuts to be made from the same recording, has a skip function for dealing with problems such as coughs, and provides networking and compatibility with other broadcasting equipment.

Sonifex Ltd. Tel: +44 1933 650700.

PowerPoint horns

ProSystems have unveiled the *PowerPoint* horn driver, whose new patent-pending topology will, according to company president Adolph Santorine, 'redefine the way horn drivers are made in the future.' Identifying a market need for wider frequency response, cleaner high-end and lower distortion, ProSystems claim this is the first departure from standard compression-driver design in over 65 years.

The *PowerPoint* topology eliminates the typical phase plug and replaces it with an 'elliptical doughnut' waveguide. The diaphragm curves outward along the waveguide with a gradually increasing gap, and this new approach, according to ProSystems, allows the radiating surface to produce the high frequencies on one part of the diaphragm and the lows on another. The waveguide allows the sound to arrive at the horn entrance naturally and in a direct path, lowering distortion and allowing for a wider bandwidth. The technology will be discussed in a paper to be presented at the forthcoming AES.

The latest driver, the ProSystems model *425*, has a frequency response from 1kHz to beyond 31kHz, and the company claim for it the lowest second and third-harmonic distortion figures ever recorded for a high efficiency horn driver, as well as extremely low nonlinear distortion. The current model couples to 1-inch bolt-on and screw-on horns, with a two-inch throat version to follow.

ProSystems—The AWS Group Inc. Tel: +1 304 233 2258.

Quested *Q205*

Quested Monitoring Systems have unveiled the *Q205* close-field monitor, the newest and smallest product in the Quested range of cabinets. Designed for producers and engineers needing an accurate portable reference speaker, the *Q205* is a 2-way, active, self-powered monitor in an extremely compact enclosure. Two low-frequency drivers are incorporated into the design, together with a ferrofluid damped 28mm soft-dome HF driver; each drive unit is located within its own chamber to eliminate any potential intermodulation distortion.

The electronics are housed in a magnetically-shielded, steel and aluminium, pod which is bolted to the back of the cabinet. Driving the bass and HF units are amplifiers capable of delivering 75W and 50W RMS respectively.

Quested Monitoring Systems. Tel: +44 171 731 7434.

OSC *Trans-port*

OSC have announced availability of *Trans-port*, the first file-exchange program for the Open Media Framework (OMF) project format. ▶

In brief

● New Foundations

Fostex flagship nonlinear recorder-editor, the *Foundation 2000*, has been joined by a further version of the *Foundation*—the *Foundation 2000 LS/LX*. The new model offers more affordable access to the proprietary technology behind the *Foundation*, sacrificing such elements as the ACE processing cards and RPE storage facility, and hence the storage, mixing and DSP functions, but gaining 8-channel I-O. While remaining fully upgradable to *Foundation 2000* status, the new model will allow Fostex to bring their technology to the market.

Fostex Corporation(Japan). Tel: +81 425 45 611.
Fostex (US). Tel: +1 310 921 1112.
UK: SCV. Tel: +44 171 923 1892.

● Maxell DAT

A new line of performance, packaging and tape lengths has been announced by Maxell. Maxell DAT now comes in 34mins, 49mins, 64mins, 94mins and 124mins and features a new housing offering elimination of excess levels of slack tape. Consistent with the development of existing Maxell DAT line are such considerations as the improvement of the ceramic armour of the tape and an improved binder.

Maxell Europe. Tel: +49 211 5951 129.
Maxell (UK). Tel: +44 1952 251911.

● dCS 950 D–A*

The forthcoming San Francisco AES Show will offer the first showing of the *dCS 950* high-resolution, stereo D–A convertor. Using discrete multibit oversampling architecture, dCS claim that the unit features 'fully differential, low-distortion, high-performance amplification with a Class A discrete balanced output stage'. Standard digital interfaces are supported.

Data Conversion Systems. Tel: +44 1223 423299.

● Opcode-*Session 8* compatibility

Opcode Systems have released a new version of *Studio Vision Pro*, the *Macintosh* MIDI sequencing software with integrated digital-audio recording and editing. The system is now compatible with Digidesign's *Session 8* hardware, significantly reducing the cost per track of 8-channel recording. *Studio Vision Pro* is compatible with the original *Session 8* hardware as well as the new *882 Studio* and *882 I-O* interfaces. It also supports *DAE* (the Digidesign Audio Engine) which allows compatibility with all current Digidesign systems, and *DAE* is included free with the package.

Opcode Systems Inc. Tel: +1 415 856 3333. ▶

SOUNDSTATION GOLD ....EVERYTHING FITS

If you're puzzled by the choice of digital audio production centres, meet the solution...

DAR SoundStation® Gold. Powerful, efficient, flexible and dependable.

For the complete answer to all your audio production questions call DAR or your local distributor. We'd love to tell you more.

DIGITAL AUDIO RESEARCH

SOUNDSTATION Gold

The Complete Digital Audio Production Centre

Digital Audio Research Limited, 2 Silverglade Business Park, Leatherhead Road, Chessington, Surrey, KT9 2QL, UK Tel: +44(0) 372-742848; Fax: +44(0) 372-743532

Nicral ISDN—see sidebar

Already a new industry standard, OMF establishes a common-file spec for digital-media session documents, incorporating digital video and audio tracks along with editing and mixing decisions. Several manufacturers, including Avid, Sonic Solutions, Studer Editech, AMS Neve and Synclavier have already announced OMF compatibility for their workstation products.

Trans-port is an OMF conversion utility for Digidesign's *Pro Tools* and OSC's own *Deck II*. It exchanges playlists, edits, automation, sync references, audio files and file locations between any of the three session formats, and allows sharing of work between inexpensive *Mac*-based workstations and the high-end models—OSC intend the system to break down the boundaries between desktop setups and dedicated workstations.
OSC. Tel: +1 415 252 0367.

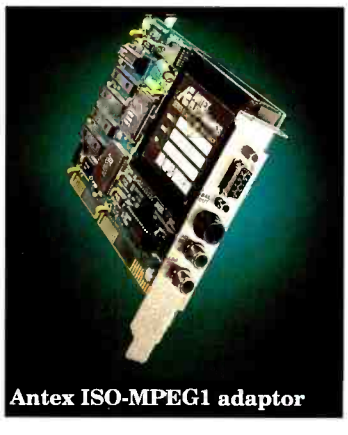
Antex adaptor

Antex Electronics have announced a low-cost, playback-only, digital-audio adaptor for ISO-MPEG-1 and Dolby AC-2 compression formats that offers the same advanced features as the Antex *SX-23e* board. Compatible with 386-486 PCs and PS2s, the *Series 2 / Model SX-9* offers playback sample rates up to 50kHz, and is designed to be a low-cost distribution device for both ISO-MPEG1 Layer I-II and Dolby AC-2 compression formats. It also supports a wide variety of other formats, including OKI ADPCM, Microsoft ADPCM, DVI ADPCM, CDI ADPCM, CD-ROM XA and 8 and 16-bit PCM.

The *SX-9* incorporates both balanced and unbalanced analogue and AES-EBU or SPDIF digital input and output, providing the ability for network transmission of audio in digital format. Advanced features include a built-in EEPROM-based software security scheme, preventing piracy and unauthorised execution of developers' software and blocking operation of unauthorised adaptors.
Antex Electronics Corporation. Tel: +1 310 532 3092.

Sony MD machines

Two new Sony MiniDisc products were on show for the first time at IBC. The *MDS-B3* MD recorder and the *MDS-B4P* player add RS232C serial-control capability and digital audio interfaces as well as new user features targeted at on-air and presentation applications.



Antex ISO-MPEG1 adaptor

Both models include IEC-958 Type II digital outputs, while the recorder can record IEC-958 Type I or II protocols. Serial control allows remote operation including edit functions, and also allows individual track titles to be acquired.
A headphone socket is now fitted, and there are now 'power on resume' and 'power on play' functions so that discs do not have to be reloaded after temporary power supply failures.

Alongside the recent launch of Sony's *PRMD-74* professional recordable MD, the latest introductions represent Sony's belief that the format has emerged as the clear successor to the analogue cart.
Sony Broadcast & Professional Europe. Tel: +44 1256 55011.
Sony Corporation of America. Tel: +1 201 930 1000.

BayWatcher

LA-based BayWatcher Inc, have released their *Patch Bay Monitor and Recall System*, which monitors and records patches in a complex patching system. BayWatcher monitors each patch as the user makes it and stores the information for future recall. Subsequently, it can recall the patch and prompt the user through a repatch, with LEDs located at each jack, as well as by voice and visual displays.

BayWatcher use an LED-phototransistor pair at each jack to 'see' the patch as it is made, and stores the patch in memory or on disk. It can then guide the user in repatching the bay, jack by jack, by lighting the LEDs at each pair of jacks to be patched. The information is also available on the Display and Switch module at the top of the bay, and on a connected PC's VDU running *Windows* software. Y-cables, pad cables, phase reversals and so on are accommodated, and the system can monitor for 'illegal' operation such as patching an output to another output, sounding an audible alarm.

Installation does not involve any jack or wiring changes, and the system includes the remotely located Micro Rack and power supply, as well as a 1U-high Display & Switch Panel that mounts at the top of the rack. Patch files are transferable from system to system using the system's CrossPatch feature, and a hard-copy print-out of the patch list can be produced.
BayWatcher Inc.
Tel: +1 213 256 4048.

● **Graham-Patten Systems**
D-ESAM 820

IBC saw the launch of Graham-Patten Systems' *D-ESAM 820*, derived from the D-*ESAM 800* digital edit-suite audio mixer. The upgraded model features a new master-processor board offering enhanced storage capacity, a new audio-output module with 20/24-bit resolution, and an optional digital-input card handling up to four AES-EBU pairs of 24-bit digital sources with built-in sample rate conversion. Current *D-ESAM 800* users can field upgrade their systems to full *820* specifications.
Graham-Patten Systems Inc.
Tel: +1 916 273 8412.

● **Nicral ISDN products**

ISDN specialists Nicral have launched two devices to address the problem of a 'broadcaster friendly' user-interface for ISDN dial up units. The *EasyCall Terminal Adaptor* provides two X21 ports and offers quick dialling routines, 50-entry, alphanumeric, number store and automatic dual-port dialling. The *ARC* is designed for slightly more sophisticated installations, and consists of a master controller capable of controlling up to ten slaves. Each slave can dial up, clear and configure any of up to eight TAs that may be available to it—Nicral say this is a unique system enabling broadcasters to maximise the efficiency of a central ISDN resource as well as improving access to ISDN-based audio links from various locations throughout the station.
Nicral Ltd. Tel: +44 1672 810351.

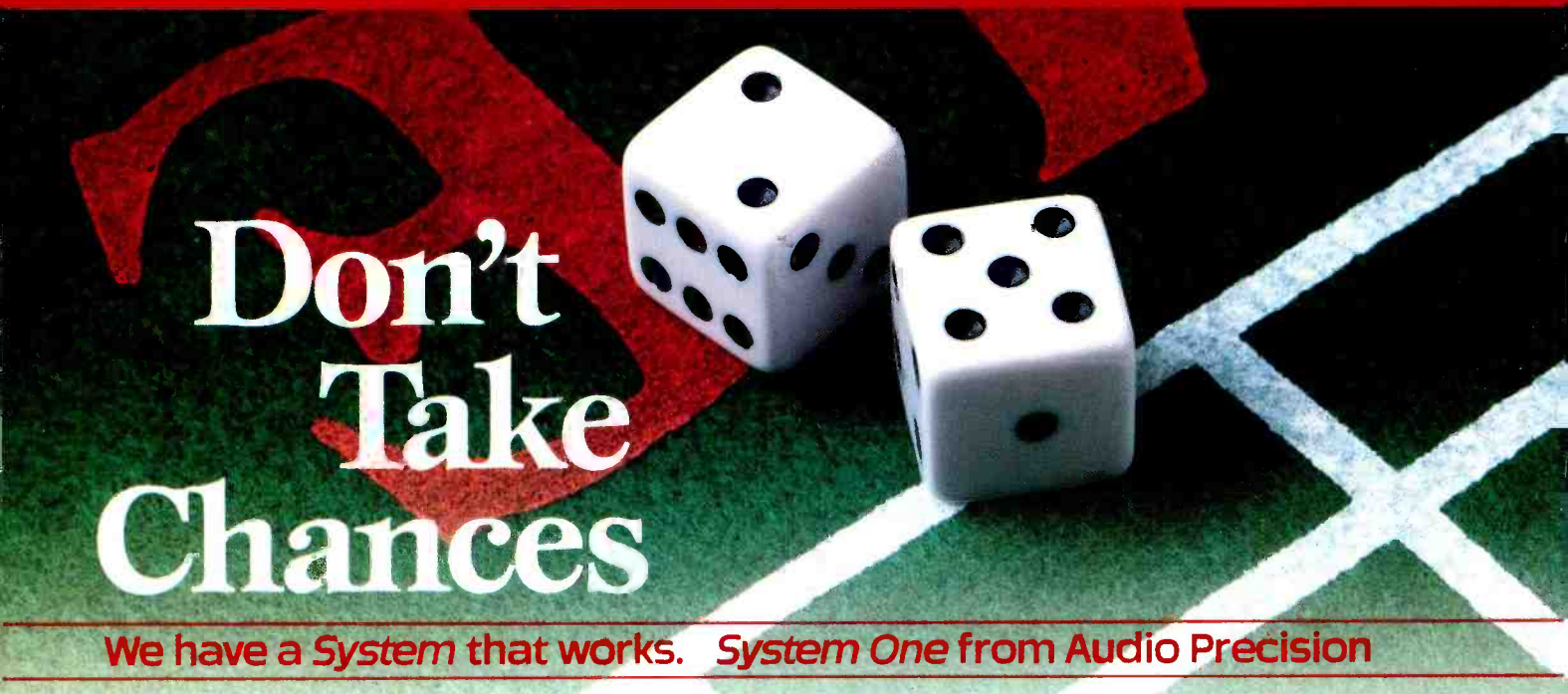
● **NTP AES-EBU switcher**

At IBC NTP showed a prototype of the *575-100* AES-EBU switcher, and have now delivered production models. The unit is a 16x16 router (expandable to 32 x 32) featuring transformer balanced inputs and outputs, 8-character displays for source and destination names, full asynchronous operation and the facility to memorise up to ten setups, occupying 1U of rack space.
NTP Elektronik A-S.
Tel: +45 44 53 11 88.

● **ARX *DI-2* Stereo Direct Box***

The *DI-2* is a true stereo pair of direct boxes in the one case, featuring switchable 20dB pad, switchable +10dB gain, plus audio ground-lift and battery-check switches with status LEDs. Dual XLR outputs are mounted on the rear panel, and powering options comprise internal batteries, external DC power and Phantom.
ARX Systems Pty Ltd.
Tel: +61 3 555 7859.

Dual Domain Audio Testing



Don't Take Chances

We have a *System* that works. *System One* from Audio Precision

In studios and labs, on benches and factory floors, in stations and networks, thousands of System One Audio test systems around the world attest to the fact that this *is* the System that works. Hardware and software refined to match the application produce both superior performance and superior reliability as demonstrated by our three year warranty on parts and labor.

THE RECOGNIZED STANDARD

System One is known the world over as the recognized standard in audio test and measurement. Component suppliers, manufacturers, equipment reviewers, and end-users all rely on Audio Precision for measurement quality they can trust.

COMPREHENSIVE & FAST

System One is a completely integrated digital and analog audio test system. By combining all the necessary instruments into one package System One provides higher performance at lower cost than conventional instruments. In addition, System One can grow with your needs. Your initial purchase of a basic System One allows you to add any option later.

Optional *FAST*TEST & *FAST*TRIG DSP capabilities test any audio channel, producing 160 measurements from a stimulus signal less than one second in duration. Options such as input and output switchers and the DSP-based FFT and digital domain modules make "one-stop" audio testing easy.

EASY TO USE

Straightforward features and stored sample audio tests make System One easy to use. Color graphic test results also may be copied to printers and plotters.

GO/NO-GO testing against limits and test sequencing with automated procedures save time and repetitive motions.

HIGH PERFORMANCE

New digital and analog technologies leave yesterdays "good enough" performance far behind. System One easily handles high performance challenges such as state of the art analog preamps or digital recording systems.

The integrated System One offers premium specifications and performance, but at no premium in price compared to lesser test sets or equivalent separate instruments.

Our worldwide force of Audio Precision representatives will be pleased to provide further information and an onsite demonstration.

Audio precision

P.O. Box 2209
Beaverton, OR 97075-3070
503/627-0832, 800/231-7350
FAX: 503/641-8906

INTERNATIONAL DISTRIBUTORS: **Australia:** IRT Electronics Pty. Ltd., Tel: (61) 2 439 3744 **Austria:** ELSINCO GmbH, Tel: (43) 222 815 04 00 **Belgium:** Trans European Music NV, Tel: (32) 2-466 5010 **Bulgaria:** ELSINCO, h.e. Strelbishte, Tel: (359) 92 581 698 **Canada:** GERRAUDIO Distribution, Tel: (416) 696-2779 **China, Hong Kong:** A C E (Int'l) Co. Ltd., Tel: (852) 424-0387 **Czech Republic:** ELSINCO Praha spol. s r.o., Tel: (42) (2) 4702 1 451, 452 **Denmark:** npn Elektronik aps, Tel: (45) 86 57 15 11 **Finland:** Genelec OY, Tel: (358) 77 13311 **France:** ETS Mesureur, Tel: (33) (1) 45 83 66 41 **Germany:** RTW GmbH, Tel:(49) 221 70 91 30 **Hungary:** ELSINCO KFT, Tel: (36) 112 4854 **India:** HINDITRON Services PVY, Tel: (91) 22 836-4560 **Israel:** Dan-El Technologies, Ltd., Tel. (972) 3-544-1466 **Italy:** Audio Link s.n.c., Tel: (39) 521-598723 **Japan:** TOYO Corporation, Tel: (81) 3 (5688) 6800 **Korea:** B&P International Co., Ltd., Tel: (82) 2 546-1457 **Malaysia:** Test Measurement & Engineering Sdn. Bhd., Tel: (60) 3 734 1017 **Netherlands:** TM Audio B.V. Tel: (31) 034 087 0717 **New Zealand:** Audio & Video Wholesalers, Tel: (64) 7 847-3414 **Norway:** Lydconsult, Tel: (47) 9 19 03 81 **Poland:** ELSINCO Polska sp. z o.o., Tel: (48) (22) 39 69 79 **Portugal:** Acutron Electroacustica LDA, Tel: (351) 1 9414087 / 9420862 **Singapore:** TME Systems Pte Ltd., Tel: (65) 298-2608 **Slovakia:** ELSINCO Bratislava spol. s r.o., Tel: (42) (7) 784 165 **South Africa:** SOUNDFUSION, Tel: (27) 11 477-1315 **Spain:** Telco Electronics, S. A., Tel: (34) 1 531-7101 **Sweden:** Tal & Ton Elektronik AB, Tel: (46) 31 80 36 20 **Switzerland:** Dr. W.A. Gunther AG, Tel: (41) 1 910 41 41 **Taiwan:** ACESONIC intl Co., Ltd., Tel: (886) 2 719 2388 **United Kingdom:** SSE Marketing Ltd., Tel: (44) 71 387-1262

HHB *Portadat* PDR1000

The big news on the HHB stand at this year's APRS was the fact that the first of the eagerly-awaited *Portadat* machines had been shipped. The BBC, following extensive consultation on the design of the machine, had taken delivery of several units for OB use, particularly for sport. The show was, for most visitors, the first chance to see the *Portadat*s in the flesh, and the display models attracted considerable interest, generating the biggest crowd on the stand most of the time.

Studio Sound brought an exclusive preview of the design of the machine and some preproduction specimens back in January of this year; now we have had a chance to look at a production model.

To recap briefly, the *Portadat* machines are pitched at the professional portable market, particularly for location work for film and TV, offering ruggedness, flexibility and easy portability without the kind of price tag attached to a Fostex *PD2*. The model now available is the more basic of the two, with the time-code version to follow shortly—despite appearances the time-code unit is not a bolt-on accessory but the bottom half of a quite distinct model with no upgrade path between the two.

Features incorporated with the location market in mind include phantom power, independently switchable mic-line inputs, a limiter, multiple sample rates, time and date stamping, a built-in monitor loudspeaker and large, brightly-coloured primary controls. The machine uses a Nickel Metal Hydride battery, with a higher capacity and, it is claimed, a better long-term performance than a comparable NiCad. The supplied charger-power supply has slots for two batteries, one of which has a Refresh mode which will completely discharge the battery before recharging it, extending its life further still. The batteries have to be charged in this external unit—there is no charging circuitry in the machine itself on the basis that it would add unnecessarily to the cost, weight and heat generation.

One aspect of the machine which has only become apparent with the release of the production models is the carrying case. This is in the best ENG-location tradition, with pockets for batteries and tapes and velcro-fastened flaps over all the bits to which you might require access. The flaps in fact open out into a kind of hood arrangement over each set of connectors, allowing the opening to be Velcro'd shut over the cables and more or less sealing the weather out. The main set of controls (RECORD and PAUSE buttons, RECORD level knobs, meters and time-programme display) are covered by a transparent plastic cover which even has little pads stuck to its underside to make control operation easier. This is a thoughtfully designed case, providing just the right combination of access and protection.

The uses I have put the machine to, on a couple of simple location recordings with a pair of Neumann *KM84*s plugged straight in the side, have shown up its thoughtful design as well as a couple of oddities. The initial set-and-forget controls (sample rate, digital or analogue input, calendar-clock and so on) are easy to find but out of the way once recording begins. The only criticism I have of this arrangement is that some of the parameters are hidden under the outer tape loading lid (there's another one inside), which would be fine if the tape did not unthread every time the lid was opened. If you want to change the digital I-O format or the sampling frequency you have to wait around while the tape unlaces and again while it laces back up, even though the tape is never ejected and all you want to do is carry on recording or playing back.

The only other moan concerns the End Search function. Most DAT machines, if asked to find the end of a tape which is already sitting near the end, will wind back to the last programme number and then shuttle forwards to the end of the recorded portion and park, ready to continue recording with contiguous programme numbers and A-time. The *Portadat* for some reason winds all the way back to the beginning of the tape and then goes to the end, presumably checking the programme numbers as it goes. Commendably thorough, but takes very much longer, which might not please busy location recordists.

These couple of negative points are more than outweighed by the positive side of the *Portadat*'s design. The plethora of controls and switches are sensibly laid out, logically grouped and clearly labelled, making it very quick and easy to set the machine's functions up the way you want them. The metering and display section is clear and easy to read, especially when back-lit, although it would be nice if the headroom margin read-out could be permanently available; as it stands, this is only displayed in Clock mode, which loses the A-time and programme number information. Furthermore, switching back to Counter mode resets the margin. Obviously trade-offs have to be made if the overall display is to remain readable, but I wonder if this is the way most people would have chosen to configure it.

The monitor loudspeaker, with its push-pull volume knob which it shares with the headphone output, can be a godsend, even if its quality is that of a cheap transistor radio. The machine's logic decides whether it will be on or not depending on the current transport mode—it will not work when you are recording, for instance—and most of the time gets it right. I am not sure about the preset modes of the source-tape monitor function, however; I like to have complete control over this, rather than having to remember which the machine will allow me to hear depending on what I am doing, particularly if its decisions are a bit odd. For instance, with no tape in the machine, it is fixed at Tape and will not monitor the source. Why?

Again, niggles aside, the facilities provided are well thought out and thorough, including a lock on the Record level controls which appears to lock them securely wherever they are rather than nudging them to some nearby detent, and a KEY HOLD switch which disables all the transport controls in order to avoid accidental embarrassing stoppages.

Overall, this is a machine which would inspire me with confidence on location. It is built like a tank, its transport is impossible to fool, its battery capacity is probably even higher than quoted, and it is hard to think of anything one might want which HHB have not provided. It bristles with all the right features and none of the time-wasting ones —unless, of course, you want time code, in which case you will have to wait for the other model. Watch this space. ■

Dave Foister

HHB Communications Ltd, 73–75 Scrubbs Lane, London NW10 6QU. Tel: +44 181 960 2144. Fax: +44 81 960 1160.
USA: Independent Audio, 295 Forest Avenue, Suite 121, Portland, Maine 04101-2000. Tel: +1 207 773 2424. Fax: +1 207 773 2422.

***PDR1000* with time-code unit**

Crest Nexsys

Up-to-date SR system control was recently brought to the *1994 Montreux Jazz Festival* through the use of Crest *NexSys* computer-controlled amplifiers for the FOH system in the main Stravinsky Auditorium. Admittedly, computer control of amplifiers has been around for a couple of years, but it is probably true to say that *NexSys* was among the first and it now has a wealth of experience behind it in order to make it a viable—and reliable—system.

Though the *Montreux Festival* is in reality a 'temporary' fixed system, this report will examine the applications of *NexSys* from a touring perspective and assess at the benefits to be gained from using it in such a situation.

The Montreux Meyer system used this year can be thought of as a large-scale touring rig in miniature, consisting of main left and right clusters (three *MSL-5* enclosures), four low mid bins (*DS-2*s), five subwoofers (*650-SW*s), left-centre-right fill speakers (*MSL-2*s) and left-centre-right delay speakers (also *MSL-2*s).

In terms of system configuration, this gives us left-right main systems (possibly broken down into subsystems), left-right low-mid reinforcement, subwoofers, front fills and delay speakers—the actual number of speakers is obviously determined by the size of the venue.

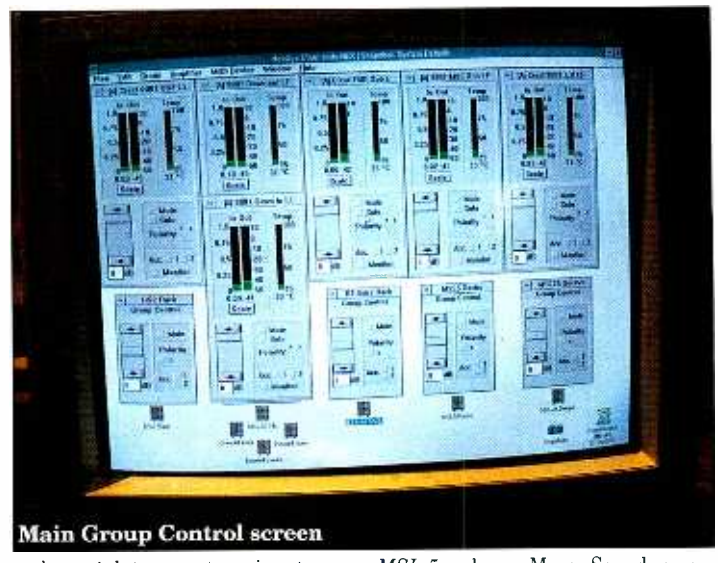
Until now, setting up a sophisticated sound reinforcement system has demanded a lot of time and attention (unless you adopt the 'turn it on and let it roar' approach). As an alternative, the *NexSys* system allows remote level control of amplifiers—or groups of amplifiers—and the possibility to have information on the operating parameters of individual and-or groups of units. However, looking closer, the heart of *NexSys* is a PC (*486* recommended) fitted with an RS-485 bus server, which in turn controls Supervisor and Load Monitor mainframes situated in or by the amplifier racks. For computer buffs, each mainframe is regarded as a device and this allows a maximum of 768 amplifiers to be controlled by one bus server without repeaters over a distance of 4,000 feet (Crest are currently developing a fibre-based net which will eliminate the need for repeaters altogether). Each Supervisor mainframe can control up to 48 channels of audio from 24 amplifiers. The Load Monitor mainframe serves 24 channels from 12 amplifiers.

The software runs on *Windows 3.1* and includes the following functions.

Plan allows a plan of the venue, together with the system, to be drawn on the screen and thus give a real-life reference rather than just a block diagram (also possible).

Snapshots allows system configurations to be stored and recalled as required. If the optional MIDI interface is used, each Snapshot (or Scene) change can send a MIDI command to control external devices such as effects units, lighting controllers and so on.

Amplifier is the control window for each amplifier channel and contains information concerning status such as heat-sink temperature, input polarity (reversible), VU meters for both input and output levels, solo and mute functions.



Main Group Control screen

Group allows groups of amplifiers to be created (rather like audio groups in a console) and controlled as a block. The control parameters for the group are as for single amplifiers.

Event Monitor is one of the most useful functions, providing a continuous record of each monitored amplifier's performance. This allows any undue temperatures, clipping, IGM (Instantaneous Gain Modulation) events to be controlled and provide early warning of component failure and-or system abuse.

Modem Linking allows *NexSys* systems to be connected via modem to the original contractor or installer. It offers increased efficiency through preventive maintenance as the contractor is able to interrogate the system directly from their home base.

Load Monitoring is the latest facility from *NexSys*, and is connected between the amplifier output and the loudspeaker enabling the audio source and load to be tested. It is an easy way of detecting possible driver failure or degradation—or even to see if it is still there (some fixed installations suffer from extensive pilfering of drivers).

Included with Load Monitoring is an Audio Return facility which allows the output of any amplifier channel to be monitored locally.

The Load Monitor function works in conjunction with the Event Monitor and provides a graph of impedance against frequency. The system is swept with user preset frequencies prior to a performance and the results are logged into the event monitor.

If this is done on a daily basis—as it might be during a tour—it is then easy to spot potential problem areas and to rectify them before they actually become serious.

In the case of the *Montreux Jazz Festival*, the Load Monitor brought to light the difficult impedance curve presented by the HF section of the *MSL-5* and gave Meyer Sound some in-field information that might otherwise have escaped notice.

From the touring point of view, apart from the information stored on operating parameters, *NexSys* provides that most useful of functions—the possibility to set up a sound system from the mix position without having to rely on mixed communications to get things done. It allows different clusters to be muted and soloed, different frequency bands to be adjusted singly and in combination, level change presets or matrixing on-off to be executed without the operator needing to be an octopus. More importantly, it allows swift comparisons between setups in order to improve fine tuning.

This said, sophistication does have its dangers and though the latest software release at Montreux was very flexible, somewhere a programmer had lost touch with the reality of live sound and left out a Solo Safe function. The ability to be able to solo a channel—or groups of channels—is fine for setup and troubleshooting but decidedly lethal during performance as someone found out when he soloed the left low mids. Fortunately, it was between numbers but it could have caused some embarrassment. Needless to say, *NexSys* software now includes Solo Safe.

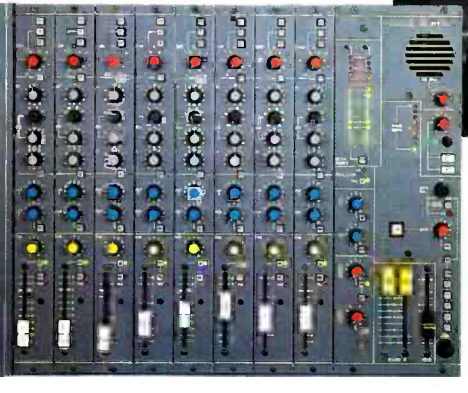
Computer-control in live sound is here to stay and will continue to grow. Yes, we managed without until now, but systems like *NexSys* can—and will—make our jobs easier to do and thus (theoretically) produce better results. ■

Terry Nelson
Crest Audio Inc, 100 Eisenhower Drive, Paramus, New Jersey 07652. Tel: +1 201 909 8700. Fax: +1 201 909 8744.
Europe: Crest Audio Europe, 5a Wilbury Grove, Hove, East Sussex BN3 3JQ. Tel: +44 1273 325840. Fax: +44 1273 775462.
Asia: Crear Audio Asia, 6001 Beach Road #17-03, Golden Mile Tower, Singapore 0719. Tel: 0295 2328. Fax: 0295 4707.

Amp racks

Follow that...

BVE100



B100

The sound performance your pictures have been waiting for.

If you've been listening out for dramatic audio performance it's closer than you think in the shape of the BVE 100, audio for video and B100, audio mixing consoles from Soundcraft.

When it comes to audio for video editing the BVE 100 is in a class of its own. Combining innovative circuit design with high quality components, the BVE 100 delivers performance and long term reliability previously unheard of in such a compact and accessible unit.

The input modules each have three-band equalisation together with a separate High Pass filter and a VCA which enables the signal level to be editor controlled.

Compatible with a wide range of edit controllers via a parallel interface, the BVE 100 can also be used with the VSA 24 for serial control.

The B100 is a fully modular audio mixing console designed for high quality stereo recording or sound reinforcement. Available in 8 or 16 channels, the B100 offers a choice of mono or stereo inputs within a compact unit.

Both consoles provide comprehensive monitoring together with cue loudspeaker and phase meter.

8 channel versions will fit directly into 19" racking or studio desk top.

And naturally, both consoles offer you the benefit of Soundcraft's design pedigree and manufacturing excellence.

More power to your pictures from Soundcraft.

Soundcraft

HARMAN INTERNATIONAL INDUSTRIES LIMITED, CRANBORNE HOUSE, CRANBORNE INDUSTRIAL ESTATE, POTTERS BAR, HERTFORDSHIRE, EN6 3JN, ENGLAND. TEL: 0707 665000 FAX: 0707 660482

H A Harman International Company

Valley Audio *XGate*

Noise gates have come a long way from the relatively simple devices of yesteryear and recent times have seen the emergence of some very sophisticated units. One of the latest to join the throng is the Valley Audio *460 XGate-NR*.

Renowned for the modular *Kepex series* expander-gates, Valley have met the demand for increased sophistication with the *XGate*—a single rack unit dual channel expander-noise gate which also features the separate facility of single-ended noise reduction.

The front panel is neatly laid out, with each channel divided into three sections according to function and these are emphasised by colour-coded knob caps.

All connections are on the rear panel and these include balanced I-Os on XLR connectors as well as 3-pole jacks. Using a jack on the input will disconnect the XLR, however, the two output connectors remain active. A balanced Key input per channel is also provided, again on 3-pole jack.

Interfacing the unit was quick and easy and pin 2 is 'hot'. 'Nonprofessional' connections can also be made using 2-pole (mono) jacks.

The operational controls comprise a Filtering section containing 12dB/8ve sweep high-pass and low-pass filters with overlapping ranges. These allow specific parts of the frequency spectrum of the incoming signal to be emphasised for more selective expansion or gating effects. An IN-OUT switch allows the filters to be preset and switched in or out of the signal path.

The Expander-Gate section houses a switch for INTernal or KEY control for triggering the detection circuits, Threshold, SLOPE (or ratio), RANGE (depth of attenuation), ATTACK, RELEASE and HOLD controls. The section is completed by a BYPASS-LISTEN switch, which we will come back to later.

The Noise Reduction section features a THRESHOLD control combined with an IN-OUT switch. The two channels can be linked together for processing stereo signals via a LINK push button located between the two channel sections.

Metering takes the form of horizontal LED displays and features four LEDs for input level (-20dB to 0dB plus clip), an 8-segment gain reduction meter (to -40 dB) and a 4-segment meter for noise reduction. Additional indication is provided by a green LED for the Bypass and Link modes.

The first thing that becomes apparent on using the *XGate* is the smoothness of its response together with a slight tendency towards gate 'chatter' or transient clipping. The range of parameters is suitably wide (-40dB to +20dB for threshold, -80dB range, 0.2–200ms for Attack and 0.05–5 seconds Release) and this is particularly true for the Slope control, which with ratios of between 1:1.1 to 1:20 allows the most subtle expansion through to hard gating.

Moving deeper into the unit, the HOLD control allows the VCA to be held open before the Release phase kicks in, and this facility allows the creation of special effects such as gated drums and reverb as well as fine tuning any 'chatter' problems with Release settings.

Apart from the creation of gating and expansion effects, the unit proved very useful for 'tightening up performances' with judicious threshold and fast attack settings, allowing the transient to be well on the beat and cutting off any trailing. However, if the sound needed fattening up, this was achieved by dialling in longer Hold settings with a medium-fast Release.

The filter section comes in handy when you want to zoom in on a particular instrument or frequency (bass or snare drum) in order to trigger the unit. The BYPASS-IN switch also has a Listen position which allows the filter section to be monitored in order to find the frequency range desired. It also allows annoying frequencies to be pinpointed (such as breakthrough from loud headphones) and the threshold set for their attenuation without affecting the main signal.

An additional use of the Listen mode is that with the filter in, it functions as a filter section. Postproduction houses can now have a very effective 'telephone filter' for no extra cost.

For critical stereo applications, the two channels can be linked together in Link mode—in effect, linking the VCA control parameters. However, it is strongly recommended that the settings for both channels be similar to avoid one being favoured over another. A better solution might have been to make the controls of only one channel operative in Link mode, thus simplifying matters.

The bonus section of the *XGate* is the noise reduction section. With only a THRESHOLD control, this is deceptively simple while remaining sophisticated in operation. In fact, the NR Threshold does two things: it varies the sensitivity of the detection circuitry to high-frequency information and, secondly, it increases the range of the filter section (20kHz down to 1kHz). This means that too high a threshold noticeably affects the programme content rather than just providing noise reduction.

I found a little use of the noise reduction function extremely useful for response tailoring with string sections, for example, and with harsh programme material which regular EQ would have impaired rather than improved, it proved particularly effective.

The range of effects and smoothness of response plus the bonuses of the filter and noise reduction sections of the *XGate* make the unit a worthwhile investment. I also appreciated the fact that all inputs and outputs are balanced —there is no excuse for 'professional' equipment to be unbalanced. Well specified and a pleasure to use —I liked the Valley Audio *XGate*.

Terry Nelson

Valley Audio Products, A Division of Galaxy Audio, 625 East Pawnee Avenue, Wichita, KS 67211, USA.
Tel: +1 316 265 9500.
Fax: +1 316 263 0642.

Digital expansion and gating via the Valley Audio XGate

MIDAS

a MARK IV company

DESIGNED FOR A PURE PERFORMANCE

Booth Nº 820,
The AES 97th Convention,
San Francisco.
10th-13th November, 1994

Yamaha GW33D

Yamaha *GW33D*—'sonically exciting...operationally ungraceful'

Opinions vary wildly on the relative merits of a dedicated guitar-effects pedalboard against a rackmount-MIDI pedalboard controller comb—particularly if you are familiar with the frustration frequently caused by inaccessible and fiddly rackmounts.

Yamaha's latest *GW33* pedalboard is about as straightforward as things can get on an editing level, but also serves as a reminder that simplicity can compromise operational ease if stripped back too far. There is no MIDI or external power supply (and it is too heavyweight to work off batteries) but the output is stereo, there is an insert that can be programmed into the presets, plus a foot controller socket, phones output and the instrument input all presented in a row at the back of the panel. Physically the unit is actually a lot sturdier than it looks. The super-shiny legend encrusted top panel reflects any stage lighting straight into the player's eyes but the one-piece moulded casing is deceptively tough with six footswitches placed very near to the front edge which is important because some routines do require more than one switch to be pressed simultaneously.

Editing, copying, saving and comparing of presets—there are 50 in total-half of which are user-programmable—is achieved using function buttons, two cursor keys, and five dials that alter parameter selection and values. These pots are the unit's Achilles heel as they are quite vulnerable and exposed and one good accidental kick or stomp should see them part company with their PCB connections underneath. The pots are not continuous and when adjusted in edit mode alter values that are displayed in a paltry 2-digit LED display (also employed for preset identification) using the front-panel legending to keep track of what it is that is being adjusted.

There are effectively eight effects blocks to edit and combine: compressor, noise gate, distortion circuitry with access to the aforementioned external insert, EQ with amp simulator, two modulation sections, delay, and reverb. Each block is selected using the cursor keys which then assigns control of the its parameters to the dials, it is a simple principle not dissimilar to that employed by Korg in the *A4* pedalboard and it works well. The range of parameter adjustment is not wide but it is effective—the two modulation blocks each offer chorus, flanger, phaser, pitch shift, detune, exciter, touch wah and pedal wah with speed, depth, feedback and tone plus ±1 octave shift depending on the effect type selected.

Each block can be edited individually and then the blocks can be switched in or out using the footswitches and the whole configuration can be saved simply and quickly as a preset.

Compromises include the fact that you can have either EQ or the excellent amp simulator but not both at the same time and while digital and analogue overdrive and distortion types are combined along with the external insert in 12 different permutations none permits the insert to be combined with the *GW33*'s analogue circuits. Additionally, if nothing is plugged into the insert send and return sockets then silence ensues for any overdrive-distortion algorithm that uses the insert and the choice is effectively reduced to six. To get the maximum benefit of the 12 possible combinations you either have to bridge the sockets with a patch lead or plug in your favourite stomp box.

Even so, the basic tonal possibilities are quite spectacular. There is a very wholesome character to the heavily sustained lead sounds that still hangs together for the occasional bit of chordal work without falling into a mush. Similarly, the overdrive tones are also workable on lead lines and in this respect the *GW33* is quite sensational. The forfeit of 3-band EQ for the three distinct amp-simulator types is countered to an extent by the inclusion of a tone circuit which is complemented by wide ranging single-pot tone control on the distortion-overdrive block. In practice it proves to be more than adequate.

Presets are arranged in ten banks of five. Recalling a bank involves pressing the bank footswitch followed by a press of one of the five numbered footswitches to select banks 1–5 or the more laborious method of holding down the BANK button as a type of shift function while pressing a numerical footswitch to access banks 6–0. Thereafter a preset within a bank is selected again on the numerical footswitches. It is an inelegant method of getting to a mere 50 presets, but access to the upper five Banks is possible without losing your balance because the footswitches are very close to the edge of the pedalboard. Matters do not improve. A double click on the BANK button, less easy to do when you are concentrating on pulling faces, calls up a type of pseudo-Edit mode in which the numerical footswitches act as individual switches for the effects blocks with in a preset allowing reverb or modulation, for example, to be switched out of circuit.

This contrived method of patch recall is the most irritating aspect of the *GW33* and makes a fine sounding unit less approachable than it really ought to be. This detracts from the immediacy that is commonly associated with pedalboards. It is redeemed to an extent by the tonal variation available and with a bit of planning ahead it is possible to get through a live set with the minimum of fuss. However, should something untoward or unexpected happen then the player's foot-dexterity and knowledge of the pedalboard will be severely tested.

There is little that can be criticised about the noise that this thing makes, the reverbs are perfectly suited to guitar, the modulation effects have plenty of movement in them and enough range to add subtle thickening or the weird and wonderful and the pitch shifting, while not the fastest on this type of box, is at least consistent and predictable with a very graunchy and earthy tone on the lower octave which is ideal.

Clean sounds are not bad either and preserve the guitar's character although they are not quite as finished and produced sounding as some of the rackmounts that excel in this department but for live work, which I consider to be the forte of the *GW33*, it is still very acceptable. Switching is silent with a fairly seamless transition even across sustained notes.

In summary therefore, a sonically exciting and enjoyable pedalboard that is hindered only by an ungraceful preset-selection process and a price that puts it up against devices that are not restricted by such things. However, if your main criteria are sound quality and a pedalboard that is easy to programme and versatile in use then this certainly deserves a listen. ■

UK: Yamaha-Kemble Music (UK) Ltd, Sherbourne Drive, Tilbrook, Milton Keynes MK7 8BL.
Tel: +44 1908 366700.
Fax: +44 1908368872.
USA: Yamaha Corporation of America, 6600 Orangethorpe Avenue, Buena Park, CA 90620.
Tel: +1 714 522 9011.
Fax: +1 714 739 2680.

Music News is compiled by Zenon Schoepe

Realize your dreams . . .

. . . enjoy the breathtaking performance of 20-bit recording technology.

Dream Series A/D & D/A converters: 115dB dynamic range
SNS 20-bit to 16-bit noise-shaping post-processor
DRE system for 20-bit performance on DAT

MR-2024T interface adaptor for 16-, 20- or even 24-bit recording on the superb Tascam DA-88 multitrack recorder

With Prism Sound, it's real 20-bit.

Call or fax us now for details of your nearest UK dealer

PrismSound

Prism Media Products Ltd.
William James House, Cowley Road, Cambridge CB4 4WX. UK
Telephone + 44 (0) 223 424988 Fax + 44 (0) 223 425023

ZOOLOGY

A new London postpro house sees the abandonment of many accepted design philosophies in favour of an advertising media ambience. Patrick Stapley 'gives good report'

Anyone setting up a studio these days has to go into it with an extremely positive frame of mind —confident that they know their market and can corner it. Adrian Reith—Managing Director of advertising production company Commercial Breaks—is one such person.

'I've been in the ideas business forever,' he states confidently, 'and I know that no matter how good your means of technical executive are, if the idea is wrong you simply won't survive.'

Coming from a creative advertising background and having been a client in most of the advertising studios in London's 'square mile', Reith has very firm ideas of what an ad studio should offer.

'Commercial Breaks has been around now for 16 years and in that time we've used a lot of other people's studio time. For ages I'd wanted to build a facility the way I thought it should be, and break away from what appears to have become the common mould.

'Every studio I've ever worked in has been designed by a recording engineer and not a creative person, and yet the clients are all creative rather than technical people. Basically our clients are much more visually stimulated than they are aurally stimulated, and actually find sound quite boring—they certainly don't have as many opinions about sound as they do about pictures or concepts. So I decided it was about time to build a studio that was interesting to work in rather than a grey, hi-tech environment that was all knobs and switches.'

Reith views cosmetics as being just as important as equipment, and admits that his one brief to himself was the 'no one should be able to work at my studio and forget it'. The studio is certainly eye-catching thanks to the work of artist Cressida Bell, whose family links with Virginia Woolf and the Bloomsbury Set, led Reith to commission her to design wall coverings and furnishings. The effect is not dissimilar to the vibrant decor found at London's Strongroom Studios which Reith admits was an inspiration.

Zoo (a name coined in true marketing style for being colourful, snappy and memorable) opened last month on the site of rock-and-roll studio 145 Wardour Street which closed rather abruptly earlier in the year. The facility is arranged over three floors with Studio 1 in the basement, Studio 2 (still being completed) on the ground floor, and a transfer room and reception on the first floor—Commercial Breaks' offices are on the floors above where they have been for some years.

Construction

Work on the studios began in March 1994 with the complete gutting of the original studio structure which was totally unsuitable for the new facility. There then followed a period of general making good, damp proofing, rewiring and so forth. Two companies were involved in the project —Audio Arcana who specified equipment and coordinated the installation, and Quested who looked after studio design and acoustics.

The two studios share the same basic layout and have been identically equipped; the only differences are that Studio 2 is slightly smaller and benefits from natural light. Both feature large control rooms with ample client seating, and special attention has been given to providing good all round visibility through into respective voice-over studio areas.

'To aid visual contact we raised the floor at the rear of each control room so wherever you're sitting you can see into the studio,' explains Roger Quested. 'The control room window splays outwards, so that the pane of glass on the studio side is much bigger than the control room side. Also, to prevent any visual distraction, the front wall has been painted black in contrast to the busy decoration around the rest of the walls.'

Walls have been constructed from what Roger Quested refers to as giant loudspeaker grilles which are covered in Cressida Bell's silk-screened fabrics. Behind these easy pull-off panels are mid and high-frequency absorbers on the side walls and bass absorbers on the rear wall. The same approach has been used in the studio areas, which although almost dead retain some natural acoustic. As with all his designs, Quested has avoided the use of fibreglass wool.

'I've used two types of material—a treated, felt carpet underlay, and a rubber barrier mat with lead particles in it. The advantages of these materials over Rockwool is that they are more acoustically controllable, they take up a lot less space, and are nonirritant. In the sloped control-room ceiling I've added a profile acoustic foam for mid and high trapping which again is excellent for fitting into tight spaces.'

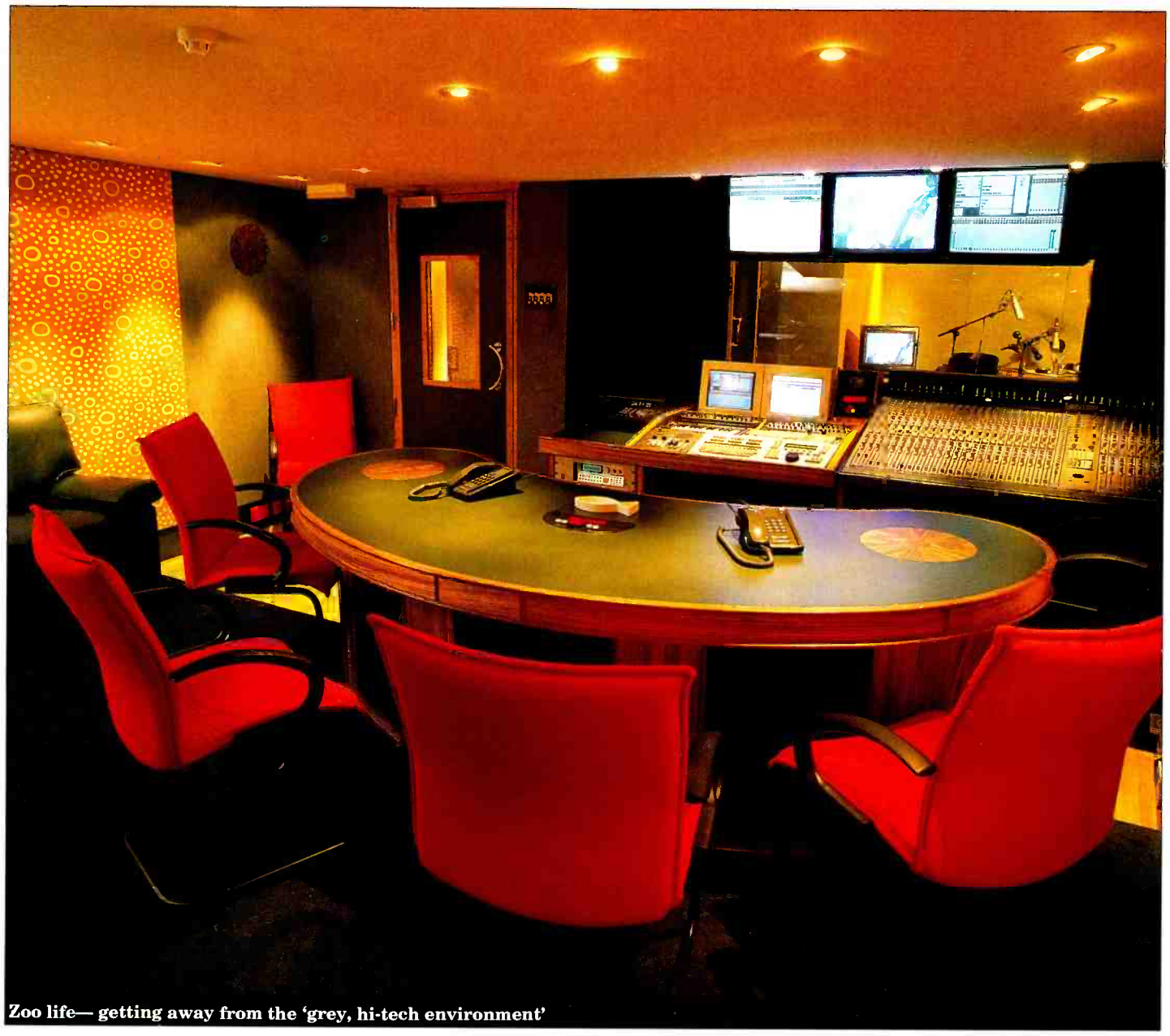
Monitoring is via custom-built Quested *H208* 3-way passive systems, which were made as narrow as possible to fit into the constricted spaces either side of the window.

'Because it's an advertising studio you obviously don't need to listen at enormously loud levels, so you don't need huge monitors,' observes Quested. 'The main requirements are for accuracy and a very even dispersion right across the client seating area, and I think we've managed to achieve both those things very well.'

Hairdressing

Another important factor in putting a successful studio together is what Adrian Reith calls the 'hairdresser syndrome'.

'In my opinion, by far the most important element in the studio is the person you're working with—the engineer. It's obviously essential that an engineer is technically proficient and can do the job well, but just as important is his ability to get on with and relate to the client. A lot of engineers secretly want to marginalise the client and wish they were not there —they just want to get on with the job which they see purely as a technical exercise. I want to create a really helpful, efficient, fun atmosphere; I'm thinking of this as a creative and a business thing, I want to make happy clients that are involved, looked after and come away with a great job. To do that it's paramount that you have the right engineers, and I feel very fortunate indeed that Owen and Hass came with us because I know they could have gone elsewhere.



Zoo life— getting away from the 'grey, hi-tech environment'

Engineers Owen Griffiths and 'Hass' come from nearby facilities house The Bridge and before that were at Silk Sound. Both have many years experience in advertising postproduction, and have played a key roll in selecting equipment for the new studio, in particular the Fairlight *MFX3* digital workstation.

'The Fairlight has a lot going for it and in our opinion is destined to take off in a big way,' says Griffiths. 'So we thought we'd be ahead of the beat rather than behind it, and be the first facility (outside of the BBC) in the country to install one. Our experience so far with Fairlight suggests that it is the fastest system of its type in town, and this has been backed up by our clients some of whom claim it has speeded up jobs by as much as 25%.'

But isn't this potentially bad for business as clients instead of booking a four-hour session will book-in for just three?

'The important thing is to be able to offer clients advantages and once they realise a job can be done more efficiently, then they'll want to use us again. Lets face it, one of the most important things in advertising is speed—people rush into a session, rush back the next day and change things because the client isn't happy, then a few hours later change everything again—and so it goes on. Everything's moving at such a breakneck speed, and the "redo factor" is quite unbelievable. So your ability to move quickly and make things happen fast is an enormous advantage.'

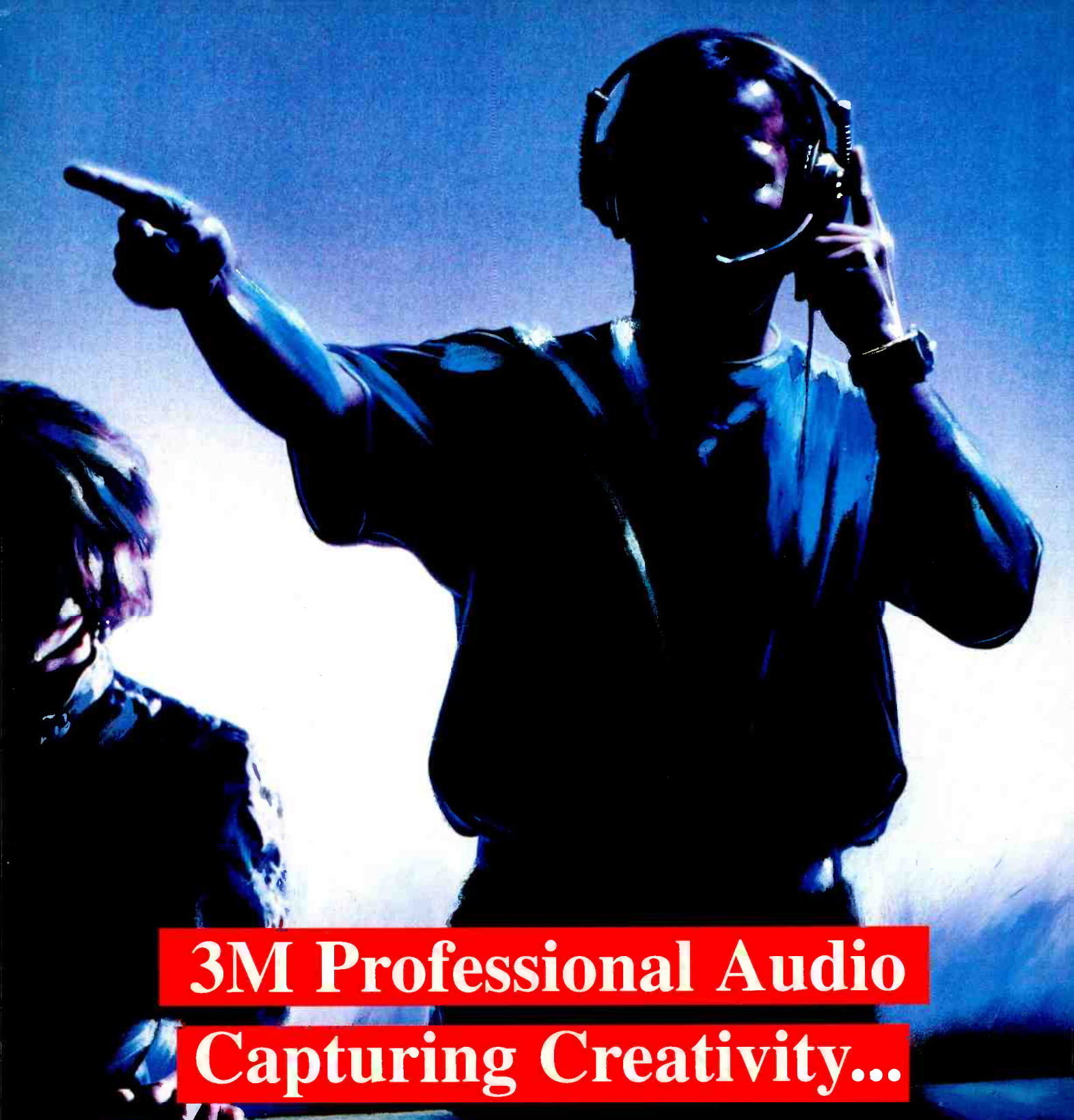
Other equipment includes a 32-input Amek *Einstein* chosen for its clean signal-path and easy-to-use Supertrue automation, and a Steinberg-Akai sequencer-sampler package.

'There are three systems that are doing really well in Soho at the moment—*Opus*, *AudioFile* and *Synclavier*,' says Griffiths. 'Now the *Synclavier* system is a very long-trousered sequencer-sampler which is great for sound effects repitching and for playing tunes with voices and so on. My idea to get around that particular side of things was to include a sampler and sequencer, so we went for *Cubase* with a *Novation* keyboard, and an Akai *S-3200* with a magneto-optical for any sound effects that need to be messed around with.

'It's amazing how much use we've made of it so far, and typically what we tend to find is that people will like a particular sound effect, but want to change it slightly—they'll ask for things like doors or cars to be deeper or lighter, so rather than adding EQ, we'll pitch change them which tends to produce the effect they're after. With sequenced passages I always dump them to the Fairlight so that everything is in one place.

Apart from choosing equipment for its suitability, efficiency and to fit in with budgets, another factor played a significant part as Reith explains.

'I would say that 99% of the clients that walk into the studio don't know the first thing about equipment and wouldn't be able to distinguish one product from another. It's very different from the music recording world where clients are actually attracted to the studio specifically because it has this or that piece of gear. We have this phrase here—Does it give good client?—meaning is the client getting any ▶



3M Professional Audio

Capturing Creativity...

Producers, Engineers and Musicians provide the creativity - 3M captures the results. Accurately, Consistently, Reliably.
Very high operating level enables massive headroom and low saturation effects.
A low noise floor that is subjectively as good as digital - even without noise reduction.
A smooth top end, complemented by clean, rock-solid bottom end punch.

Combining the best of analogue warmth with high clarity.
3M 996 - a tape with a sound so popular that even digital projects use it for mixdown.

Supported by the range of 3M Professional Audio products, covering all recording formats.

3M 996 - Capturing every level of creativity.

3M Professional Audio/Video group
3M United Kingdom PLC.
3M House, P.O. Box 1,Bracknell,
Berkshire, RG12 1JU.
Tel: (0344) 858614 - Fax: (0344) 858082

3M *Innovation*

Captured Creatively

Mike Spike Drake (producer):
"I use 996 all the time for mixing, running 'Z' at 30ips without noise reduction. It just sounds really nice - especially good at the bottom end and with no apparent noise. Projects always sound more like a finished album when they're coming back off 996."

John Leckie (producer):
"996 impressed me the first time I heard it and I've been using it ever since. The amazing lack of hiss enables me to work without noise reduction and the tape is remarkably free of compression effects. And much material sounds almost better on replay than it did going down!"

Avi Landenberg (Chop Em Out):
"We use 3M AUD cassettes in our mastering suites - their very low error rates provide us with extremely reliable and cost-effective performance. The 20 bit technology used in our High Resolution Mastering demands the utmost consistency - we get this quality from the 275LE open reel tapes, which we use for our archive safety copies."

Tom Fredrickse (producer):
"996 gives you the kind of punch you just can't get from digital. I use the tape to the full, often slamming the levels very hard indeed but it all comes back sounding good. I used to think that to record ballads you needed digital but with the lack of hiss on 996 I don't have that restriction any more"

Dominic Fyfe, producer (Nimbus Records):
"We are very concerned with issues of quality, and conducted extensive tests via our manufacturing facility into the 3M Professional DAT tapes. Both in the studio and on location, these have proved to be highly reliable. We quite often don't get a second chance with a recording, so everything has to be right first time."

3M Professional Audio Tape Dealers

PRO-TAPE
33 Windmill Street, London W1P 1HH
Tel: 071 323 0277

TRANSCO
7 Soho Square, London W1V 5DD
Tel: 071 287 3563

STANLEY PRODUCTIONS
147 Wardour Street, London W1V 3TB
Tel: 071 439 0311

BACCUS PROFESSIONAL AUDIO
PO Box 127, Kempston, Bedford MK42 7HW
Tel: 0234 840408

STUDIO SPARES
61-63 Rochester Place, London NW1 9JU
Tel: 071 482 1692

MUSIC LAB
72-74 Eversholt Street, London NW1 1BY
Tel: 071 388 5392

PMD MAGNETICS
Magnetics House, Avenue Farm,
Stratford-Upon-Avon CV37 0QJ
Tel: 0789 268579

ORCHID VIDEO
Old School House, Barton Manor, Bristol BS2 0RL
Tel: 0272 413898

SVS
Sharston Industrial Estate, Shentonfield Road,
Manchester M22 4RW
Tel: 061 491 6660

P F MAGNETICS
14 Simpson Court, 11 South Avenue, Clydebank
Business Park,Clydebank, Dunbarton G81 2NR
Tel: 041 952 8626

gratification from the equipment or the recording process. Traditionally, the answer to this has been no, as they're mostly sitting at the back of the room quite alienated from what's going on. What we've tried to do, by choosing what we considered to be client-friendly equipment, is to enable them to be more aware of what's happening and give them the opportunity to become involved if they wish to.'

This philosophy has been successfully put into practise by adding three 28-inch video monitors above the control-room window. These 'repeat' monitors show the track screen for the *MFX3* on the left, the video programme in the middle, and either the desk automation or *Cubase* sequencer on the right.

'By giving clients good direct visual contact with what's going on, rather than obscuring everything in front of the engineer, it really involves people much more in the session,' confirms Griffiths. 'The *MFX3* screen is very easy for untechnical people to understand, and it makes them aware of how the process works and the kind of things that are possible with it. We're finding that this more open approach draws people into the session, and gives them the opportunity to contribute in a very constructive way.

'This is particularly relevant when you consider the kind of detail we're dealing with during a 30-second commercial—for example its not unusual for us to replace syllables in words from different takes, which is where a system like the *MFX3* really comes into its own.'

Both studios are connected via audio and video tie lines to the first floor transfer room which contains Beta SP, U-matics, DAT machines and so on. As a lot of Zoo's TV work originates on Beta it has to be lifted and layed back without going via DAT. This procedure involves the transfer engineer making a U-matic work copy (either high or low band), while at the same time piping audio and time code to the studio for transfer to the Fairlight. The U-matic copy is then bought down and locked up with the Fairlight, and once the job is completed a final lay back is performed again via tie lines back to Beta. Clients working from the more expensive D1 format, which is rarely found in this type of facility, will normally bring a low-band copy and take away a DAT for lay back.

Zoo are currently looking at installing ISDN which is rapidly becoming an important consideration for many advertising studio's as Owen Griffiths explains.

'We'll be adding ISDN in the very near future which is pretty much essential for getting things to Satellite Media Services (SMS) as quickly as possible. SMS distribute ads by satellite to all the stations on the top of each hour. By sending them a finished radio ad via ISDN you can be pretty confident that it will get to the stations within the hour, and can be broadcast soon after that. It really is quite astonishing how quickly things can be turned around, and also how late some things are left these days.'

Outboard accommodation

EQUIPMENT

STUDIO ONE
- Amek *Einstein*, 32-input 8-group with *Supertrue* automation
- Fairlight *MFX3*, 12-input, 12-output with 2Gb hard drive, 1Gb optical backup
- Studer *A810* ¼-inch
- Tascam *DA60* time-code DAT
- Denon *DRM740*
- Sony *VO9800P* U-matic

Outboard
- Eventide *H3000SE*
- Akai *S3200* plus DAC optical backup
- Drawmer *DS201* (2)
- BSS *DPR402*
- Urei *LA22* (2)
- Lexicon *LXP 15*

Monitoring
- Quested *H208* with Chameleon amplification
- Nearfield Horton-Tannoy

Miscellaneous
- Technics *SLP1200* CD player
- IBM 386-33MHz with *Cubase*
- Probel audio-video D-A and switching
- Novation *MM10x*

TRANSFER ROOM
- Tascam time code *DA60* (2)
- Denon *DRM740* (6)
- Studer *A810* ¼-inch
- MCI ¼-inch

Video Machines
- Sony *VO5850* U-matic
- Sony *VO9850P* U-matic
- Sony *CVR750* Betacam
- Panasonic *NVFS2000* VHS
- Sony *BVM1302P* video monitor

Monitoring
- Rauch *P120*
- Yamaha *NS10*

Miscellaneous
- Probel *6063* audio-video D-A rack
- Raindirk 12 stereo-input audio mixer
- Avitel *2060* time-code reader
- Avitel *2040* time-code generator
- Seltech *110P* house-sync generator
- Technics *SL1210* turntable
- Technics *SLP1200* CD player

Bookings

The studios will, of course, provide an in-house facility for Commercial Breaks, but Reith envisages as much as 80% of work coming from outside with a 50:50 split between radio and television advertising.

A general air of optimism seems to exist in Soho at the moment, and there have certainly been no shortage of bookings during Zoo's opening weeks: clients include names such as Saatchis, BMP, JWT, FCB and MTV. In fact initial business has been so good that Adrian Reith is already talking about expanding the operation and the possibility of adding a third studio at 145 Wardour Street.

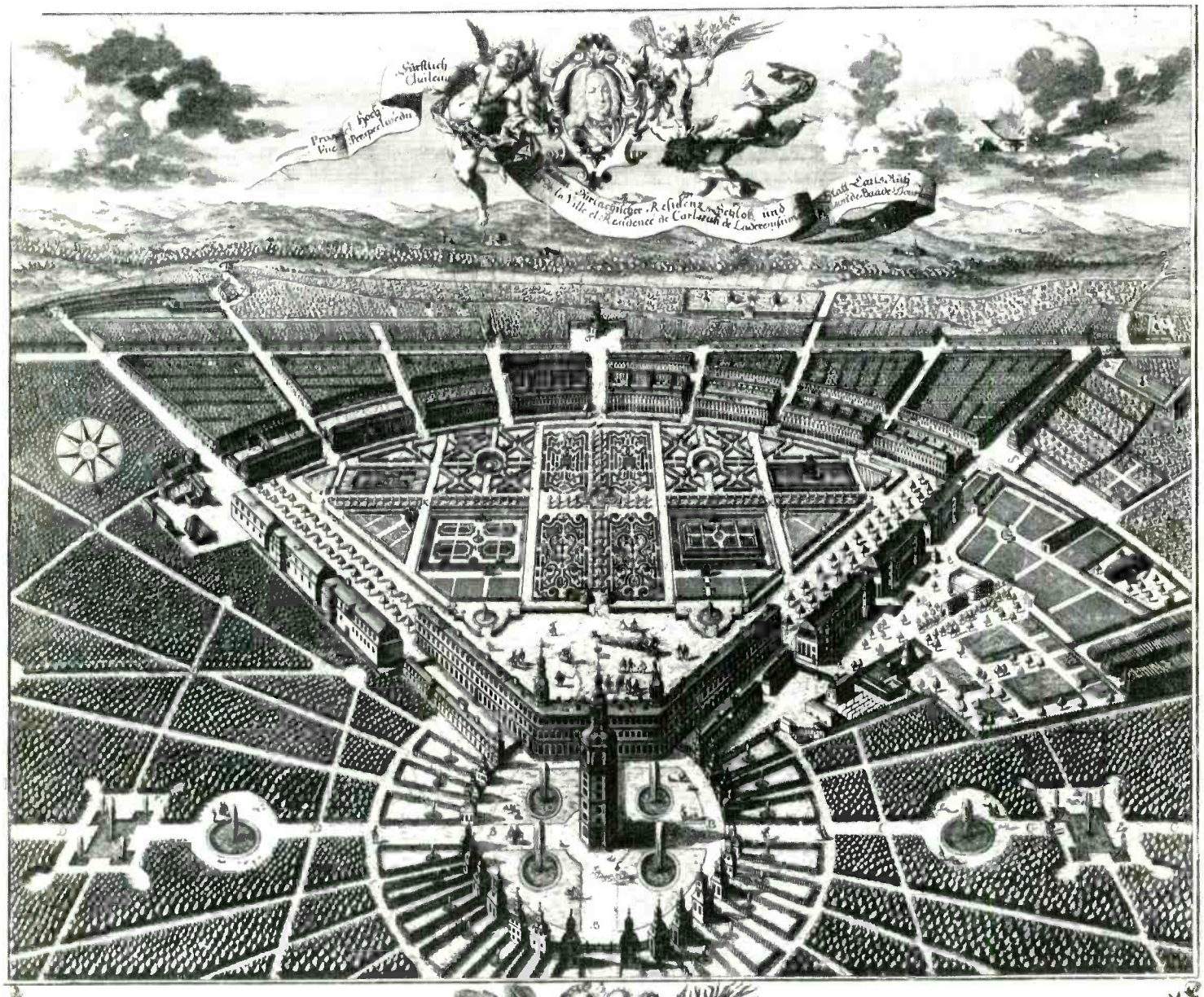
'We are very optimistic about the way business is currently going. For example UK radio advertising has expanded by 100% in the last couple of years, and the listening audience to commercial radio is about to overtake the BBC this autumn which is quite a landmark—it's also quite ironic as my great uncle (Lord Reith) started the BBC.' ■

Zoo Studios, 145 Wardour Street, London W1V 3TB, UK.
Tel: +44 71 734 2000. Fax: +44 71 734 2200.
Studio Design: Quested Monitoring Systems.
Tel: +44 71 731 7434. Fax: +44 71 731 3280.

18. tonmeistertagung

INTERNATIONAL CONVENTION ON SOUND DESIGN
15.–18. November 1994 – Stadthalle Karlsruhe

VERBAND DEUTSCHER TONMEISTER e.V. VDT

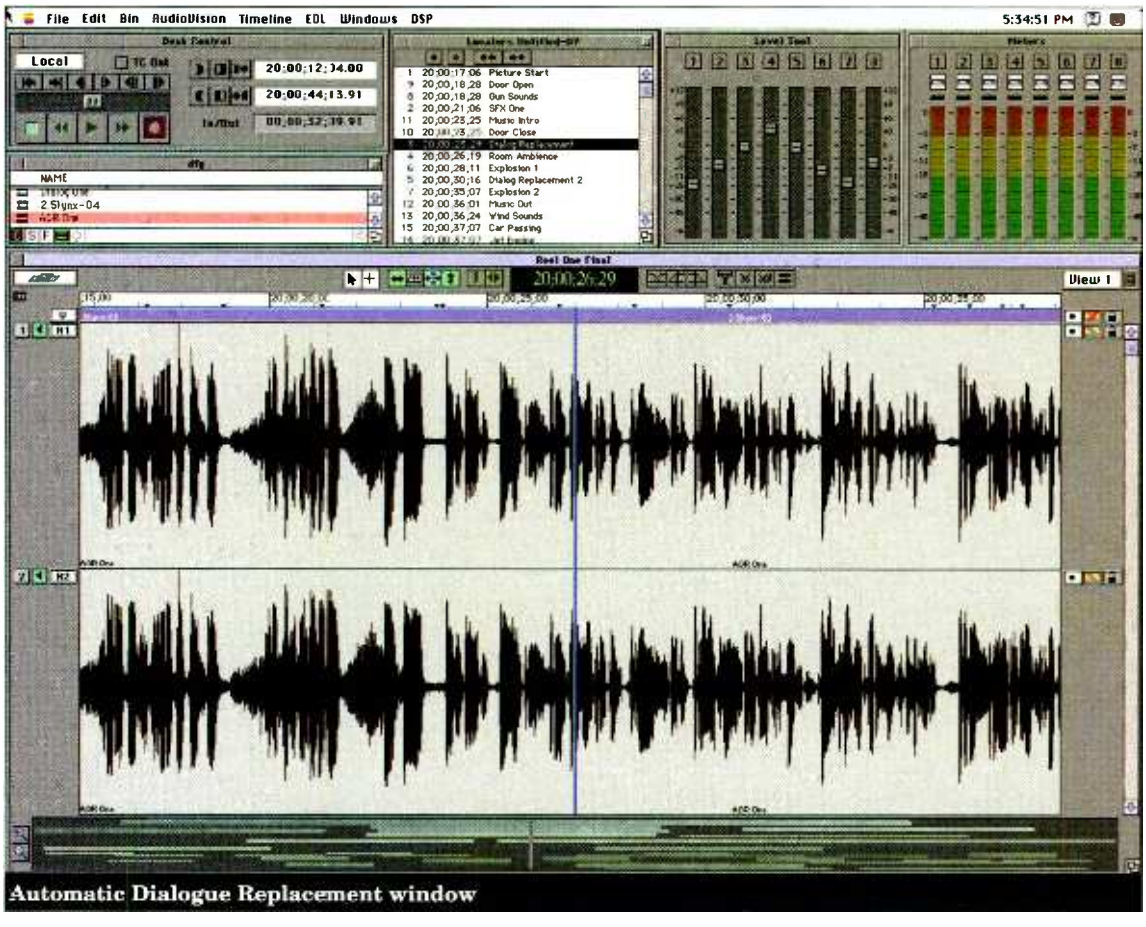


Information:
Bildungswerk des VDT
Am Zaarshäuschen 9
D-51427 Bergisch Gladbach
Tel. 02204-23595
Fax. 02204-21584

Registration:
Teilnehmerbüro des VDT
Auf der Aspel 66
D-50859 Köln
Tel. 0221-503428
Fax. 0221-5002576

The Castle of Karlsruhe. Engraving by J. Thran 1739

AVID AUDIOVISION



Automatic Dialogue Replacement window

The Avid Technology *AudioVision* is, to date, the most powerful, fully integrated *Macintosh*-based workstation that I have used. Running the recently released v2.6 operating software, *AudioVision* is, quite simply, a rational, powerful, easy-to-use device for cutting audio to picture, or stand-alone music editing. Period.

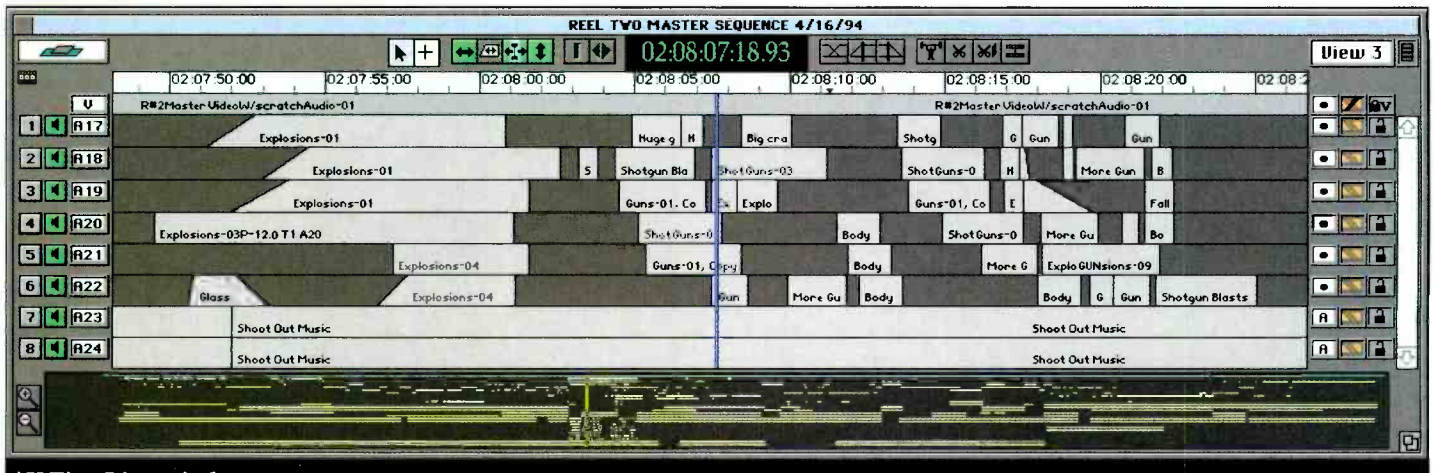
Avid Technology have positioned *AudioVision* as a possible companion to their very popular *Media Composer* and *Film Composer* random-access, nonlinear visual editing systems. *AudioVision*, unsurprisingly, can directly import EDLs and other data from *Media* and *Film Composer*, in addition to other edit-list formats. Which is not to say, however, that *AudioVision* cannot function as a stand-alone system, or be used with other types of video and film editors. Also, given Avid's rigorous support of the Open Media Framework, *AudioVision*'s latest software release offers full compatibility with OMF Project, Bin and Sequence data. (Until now, OMF and similar compatibility had been at the media level, meaning that while *AudioVision* could input EDL and Sequence information from *Media Composer* disks, a translation process would be necessary to convert the information between these two programs. Now, however, information can be transferred more quickly between the two using an OMFI file-exchange format.)

Unlike the competition, which often targets multichannel workstations at a variety of markets (from project studios that require MIDI compatibility, to CD mastering) Avid have aimed *AudioVision* squarely at specific segment: editing sound for video and film. In other words, the firm have built comprehensive machine control and synchronisation functions into the system appropriate to frame-accurate dialogue, music, sound-effect, ADR and Foley editing to picture. And it would seem to be a formula that has met with a fair degree of success; recent films soundtracks cut on *AudioVision* include *Clear and Present Danger*, *Wyatt Earp* and *Addams Family Values*.

Multitrack audio with video

One of *AudioVision*'s most prominent features is its ability to simultaneously record and replay multiple channels ▶

Avid's *AudioVision* is the latest example of the company's progressive approach to integrated nonlinear A-V workstations and a powerful audio system. James Douglas takes the hot seat



AV TimeLine window

of audio plus digitised, full-motion picture to a single hard drive. Given the data throughputs involved, that is no mean technical achievement, especially during scrubbing. Utilising proprietary data-handling algorithms, fast SCSI-II interfaces on the *Macintosh* platform, plus optimised video-compression techniques, *AudioVision* can store and access several hours of multichannel audio and picture from a single 3Gb hard drive.

AudioVision can be supplied in a variety of system configurations. The *Model 4* currently offers four record-replay channels, 24 virtual tracks, four analogue and two digital (AES-EBU-format) I-Os; a *Quadra 950* with 28Mb of RAM plus 240Mb hard drive (solely for storing system software, EDLs and companion data); a pair of multisync video monitors (one for the various software windows; the other for companion video display); video digitiser with JPEG compression board; SCSI-II accelerator for data-storage hard drive; 4 x 4 audio interface convertor; SA-4 audio coprocessor; machine control synchronisation package capable of supporting three external transports; cables and system software. A revised hardware version will offer four digital I-Os.

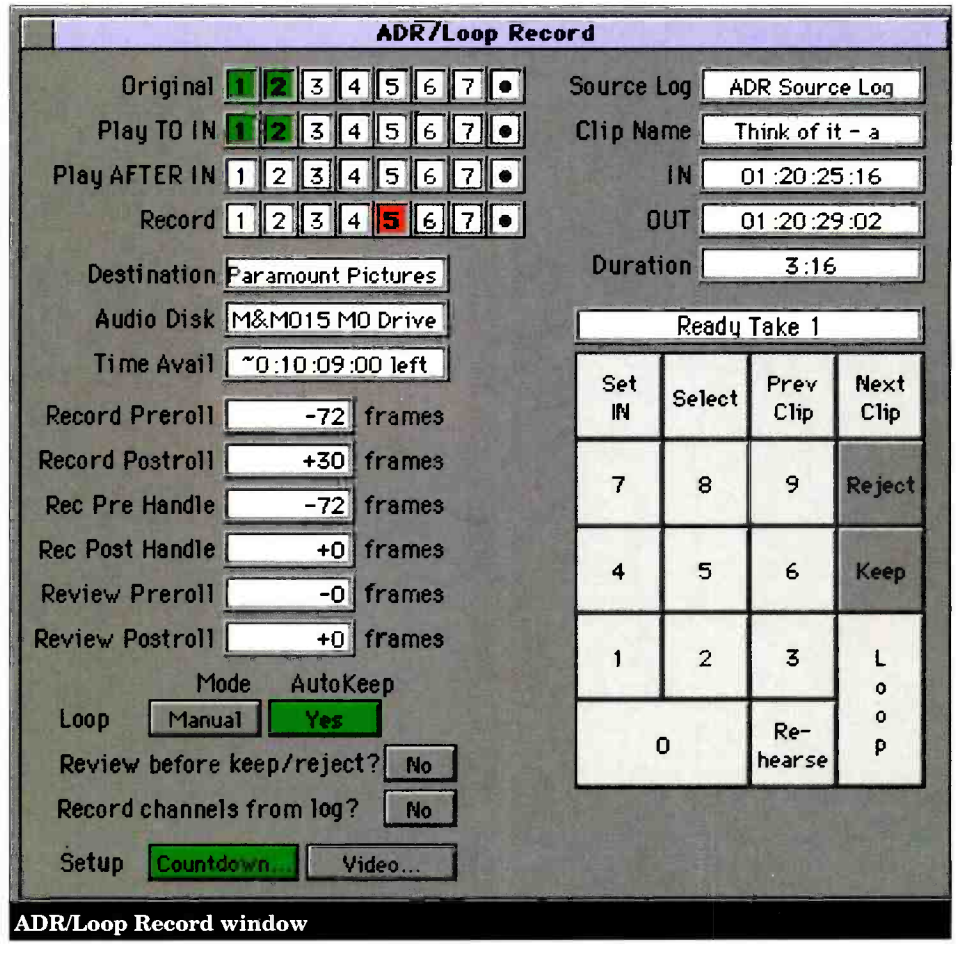
The *Model 8* offers eight record-replay channels; it is identical in configuration to the *Model 4*, with two audio interface convertors and two SA-4 audio coprocessors. Both systems offer internal track bouncing, to free up tracks during a project.

In the US, a *Model 8 AudioVision* sells for $45,000(US)—a complete *Mac*-based system apart from external disk storage. (At the time of writing, high-capacity 9Gb drives cost around $4,500–$5,000). Also available is *AudioStation*, a version of the *Model 4-8* that lacks digital video record-playback—but which is capable of controlling an external VTR player for transfer applications).

By the AES Convention, San Francisco, Avid plan to have releases the new *Model 16* which, as the name suggests, will offer 16 simultaneous record-playback channels, with 24 virtual tracks. *AudioVision Model 16* will be offered as a $15,000 upgrade to current users. Because of the increased data throughput—think about it; 16 tracks of digital I-O plus video from a single drive—Avid have developed a new SA-8 coprocessor board that handles eight channels at time. Also provided by the new configuration will be real-time crossfade and effects; the current *Model 4* and *Model 8*, as reviewed here, rerecord complex crossfades as separate files, which are seamlessly knitted together during playback. (As will be readily appreciated, the new 16-channel AMCI coprocessor board represents a major horse-power upgrade for *AudioVision*; it will also incorporate enhanced video record-playback quality.

A native Power PC version of *AudioVision* should be available in 1995. (Avid are also reported to be taking advantage of the speed offered by the Power PCI Bus architecture, which represents a dramatic improvement over the current NuBus implementations).

The ability to access 4, 8 and 16 channels of full-bandwidth audio and digitised picture from a single hard drive should not be passed over too quickly. For me, it represents what I would consider as a degree of maturity for a product that looks, feels and behaves as if it was designed by audio professionals *for* audio professionals. Drawing on their not inconsiderable experience with video compression and optimised data ▶



ADR/Loop Record window

SIMPLY RED

The Focusrite Red Range brings to the recording engineer a family of products designed, quite simply, to make the process of recording more creative and enjoyable, with tangibly better results.
RED 1: four channels of the best mic-preamplifier money can buy; **RED 2**, two channels of the renowned, Rupert Neve designed, parametric equaliser; **RED 3**, a two channel compressor with following limiter switchable to stereo operation for the mix.
New to the range, **RED 4** is a precision Studio Preamplifier designed to interface up to 7 stereo sources (tape, DAT, CD, etc) at either −10dB or +4db (individually switchable) into the console or direct to the monitoring amplifiers.

All the above are balanced in and out with very high performance transformers for optimum interface, eliminating ground loops and digital noise artifacts.
RED 5 is a stereo monitoring amplifier rated at 250 watts RMS per channel continuous, with peak transient output of up to 800 watts into any load. The high crest factor, over 3 times the continuous rating, contributes to the astonishing sound quality delivered. Simply compare it with your present amp to be amazed how good your speakers can sound.

Ask your dealer for a demo of each of the Red Range – believing is that simple.

FOCUSRITE AUDIO ENGINEERING
Unit 2, Bourne End Business Centre
Cores End Road, Bourne End
Bucks SL8 5AS, England.
Telephone: +44 (0)628 819456
Facsimile: +44 (0)628 819443

FOCUSRITE USA
Telephone: 310 306 8823 (West)
516 249 1399 (East)
Facsimile: 516 753 1020

RED RANGE

Clip Editor window

storage-retrieval, Avid engineers have attempted to make *AudioVision* as operationally transparent as possible.

When a project is being loaded into *AudioVision*'s hard drives, it is expected that some users might have tracks preassembled to analogue or digital multitrack, and that maybe eight channels will need to be imported simultaneously. (Contrast this with other workstations, where you might need to make as many as three separate passes to load the data—four audio tracks for Pass 1; four more for Pass 2; plus maybe a *Quick Time* movie during Pass 3—prior to starting a project.) And, come the time that the current work needs to be off-loaded to make room for a new editing or sound-design project, the ability to back up an entire 4, 8 and 16-channel session with editing and processing data to a single 8mm Exabyte drive saves a great deal of time and effort.

As well as AES-EBU and SPDIF-compatible digital I-Os, for direct connection to DAT and multitrack decks, *AudioVision* is equipped with 1-bit sigma delta A–D convertors with 64x oversampling, and successive approximation 18-bit D–A convertors with 8x oversampling, both of which do an excellent job of interfacing with nondigital signals. Sampling rates for a project can be set to either 44.1kHz or 48kHz; an external sample-rate convertor would be required for mixed-rate sources.

Project windows

The majority of power users will elect to run *AudioVision* from the familiar dual 20-inch monitor layout, with one display being dedicated to picture playback, and the other carrying the various TimeLine and Editing windows. As well as full-screen display of AVR1 through to AVR5 digitised picture (user-selectable, to offer the choice between reduced disk-space and enhanced playback quality), the multisync monitor will also handle conventional PAL-NTSC-format video. In addition, the digital video playback is also available as a conventional PAL-NTSC signal that can be connected to extra monitors for the producer, voice-over talent, Foley artist and so on.

For video-editing facilities utilising *Media* and *Film Composer* systems, *AudioVision* offers another advantage. As well as recording digitised video in AVR1 through to AVR5 formats (the range in comparable picture quality being sub-VHS to better that 3/4-inch U-matic), the system will also replay a total of 11 Avid compression types, ranging from AVR1 and AVR5E, several of which are preferred choice for *Media-Film Composer* users. In this way, projects that have already been digitised within a transfer room or video edit suit can be transferred directly via Exabyte of removable hard drive/M-O to *AudioVision* for the sonic manipulations.

Capturing audio into the system is simplicity itself. Having selected record-ready on the targeted channels, a single button activates record mode. It is possible to drop-in and drop-out instantly on any channel, which is essential for frame-accurate voice-over and other sessions, while picking up additional lines or part lines. ADR and voice-over takes are also autonumbered, with instant playback auditioning from the Capture window. If time code is available, each take will be recorded with H:M:S:F data; otherwise a *Mac*-derived time-of-day tally will be added automatically. Each take is thus tagged with a frame-accurate time references, and the database automatically calculates durations, as well as providing multiple fields for user information. All PAL and NTSC time-code frame rates can be accommodated.

Input levels can be monitored on screen via a set of eight peak-reading displays, while a set of fader icons controls output levels. (Also available are direct interfaces for digital consoles, including the Yamaha *DMC-1000*, enabling signals to remain entirely within the digital domain from source to master tape.)

For extended functionality, *AudioVision*'s *Sound Designer* file structure is fully compatible with Digidesign files, allowing material from *Sound Tools* and related workstations to be imported directly into *AudioVision*. (Of course, OMF also opens up a wider window of connectivity to other systems.)

Audio-to-video synchronisation is remarkably stable, with instant-access to any section of the project in just about as much time as it takes to click a mouse button, or drag the Now Line. Unlike a *Quick-Time*-based system, there is no picture tear nor frame repeats as the system attempts to retrieve large amounts of data; Avid's optimised video-data compression algorithms certainly are a major breakthrough! And if your picture source just happens to be on an external VCR or laser disk, *AudioVision* is equipped with both conventional 9-pin VTR and VLAN serial control, plus direct porting for TimeLine *MicroLynx* modules. *AudioVision* can function as a master, slave or stand-alone system.

Editing and mixing

Having laid up the various elements in rough or accurate sync to picture—dependent upon how they were originally recorded or transferred into the system—the sound clips or complete tracks can be easily dragged to the TimeLine window from the Librarian window. The user has the choice of either retaining the same time-code handles as were added during inload, or referencing a specific point—the start, end or internal sync point—to the currently selected Now Line. In this way, *AudioVision* really does begin to function much like the audio equivalent of a very powerful word processor, with full creative control of all timing references. Once a clip-sequence has been placed at one location in the TimeLine window, it can be freely cut and pasted to other positions. Simplicity personified.

Edits can be performed in a variety of modes, including Clip Edit (remove the section and leave everything else in sync) and Clip Slip (move the segment but retain in-out sync references). Merge can be performed in either Ripple or Replace mode (to either extend or reduce the overall length). Time compression (50% to 200% of original) is also available.

Also, if the sound-assembly to picture session involves a EDL, this data can be directly imported to *AudioVision*, and the cleaned list used to initiate Go-To and automated record cycles from the source reels (time-code DATs or other synchronisable media). Edit Lists can be in either CMX, Grass Valley, Ampex or Sony formats. The system's 'batch digitising functions'—referred to, less formally, as Autoconforming—dramatically reduce the amount of time it takes to lay in preselected dialogue, effects and related sound elements to time code, and prepare for the editing and processing stages of a project.

On screen

Sounds placed within the TimeLine window can be labelled using a text description, and-or ▶

Valve EQ: "It sounds really good and smooth. In fact, the unit itself is addictive...the results are immediately satisfying."
Audio Media Feb '94

8:2 Valve Mixer: "The desk was an absolute joy to use... I guarantee that you will not be disappointed. It has forced me to rethink the use of the standard EQ available on solid state consoles."
Audio Media
June '94

VALVE WARMTH

WITH VERY LOW NOISE

VALVE EQ £750 +VAT

COMPRESSOR £875 +VAT

8:2 VALVE MIXER £2,500 +VAT

..AND AT A PRICE YOU WOULD NEVER HAVE DREAMED POSSIBLE

TL Audio Valve Compressor
Mic & Line balanced inputs, sidechain processing, 2 x mono or stereo mode, frequency conscious compression, front panel AUX inputs, continuously variable attack & release, separate ratio control.

TL Audio Valve EQ
Mic & Line balanced inputs, dual 4 band valve EQ (switchable to 8 band mono), insert points, front panel AUX input.

TL Audio 8:2 Valve Mixer
Mic & Line balanced inputs, 4 band switchable valve EQ with high pass filter, balanced valve mix busses, phantom power, link facility for 16, 24, 32 etc. channels.

TL Audio Users Include:
Abbey Road, Chris Porter, Townhouse, Master Rock, Rcy Thomas Baker, Andy Jackson (Pink Floyd), Bray, Stevie V, Matt Cooper, Pete Vitesse, Surrey Sound, AC/DC, Marcus Music, Eric Stewart, Mr.C (The Shamen).

TL Audio

Worldwide Distribution Tony Larking Professional Sales Ltd. Letchworth, SG6 1AN (UK). **Tel: +44 (0)462 490600 Fax: +44 (0)462 490700**

WHY...?

..do the world's top studios rely on the smooth transparent sound of KRK monitors?

Abbey Road Studios, A&M Studios, Billy Joel, Bop Studios, Bob Clearmountain, Bryan Adams, Chris Kimsey (Stones), Hollywood Digital, Konk Studios, MCA Studios, Olympic Studios, Phil Manzanera, Mick Hucknall, Prince-Paisley Park, Record Plant, Skywalker Sound, Sting, Trevor Horn, Metropolis, Neve Inc. and many others.

To find out more contact your nearest KRK demonstration centre;

Music Lab
72-74 Eversholt Street, London. NW1 1BY . Telephone 071 388 5392 . Fax 071 388 1953

Sound Control
61 Jamaica St. Glasgow. G14 NN . Telephone 041 204 2774 . Fax 041 204 0614

Tony Larking Professional Sales Ltd. (UK Distributor)
Letchworth, Nr. Baldock, Herts. SG6 1AN . Telephone 0462 490600 . Fax 0462 490700

TONY LARKING
PROFESSIONAL SALES LIMITED

displayed with a waveform trace. Identifying a cue with an text label makes it far easier to see exactly what elements are currently loaded, and where you are in a project. Labels can also be used to mark cues with reminders that, for example, they might need replacing with a processed version at a later stage, or that the production dialogue track seems to be from an incorrect take—something that will not hold up the session, but which needs to be fixed before the end of a project.

Usefully, the modulation envelope can be set to Autorange mode, so that it will be automatically scaled to fill the full height of the available window space. Although only eight tracks can be seen in detail at a time within the TimeLine window, you can shift these around as necessary, while working on different sections of a 24-virtual track project. To see where each of these cues are recorded—and determine where free track-space might be available—below the eight, full-detail tracks is a miniature version of the full project, with a narrow, coloured strip showing the presence or absence of audio on the 24 virtual tracks.

AudioVision also offers internal track bouncing, to free up tracks during a project. *Model 8* allows real-time mixing of six tracks into stereo (or seven into mono); non-real-time mixing off all 24 tracks is also available. (The new 16-channel AMCI *AudioVision* will provide real-time mixing of additional tracks.)

As would be expected, in addition to the conventional menu-based point-and-click functions available via the *Macintosh* graphic interface, *AudioVision* also offers keyboard equivalents (the *Mac* keyboards is supplied with special colour-coded, labelled keycaps for the more forgetful); standard *Mac* utilities such as QuicKeys can also be used to automate repetitive functions. In addition, external ADB-compatible controllers from companies such as JL Cooper can be connected to *AudioVision*; Avid are also reported to be developing a dedicated hardware controller for the system.

Scrub editing with *AudioVision* is a breeze. You can use either a trackball or a mouse to move though the edit point, while monitoring the graphic representation of the audio modulation, and listening to the very tape-like sound from the monitors. *AudioVision* has sufficient processing power to provide full scrub across all eight track-outputs plus digitised video. After a while, it is often possible to locate edit in-out points simply from the graphics icon—it is pretty obvious when a dialogue element starts following a breath, or a moment's pause. To speed one's progress through a file, audio is replayed in both forward and reverse play modes.

All scrolling modes are smooth in operation; seldom do you need to wait for the on-screen graphics to catch up. During replay, the window moves from right to left behind the stationary Now Line. A total of up to 32 levels of Undo and Redo are available.

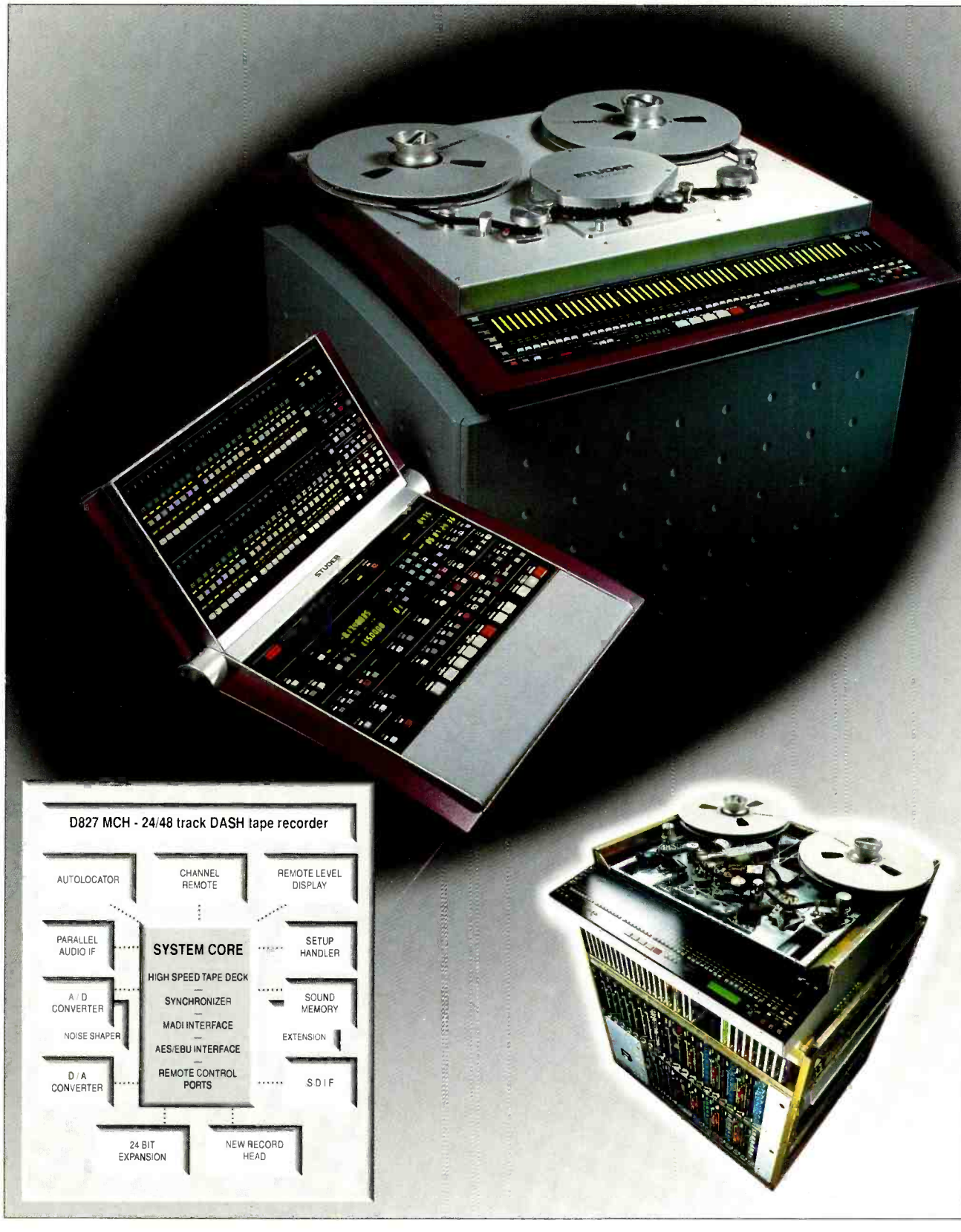
Also available within *AudioVision* is a dedicated software module for ADR-Foley recording, which places a video countdown across the video signal for cueing talent; beeps are also provided. Audio numbering of cuts enables a session to progress very quickly; instant-access video replay also means that there is no waiting around for a VCR or laser disc to recue itself, and prevent the talent's attention from wandering.

Project management

Aside from the speed and efficiency with which sound cues can be positioned within the TimeLine window, trimmed to length with variable-profile crossfades, and all of the other toys, *AudioVision* incorporates a plus feature that few other workstations offer. As most *Studio Sound* readers will be aware, keeping together the various information associated with an editing session can be a nightmare, especially if you need to return to a project at a later date and, for example, replace an English-language dialogue track with a ▶

M-O-D-U-L-A-R-I-T-Y

D827 MCH - customize your recorder for highest quality DASH recording



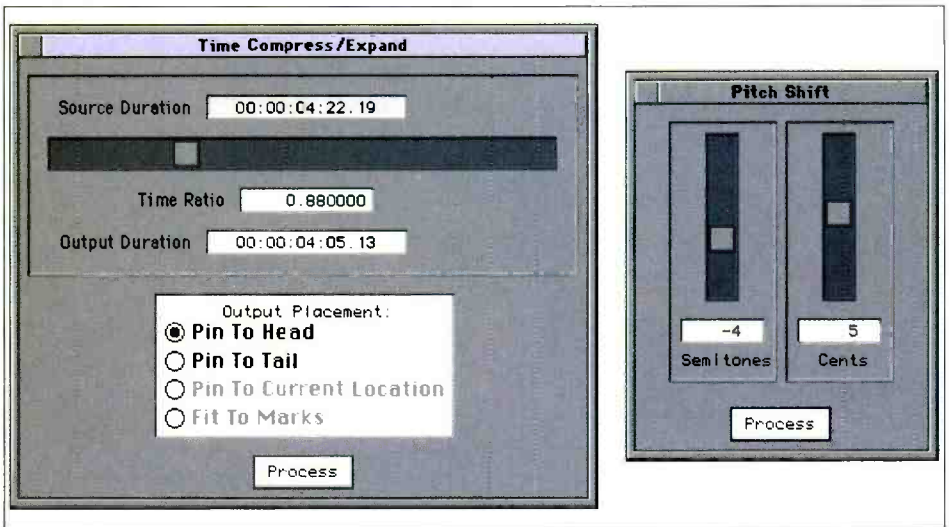
STUDER

PROFESSIONAL AUDIO EQUIPMENT

H A Harman International Company

STUDER Professional Audio AG, Althardstrasse 30, CH-8105 Regensdorf-Zurich
Switzerland, Telephone +41 1 870 75 11, Telefax +41 1 840 47 37

Direct-Subsidiaries:
Austria: +43 1 470 76 09/10
France: +33 1 48 76 11 44
Germany: +49 30 723 934 0
U.K.: +44 81 953 35 33
Canada: +1 416 510 13 47
Japan: +81 3 3465 2211
Singapore: +65 481 56 88
USA: +1 415 326 7030



TC/Pitch shift window

freshly-recorded French one. Where are all the composite elements stored? What are their time-code references? What edit profiles were used? What levels were they mixed at?

All of this information, and a whole lot more, remains as part of an *AudioVision* project on the *Quadra950*'s internal hard drive, plus a backup —in case of crashes—within an Attic File. The process in totally transparent to the operator, and leaves a trail of Last Saves that can be used to recover material which might have been deleted accidentally, or to recover for (an extremely rare) system freeze.

All the data is organised in terms of Bins, whose format is totally *Apple Finder*-compatible, allowing standard Copy, Delete, Rename and related functions to be used. A Bin, in turn, comprises Clips (sound files) and Sequences (the timing relationships between them, plus edit profiles.) The contents of Bins can be sorted using *AudioVision*'s integral database, so that rapid sifts and searches can be made through sound-effects libraries, for example, looking for cues that match preselected criteria.

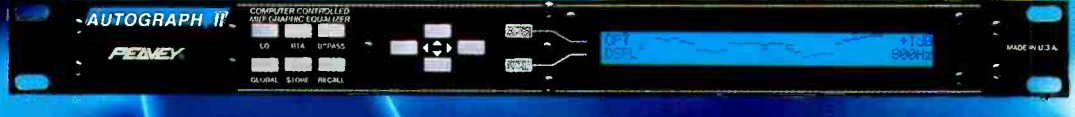
So, to back up or restore a project simply involves an Exabyte holding the data files, and an M-O or removable hard drive holding a copy of the Session Profile. Speed and power, it's the only way to achieve the kind of functionality required by today's sound editors. In that respect, *AudioVision* is one of the most powerful, easy-to-use *Mac*-based workstation available today. I eagerly await the AMCI Update that will offer enhanced 16-channel operation. ■

Avid Technology Inc, Metropolitan Technology Park, One Park West, Tewksbury, MA 01876, USA. Tel: +1 508 640 3158. Fax: +1 508 640 0063.
UK: Avid Technology Europe Ltd, West Side Complex. Pinewood, Pinewood Road, Iver, Bucks SL0 0NH. Tel: +44 1753 655999. Fax: +44 1753 654999.
Japan: Avid KK. Tel: +81 33 505 7937.

ONLY £499*

Write On Target

"The Autograph II, a MIDI, 28-band graphic EQ, utilizes built-in RTA, pink noise generator, room sampling, storage for 6 target and 128 venue curves, feedback finder, & more to write perfect EQ curves and hit the bull's-eye every time!"



The Peavey Autograph™ II contains all the easy-to-use features necessary for accurately EQing PA systems. The MIDI controllable, 28-band, 1/3 octave graphic EQ features constant Q filters on standard ISO centers. The built-in real-time analyzer and pink noise generator perform RTA using multiple discrete and continuous room sampling. This amazing feature samples a room's frequency response at different locations, and averages them together for a final EQ curve. This final curve matches the system frequency response to one of six different factory or user target response curves stored in the Autograph II. You can then name and store this new curve in any of 128 available memory slots. It's that simple. For best results use the Peavey PVR-1 reference mic (sold separately), or store the curve from another mic and use it for the RTA. Another exciting feature is the Feedback Finder which automatically locates a "hot" frequency and moves the cursor under it...press the down parameter button and the feedback is eliminated. The Curve Compare feature allows you to take an EQ curve, modify it, and then compare it to the original. Additional features: glitchless program changes, electronically balanced input/output, 40 Hz low cut filter, frequency response 5 Hz to 50 kHz, output noise below -94 dBv, ±6/12 dB cut/boost ranges, software security lock, relay/power-off bypass, and MIDI linking of two or more Autograph IIs. All for the incredible price of £499*! Write on target EQ curves every time with the Autograph II...only from an authorized Peavey dealer.

*Suggested retail price (U.K. prices only)

PEAVEY®

Peavey Electronics (UK) Ltd. Hatton House Hunters Road Corby Northants NN17 5JE United Kingdom Tel: 0536 205520 Fax: 0536 69029

THE J-J-JITTER BUG

THE J-TEST

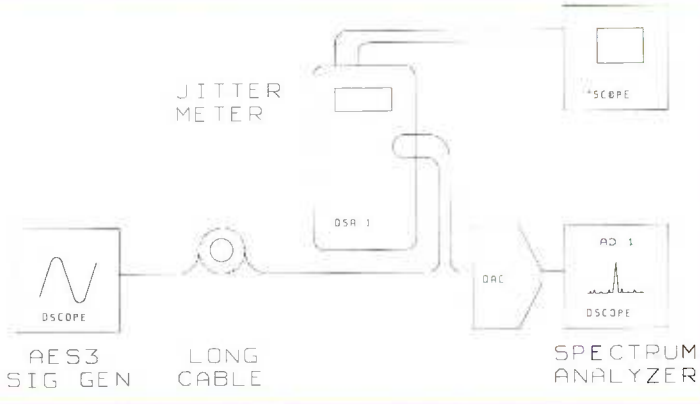


Diagram of the J-Test with long cable

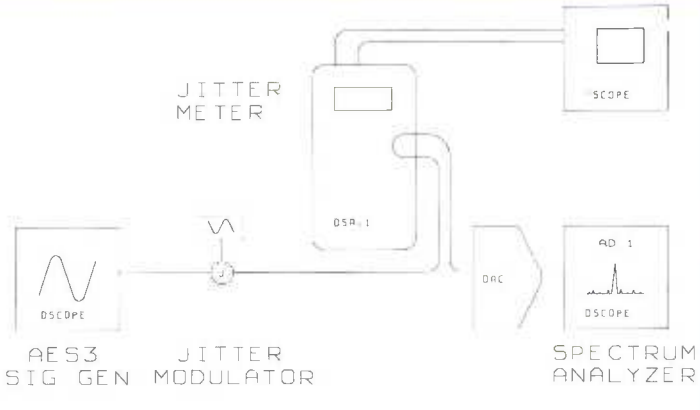


Diagram of the J-Test with jitter modulator

The J-Test is designed to expose the susceptibility of a D–A converter fitted with an AES-EBU interface to the effects of cable induced jitter. It is a digitally-generated test signal which, when combined with a typical 'jittery' cable such as a 100m drum of 100Ω twin screen can severely embarrass an unsuspecting D–A convertor.

The signal is a twin tone comprising a high-frequency component of one-quarter sampling rate (12kHz for 48kHz sampling) at a high level, combined with a low frequency signal (fs/192) at a very low level. This is usually generated to 20 or 24-bit word length without dither, so it can easily be copied to media of other word lengths—for example 16-bit DAT—although the effect becomes slightly less marked as the word length is reduced.

The signal is fed to the D–A convertor under test and the THD+n is measured at the output. (Although the low frequency component will be treated as distortion, it is low enough in level not to affect the results.) The measurement is then repeated with the cable inserted between the signal generator and the input of the D–A convertor. If there is a difference it is an indication that the D–A convertor may suffer from the effects of incoming jitter, which could adversely affect the audio quality. This is because the distortion components are not harmonics of the high level 12kHz frequency and are spread right across the audio spectrum. ■

As with any standard designed by committee and then subjected to an international approvals process, some aspects of the AES digital-interface standard were not as tightly defined as they might have been. They were therefore open to interpretation—and when equipment designers are free to interpret, that is exactly what they tend to do.

Early interconnection difficulties were mainly caused by channel-status incompatibilities—the 'flags' which among other things indicate the audio signal's sampling frequency and word length. While a great many of these problems were simply caused by the use of cheaper consumer (SPDIF) chips in so-called professional pieces of equipment, a significant number of other instances were due to misunderstandings over the way the various aspects of the interface should be implemented. In these latter cases the reason a connection failed was often far from obvious. For example, a DAT machine might be programmed not to record unless it receives a sample frequency indication, but the sending device may not output this flag. This is because it is not mandatory in the AES-EBU specification.

Theme and variations

As an early user of the AES-EBU interface, I was astounded at the ▶

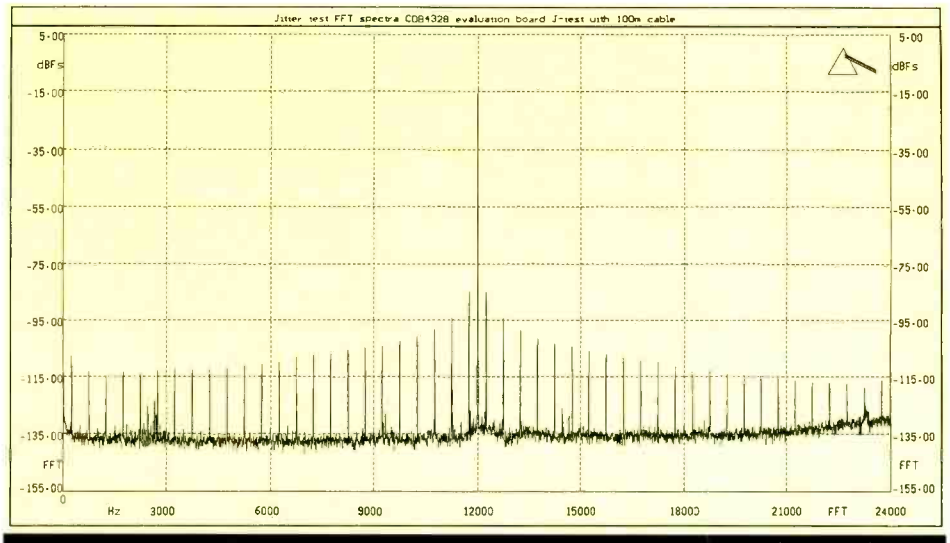
When the AES announced their interface standard around ten years ago, many believed their digital interconnection problems were over. Bill Foster talks to Prism Sound's Graham Boswell about the problems still plaguing users of digital equipment

number of different interpretations of the 'standard' there were in existence. In one notable instance two supposedly identical models of a very widely used DAT machine had totally different implementations of the interface.

There has also been a great deal of confusion over the interface's Validity Bit. It was the designers' intention that this bit should become a '1' if the data is not valid for conversion to analogue. However, arguments rage over what happens if error concealment is applied to the data at some stage in the chain. In theory it is still okay for conversion to analogue, but the data is not identical to that which was originally input.

The 1992 revision of the interface specification has seen many of these anomalies disappear, but there is still the small matter of of pre-1992 equipment waiting to trap the unwary. It is because of these, and the fact that an uncomfortably large number of manufacturers have failed to read the 'small print' of the AES-EBU specification, that it is still so important to have a means of identifying which channel-status flags are set.

Two digital-audio system designers who realised this very early on were Graham Boswell and Ian Dennis, part of the design team responsible for Neve's *DSP-1* and *DTC-1* digital consoles in the mid-1980s, and subsequently founders of Prism Sound, based in Cambridge, UK.



Jitter test showing FFT spectra CDB4328 evaluation board J-Test with 100m cable

It was during their time at Neve that Boswell and Dennis became aware of the problems many studios were experiencing with the AES-EBU interface, giving them the idea to develop a range of relatively low-cost digital measurement devices.

Prism Sound's first product, the *DAS-90* analyser, was launched in 1991 and was designed to address the problem of incompatibilities in the AES-EBU channel status. The PC-based unit indicated each of the channel-status flags and allowed the user to 'flip' any that might be causing a problem.

During the development of their *AD-1* convertor, Boswell and Dennis realised that there was no equipment available capable of directly measuring the full-scale convertor-output and at the same time resolving the noise and distortion products. This led them to develop a new software package for the *DAS-90* called *Dscope* (see review, *Studio Sound*, August 1994) which includes a test signal generator and FFT analyser designed to work at 20 bits and higher.

In recent years users of digital equipment have become increasingly aware of another, and potentially far more serious problem in the digital-audio signal chain; sound degradation caused by jitter.

'There are actually two different types of jitter that can affect an AES-EBU link,' states Boswell. 'The first of these is data jitter—closely related to eye width—which is the modulation of the interface transition timings by the changing data bits. This is caused by the capacitance of a cable and affects all the transitions in the waveform.'

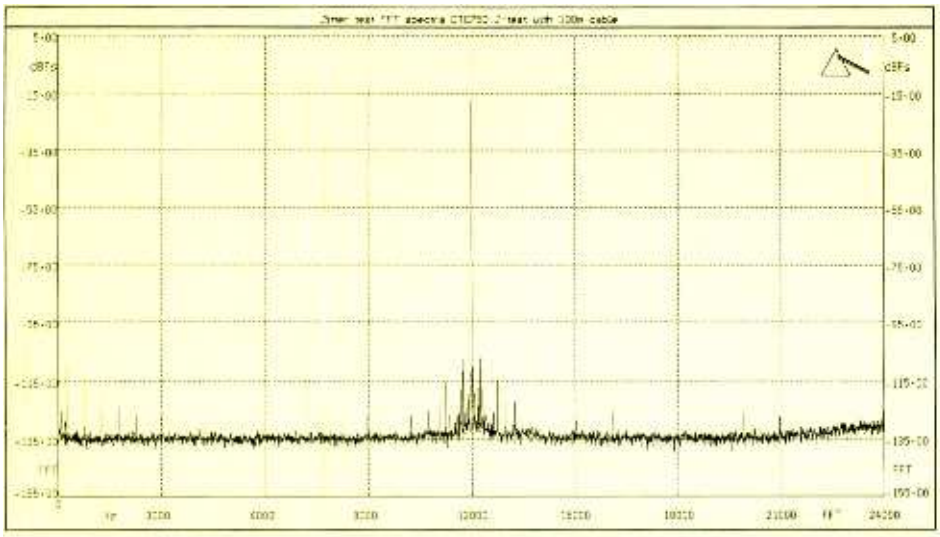
The choice of cable is extremely important. There is a popular misconception that it is perfectly satisfactory to use standard twin-screened microphone cable for AES-EBU links, but this is definitely not the case.

The original AES3:1985 specification called for the use of 110Ω cable, but there is now an alternative interface proposal which uses 75Ω coaxial cable. In fact, Prism Sound consider that using 75Ω co-ax wired directly into the XLRs produces less jitter than conventional twisted pair over long runs, although this is a totally nonstandard implementation.

The other type of jitter is sampling (fs) jitter, and this cannot be improved by better cabling. Boswell explains: 'fs jitter results from a poor quality PLL in the transmitter and tends to jitter all the transitions in the frame, including the preambles. This may then affect the receiver, causing very unmusical distortion components and cross-channel effects. In the case of data jitter, the casual mechanisms tend to affect the data-area transitions rather more than those of the preamble.'

In a well designed D–A convertor there should be adequate decoupling between the digital interface and the conversion circuitry. Otherwise, not only will any jitter on the incoming signal affect the audio output, sometimes there will be amplification of the jitter, making things even worse. It is, in fact, the receiver's ability, or more precisely, its lack of ability to handle a jittery clock signal that is increasingly being blamed for the audible artefacts which many engineers cite as their reason for continuing to use analogue.

Boswell believes it is important for an equipment or systems designer to look at the



Jitter test showing FFT spectra DTC750 J-Test with 100m cable

ability of the receiver to tolerate a certain amount of jitter at the input. This jitter must then be filtered, and where the signal is to be passed to a transmitter it should ideally have no more than 5ns of jitter at the output. (The AES-EBU specification actually allows up to 40ns p-p jitter, but it is not uncommon for equipment to fail to lock to sources exhibiting jitter of this order.)

The proof

The output of a *Dscope* set to generate an undithered twin-tone signal of 12kHz and 250Hz (at 48kHz sampling rate) was connected to a supposed 'reference' convertor (from a well-known manufacturer) on an evaluation board. The analogue output of the convertor was connected directly to a Prism Sound *AD-1* convertor, which in turn fed the *Dscope* FFT analyser input.

Passing a 0dBFS signal from the *Dscope* through the system produced a THD+n figure of 85dB, considered to be a reasonable performance from such a convertor.

Having established this benchmark, Boswell proceeded to demonstrate the devastating effect that data jitter can have on a D–A convertor by inserting a 100m drum of moderately capacitive cable between the *Dscope* and the convertor. The effect was dramatic; the distortion created by the introduction of this cable reduced the performance of the convertor to -70dB, which corresponds to about 20ns p-p jitter. In addition, although no audio monitor was connected at the time, this distortion —which could be clearly seen on the FFT display —would obviously have sounded most unpleasant.

Boswell explains: 'The low frequency is modulating the high frequency and producing distortion sidebands. The peaks of these sidebands are only 70dBs below the main signal and 250Hz apart—that is, the lower of the two test signal frequencies. This is because in a low frequency signal at a mid to low level there are a lot of bits changing from 1 to 0 and 0 to 1 at the same time, and in the same direction. This causes a shunting of the whole waveform when it is passed through the cable.

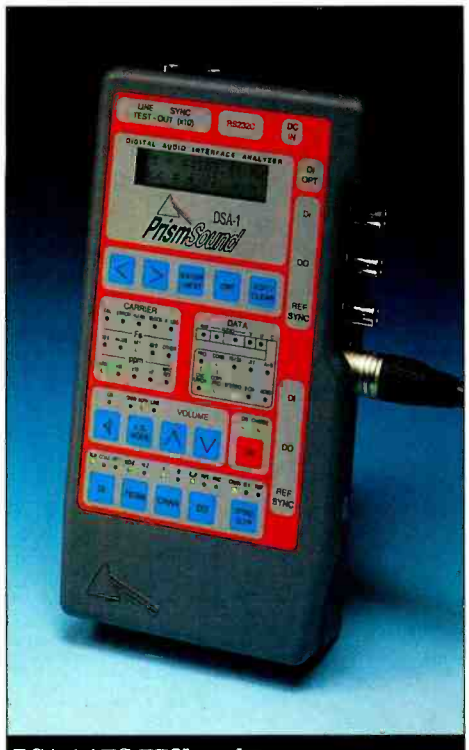
'The resulting low frequency beat tone goes right across the spectrum and it is not even harmonically related. This nonharmonic distortion is nothing like the typical second and third-order harmonics we are used to in the analogue world, and to make matters worse it is subject to aliasing, so high frequency sidebands can pop up in the low-frequency region.

'Introducing a cable like this before the convertor can cause the audio performance to vary between 12 bits and 16 bits in terms of distortion, depending on the signal. A lot of people mistakenly think it is the clock which causes this effect, but it is, in fact, the quality of a digital receiver's design and its ability to handle poor quality incoming clock signals, rather than either the clock or the convertor itself.

'The J-Test is actually a very simple test to do and is a good indicator of whether a piece of equipment is well designed in this respect. Even if you don't have a digital signal analyser, provided you have a test signal source—for example, on a DAT tape—by using a notch filter to reduce the gain of the primary signal any distortion created by the system should be heard quite clearly Alternatively, you could use a standard analogue distortion measurement set and measure the THD.'

A recent addition to Prism Sound's range of test equipment is aimed at equipment or systems designers who might want to look at the impact any jitter might have on conversion quality and to check jitter transfer function input to output. The *JM-1* jitter modulator simulates a jitter ▶

'It's surprising how many people don't appreciate the importance of good quality cabling and jackfields in a digital audio system,'



***DSA-1* AES-EBU analyser**

environment to see whether a piece of equipment can handle it. For example, it is important how the timing is extracted from the incoming signal. If there is insufficient decoupling between the digital interface and the conversion circuit, the transfer function on the timing circuit may actually make things worse rather than better.

It is also important to test a receiver's ability to output error free data in the presence of jitter and to establish at what level errors begin to occur'

The *JM-1* can be locked to an AES-EBU reference signal—ideally with a jitter of less than 1ns—and will output a controlled signal with jitter of up to 500ns.

When connected into the test system (without the 100m cable), 30ns of jitter reduced the S–N ratio of the D–A convertor from -85dB to -55dB. Even at 5ns—well inside the AES-EBU specification—the D–A convertors S-N went down by 6dB (around 1 bit).

In order to assess the overall quality of a digital audio system it is essential to make accurate measurements. Like any system, the quality will only be as good as the weakest link. Aware that time is usually at a premium, Prism Sound have recently developed a hand-held device for those seeking a quick check but comprehensive of their AES-EBU signal path.

The *DSA-1* AES-EBU analyser can measure sampling frequency to a very high accuracy (less than 2ppm as standard—0.5ppm to order) as well as checking preambles, block lengths, channel status and the amount of jitter on an incoming signal. It can also show if the active bits as flagged really are active and indicate conflicts in sampling frequency indication. All these parameters can be compared either to one of the four preprogrammed templates or to 'house standard', which can be downloaded into the unit. It also includes a jitter filter, and this can be used to assess whether reducing any incoming jitter will improve the quality of the audio circuit under test. (If the result is positive a better quality convertor, or one of the jitter-reduction boxes now coming onto the market should be considered as a more permanent solution.)

'It's surprising how many people don't appreciate the importance of good quality cabling and jackfields in a digital audio system,' Boswell says. 'It doesn't always follow that using a poor cable will result in signal degradation as a well designed D–A convertor will handle bad incoming data and still output a good signal, but doing your cabling and installation properly will help to ensure that you're free from the effects of jitter'

Having seen the rather startling results from the bench tests, I must agree that while it is certainly possible to measure performance using conventional equipment—and, of course, the ears—the only effective way to make the type of detailed measurements necessary to ensure that a digital-audio system is performing correctly is by using test equipment designed specifically to do that job. ■

MSL-5 High Power Loudspeaker System

From Opera to Rock... and everything in between

"The most important part of my job is to connect the audience to the artist and make them forget that they are in-fact listening to a loudspeaker system. The ability of the MSL-5 to reproduce sound naturally plays an important part in helping me achieve that. The MSL-5 represents the next evolutionary step in large scale concert loudspeaker systems."

Alexander Yuill Thornton II "Thorny ", Sound Designer for Luciano Pavarotti, The Three Tenors Series, concerts of Placido Domingo and José Carreras.

"The MSL-5s provided incredible coverage: If I had used any other system, I would have asked for four times as many boxes. With only three MSL-5s per side we were clocked at 87 dB - a mile away! From the first hit on the drums, I knew I was going to have a great time. Using the MSL-5s for KISS was a hell of a lot of fun."

Orris Henry, Front of House Engineer for KISS and Lita Ford

" The MSL-5/DS-2 system used at the 28th Montreux Jazz Festival was capable of providing incredible power and punch for nights when we had rock acts, to grace and nuance for an acoustic ensemble or orchestra. It remains one of the most flexible systems I have ever used, and I will certainly consider specifying it for all my future jobs."

Steve Levitt, Front of House Engineer , 28th Montreux Jazz Festival, Lisa Stansfield, Level 42

Photo: Montreux Jazz Festival main system (left).

Meyer Sound

MEYER SOUND

GALAXY

Zenon Schoepe looks at important recent developments in broadcast and music recording in Belgium—Galaxy Studios

Belgium may not be as famous for recording studios as it is for cuisine and beer but moves in the small town of Mol in Flanders look set to change all that. Galaxy Studios have opened with a world-class facility sporting twin Sony *PCM-3348* DASH machines, an MCI 24-track machine, Neve *Capricorn*, Amek *Angela*, an old Neve *5051* (for high-resolution, stereo, classical recording) consoles, and a 330m² 60-musician hall. There are also mastering, editing and preproduction suites. All this is set in typical Flanders countryside—with adjoining residential facilities, restaurant and separate bar areas for each of the rooms—and within easy distance of airports, other countries and recreational spots.

There is nothing unusual so far, as these are what you would expect from a top-flight complex but what is interesting is the manner in which Galaxy was put together. Its conception and form involved a team from Eastlake Audio, industrial acoustics specialist Gerber BV and the Building Acoustics Department of the Catholic University of Leuven, Belgium. Actual physical construction of the complex was taken on almost entirely by the owners.

Managing Director Wilfried van Baelen and Maintenance Manager and brother Guido van Baelen—the 85% shareholders in the studio with other family support—drew on the assorted talents and muscle power of no-less than 95 cousins to build the complex to an extremely high standard.

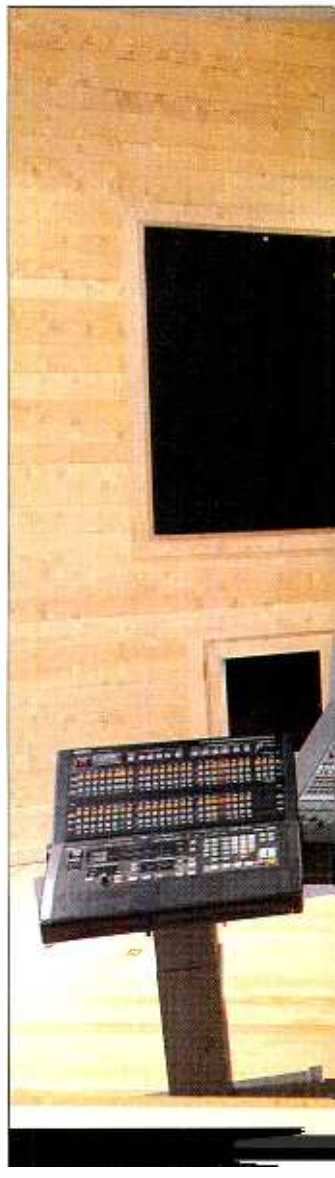
'Everything is as good as the weakest link in the chain,' explains Wilfried van Baelen. 'The big advantage of doing it yourself is you'd be hard pushed to find someone who would work to such close detail for you. We spent hours getting it perfect and I could not afford to pay someone to work like that.'

Wilfried Van Baelen, a musician and producer, started the first Galaxy in 1981 in a large garage at the back of his parents' house and this building with its 56-channel *Optifile*-automated Amek *Angela* and live room still exists but is now enclosed within the 25m x 52m x 9.5m high outer studio shell. A short chat with van Baelen reveals that he is obsessed with isolation—and was even in the early 'garage' days.

'I was aware of the importance of isolation and we ended up using about 9 tonnes of rubber in the walls,' he remembers. 'This turned out to be a good idea because when we were building the new complex around the old studio I was able to work in there even while building was going on.'

The garage studio enjoyed considerable success with van Baelen's productions but the increasing need for acoustic recording eventually led him to think about building on a hall—particularly as he was starting to get classical recording enquiries that he could not serve.

A meeting with David Hawkins at the APRS exhibition six years ago focused his thoughts to extend beyond the hall to another control room and a mastering suite. However, van Baelen's calculations on investment and return revealed that this original setup would not pay for itself, so he juggled the figures until he arrived at the 3-room solution—each aimed at different applications with its own studio areas but with the ability to mix and match areas.



Isolation

'A lot of producers had told me to be careful about having classical and rock music under one roof because they didn't know of a studio where the isolation was good enough for the 80dB–85dB you need to be sure you can work simultaneously,' says van Baelen.

Professor Gerrit Vermeir of the Building Acoustics Department at the University of Leuven had laboratory experience in achieving 90dB isolation values while Gerber was experienced in industrial applications but neither had encountered the walk-through and see-through environment of a studio. Finally the team of Eastlake, Gerber and the University was created to contribute the necessary skills to see it happen.

'Normally when people ask for isolation figures of this type I generally suggest they build the rooms in different streets, preferably in different towns,' remarks David Hawkins.

'Fairly early on we realised that to achieve such high isolation values between rooms we had to make each of them into a type of laboratory standing on springs,' claims van Baelen. 'They calculated that to reach a worse case of 85dB isolation we needed to build concrete bunkers 35cm thick. The biggest problems were the air-conditioning and the glass because we didn't want to let in any noise or create it and we

Construction time at Galaxy

Pride of place—Galaxy's *Capricorn* console

had to be able to see throughout the complex.'

The layout of the rooms permits a conductor standing in the middle of the main hall to have direct line of sight into every studio area in the complex, something that van Baelen states was very hard achieve given the number of rooms involved.

Glass

'Each bunker is 60cm away from the other and they calculated that we needed 13cm–14cm thick glass on each side of the windows between rooms. However, when they checked if glass this thick could be manufactured they discovered that only two factories in Europe make glass 8cm thick,' explains van Baelen adding that this was not enough for the targeted isolation, so costly custom manufacture was required. The biggest problem for the Belgium glass manufacturer was that the desired thickness of glass weighed more than the machines that would produce it were insured to take but the risk was taken and 11cm panes were manufactured.

'Originally we wanted 14cm but by making the air space between panes bigger and placing the 11cm glass on its own rubber springs we managed,' he states. 'This was, however, only the beginning of our problems because there was no machine that could actually lift and fit a 1,000kg sheet of glass so Guido van Baelen in co-operation with the glass factory developed a special suction pad that could be fitted to a machine that could pass through the doors of the studio with the glass and lay it.'

The stringent requirements of high-resolution, classical-music recording necessitated exemplary air conditioning. Gerber's Eric Desart achieved a noise performance at the threshold of hearing by using large pipes and redesigned impeller blades feeding a labyrinthine silencer the size of a swimming pool connected to individual silencers for each room. Even the connecting pipes are isolated on their own spring arrangement.

The aim of achieving a flat response in rooms between 30Hz and 16kHz was achieved by Eastlake, according to van Baelen, yielding an even RT60 across all frequencies. 'What we have is a very natural sound,' he claims. 'I've already been surprised by the reaction from players who have commented on how good their instruments sound and drummers have said they can hear the slightest alteration to their drum tunings and dampings.' The main hall's 2s reverb time can be clamped down to 1.3s with drapes. ▶

EASTLAKE AUDIO

David Hawkins, Managing Director of Eastlake Audio, comments:

'Although the Galaxy building looks fabulously impressive from the outside it's a relatively inexpensive one because its prefabricated. It's a fraction of the cost it would be if you got an architect in to design a building from scratch.

'A lot of people in the past have thought it would be nice to do this sort of thing until they've realised the investment in terms of isolation which doesn't come cheaply. To do it properly is incredibly expensive and has basically stopped others.

'It has been a very interesting project for us. All the large-scale engineering has been conservatively enough done, that I would expect the design criteria to be at least matched or exceeded.

'Most of my working life is spent trying to do things that can be executed in five minutes for nothing and it was really quite a pleasant change to work on something that used such heavily engineered solutions.

'I've never seen anything quite like Galaxy.' ■

The hall weighs around 1,600 tonnes

'I believe in studios that have all their facilities separate but the big advantage here is that I have one big hall and I can use it with the *Capricorn*, with 2-track digital recording or with another traditional studio and we can split it how we want. Commercially that's important,' he says. 'It's also important to have a specialised room only for recording classical music and Studio 3 can monitor 48-track and record 2 or 4 track so that room also remains flexible. For film scores we can separate parts of the orchestra and retain line of sight.'

The classical section of Galaxy is headed by Engineer Kees de Visser who specialises in this type of recording and has his own minimalist custom desk for location work to supplement the old Neve. De Visser is still deciding on whether to opt for the Sony *PCM-9000* or Nagra *D* as a 2-track medium to supplement the Sonic Solutions system he is using.

Van Baelen maintains that he has endeavoured to stick with established equipment standards as much as possible. 'The only thing I was a little progressive in was choosing the *Capricorn*,' he says. 'But I believe in the system and total reset—we can reset the desk and all the outboard in a minute and that includes a custom-designed manual recall system on our Tube Tech gear.

'The sound is as good as a top-end analogue console plus you get all the advantages of the digital domain. Perhaps not everybody is aware of it, but a time is coming very soon when all engineers will need to know about these things if they want to stay on top.'

The complex took two years to complete and van Baelen is glad the construction is over. 'My intention is not to keep building and expanding, all along it was to create a place where interesting productions could be made,' he says. 'It started by just adding a hall, just another studio and so on but it was much cheaper to build a whole complex. I know the risk is less in doing it in stages but taking one big step is the most efficient way of doing it.' ■

Galaxy Studio, Kievistraat 42,
Mol 2400, Belgium.
Tel: +32 14 31 4343. Fax: +32 14 32 1224.

Studio Design: Eastlake Audio.
Tel: +44 71 262 3198.
Fax: +44 71 706 1918.

ITS OF GALAXY

● **Foundations**
Each bunker is of concrete construction supported on springs—the Capricorn room weighs around 300 tonnes, the hall some 1600 tonnes. The foundations were formed in a wood frame 20cm higher than their final position and were then lowered on hydraulic lifts onto the springs which are expected to compress by about 0.5mm in the next 50 years.

● **Doors**
Industrial doors with an isolation value of 55dB are used throughout the complex in a minimum of pairs. Each weighs 300kg and is suspended on ball bearing hinges so they can be opened and closed by a child. When the handle is turned to lock a door it compresses the space between doors by more than 10mm putting 400kg of pressure on the wall. At least three doors are placed between all critical areas. 'In practice not all the doors will be closed so we have built in a safety margin so that one can be left open and isolation is still preserved,' says Wilfried van Baelen.

● **Monitoring**
Galaxy use Genelec *1035*s in the control rooms.

'In most control rooms the biggest problems are encountered with low frequencies,' comments van Baelen, 'but an extra problem for us was that everything was so well isolated that the low frequencies couldn't drain away. The university pointed out that we could isolate the speakers from the walls by putting them on springs and we tried this but they sounded different. Eventually we used spring spikes but we had to increase the weight of each speaker to about 450kg to make it effective and we did this by putting heavy metal plates on each cabinet.'

● **Motor close fields**
Guido van Baelen devised a motorised close-field speaker arrangement for his long-suffering brother Wilfried working at the oversized 56-channel *Angela* in Studio 2. The *NS10*s are mounted on a hydraulic rail at the back of the console and can be propelled as a pair along the length of the desk to maintain the stereo field at any working position. An additional switch sends the speakers to either end of the desk and out of the way when the main monitors are being used. ■

In art and technology the wildest imagination of the past becomes the reality of today. Sennheiser's 16 channel switchable frequency radio systems bring complete artistic freedom to theatre, stage, and broadcast.

No constraint in performance. No compromise in style. Our transmitters and receivers set new standards in the interaction between computerised mixing and RF technologies. With supreme sound quality and total reliability.

Realistically Sennheiser radio systems are the ultimate choice. Surrealistically of course, they're a fish.

SENNHEISER

Sennheiser UK Ltd, Freepost, Loudwater, High Wycombe, Bucks HP10 8BR.
Telephone: 0628 850811. Fax: 0628 850958.

VTM

Zenon Schoepe looks at Flanders' only commercial TV station after its dramatic relocation and refit

Vlaamse Televisie Maatschappij have undergone the type of uprooting and relocation that all broadcasters dread. The only commercial TV station in Flanders, Belgium transferred and flipped operations seamlessly at 5pm on 2nd July last year from its original and greatly outgrown premises to a building on the outskirts of Brussels. The move has also allowed the broadcaster—less than six years old—to reassess their audio requirements and to do it properly from scratch with room for growth and the resulting purchase of three SSL *SL5000*s plus a *SL4000* and *ScreenSound*.

Studio with one of VTM's three SSL *SL5000*s

The smooth transition is typical of the unorthodox station which has continuously surprised its critics and the Flemish-speaking viewers. Founded by four Flemish newspapers and five Flemish weekly publications in 1987 it started transmitting via cable at the beginning of 1989 despite the widely-held view of observers who believed TV advertising would not be tolerated by viewers. Indeed there was positive resistance to the station as it challenged the status quo in Flanders of the state-owned BRT and RTB Flemish and French-language stations respectively and the French language commercial station RTL in Luxembourg. Belgium's high density of cable network compounded the issue with viewers able to draw on a pool of some 26 national and foreign programmes.

However, VTM proved to be a success from the launch exceeding its estimated initial 20% market share immediately and becoming market leader with more than 40% of the viewing public. The operation started with 80 staff but now employs around 230 at the smart new purpose-built complex at Vilvoorde with three on-air studios and a complete production infrastructure for news and drama. It is also telling the world that VTM is here to stay.

Apart from news, current affairs and some children shows VTM programming previously consisted mainly of prerecorded material but this was planned to increase with the move and the audio installation had to be in-line with the commitment made in picture to serial-digital video. Head of Audio Engineering Chris Wolters van der Wey, who was responsible for the sound installation, says he had to dismiss the possibility of digital on grounds of practicality, cost and what he regards as a distinct lack of choice.

'If you look at the whole structure here, each studio next to another, all the machines interfacing with each other, digitally it becomes a question of timing,' says Wolters van der Wey. 'It's not just studio work where one guy works and comes out with a tape—it's a broadcast building and everything has to be in time, in sync.

'And there's all the A–D convertors,' he adds. 'We have hundreds of sources here. I did the equation, to do it properly it ended up requiring about 60% more budget if we went digital. Plus I know that next year I would be looking at other products on the market and worrying about my choice.'

Wolters van der Wey believes that the number of suitable digital products is a problem for bulk-purchasers. 'I'd rather wait for some time until I have enough choice and the products have proven themselves. That is an important consideration because I will only buy a machine that has proven itself—I'm not going to jump in the pool with modern technology and find out it was wrong for us. There was not one franc too much to spend so I had to be careful; we were not in a position to experiment.

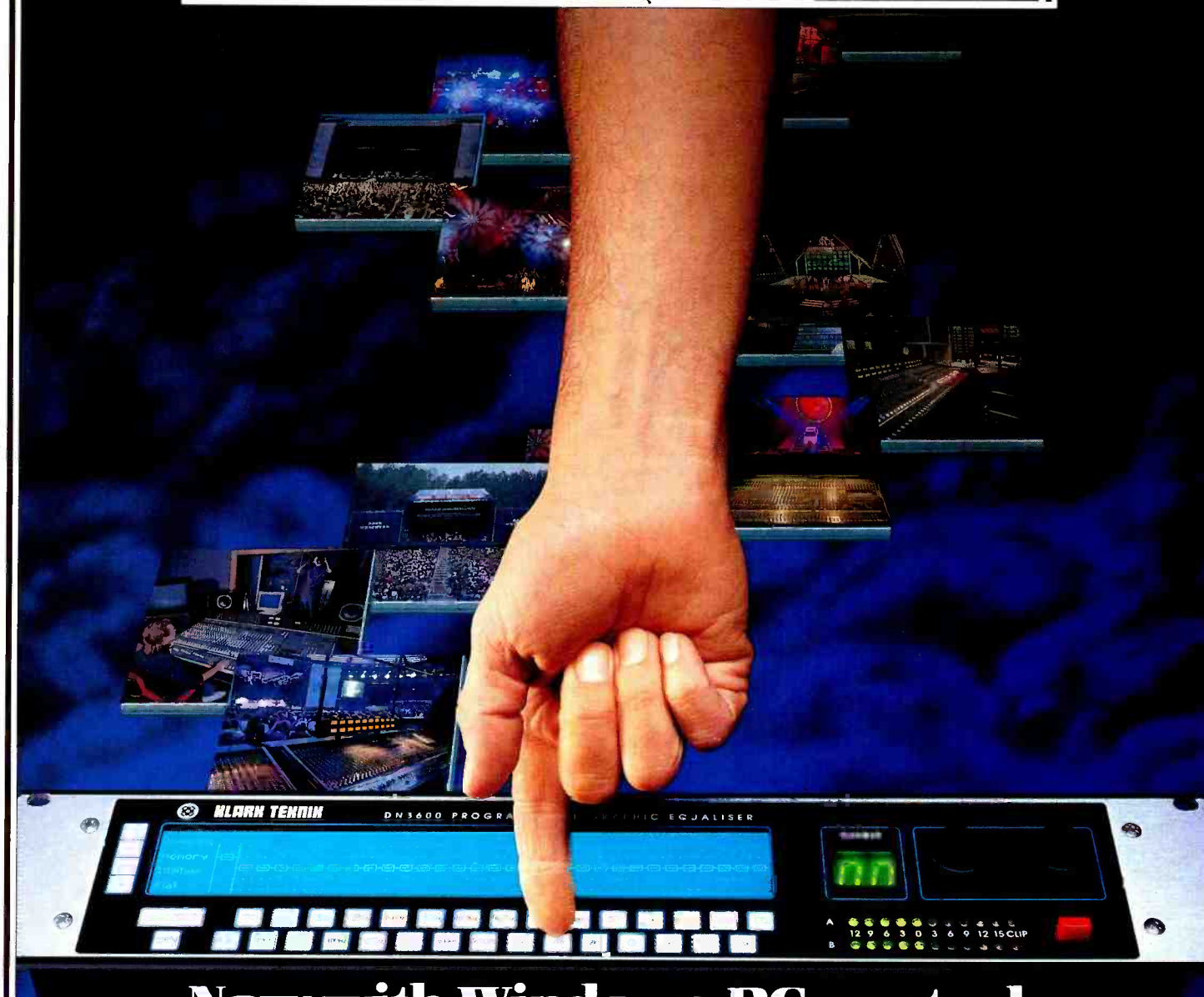
'Even now the choice of digital equipment, and I'm not talking studio I'm talking broadcast, is still too limited,' he adds.

Wolters van der Wey adds that a similar situation exists with video but the stakes are higher. 'The expense is much larger,' he says. 'You can end up buying analogue ▶

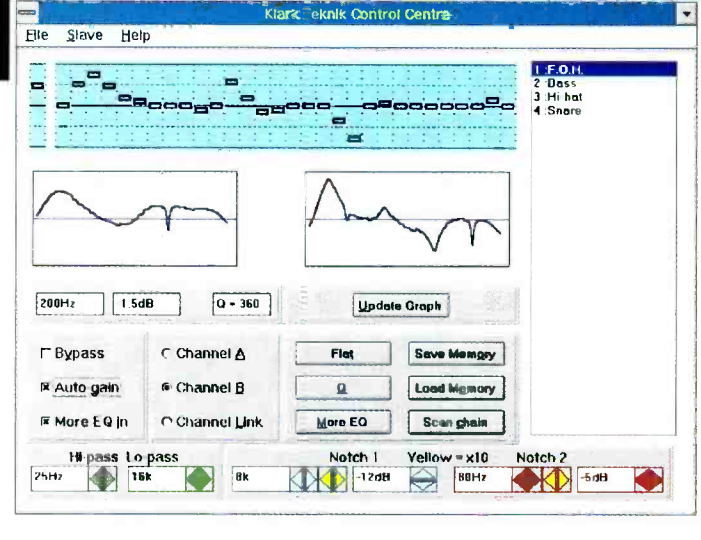
Continuity Studio also equipped with a *SL5000*

DN3600

PROGRAMMABLE
GRAPHIC EQUALISER



Now with Windows PC control.



Come and see us at **AES San Francisco Booth 820**

- Instant access to all DN3600 functions
- Controls up to 66 units
- All memories/units can be saved to disk
- Curve and faders displayed simultaneously

- Slaves can be named
- Fast zoom on notches
- On screen indication of fader frequency and level
- Auto-gain
- Unit by-pass
- Windows minimise facility

KLARK TEKNIK
a **MARK IV** company

The first name with sound system designers

Klark Teknik PLC, Klark Industrial Park, Walter Nash Road, Kidderminster, Worcestershire DY11 7HJ, England.
Tel: (0562) 741515 Fax No: (0562) 745371.

BELGIAN DEVELOPMENTS

Postpro studio with SSL *SL4000* and *ScreenSound*

technology and then you're really out of date. You can make an investment in audio for five years and within that time you can work with it and then think about rebuilding but with video the investment is so large that you can't afford to not to be ahead of the game.'

Functionality

VTM installed *SL5000* desks in the continuity suite, Studio 1, which deals mainly with news, and a production studio with the *SL4000* and *ScreenSound* employed in an audio post suite. These front-line desks are supplemented by a host of workhorse Soundcraft desks for the numerous editing suites located throughout the complex. He admits that he would choose the same solution now if presented with the same project and remains unimpressed with the merits of digitally controlled analogue desk technology aimed at his market.

'What is more important, to have digital control over something analogue or to have all the transports digitised?' he asks. 'Controlling something digitally is at the moment not very interesting to us. The audio engineers at VTM have talked on the subject and they're not keen on assignability, they want a button for each function. Maybe that's archaic and maybe they'll change their minds in five years but at the moment they don't like it.'

While he acknowledges the space-saving attributes he questions the benefits of single-man operation that digitally-controlled analogue professes.

'I'm not so sure that one operator can control 26 mics and 18 stereo sources at the same time so for that kind of work you still need two people. Having a large desk and a large control surface is still an advantage.

'After all, it's not the electronics that cost the money, it's the faders, the knobs and the buttons. They're trying to trim down production costs and that's why manufacturers will sell you an assignable console.'

The lessons learnt in the move are clear to Wolters van der Wey. 'When the old building was equipped it was really down to the basics —receiving a tape, putting it on a machine, playing it back through a small continuity suite and having a small studio for just the bare necessities,' he recalls. 'We decided that if we were to design something it would always be expandable within the side walls of the console so we don't end up with wires hanging everywhere. In our video suites all our consoles are large enough to accept even more equipment.

'The second thing was cabling. When we cabled this building I wanted everything to be labelled properly from the first wire to the last with full documentation.

'We also learnt how to approach our suppliers,' he adds. 'It wasn't just a matter of what we could get for the money but what the equipment does now and how it will be able to be expanded in the future. We had a limited budget so instead of buying one complete SSL with every possible feature we stripped the desks down to the necessities for now but precabled and left open so if we need something we can add it. That's the case with all our *SL5000*s, they all have blanks and connectors.'

He adds that the opportunity to standardise on equipment could not be passed up and, by example, VTM now use Grass Valley for video, Denon CD players, Tascam DATs and Genelec monitoring throughout rather than the mixture that evolved in the original site. 'People should have seen the old building because then they'd realise the wonders we did there—a small studio of 150m² and sometimes we did four programmes one after the other.'

The upgrade in operations has also had implications for the production industry in Belgium with Wolters van der Wey estimating that around 20 companies survive on working only for VTM.

The improvements for viewers are less apparent, according to Wolters van der Wey, but then they never are he says. 'The moment something is that obvious it would mean that we had been doing things wrong before. The day we moved the viewers wouldn't have noticed anything accept for the images being a bit sharper because we had new cameras.

'The sound may be slightly better because with the move we checked out the whole circuitry and made measurements,' he observes. 'As an anecdote we found out that for the last four years there was a part of Belgium that had been receiving us with twice the pre-emphasis on the modulator! When we moved that was solved and there were some telephone calls from people saying it sounded a lot better.

'The benefits are really for us in that we can now do a lot more,' he says. 'It will lead to more consistency.' ■

Vlaamse Televisie Maatschappij (VTM), Medialaan 1, 1800 Vilvoorde, Belgium.
Tel: +32 2 255 3605.
Fax: +32 2 253 1221.

Step into the Future: Go Optical with AUGAN

Do you still work with CART machines?
OMX CART software replaces 4 CART machines and stores hundreds of effects in the MOD library.

- Δ **A single page display on the colour screen allows automatic next play, interruptable play, title search, continuous play and timed play.**
- Δ **Separate fader start can be used for each CART.**
- Δ **CART audio can be moved or copied while the system is in full operation.**

Because the OMX CART software is installed on a standard 408 OMX you naturally have the ability to edit and produce all your own CART material.

Choose for AUGAN

AUGAN Instruments BV - Wilhelminastr 31
6881LH VELP The Netherlands
Tel:(31)85.648966 Fax:(31)85.644785

*The Netherlands - Ampco 030.414500
*United Kingdom - Kinetic Systems - 81.9534502
*U.S.A. - A/Z Associates 617.4440191
*France - TBC Communications 1.47457880
*Germany - Excel Systems Wedel 4103.605468
*Sweden - Zima Productions 08.6535710
*Italy - E.V.M. - 06.899907
*Switzerland - Mase - 22.3212345
*Spain - Fading - 01.3772400
*Korea - AVIX 82.2.5653565
*Singapore - Auvi 65.2832544
*Hong Kong - PL Development 0889106

Focusrite's *Red 5*

The right *Red*

Dear sir, thank you for the review of the *Red 5* in the July issue of *Studio Sound*. As a result of the interesting comments and feedback from the reviewer, Ben Duncan, both during the testing phase and whilst he was writing the final assessment, we have made two changes to the *Red 5* product.

The first is improvements to the CMR performance, both the overall figure which is now better than 60dB and the maintaining of this CMR performance within 1dB from 85kHz down to 20Hz.

The second is the addition of a further level of temperature sensing to cover the unusual circumstance that was devised for stressing the amplifier which caused one unit to expire. Although we would not expect any actual usage to produce this result, should such conditions ever occur in a practical environment the amplifier will now shut down until normality returns.

Our thanks for the useful, constructive, criticism.
Richard Salter, Technical Director, Focusrite Audio Engineering Ltd, UK.

Subjective listening

Dear sir, I was very interested to read the comments by Philip Newell (*Studio Sound*, August 1994, 'Beyond Compare') regarding the perception by individuals of what many have assumed to be invariable sound characteristics. I would like to add another problem to the many he lists as affecting individual perceptions; one which I believe has not been fully recognised.

Apart from the physical constants of head and ear size, individual physiology and other possibly measurable effects, there is also the effect of the society in which we live. The majority of sounds (music, speech *et al*) which we record and listen to, are finally presented in a stereo format. Exactly what that word, stereo, defines is subject to argument, but we all think that however 'stereo' the sound may be, everyone hearing it, will hear the required effect. Therefore, if an individual does not hear it, that individual will be prevented from saying so publicly, for fear of seeming out of touch with the rest of the world. If such people take part in listening tests involving any form of stereo perception, even as a by-product, then the results from them will appear wildly at variance with other participants.

Generally, I think that there could well be a large percentage of the listening public who have the problem, but have stereo hi-fi, car stereos, NICAM stereo television sets, personal stereos, well, you get what I mean! Almost everything we listen on or to, has the word 'stereo' attached to it in some way or other, so, naturally, it must be and everyone should hear it. No-one will want to appear the odd one out, and some won't acknowledge, even to themselves, that they do not actually know what a stereo reproduction sounds like!

Naturally, I am not theorising, as I myself find it difficult to fully perceive what others say stereo should sound like. I assume that I am not a unique individual, at least in that respect. As far as I am concerned, I would imagine that if my work did not involve working every day on stereo sound, I would probably never have noticed. As far as my work is concerned, it does not affect it as I know the degree to which I perceive stereo effects and can rely on *The Box* to ensure that I do not over-exaggerate to compensate. Exactly the same technique as for a recordist who knows that they lack high or low-frequency perception.

However, having made this major point, I must add a rider to it. Again, from personal experience. Some years ago, the APRS staged several Ambisonic demonstrations as part of a seminar on Ambisonics, at the Hotel Russell in London. I was interested to see how the system was implemented, but did not expect to personally get any real perception of the effects claimed. Quite against my expectations, therefore, I found that all of the demonstrations gave me a unique listening experience. From the small hi-fi system in one of the bedrooms, through the semi-pro monitoring system in a medium sized room and right up to the full scale height, width and depth system in a large hall, I found that I could clearly hear what the demonstrators claimed and could accurately position the sound sources within the soundfield, even when standing outside the physical position of the various loudspeakers. This was a remarkable experience and I immediately looked for a source of decoders so that I could have a system at home. This experience implied, to me, that what I might call, normal, stereo is not a 'real' system, but Ambisonics is, as it can convince an otherwise unconvinced individual and works well in a very wide range of situations. As I said before, I wonder how big a percentage of the population also has trouble with stereo perception but, unlike me, won't admit it! I certainly have no trouble positioning sounds in the natural world and Ambisonics appears to emulate that very well.

Some years later, I was invited to another Ambisonics demonstration at Abbey Road, this time staged by Nimbus. I went with great expectations of repeating an enjoyable experience and persuaded several other people that they should look forward to it also. Unfortunately, the demonstration was a disaster. Myself and others sat there unable to believe our ears, but I was the first to stand up and complain that all the sound seemed to come in glorious mono from the nearest speaker! Again, this illustrates my point. Once I had pointed it out, many others stood up around the room with the same complaint. No-one wanted to be the first to say that they couldn't hear what they were told they should. The organisers at first reacted in the same way and discounted my complaint and even tried to say that other complainers were also arrived, they had only heard what they expected to hear, and completely missed the fact that with their set-up, the Ambisonic soundfield just did not exist! A recess was declared while the speakers were re-positioned, but with no time to really check it out, the final demonstration could never be expected to work properly, and it didn't really convince. Luckily for Ambisonics and Nimbus, most of the audience had already had experience of what Ambisonics can do, and so little harm was actually done.

Perhaps my own experiences and the example given which involved many people, can give Philip Newell and others some new ideas when conducting listening tests and equipment trials.
Tony Batchelor, TAM Studio, UK. ■

We catalogue the best and bin the rest

The Studiospares catalogue contains over 2000 items. All have been selected for quality, cost effectiveness and suitability for their application. For every item included we have probably rejected two others. Existing stock is continuously monitored and replaced or withdrawn if necessary.

Keep rubbish in our bin, not yours!

Studiospares

Immediate response and service with speed!

PHONE: +44 (0)71 482 1692

FAX IS FASTER +44 (0)71 485 4168

STUDIOSPARES LTD, 61/63 ROCHESTER PLACE,
CAMDEN TOWN, LONDON NW1 9JU

VISA Access

Please send my FREE copy of the "STUDIOSPARES Catalogue" to:

NAME: .....

COMPANY (If relevant): .....

ADDRESS: .....

.....

.....

.....POSTCODE .....

TELEPHONE: .....FAX: .....

Fill out this coupon and send to the address alongside.

OTARI RADAR

***RADAR* offers the simplicity and familiarity of tape-based systems**

The long awaited *RADAR* hard-disk recorder is finally available. Patrick Stapley discovers whether it lives up to its prepublicity

For many people, the *RADAR* system from Otari will offer the answers to the questions they have been asking of a hard-disk recording-editing system for the first time—a no penalties, hard-disk multitrack that operates like a tape-based multitrack machine.

Indeed, Otari themselves have been aware of the need for such a system for some time: with declining sales of analogue multitracks and the seemingly impregnable strength of digital multitrack manufacturers such as Sony and Alesis, an innovative system was badly needed to keep Otari's name well and truly in the multitrack frame—put bluntly, another *MTR-90* was called for.

RADAR (Random Access Digital Audio Recorder) is being marketed as the natural successor or alternative to tape-based multitrack systems, and is intended to appeal to the 'computerphobic' user who in the past may have shied away from digital-audio workstations. The system has been designed around simplicity and familiarity, there being no complex computer-operating systems, mice or confusing menus—to quote Otari, the system has 'the face of a multitrack tape recorder with the heart of a digital-audio workstation'.

Origins and hardware

RADAR was not actually developed by Otari, but had existed in various guises for the last couple of years. Otari in fact bought the product earlier this year from Canadian company Creation Technologies, redesigning various aspects of the audio, interfacing and its general appearance.

RADAR is a fully integrated system available in 8, 16, or 24-track recording configurations which also includes a range of nondestructive editing facilities such as Cut-Paste, Track Slip and Looping. The system consists of a 4U-high rackmount unit which contains the hard disks (one 1.1Gb Quantum drive for each block of eight tracks), 486 processor, Otari 16-bit A–Ds and 18-bit D–As (both 64x oversampled), and interfacing. Attached to this via a single cable is a compact *RE-8* remote controller containing all controls for 'transport' and location, track selection, editing and other system functions. Certain controls have also been duplicated on the front panel of the rackmount unit which also houses ▶

24 (20-segment) peak-hold meters with clip indicators, and a 3½-inch diskette drive for loading software updates.

The *RE-8* controller has been logically organised into specific control areas, and dedicated controls have been provided for regularly used functions. Functions that are used less frequently have been incorporated in a simple menu structure, and are displayed via an LCD window (two lines of 32 characters). This LCD also provides feedback on system configuration and editing functions, and is duplicated on the main unit. There is an additional 2-character window which displays the number of the current Project (see later).

Recording

RADAR supports sampling rates from 32kHz to 48kHz, and a 24-track system operating at a sampling rate of 44.1kHz provides just over 24 minutes continuous recording time per track. If just parts of tracks are recorded, or some tracks are not recorded at all, then more time becomes available elsewhere—thus a 2-track recording could run for virtually five hours, while a continuously recorded 16-track would have a duration of 36 minutes.

There are no restrictions on the number of tracks that can be recorded at one time or the number that can be replayed. Recordings are called Projects and up to 99 nameable Projects can be supported. A Project is a playlist that references audio files on disk arranging them into the 24-track format. Each Project contains its own playlist, locate points, sample rate and sync offset, and one of the beauties of the system is that because a Project refers to a 'pool' of audio, making copies of a Project to try out alternative edits and so on, uses up no additional disk space.

Like a multitrack tape recorder, *RADAR* incorporates 24-track selector buttons (with integrated LEDs) on both the remote and main units, and these can operate in different ways depending on global modes. Firstly, they can provide a normal track-arming-readying facility familiar to all multitrack users; secondly, they can operate as track solo buttons muting the monitor output of nonselected tracks—this being a useful and convenient facility during some editing procedures —thirdly, they can be record disabled to guard against accidental erasure; and lastly, the monitor status can be selected between Auto Input, which switches armed tracks to line-in for the duration of a drop-in, or Fixed Input that switches an armed track to line-in as soon as it has been selected.

A facility you definitely will not find on a tape-based machine is the Undo function that allows the previous record action or edit to be restored. I think anyone who has suffered the finality of the record button will find this a very welcome feature indeed. Undo can function in varying degrees; for example, if recording across all 24 tracks, it can restore all 'erased' audio, or alternatively restore just a few seconds from a single track. The function works in both directions, so that once a section has been Undone it can also be Redone again. An added bonus would be to offer further levels of Undo, allowing one to retrieve further back than just one step, and this is something Otari are considering.

Dropping in and out of record is either performed manually or can be automated (see next section). At present no automated drop-in/drop-out rehearse mode is included. Otari's argument being that with an Undo facility there is no need for one, which is fine as long as you remember to restore after each rehearsal.

Drop-outs can be performed on the fly (without stopping), but this will cause a gap of approximately 1.5s before the previously recorded audio is heard. It should be stressed that this is a monitoring function only and the drop-in itself remains seamless. However, it can be a little disconcerting, particularly for artists and producers who are used to tape-based monitoring. Apparently putting this right is not particularly straightforward, but Otari are intending to replace silence with the input signal—better but not perfect.

RADAR allows the operator to change crossfade times from the default of 5ms to anywhere between 1ms to 100ms —this applies equally to drop-ins as it does to edits. Although probably fine for the majority of punch ins and outs, this could prove a little restrictive for some editing applications and ideally should be increased.

Transport

Nearest to the operator on the remote unit is a row of traditional transport buttons which mimic the control of a normal tape machine. REWIND and FORWARD buttons include two-speed operation —a single press executing 6x normal speed, ▶

NEW SOFTWARE AND ACCESSORIES

Otari have just confirmed the following features for v1.03 *RADAR* software, to be released during October.

- **Reverse Play and Reverse Lock to time code.** This is important for film and video postproduction during track laying and final mixdown.
- **Play up to End and Play from Mark Points.** This provides easier and more precise edit-point definition.
- **Cue to Start and Cue to End of audio Clip.** This assists end-point location.
- **Selectable track solo modes.** This provides Interlock, Additive and Momentary functions similar to those in Otari's *Concept 1* console.
- **Selectable rewind and fast forward speeds.** These provide more 'familiar' tape recorder-style performance.
- **Audio reverse facilitates the creation of effects—reverse reverb, delays and so on.**

Otari have also announced the imminent release of *RADARStore* which will be available in four rackmounting configurations. These storage peripherals will range from a single Exabyte *8505* drive to a unit containing three 1Gb removable drives plus Exabyte. ■

2:00 a.m. The band just found the sound they've been looking for. Everyone's rockin'. Except you. **You're figuring out how to tell them the HIGH OUTPUT MASTER you were using just "crapped out."**

Of course, you wouldn't be having this anxiety attack if you used new **BASF 900 maxima** High Output Mastering Tape. With 3 dB more output and 2 dB less noise than standard analogue mastering tapes, it is identical to the MOL and the signal-to-noise ratios of other high output masters. But it has the reel after reel reliability and consistency of BASF 911. Low rub off. Precision-manufactured. It's classic BASF. The kind of BASF tape studios have been relying on since 1934. As you turn to face the band (gulp), you make a vow.

If you survive the next ten minutes, the first thing you'll do is contact BASF: Germany, 0621 - 4382-366 or UK, 081 - 908-8340.

ADDED VALUE BY BASF

BASF

while a double press enters 20x normal speed—a feature included in Otari's *DTR-900*. A small criticism here is that although the intention has been to emulate tape transport, the actual wind controls make no allowance for the acceleration times inherent in mechanical transports. Consequently, anyone expecting the system to operate and 'feel' like a conventional transport will inevitably end up overshooting the mark—also I found it quite difficult to rewind by just a few seconds. A solution might be to build-in ramp times to match tape spooling performance.

Apart from the transport controls, the system also offers 99 programmable location points (plus a dedicated return to zero) per Project, which provide an instant cueing facility. These nameable cue points can be recalled either by number or by keying in the first letter of the name from the QWERTY keyboard (cues sharing the same first letter are cycled through by repeated keying). Keys 0-9 function as direct locate buttons, in other words a single key press will implement the function, and if Auto-Play is selected the system will instantly play from the selected cue.

Cues may be edited both in terms of time-code position and name, and new cues can be entered off-line. Cues are arranged in a list which can be cycled through on the LCD, and during playback cues will be displayed as they become current.

Additional features include cycling between two cue points, and a user-specifiable preroll time to allow run-ups before drop-ins and so on. A useful addition would be a rollback facility, whereby the system 'rewinds' by the preroll time from its current position.

The system also operates with two temporary points called Mark-In and Mark-Out which apart from providing an additional locate facility are used for positioning automated drop-ins, and for editing functions. Cueing can also be performed by simply typing in a time-code value and executing a locate command.

Next to the transport buttons is a jog-shuttle wheel which provides realistic results for both functions, although slight interference was noted while scrubbing audio. The same control can also be used for incrementing or decrementing parameter values in the LCD window.

Varispeed is catered for, and this will vary in range depending on the audio sampling rate. At 44.1kHz a range of -31% (642 cents) to +13% (217 cents) is available, while at 48kHz the range is -37% (799 cents) to +4% (67 cents).

An optional method of transport control is provided by three momentary footswitch jacks. The first toggles between Play and Stop modes, the second locates to the current Cue, and the third executes Record.

Editing

Editing functions in *RADAR* can be applied across any number of tracks and fall into two groups: Cut, Copy, and Paste; and Move, Slide, Loop, and Erase. The first group are referred to as 'Clipboard' functions while the second are 'Non-Clipboard'.

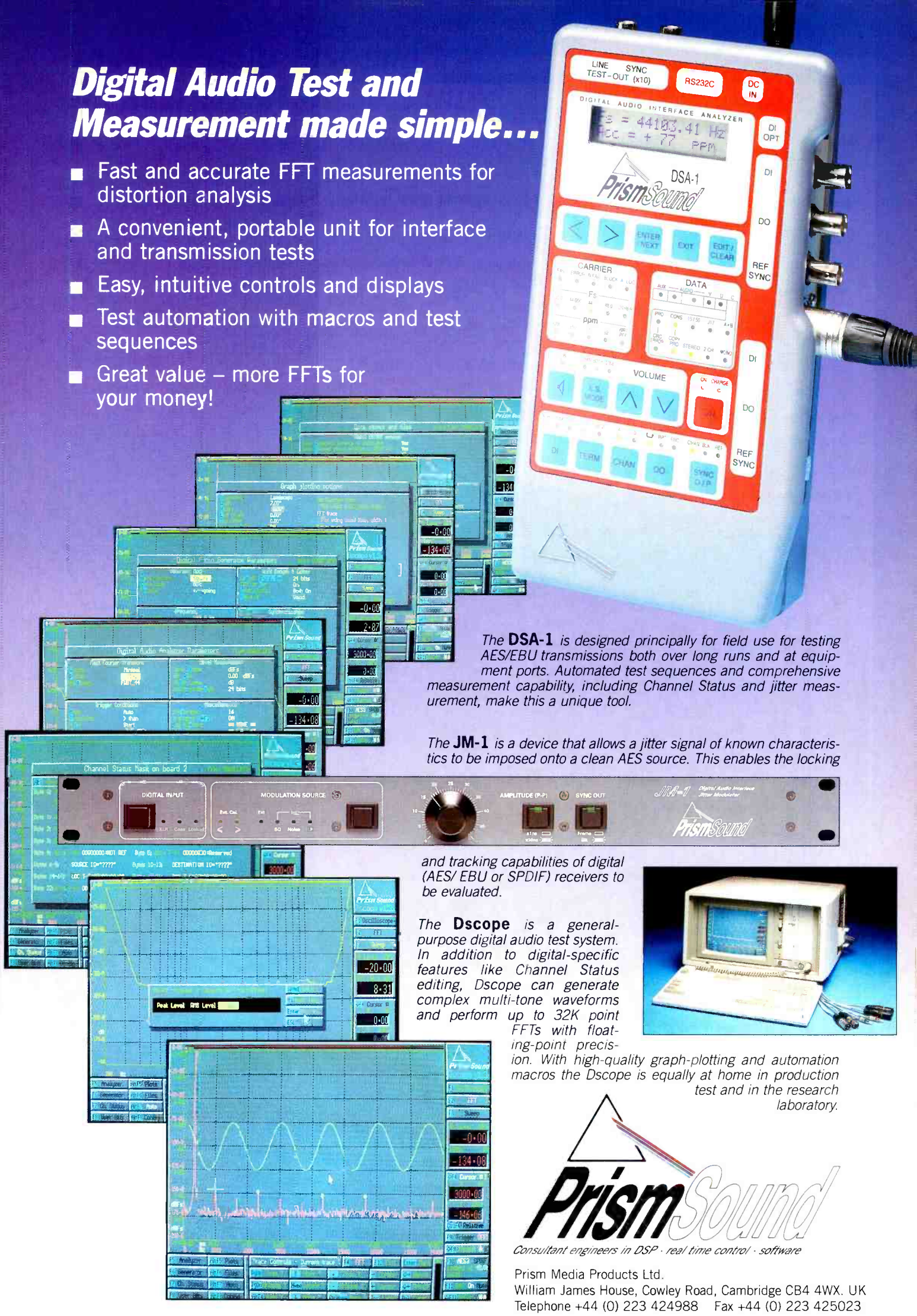
All editing functions first require a Clip to be created. A Clip is simply a section of audio (on one or more tracks) which has been defined with the MARK IN and OUT keys. The Clipboard then acts as a temporary store for a Cut or Copied Clip, allowing it to be Pasted to single of multiple locations on either the track(s) it originated from, or other track(s) specified by selecting the track arming keys. The Clipboard also allows audio to be pasted between Projects.

A Clip is passed either relative to its In Point (the default) or its Out Point, and this is achieved either as an Insert or an Overwrite. Insert will copy the Clip at the chosen position slipping existing audio to make room for it, while Overwrite will record the clip over existing audio, although of course, as with drop-ins, this can be restored using the Undo facility.

The Erase function works in the same way as Cut apart from the fact that the erased Clip is not transferred to the Clipboard. Once marked, sections can be erased instantly, and restored if ▶

Digital Audio Test and Measurement made simple...

- Fast and accurate FFT measurements for distortion analysis
- A convenient, portable unit for interface and transmission tests
- Easy, intuitive controls and displays
- Test automation with macros and test sequences
- Great value – more FFTs for your money!



The **DSA-1** *is designed principally for field use for testing AES/EBU transmissions both over long runs and at equipment ports. Automated test sequences and comprehensive measurement capability, including Channel Status and jitter measurement, make this a unique tool.*

The **JM-1** *is a device that allows a jitter signal of known characteristics to be imposed onto a clean AES source. This enables the locking and tracking capabilities of digital (AES/ EBU or SPDIF) receivers to be evaluated.*

The **Dscope** *is a general-purpose digital audio test system. In addition to digital-specific features like Channel Status editing, Dscope can generate complex multi-tone waveforms and perform up to 32K point FFTs with floating-point precision. With high-quality graph-plotting and automation macros the Dscope is equally at home in production test and in the research laboratory.*

PrismSound

Consultant engineers in DSP · real time control · software

Prism Media Products Ltd.
William James House, Cowley Road, Cambridge CB4 4WX. UK
Telephone +44 (0) 223 424988 Fax +44 (0) 223 425023

mistakes are made, again offering great advantages over tape-based systems. The Move function combines the Erase and Paste operations into one operation, and this provides a useful alternative to Cut and Paste as it allows audio to be rearranged without affecting the existing contents of the Clipboard which may be required for subsequent editing.

Slide allows the Clip to be moved backwards or forwards on its home track(s) by entering positive or negative millisecond values, and these can be incremented-decremented from arrow keys or the jog wheel. The function works in Overwrite, so any audio that a Clip slides over will be removed.

The Loop function copies a Clip consecutively up to 99 times on its originating track(s). The direction of copying can either be forwards or backwards from the original Clip, and will function either in Insert or Overwrite modes. The facility has obvious uses for creating repeating rhythmic sequences, or for building atmospheric backgrounds.

Apart from being able to Undo the current edit, *RADAR* also provides the facility to modify an edit. This allows applicable parameters—Mark In and Out points, crossfade time, destination tracks, Insert and Overwrite, Paste points—to be altered without having to completely redo an edit.

There is strong likelihood that once edits have been performed that some of the recorded audio is no longer required, and *RADAR* includes a Reclaim function that permanently removes audio files from the disks. The Reclaim Space function scans playlists for all Projects and marks any redundant audio—this can then be deleted to create extra disk space, but the user must remember that unlike Erase, this is not a reversible function.

Synchronisation

At present *RADAR* will chase sync to all common time-code frame-rates, but will not output time code to allow it to act as a master (unless code is recorded to a track).

The system will track to 'slurring' time-code from a tape machine, and allows for varispeed machines as long as the differential is within the system's own varispeed limits. A feature that will become available in future software is Freewheeling, which enables the user to set a resolution (1 to 99 frames) so that the system ignores any time-code dropouts.

Interconnections

Multitrack audio I-Os are presently restricted to analogue, and this seems something of an oversight bearing in mind upload-download to other digital storage devices, as well as interface to digital consoles. However, this is an area that Otari are currently addressing and by November the system should offer a 24-track optical interface to *ADAT*.

The system is fitted, though, with 2-channel AES-EBU and SPDIF I-Os which are mappable to and from selected tracks, which apart from track laying applications, also allow digital stereo masters to be loaded into the system for editing. The 24 analogue I-Os are via two rows of ¼-inch jacks which presumably were chosen rather than the more professional XLR as a space-saving measure. Global switching has been provided for both input and outputs to allow for +4dB and -10dB operating levels.

Other connectors that have been included for future use are: MIDI In, Out and Thru; Sync Reference (video or wordclock); Time Code Out; RS422 Machine Control; and Radarlink for connecting and syncing another *RADAR* unit. A pair of *RADAR* systems will provide 48-track operation, but will require two *RE-8* controllers. A useful future enhancement would be to offer a single, dedicated 48-track remote.

A SCSI port is provided for backup-restore purposes, or to add additional hard discs to the system, and it's imperative that this is correctly terminated when not in use to prevent data loss. Also included is a PC interface which is currently used for diagnostic purposes, but could have obvious additional applications in the future. ▶

The performance of our audio products appeals to these. The commitment of our company appeals to what's in between them.

It's no surprise that Avid Technology's digital audio workstations are fast becoming the systems of choice for discriminating audio post-production professionals around the world. After all, Avid offers a full line of audio solutions for every step of the post-production process.

Avid AudioVision's intuitive user interface.

Systems like Avid AudioVision® and our new Avid AudioStation™ provide a level of speed, creative flexibility and editing precision unlike anything you've ever experienced. And they're compatible with our Media Composer® and Film Composer® nonlinear editing systems for video and film, which lets you streamline your entire post-production process.

To find out more about audio solutions from a company that's totally committed to the present and future of audio post-production, phone **1-800-949-AVID.**

A · V · I · D®

Backup and restore

RADAR has been designed to back up all data to an Exabyte 8505 (5Gb) tape drive which is supplied with the system as an option. The system utilises a '100% lossless' data compression algorithm that compresses 16-bit audio by approximately 30%, and both backups and restores are performed 6x faster than real time. However, this is a sixth of track time, and if a Project runs for four minutes with all tracks continuously recorded, it will take 16 minutes to backup and 16 minutes to restore.

At the moment it is not possible to backup individual Projects and the whole contents of the discs must be transferred which could take over 1½ hours for 24 minutes. A way around this is to work on a Project at a time backing up as you go. But if one considers a typical album overdubbing session where five or six titles may be worked on in a day, the time required for backing up and restoring tracks could still run into hours rather than the few minutes it currently takes to change over multitrack tapes. Imagine the scenario during an expensive string overdub!

Another problem with this type of storage is the peace of mind factor, and I'm not sure how many producers would feel happy entrusting their 24-track digital master to a data tape streamer without any other form of backup. There's something a little more reassuring about a reel of 24-track tape machine or a stack of *ADAT*s, and this makes another very good argument for including multichannel digital I-O to allow for digital-tape backup.

Yet another difficulty with the present arrangement (and here again Otari promise improvements), is backing up a *RADAR* system that has been fitted with extra drives. Let's imagine that an additional three 1.1Gb drives have been added thus offering a total storage capability of more than 6Gb. Now due to the data compression used by the Exabyte *8505*, there is a very good chance that this will fit; however, there is also the possibility, depending on how compressible the audio is, that it will not. If the latter is the case, the first the user will know about it is when the tape runs out three hours later!

Conclusion

RADAR has been designed to provide a nonlinear 24-track recording format that offers the simplicity and familiarity of tape-based systems while giving the full advantages of a random-access system. In most respects it has achieved this goal with its easy-to-operate user-interface, full 24-track uncompromised operation, and instant access locate and nondestructive editing capabilities. The system also benefits from being compact (and thus easily portable), needing very low maintenance (obviously no tape alignment), and no tape costs other than Exabyte backup.

However, there are certain areas where improvements can be made and Otari are fully aware of these—two fundamental points being the inclusion of multitrack digital I-Os, and better solutions for backup-restore.

Although the system reviewed was a production unit, there still appear to be some features that have yet to be implemented, and one would hope to see these operational in the very near future.

RADAR has the potential to successfully crossover into the tape-based studio, where I can see it initially working along side multitrack tape machines rather than replacing them. The prospects for the future could be very exciting, but Otari should be quick to get their product in order, before other manufacturers, also thinking along very similar lines, launch competing products. ■

Otari Inc, 4-33-3 Kokuryo-cho, Chofu-shi, Tokyo 182, Japan. Tel: +81 4 2481 8626. Fax: +81 4 2480 8633.
US: Otari Corporation, 378 Vintage Park Drive, Foster City, CA 94404. Tel: +1 415 341 5900. Fax: +1 415 341 7200.
UK: Sterling Audio Systems Ltd, Kimberley Road, London NW6 7SF. Tel: +44 171 372 6370. Fax: +4 171 372 6370.
Europe: Otari Duetschland GmbH, Rudolf-Diesel Strasse 12, D-4005 Meerbusch 2, (Osterath), Deutschland. Tel: +49 2159 50861. Fax: +49 2159 1778.
Singapore: Otari Singapore Pte Ltd, 40 MacTaggart Road, Singapore 1336. Tel: +65 284 7211. Fax: +65 284 4727.

The most completely automated console, with up to 240 Inputs - but just over a metre wide

The new M4000 digitally controlled analogue mixing desk from Tactile Technology is nothing short of revolutionary. M4000 gives you complete automation. It is also extremely fast, enabling a complete mix set-up to be reset instantaneously! And the desk's architecture not only gives improved audio quality, but allows you to conceive your mix in different 'planes', dramatically speeding up the mixing process.

Its two-piece architecture separates the digital control surface from the Audio Processing Centre (APC) making the actual desk significantly smaller and giving more space in your control room. In addition, this modular design means you can start small (48-channels) and grow in capacity (in 48-channel increments) without ever growing in size. Up to five 48-channel APCs can be connected to one controller, giving a 240-input console with the smallest footprint ever - just over a metre wide!

Three fader automation options are available – Snapshot, Dynamic VCA and Moving Fader. Its complete automation, giving total and immediate reset of all controls and functions, plus its compact size, and sensible pricing, make the M4000 the No. 1 Choice for Sound Recording, Sound Reinforcement and Theatre use (just think how many more paying seats you can get!), Post-Production, Broadcast, Mobiles and remote recording.

The M4000 is on demonstration at Stirling Audio Systems now. Call today to book your personal demo.

M4000 – The Revolutionary Console from Tactile Technology

Distributed in the UK by
Stirling Audio Systems Ltd., Kimberley Road, London NW6 7SF

Stirling

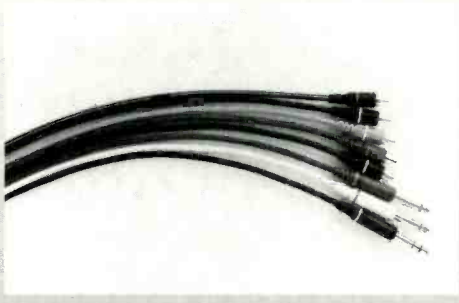
071 624 6000

THE LONG-LIFE, ECO FRIENDLY CABLE

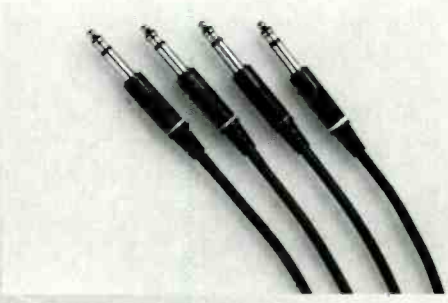
MOGAMI

Any cable failure often results in problems where the original cause is extremely difficult to detect. The reliability and quality of Mogami cable ensures those problems do not arise. Long-life, safety, efficiency and economy make Mogami the No. 1 choice for cable.

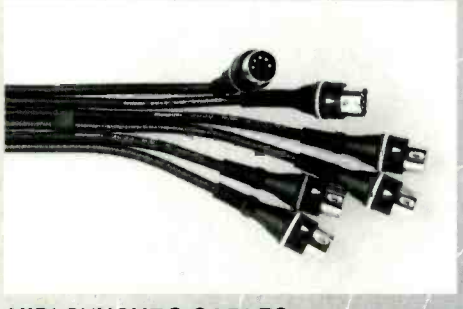
BANTAM PATCH CORDS



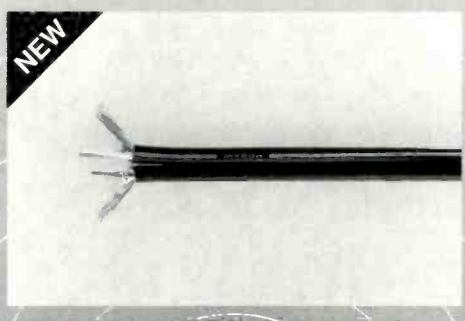
HIGH DEFINITION 75Ω AUDIO/VIDEO CABLES



LONGFRAME PATCH CORDS

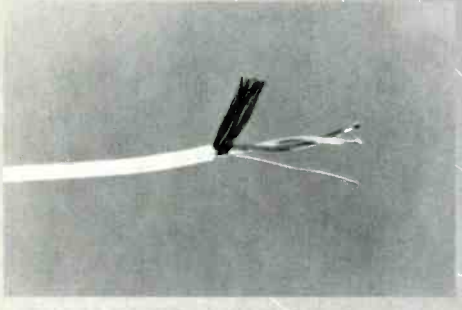


MIDI SYNCHRO CABLES



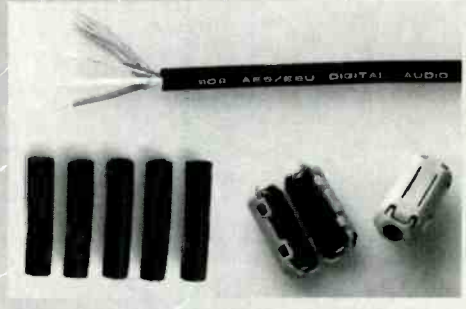
STEREO MIC. CABLE AWG #24 (0.226M²)

CL2 RATED SNAKE CABLES

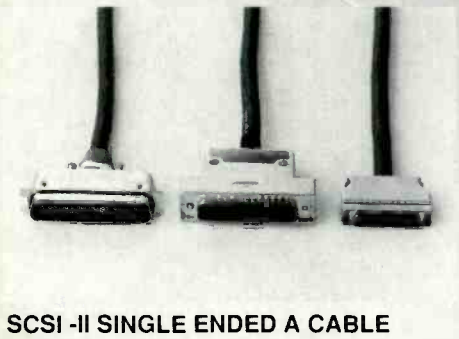


CONSOLE WIRING CABLES

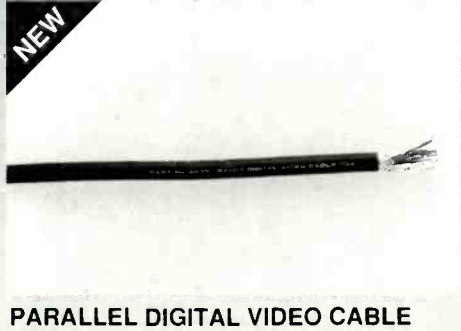
CL2 RATED SUPER-FLEXIBLE STUDIO SPEAKER CABLES



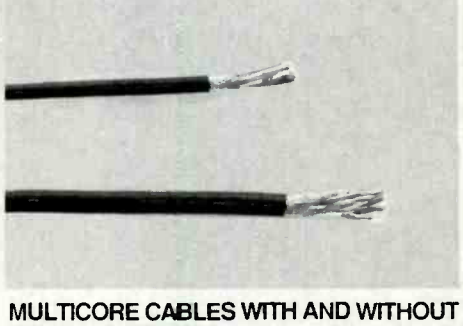
AES/EBU 110Ω DIGITAL AUDIO CABLE



SCSI -II SINGLE ENDED A CABLE



PARALLEL DIGITAL VIDEO CABLE



MULTICORE CABLES WITH AND WITHOUT OVERALL SHIELD

CALL OUR DISTRIBUTORS FOR A FREE CATALOGUE AND/OR MORE INFORMATION:

AUSTRALIA: *GREATER UNION VILLAGE TECHNOLOGY (02) 550 5488* • **AUSTRIA:** *DIETMAR KOLLER RECORDING EQUIPMENT (0222) 450 43 43* •
CANADA: *CABLETEK ELECTRONICS LIMITED (604) 942-1001* • **CROATIA:** *AUDIO VIDEO CONSULTING (38) 41 624 622* • **DENMARK:** *D A DISTRIBUTION APS (31) 61 07 55* •
FINLAND: *SOUND MEDIA OY (0) 629 669* • **FRANCE:** *D.M.2.J. SARL (1) 39 57 90 44* • **GERMANY:** *AUDIO-VERTRIEB PETER STRUVEN GMBH (04106) 6 99 99* •
HONG KONG: *ODYSSEY ENGINEERING CO. LTD. 5-8988111* • **JAPAN:** *MIT INC (03) 3439-3755* • **KOREA:** *AVIX TRADING COMPANY (02) 565 3565* •
NEW ZEALAND: *DENCO AUDIO LTD (3) 3790743* • **NORWAY:** *LYDROMMET A.S. 22 37 02 18* • **SINGAPORE:** *TEAM 108 TECHNICAL SERVICES PTD. LTD. (065) 748 9333* •
SOUTH AFRICA: *EMINENTLY MORE SUITABLE S.A. (PTY) LTD. (011) 482 4470* • **SPAIN:** *MEDIA-SYS, S.L. (93) 426 65 00* • **SWEDEN:** *TAL & TON ELEKTRONIK AB (031) 80 36 20* •
SWITZERLAND: *ZAP SONO (22) 340-05-70* • **TAIWAN:** *SEA POWER CO. LTD (02) 298 2688* • **THAILAND:** *VIDHYA SUVANICH (2) 321 4426* •
THE NETHERLANDS: *MAARTENS SOUNT & VISION (0) 5130 29120* • **U.K.:** *STIRLING AUDIO SYSTEMS LTD. (071) 624-6000* • **USA:** *MARSHALL ELECTRONICS INC. (310) 390-6608* •

Martin Polon

The death of technology: what happened to after-sales support, and what are the alternatives?

In a recent conversation with one of the leading lights of the British professional audio business, the topic shifted to the wanton destruction of audio or other electronic equipment that would simply not work properly and-or refused to be repaired—by anyone. The American perspective was provided by those who would 'shoot' the offending piece of equipment. In one case, a CD-ROM drive that refused to terminate the SCSI chain of a postproduction editing setup, the weapon of choice was a Colt 45—just like the one used by Sonny Crockett in *Miami Vice*.

It was well felt that this was the American way of dealing with recalcitrant audio equipment—quick, violent, decisive and relatively painless for the CD-ROM drive. As the conversation evolved, it became apparent that the higher level of culture found in the UK allowed for amplifiers being 'stoned' or used as a boat anchor. A quick call to France, revealed that Gallic sensibilities demanded burial of offending pieces of *les apparatus*—preferably in soil capable of sustaining black truffles. It was not clear whether power amplifiers or tape machines better sustained truffle production.

Humour aside, the inability to coax a particular unit to perform to spec or repair has driven audio people to distraction. Countless audio practitioners have been known to bring about 'death by unnatural causes'.

There are many less violent options available to discontented equipment buyers in theory, but few in practice.

The dealer having provided a piece of gear is, in theory at least, the best and closest service option available. A professional dealership is there to sell equipment and support it after sale. The 1990s, however, have seen the financial failure of many suppliers, effectively orphaning the equipment sold. Other dealers are often wary about servicing products that were not purchased from them; even if the manufacturer's policy dictates that they should.

The most common problem is reserved for the newest addition to the audio equipment sales firmament: the warehouse superstore. Whether it is a general merchandise discounter, an electronics superstore, a computer superstore or a dedicated consumer audio discounter who has branched out into suppliers with selections of studio equipment. Whether they are selling computers, personal and project studio equipment, high-end consumer audio equipment or other items found in today's studios —the staff often have nary a clue as to what a studio and its associated technology is all about. Even when they do understand the products, low-ball pricing allows little customer service in most causes.

These retailers do offer a price advantage but have so little technical connection to or intimate knowledge of the equipment they sell, that the provision of 'warranty' repair in many of these establishments, is frequently done by third-party servicing offices. Companies such as General Electric, TRW and Kodak will often be repairing a PC, a microwave oven, a camcorder and an cellular telephone while 'benching' your unit at levels far below those used in the studio. In other words, the product most often does not go back to the people who made it and could best diagnose it—ultimately, you get what you pay for.

Even when you can access a dedicated professional-audio dealer where you may pay a higher price for the privilege of staff competence, you are frequently competing for the attention of the knowledgeable sales and repair personnel with the rest of their clientele and their inventory. It is an unfortunate reality that successful studio audio dealers are stocking about 40% more products than they did ten years ago. It is also true that studio products and the support knowledge required for them, used to have a life expectancy of five to ten years. Today's products frequently have a 'knowledge life span' of only 24 to 36 months before they are replaced by an upgraded model. Successful dealers have also increased their customer base by well over 100%. All of this translates into a significantly greater number of products to support for a professional audio equipment dealer remains the best option for direct equipment support.

Consider also that 20 years ago the average studio owner could expect to see a technical representative from his console manufacturer, tape machine supplier, speaker vendor and so on, at least twice a year. Any technical problems would be taken care of by the rep—on the spot—during his visit or via subsequent telephone call. Anything that the rep could not fix was repaired by the regional technical staff or if necessary brought up to specification by a SWAT team flown in from the factory. Contrast that with the 1990s when audio equipment makers have ceased to be 'mom and pop' establishments, even if most studios still are. The tradition of 'hands on' personalised service for purpose-built hand-wired studio equipment has to some extent fallen by the wayside. In its place, we have ten large audio and electronic conglomerates in the US, Japan and the European Community selling over 50% of all studio equipment bought in the world today.

As the conversation evolved, it became apparent that the higher level of culture found in the UK allowed for amplifiers being 'stoned' or used as a boat anchor

Obtaining customer service from such manufacturers varies in the degree of difficulty. Some have indeed upheld the old traditions of customer support for their studio audio products. Others, emboldened by the success of voice mail throughout corporate America have placed this directly between customer and technical support. The result in some cases has been 'waits' on the telephone helpline in excess of one hour.

Studio repair was much more feasible in the past—according to many in the biz, when a significant amount of repair activity occurred within the studio itself (since equipment had not reached the level of semiconductor and component integration, complexity and size shrinkage of today's products). This and digitisation has rendered studio in-house repair somewhat problematic. What tools are available to the studio owner-manager-operator who insists on not having equipment that will need to be shot, drowned or buried. This issue again defaults to the level of manufacturer's support to some great extent. Documentation for repair and troubleshooting has to be supplied by the manufacturer, along with a real commitment to provide parts support to the customer base—especially for custom ICs and other parts not readily available through traditional electronic parts houses. Jigs, board extenders and special test equipment are another category of support for in-house repairs, along with a well-equipped electronics repair shop and an experienced expensive computer-savvy technician kept (on staff, on call or on a retainer). For many studios, this is more expense then they are willing to sustain for the sometimes dubious privilege of in-house repair.

What is our bottom line? Buy customer support along with the product. Verify the length of the original warranty and the period for which that warranty can be extended by the manufacturer. Research the style of customer support, whether by voice mail, accessible technical support or technical rep. Buy equipment from a dealer who will provide you with the highest level of technical support that you need in running your studio. If you have a piece of equipment that does not operate properly or to specification, do not keep it to see if it will settle down. The odds are that it will not and that you will keep it just long enough to be out of warranty. Do not try to fix it in your studio. That action may well 'void' the warranty if you fail. If you succeed and the unit fails again in the future, the previous repair may still void the warranty. ■

AES 97th Convention

San Francisco, California
November 10–13, 1994

...bridging audio throughout the world...

Some cities in the world have panache and certainly San Francisco is part of that universe of style, comfort, and vibrance.

AES has selected San Francisco as the site for our 97th convention. For these reasons the city will serve as an exciting centerpiece for the four days of Papers, Workshops, and product Exhibition that will provide an insight into the coming years of audio technology and practice.

An abundance of new technical developments and products from North America, Europe, and the Pacific Rim will all be housed in the recently expanded Moscone Convention Center, November 10–13, 1994. The 97th Convention will assist AES to continue its mission of bridging audio throughout the world!

Plan now to attend and be prepared to face the future of professional audio with the help of the AES 97th Convention.

Kevin Hilton

TV formats and satellites

When I was young, my television film viewing was periodically ruined by something strange happening to the picture: either the image appeared unnaturally elongated or the frame went through a odd lateral shift every now and again. Of course, it was some time before I learned the reason for all this; the phrase panning and scanning was not part of my vocabulary in those days

Although this artistic atrocity was noticeable, it was accepted by the TV viewers of the early 1970s. TV broadcasters had a 4:3 aspect ratio screen to fill and they often did not seem bothered how they did it—whole sections of a frame would go missing, characters would be heard but not seen, or sometimes you would get 'talking noses', when the telecine operator tried to get both protagonists into the picture.

Pan and scanners must be fearing for their jobs now, however, as wide-screen transmissions become more commonplace. It was always the intention to go for full 16:9 wide-screen transmission when high-definition television (HDTV) services were introduced, but format wars have put back its implementation. There has also been some consumer resistance; one British home entertainment magazine has received many letters from die-hard full-screen fans saying that they don't care about the film director's original vision —they will not tolerate black bars top and bottom of their picture.

It seems that this reaction results from the misguided belief that the viewer is losing something when a film is shown in its original aspect ratio. Of course, the opposite is true, which is why a number of broadcasters have started to toy with the wide-screen presentation of both movies and major drama series. In the UK, the leader in this field has been Channel 4, which has shown some of Hollywood's widest films the way they were intended to be seen.

'We try to keep as close as possible to the original intention as far as film is concerned,' Mairi MacDonald, Head of Film Purchasing at C4, told me earlier this year. 'We've got to decide between various wide-screen ratios but we think it's better to show as much as possible to maintain the director's intention, but there isn't a perfect answer given that the TV screen is the wrong shape.' This has long been the problem—the almost circular shape of the cathode ray tube dictated the three predominant television colour coding transmission systems—PAL, NTSC and SECAM—and has sustained, even though many see it as now woefully inadequate.

Video projectors and plasma-panel screens are either too expensive or insufficiently reliable to replace the venerable CRT, so it endures. However, some things are changing. A number of consumer electronic manufacturers—Philips, Thomson and most especially Nokia—have developed wide-screen televisions, which, although still CRTs, are set for the 16:9 future.

Nokia recently introduced two new models onto the market, both of which can deal with PALplus transmissions. In lieu of HDTV proper, broadcasters and manufacturers began looking for ways to adapt existing standards, and although some observers see PALplus (which works on the same 576 active lines as conventional PAL but with extra HD information buried in the picture) as merely an interim compromise, others have voiced the opinion that 16:9 PALplus pictures could be more than acceptable. The fact that the system is backwards compatible leads them to believe that HDTV could be unnecessary.

Nokia's launch coincided with C4's announcement that they had won a European Commission contract to supply at least 500 hours of PALplus programming by the end of 1995. In this, the UK will join Germany, which saw PALplus transmissions start at the end of last year on some of its channels. Half the cost of C4's PALplus service will come from the EC's Support Fund, with the remainder being provided by Nokia. Through this, Nokia become the only European consumer electronics manufacturer to back a broadcaster in the bidding system.

Whatever the delivery format, wide-screen broadcasts are becoming more commonplace, and not just for movies. Granada Television have pioneered shooting drama series and serials on Super 16 film stock; this format has an aspect ratio of 15:9, which can be reduced to 14:9 for transmission today, so that it will not be too distracting for the viewer, but which will be blown up to 16:9 for later repeats. 'A major project is bound to have a very long life and we hope that in the next couple of years everybody will be seriously into wide-screen and people will be crying out for software,' Craig McNeill, Production Executive for Drama at Granada, told me in an earlier interview.

The broadcasters are merely pre-empting what is already happening in the home entertainment market. Wide-screen videos are now simultaneously released with their full-screen counterparts, and although laser discs are still expensive and pretty much the preserve of either the visual equivalent of the audiophile or the serious film buff, movies in their original aspect ratios with surround sound are the way a lot of people now prefer to watch their favourite stars.

The industry realises this and is starting to feed off it. A huge home cinema enthusiast is genre Film Director John Carpenter, who said to me in a recent interview, 'If you're going to buy any of my stuff and it's not in wide-screen with surround sound, forget it. Laser disc is the way to go. It's the only way to watch movies.'

The other side of the home entertainment boom is the perceived increase in demand for transmission capacity. This has resulted in most of London, particularly the south, for some bizarre reason, being dug up to lay new cable systems, while satellite operators are gleefully shooting new vessels into space at an alarming rate. Of course, the only physical manifestation we'll see of this down here is when they drop out of orbit and hit someone on the head.

Astra will be launching their fourth satellite at the end of this year, with the fifth and sixth (both of which have digital capability) going up in 1995 and 1996 respectively. The company's main European competitor, Eutelsat, will have two more Hot Birds hovering above the earth by the middle of next year. On the worldwide front, Intelsat predict that they will be operating a fleet of 25 craft by the year 2000.

This will create a large number of space segments, which could be doubled by the introduction of digital compression technology. Although television and radio broadcast is not the sole purpose of these satellites—and many feel that data transmission and telephony are more important than entertainment-based work—there is concern from some that there is already too much capacity.

One such doubter is Paul Turbang, Head of the European Broadcasting Union's Eurovision Operations Division, which deals with the company's large volume of satellite traffic. 'There are more satellites coming onto the European market because of deregulation, which means that there could be more capacity than customers.' Describing the Eurovision operation, he comments, 'We have four repeaters and have created six channels by playing around with the frequencies. Digital will give 34 channels but really, eight TV channels is enough for us for the time being.'

Turbang's other major concern is interference: 'Digital compression will be able to squeeze in more channels. Officially it will go to 34, with various extra channels for news and fly-aways. When you play that kind of game, you have to be very cautious technically, especially with frequency and power. Matters will have to be watched very carefully to make sure that operators do not step on the toes of others.'

Both Astra and Intelsat reject such suggestions out of hand, saying that they both need extra capacity to sustain future services. Tony Trujillo, Corporate Communications Director for Intelsat, says, 'We need more capacity for general systems, and now for video. We're moving towards an all-digital system because we're trying to squeeze out as much capacity as we can, but we don't feel that our systems will be under-utilised. Our best estimate is for steady growth for all satellite services—if we had a way, we would accelerate the launches we have scheduled.'

While Eutelsat are keen to increase their own potential, Commercial Director, Guiliano Berretta, is pragmatic in his approach. 'At the moment we don't have too much capacity—we're practically full. It is true that some people have got too much capacity but the point is to be in the correct position for up-linking. Producing exactly what you need is wrong—there must be something in excess of demand, but there will always be some who will suffer because they will not have a way of selling their goods.'

At the moment, it appears that very little will halt the increase in the number of new satellites going into orbit. Perhaps the only way would be to hand all launching responsibilities over to NASA. ■

MIC PREAMPS

The 2-channel Millennia Media *HV-3* and 8-channel Creation *C101* microphone preamplifiers offer high performance but contrasting facilities. Bench test by Sam Wise

These two preamps are quite different in their system philosophy, yet both are good, making the choice more than a matter of specification or what seems to sound best.

The Millennia Media *HV-3* high voltage microphone preamplifier is designed primarily for the minimalist-purist recording session, using typically a single microphone pair—though it is also used by the multitrack community either to front end all of their microphones at the source end, or to provide extra quality on spot or soloist microphones. Simplicity is its byword, even its fundamental specification.

In contrast, the Creation *C101* provides eight channels of remote controlled mic preamplification in a 3U-high case, complete with remote level read-outs. It is particularly suitable where problems with long cable runs can affect signal quality and on the larger recording project using multiple microphones. It is not nearly so basic in either features or construction, but remains easy to operate.

The two preamplifiers will be described in sequence starting with the Millennia *HV-3*. However, the graphs are presented side-by-side to allow easy comparison.

Millennia *HV-3*

Millennia Media are primarily a recording company operating in Sacramento, California—and apparently working mainly on live recordings of clean material such as symphony orchestras, opera and small acoustic ensembles. The main protagonist behind the Millennia range is John La Grou (Recording Engineer, and author of various articles on the subject). The *HV-3* and other Millennia units were initially designed for the purpose of improving in-house recordings, and were developed as much using listening tests as with the test bench. An incremental design approach was used by comparing step-by-step changes of circuitry elements with previous versions and to other available products. Even the polarised coupling capacitors are said to have been chosen this way.

Using this method, Millennia finally arrived at their ideal design for the *HV-3*, and of course following successful recordings, other people wanted one too. Many specialist companies have started this way.

The *HV-3* chassis is 1U-high and is constructed of 16 gauge steel with welded joints, painted with lightly textured durable polyurethane. The front panel is about 2.5mm thick aluminium, black anodised with etched-in labelling said to be made by a high power laser, then filled light brown. This has high contrast and appears to be quite durable. Visually, the *HV-3* is not going to impress your friends, but it is strongly built and our short experience indicates that it will travel well.

As its model designation indicates, the *HV-3* provides built-in powering for the high-voltage B&K 130V microphones on a 4-pin XLR type connector, as well as standard +48V phantom powering on a standard 3-pin XLR type. The required input is separately selected for each channel by front panel HIGH VOLTAGE-NORMAL toggle switches, with +48V phantom also switchable on an adjacent toggle switch. The only other front-panel controls are rotary gain switches with 5dB steps. A continuously variable conductive plastic pot is optional for those requiring gain changes without steps. All switches are have gold-plated contacts for the best audio performance.

In each channel group there is also an Overload indicator operating at an output level of about +27dBu, approximately 5dB below the output clipping level of +32dBu (into a high impedance load). Finally, at the right end of the panel are four small LEDs indicating correct power supply operation of +130V, +50V, +25V and -25V rails. And there you have it, one knob and two switches per channel —usually set to the same settings.

The rear panel is just as simple, containing the input sockets mentioned above, plus an XLR-3 output connector for each channel and a slot allowing the addition of a future 20-bit A–D convertor system. An IEC-type power connector, switchable from 100–120V AC to 200–240V AC with externally accessible fuse. Mains noise-filtering is included. The actual operational voltage range is not given in the specification and was not tested.

In finalising the circuit design of the *HV-3*, Millennia undertook both theoretical examination and listening tests on a wide variety of design configurations. The production design uses a packaged matched octal transistor hybrid input circuit and an 80V FET-based DC monolithic output-stage. The path between these two critical stages remains on the single PCB, avoiding the possible effects of board interconnections, and maintains a balanced signal configuration throughout. No bandwidth limiting is provided—either buy a microphone ▶

The American Millennia *HV-3* mic preamp

MANUFACTURERS' SPECIFICATIONS

	Millennia HV-3	Creation C101
Minimum gain	9dB	+6dB
Maximum gain	65dB	+69dB
Frequency response	10Hz—100kHz, +0/-0.15dB	10Hz—150kHz, +0 /-3dB
Noise	(0Ω source)	-73dB @ 60dB gain
(30Ω source)	-71dB @ 60dB gain	
(150Ω source)	-68dB @ 60dB gain	
EIN gain = 60dB	-128dB	≤128dBu
EIN gain = 10dB	–	≤110dBu
THD+N, 20Hz to 20kHz (rectifier not identified)	<0.001% @ 35dB gain, +27dBu out	<0.003% or noise of 150Ω source
	<0.0005% typical	
Stereo phase accuracy	<0.5°, 20Hz to 40kHz	
Phase vs frequency	<2°, 50Hz to 20kHz	
Common mode rejection ratio	>72dB @ 35dB gain, 100Hz to 20kHz	>75dB
Slew rate	>25V/µs	>300V/µs
Interchannel crosstalk	≤120dB @ 1kHz	≤100dB
Input level, maximum	+17dBu	>+12dBu
Output level (onset of clipping)	+32dBu	+29dBu
Input impedance	6,700Ω	1,200Ω or 5kΩ, link
Output impedance	24.3Ω (x2)	40Ω
Power consumption	14W max	240VA max
Dimensions (w x d x h)	19 x 10 x 1.7 inches	19 inches x 410mm x 3U
Weight	10lb	18kg

with this in-built if you need it, or provide it externally. No risks have been taken in unnecessary signal degradation.

Internally, the *HV-3* is simple. There is a single PCB which fits into the front half of the case and full width. To this all audio wiring is hard soldered from rear-panel-mounted XLR types with gold-plated pins. Power wiring is connected by 6.35mm Faston-type connectors. There are ferrite beads on the audio input wiring, and a filter is fitted within the IEC type mains input connector. A rear panel 120-240V switch is provided along with a fuse holder which can be adapted for 20mm or 1¼-inch fuse types. The PCB is well supported. Some of the large capacitors might be held more rigidly to prevent fracture during extensive travel. There is no legend on the PCB, and ICs are painted out to prevent their identification.

At the lowest gain setting, the clipping point at 20Hz and 1kHz is +22.44dBu (for 0.1% THD). The gain at this setting is 9.1dB. Increasing the frequency to 20kHz has little effect, reducing the clipping point to +22.29dBu. Under extremely high sound pressure level conditions (above 140dB), the B&K microphone can exceed this level—in which case an *HV-AM* can be plugged in to attenuate the signal, or an outboard *HV-1* or *HV-2* power supply can be used.

At the highest gain setting, it is possible to measure the maximum output clipping level (for 0.1% THD) at 1kHz as +31.75dBu into 100kΩ, reducing to +22dBu at 600Ω. This implies that though the amplifier provides a high voltage swing, it is not actually a high current design and will suffer somewhat if cable lengths get very long. A comparison with the *C101* in this area reveals some large differences in design philosophy. However, in the purist recording environment, the recordist and his stereo machine are often sitting alongside the orchestra so no problem will occur.

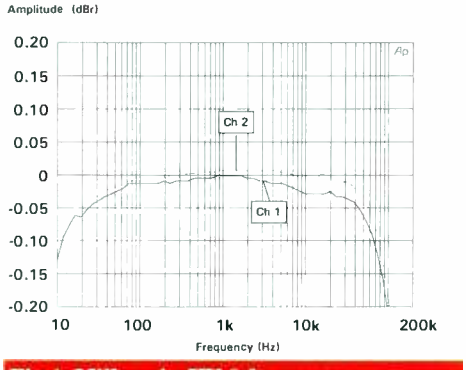


Fig.1: Millennia *HV-3* frequency response. Note the rather expanded scale when reading these curves. Input level -10dBu, output level +25dBu. Load impedance 100kΩ

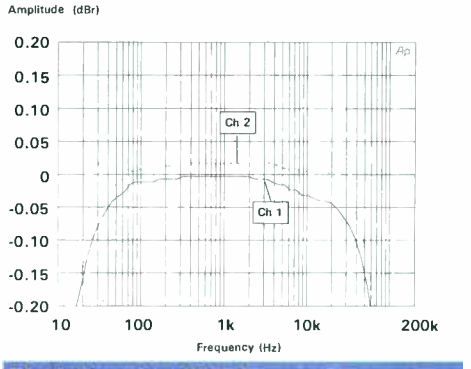


Fig.7: Creation *C101* frequency response. Note the rather expanded vertical scale when reading these curves. Input level -10dBu, output level +25dBu. Load impedance 100kΩ

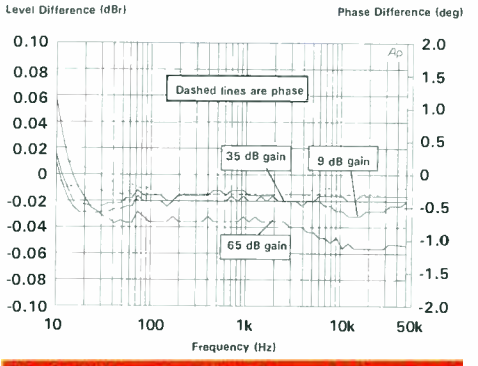


Fig.2: Millennia *HV-3* channel phase and level difference. Note expanded vertical scales when reading these curves. Gains of 9dB, 35dB and 65dB

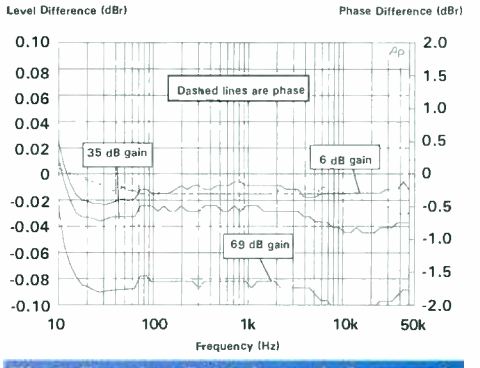


Fig.8: Creation *C101* channel phase and level difference. Note expanded vertical scales when reading these curves. Gains of 6dB, 35dB and 69dB

Frequency response at 35dB gain as shown in **Fig.1** is outstandingly flat—notice the highly enlarged scale used for this plot. From 20Hz to 20kHz the level remains within ±0.03dB, and with the lack of filtering on this unit remains within -0.15dB at 10Hz and -0.20dB at 100kHz.

Fig.2 shows the phase and level difference between the two channels at 9dB, 35dB and 65dB gains. Here the level difference reaches a maximum of 0.06dB at maximum gain above 10kHz, while the phase difference is never more than 0.5∞ at any frequency from 10Hz to 50kHz —excellent stereo matching.

As can be seen in **Table 1**, the gain accuracy is very close to the nominal specified gain steps, and channel matching is to all intents identical —remaining within 0.05dB at every gain step.

Input Common Mode Rejection Ratio is shown in the top curve in **Fig.3**. Note that the best performance is achieved at about 1kHz, with a 100Hz figure of about 85dB. Compare this with the Creation unit (**Fig.9**), which gives about 95dB at 100Hz, but shows a rising characteristic at the higher frequencies. In practice, the units will be ▶

TABLE 1: GAIN SETTING ACCURACY AND MATCHING

Gain position	Min											Max
Chan 1 gain	9.11	15.24	20.24	25.38	30.32	35.25	40.30	45.20	50.21	55.23	60.15	65.22
Chan 2 gain	9.12	15.21	20.21	25.36	30.29	35.25	40.28	45.15	50.16	55.22	60.14	65.25

SSHDR1 FROM SOUNDSCAPE

THE MULTI-TRACK HARD DISK RECORDER

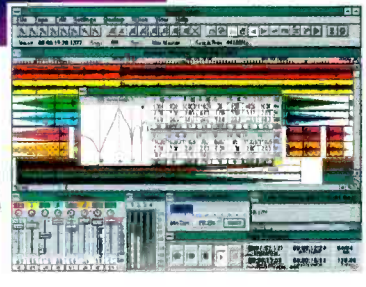
The Producer 'we need more tracks'.

The Engineer 'no problem! how many do you need ...16 ...24 ...32 ...48...➤?'

THE SSHDR1

Sync it! Expand it! Use it!

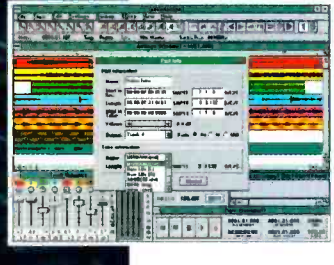
Unlock the power of digital audio on the PC in your studio without compromising *audio quality* or *synchronization* issues and have real flexibility to **EXPAND** and upgrade your system. Unlike other systems, each SSHDR1 8 track rack unit has its own internal 24 bit DSP handling all soundfiles allowing the freedom of integration with other Windows™ applications like MIDI sequencers or random access digital video and the ability to expand your system up to 128 physical tracks.



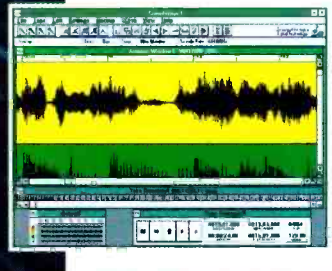
See us at AES, San Francisco on Stand 1631

Hardware and powerful editing software from the same manufacturer gives perfect compatibility and eliminates the '*sorry man, it's the other guy's problem!*'.

Now SHIPPING in the US, and with a price tag that WON'T break the bank ... do yourself a favor and **DEMAND A DEMO** at your local store today and find out why this British company have sold more digital audio workstations in Europe over the past 12 months than any other manufacturer.



- Expandable from 8 to 128 tracks
- 64 virtual tracks per unit
- Powerful non-destructive editing tools: cut, move and copy/real-time fades/copy from hard drive to active arrangement/normalize process/repeat/loop record/ varispeed (+/-10%)/waveform d splay/stereo link tracks/ compute tempo/stereo*. WAV file support
- Mounts for 2 IDE hard drives within each rack unit currently up to 3.4GB (10½ hou·s recording time)
- Full chase-lock sync
- Software features 8 real time parametric EQ's per rack unit assignable to any of the 8 tracks
- 'Crystal' 16bit A/D, 18bit D/A 64 x oversampled converters
- Analog in: 2 x RCA/cinch, unbalanced – 10dBv/+4dBv
- Analog out: 4 x RCA/cinch, unbalanced + 4dBv
- Digital in: 1 x RCA/cinch, S/PDIF format
- Digital out: 2 x RCA/cinch, S/PDIF format
- Input S/N Ratio: > 93dB un-weighted
- Output S/N Ratio: > 113dB un-weighted
- MIDI: in, thru, out
- Rock solid synchronisation even with 386 machines
- Back up to DAT recorder or any logical PC drive
- Real time digital mixing with full automation via MIDI even using multiple units
- Optional: XLR balanced analog inputs and outputs, AES/EBU Digital inputs and outputs (XLR)
- Seamless integration with any Windows™ sequencer or editor
- Software upgrades add new features (in the works: Time stretch, pitch shift, reverb, compression)



SOUNDSCAPE DIGITAL TECHNOLOGY

US Office:-
705-A Lakefield Road
Westlake Village
CA 91361
Tel: 805 495 7375
Fax: 805 379 2648

UK Office:-
Crichton House
Mount Stuart Square
Cardiff Bay
Cardiff CF1 6DR
Tel: +44 (0) 1222 450120
Fax: +44 (0) 1222 450130

Dealer enquiries invited

Name

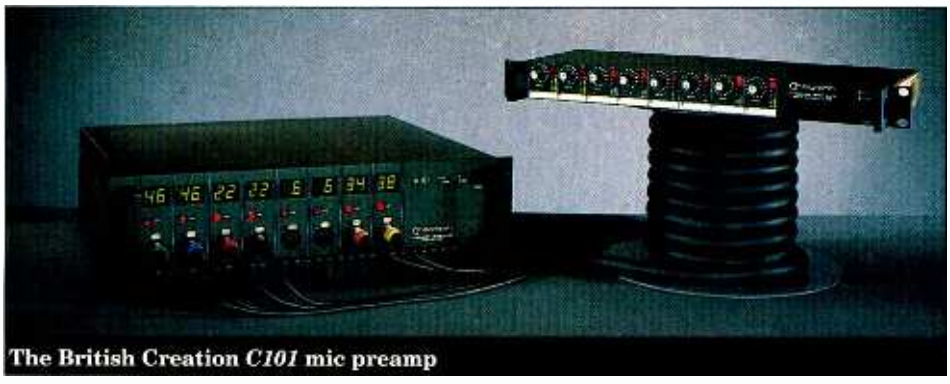
Address

Post Code

Telephone

Please send me a color brochure on the SSHDR1

Please return to:
Soundscape Digital Technology Ltd
Crichton House
Mount Stuart Square
Cardiff Bay
Cardiff UK CF1 6DR



The British Creation *C101* mic preamp

about the same in their audible results under most circumstances. The lower curve in **Fig.3** shows third-octave bandwidth noise—again comparison with the *C101* reveals that the latter unit has some excess LF noise. The increasing slope is a natural effect of the measurement technique.

Equivalent input noise at 65dB gain using a 150Ω source resistance is -128.6dB on channel A and -129dB on Channel B using an average reading meter over a 22Hz–22kHz bandwidth. Changing to a 200Ω source resistance decreases these to -128.5dB and -128.7dB.

Table 2 gives RMS noise over 22Hz–22kHz at the various gain settings, leading to a 65dB gain EIN measurement of 127.1–127.7dB with an RMS rectifier.

The published specification does not indicate the rectifier used to achieve the specified EIN of 128dB. In any case, this is a very good performance.

Crosstalk is shown in **Fig.4**. Driving Channel 2 and measuring Channel 1 gives the lower curve, showing the crosstalk rapidly getting into the noise and below the level of any of todayís digital convertor systems. Channel 1 into 2 is about 10dB worse, but still nearly achieves the specified -120dB at 1kHz figure. Either of these results is commendable. Setting the gain of the two channels to the extremes still only gave a worst case crosstalk of -80dB at 1kHz, this with a gain difference of 56dB. These two solid curves practically duplicate the noise curves of the unit and give no cause for concern.

In **Fig.5**, you will notice that the THD+n curves appear to deviate above the manufacturerís specifications. Knowing a little about the internal workings of my Audio Precision *System One* test set, the bumps in the curve made me suspicious —and indeed, below 1kHz the distortion is entirely due to the test set rather than the *HV-3*, which must be as good as specified not to have degraded the test-set distortion figures.

Fig.6 shows a rarely measured performance characteristic, dynamic intermodulation distortion. This test uses a 3.150kHz square wave with a 15kHz sine wave superimposed on top. It is of interest in this case, since a comparison with **Fig.12** for the Creation amplifier shows that both are low in DIM, but the *HV-3* is lower by nearly a factor of 4. The *HV-3* is about on the limit of measurement with the Audio Precision in its present state of calibration.

SMPTE intermodulation distortion using 50Hz and 7kHz tones at 4:1 ratio, and in put of -10dBu and gain of 35dB into a load of 100kΩ gives a reading of 0.00084%, which is identical to the test set itself.

All in all, the *HV-3* is an excellent performer. Its noise and distortion characteristics are slightly better than the Creation C101, but its line driving characteristics are not as good.

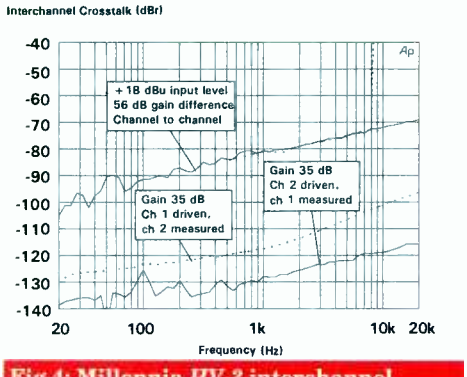


Fig.4: Millennia *HV-3* interchannel crosstalk. Top curve shows results of +18dBu input at 9dB gain on driven channel with 200 source termination on unwanted channel at 65dB gain. Bottom curves are with -10dBu input at 35dB gain in both channels. All measurements at third-octave bandwidth

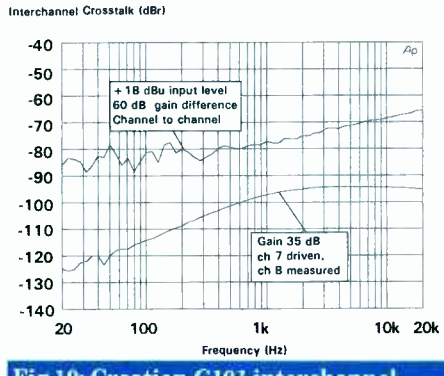


Fig.10: Creation *C101* interchannel crosstalk. Top curve shows results of +18dBu input at 6dB gain on driven channel with 200 source resistor on unwanted channel at 66dB gain. Bottom curves are both with -10dBu input at 35dB gain in both channels. All measurements at third-octave bandwidth

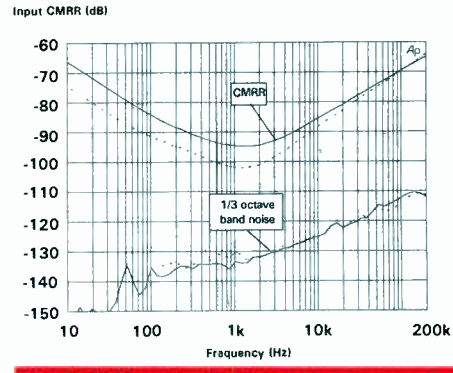


Fig.3: Millennia *HV-3* input common mode rejection ratio. Top curves show input CMRR with 35dB gain, -10dBu input level. Bottom curves show third-octave band noise at same gain and reference level

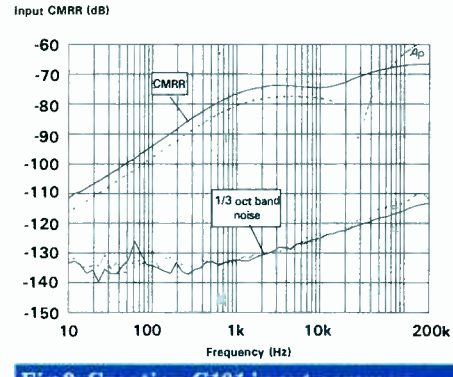


Fig.9: Creation *C101* input common mode rejection ratio. Top curves show input CMRR with 35dB gain, -10dBu input level. Bottom curves show third-octave band noise at same gain and reference level

Creation *C100* series

Trevor Stride is the man behind the Creation *C101*, with a MA in Zoology from Oxford as his electronics qualification. He has been a musician since the age of 14, and with a father who is an electronics engineer, naturally drifted towards audio electronics. His major jobs have included six years with SSL working on the design of the *5000* and *6000*-series consoles, followed by a one year contract with Focusrite in the days of Rupert Neve. Since then he has been a contract designer working on a range of mixer console projects including the Soundcraft *Delta* series. Thus he has known high-end/high-performance products and low-end, but still high-performance, products—I remember being impressed with the cost-effective design of the original *Delta* series.

Creation is his company, and the *C101* and its controllers are his own products. Meanwhile he still spends much of his time helping others get their designs together. Thus, Trevor comes at design with a more purist electronics perspective than John La Grou, but still has that bias towards audible perfectionism that being a musician and potential user brings to the mix.

The Creation *C101* microphone-amplifier ▶

TABLE 2: GAIN SETTING VERSUS RMS NOISE

Gain position (dB)	9	15	20	25	30	35	40	45	50	55	60	65
Chan 1 RMS noise (dBu)	-99.5	-98.5	-97.2	-95.1	-92.5	-89.2	-85.4	-81.2	-76.7	-71.9	-67.1	-62.1
Chan 2 RMS noise (dBu)	-99.0	-98.2	-96.9	-94.9	-92.4	-89.0	-85.1	-81.1	-76.7	-72.2	-67.7	-62.7

NOW WE'RE MOVING THEM.

You can move them on Stand No. 834 97th AES Convention November 10 - 13, 1994 Moscone Center, San Fransisco

Soundtracs have earned a reputation for introducing mixing consoles which continually set new industry standards for quality, innovation and value.

A reputation our competitors would die for.

Last year we sent them reeling with the stunning, high-end Jade Production console.

And if Jade turned them green with envy, the new mid-range Solitaire is set to give them the blues.

Awash with features and function, the Solitaire Production Console combines the finest audio quality with DSP multi-processor control including the option of motorised faders.

Like someone once said - "Innovative in design, dynamic in operation".

Present on every channel the unique FdB Parametric Equaliser™ overcomes the problems of non-linearity in music and the ear providing precise control of all frequencies in the audio spectrum.

In addition, all monitors have a 2-band equaliser plus access to the FdB Parametric Equaliser™.

The on-board ADP, (Assignable Dynamics Processor), provides a comprehensive range of gating, compression, expansion, limiting, modulation and auto-pan functions on each channel.

Plus there's the precision automation, in motorised fader or VCA flavours.

Quite a specification. - Quite a console.

Solitaire - much more than moving faders.

SOUNDTRACS

SOLITAIRE

Soundtracs PLC. 91 Ewell Road. Surbiton. Surrey KT6 6AH. England. Tel: 081 399 3392. Fax: 081 399 6321.

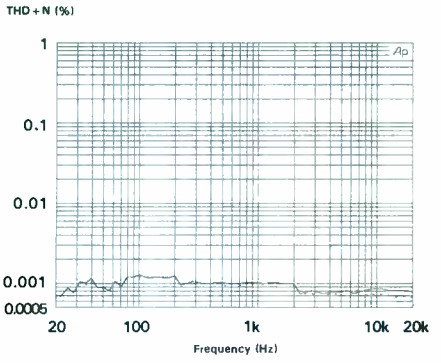


Fig.5: Millennia *HV-3* total harmonic distortion plus noise. Gain=35dB, source level -8dB, output level +27dBu. Results below 2kHz are test-set residual— the *HV-3* is better than this

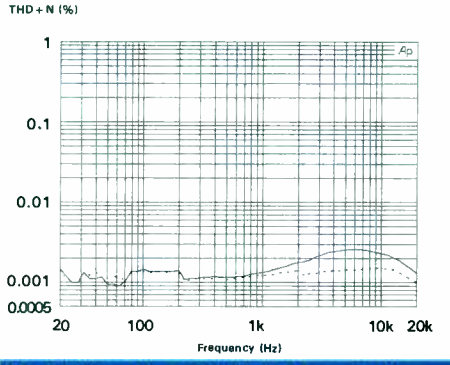


Fig.11: Creation *C101* total harmonic distortion plus noise. Gain=35dB, source level -8dBu, output level +27dBu, load 100k. Results below 1kHz are test-set residual— the *C101* is better than this

audio-rack system, is designed with the same high audio performance goals as the *HV-3*. But it is more complex, being conceived as a modular assembly and as an element of a larger audio system including a complete remote control system. Each rack housing contains up to eight microphone amplifiers, complete with optional switchable high-pass filter and-or multiway microphone splitter. The housing itself is internally modular within a 3U-high rack enclosure having single front and rear panels. Each channel has a two digit gain display, illuminated phantom ON-OFF switch and input XLR on the front panel. The lower part of the panel contains ventilation slots for front to rear fan cooled air movement. The fan is very quiet and thermostatically controlled to maintain the absolute minimum of noise.

At present two alternative remote controllers are available, the *C102* and *C103*. The *C102* is intended to control the basic functions of a single *C101* rack—providing a level control potentiometer with 1dB steps, a 6-segment level meter, and a phantom power ON-OFF switch for each of eight channels. It is 1U-high, and has white scribble strips on the bottom, engraved with the related channel number. The *C102* does not display channel gain settings, but does display the level on each channel via 6-segment peak-reading LED meters.

The *C103* is an assignable controller able to set the gain of up to 12 racks or 96 channels of audio. Push-button switches select the banks of eight channels to be controlled. Eight sets of channel controls are provided, consisting of a rotary encoder to set 1dB level steps, a two digit LED gain-channel number display, phantom on-off, and control of the optional high-pass filter. The *C103* also allows four gain presets (or memories) to be set up and recalled using switches labelled Memory 1 to Memory 4. Only the setting of the presently active rack is affected. A LAST switch acts as an undo switch, restoring the last used settings. This feature could prove of great benefit in many applications, but requires a bit to thinking through since rarely would we want just a block of eight channels updated, usual requirements would range from one to all channels.

Further STEREO LINK switches alter the function of adjacent channel gain controls. The left (odd numbered) of each pair becomes the gain control and the right (even) becomes balance (gain offset).

Remaining on the front panel are some warning switches for control cable connection, data flow and temperature indication. Power supply rails ramp up, minimising any switch-on thump from the outputs of the unit.

A software bug arose when the *C101* +48V switch was tripped. This activated phantom, but could not be used to cancel it, which had to be done on the remote. Trevor Stride fixed this within about ten minutes of informing him of the problem, my test unit having new and not totally debugged software.

The control link between the preamp and remote uses serial communication over a single standard twisted-pair microphone cable to provide the bidirectional communications between units. A break in the link during operation will not affect operation of the *C101* or *C102*, both retaining the last settings given to them as long as they are powered up.

The rear panel provides an output XLR per channel, plus a space for a two 38-pin EDAC multiway connectors, which can be wired to a number of standards. Option 1 provides a hard parallel with the input connectors, but with an adjacent earth lift switch which can be used to lift the screens. Option 2 provides a hard output parallel, again with an earth lift capability. Option 3 replaces the standard output transformer with one having twin independent secondary windings, giving two electrically independent outputs. The main outputs are on the XLRs, and the secondary outputs on the EDAC at -10dB. A short circuit on these will not affect the main outputs. Option 4 provides a piggy-back input splitter with unity gain, which can provide one or two buffered and transformer isolated feeds of the input signal at a fixed gain with very low noise. Again earth lift is provided. With one or more of these options, there is little which cannot be done with a *C101* microphone amplifier in the front end of a sound system.

Internal construction is tidy and very professional, using mostly high-quality ribbon cables for interconnection. But simple it is not. All PCBs are of fibreglass construction with printed legends. Component identifications are *not* obliterated on this product.

The circuitry used in the signal path consists of all discrete semiconductors in a fully differential-balanced class A configuration. The output system uses a toroidal transformer in a special circuit which removes its potential ill effects while retaining the benefits of real floating outputs. Input transformers are optional. All gain setting is accomplished by shielded reed relays with precious metal contacts and also isolates the audio circuitry totally from the digital control circuitry.

At the lowest gain setting, the clipping point at 20Hz and 1kHz is +23.43dBu (for 0.1% THD), clipping occurring at the output. The gain at this setting is 5.86dB. Increasing the frequency to 20kHz has little effect, reducing the clipping point to +23.19dBu. Even at minimum gain it is impossible to overload the inputs before the outputs clip. The maximum output clipping level (for 0.1% THD) at 1kHz is +29.61dBu into 100kΩ, ▶

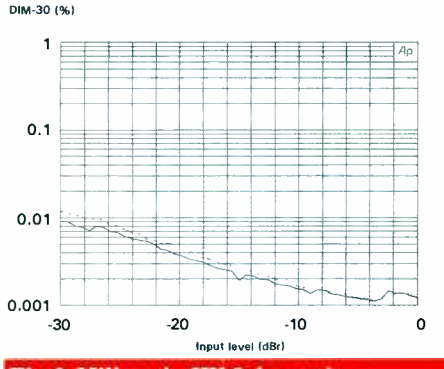


Fig.6: Millennia *HV-3* dynamic intermodulation distortion. Gain=35dB, source ref. level -10dBu. Results are almost entirely noise rather than distortion

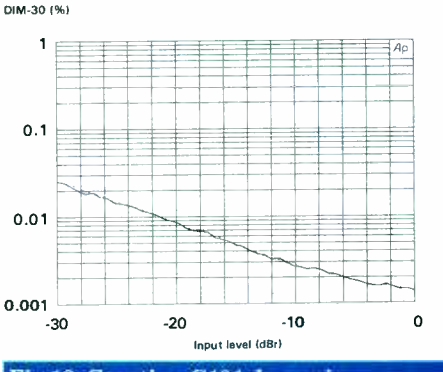


Fig.12: Creation *C101* dynamic intermodulation distortion. Gain=35dB, source ref. level -10dBu. Results are almost entirely noise rather than distortion

TABLE 3

Gain position (dB)	6	15	20	25	30	35	40	45	50	55	60	65
Chan 1 RMS noise (dBu)	-99.5	-97.8	-93.8	-94.8	-94.0	-89.5	-86.6	-81.9	-77.8	-73.0	-67.9	-63.3
Chan 2 RMS noise (dBu)	-99.8	-98.8	-94.0	-94.9	-92.4	-89.5	-86.6	-81.9	-77.7	-72.9	-67.7	-63.1

SigTech™

UNPRECEDENTED MONITORING ACCURACY

BENELUX
TransTec
(010) 414-7055

FRANCE
D.D.D.
(1)-4246-8501

GERMANY
Audio Export
(07131)-6247-0

ITALY
AudioLink
(0521)-598723

SPAIN
Audiofilo
(063)-331156

SWITZERLAND
J&C Intersonic
(056) 321850

UNITED KINGDOM
Munro Associates
(071) 379-7600

CANADA
Applied Electronics
(905) 625-4321

BOSTON
Parsons Audio
(617) 431-8708

CHICAGO
WAVNet
(312) 889-5532

LOS ANGELES
RSPE Audio Solutions
(818) 509-5876

NEW YORK
ARCoustics
(212) 727-9645

JAPAN
Electori, Ltd.
(03)-3950-6266

HONG KONG
Winlite Technology
691-0631

KOREA
Avix Trading
(02) 565-3565

TAIWAN
Gestion Taycan Int'l
(02)-786-3468

AUSTRALIA
ESA Audio
(03)-562-4605

MCA's Digital Restoration Room – in a small space with little opportunity for acoustic treatment – presented significant acoustic problems from wall and console reflections. SigTech's AEC accurately displayed the problems . . .and corrected them. This enabled the engineer to focus all attention to the mix, without continuously compensating for acoustic errors.

SIGTECH AEC: new digital filtering system compensates for loudspeaker/ room interaction, providing accurate tonal balance and stereo imaging

- **Automatically measures direct sound and room reflections**
- **Adaptively designs inverse FIR digital filter**
- **Corrects from Time Domain analysis**
- **Uses 250 MIPS design for high resolution without signal delay**

MCA MUSIC MEDIA STUDIO: DIGITAL RESTORATION ROOM
Dealer: RSPE AUDIO, Los Angeles

Other SigTech featured Installations:

PHILIPS CLASSICS
by TRANSTEC

PLUS XXX
by D.D.D.

CANADIAN BROADCAST
by APPLIED ELECTRONICS

AIR LYNDHURST
by MUNRO ASSOCIARTES

N.H.K.
by ELECTORI

CAMBRIDGE SIGNAL TECHNOLOGIES, INC.
Cambridge, MA USA • Ph (617) 491-8890 • Fx 491-9066

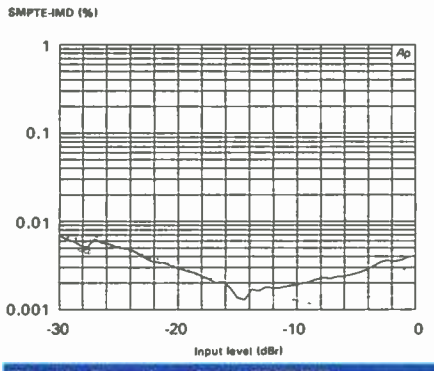


Fig.13: Creation *C101* SMPTE intermodulation distortion. Gain=35dB, source ref. level -10dBu, load 100k. 50Hz plus 7kHz 4:1. At levels above -14dBr (+11dBu output) real IMD begins to appear but it remains a low amount of distortion

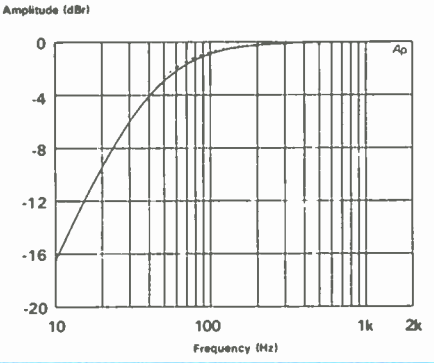


Fig.14: Creation *C101* optional high-pass filter characteristic. Gain=35dB, input level -10dBu, load 100kΩ

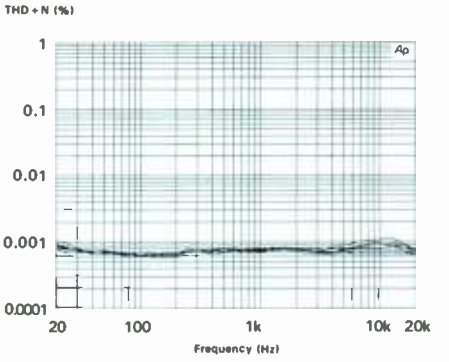


Fig.15: Creation *C101* total harmonic distortion plus noise. Gain=38dB, source level -20dBu, output level +18dBu. Measurements by Trevor Stride of Creation of improved THD+n performance

reducing to +28.55 at 600Ω. The level is maintained much better with decreasing load resistance or increasing capacitance than the *HV-3*. The distortion remains the same over the whole audio range. The output current capacity of the *C101* is very large, and will make it really shine when driving the long lines typical of many outside broadcast or location recording situations. The overload point of the *C101* is actually slightly higher than the *HV-3*, so it should cope with the B&K high voltage microphones just as well —however, an external power supply is required for this.

Gain settings are typically within 0.2dB of nominal with very accurate matching between the two channels. Step size measures 1±0.2dB from 6dB to 69dB, well within specification. The system has zero crossing detectors on each channel, and will not allow the gain to change until the signal is at zero. The effect of this is that gain switching is almost totally silent, even when it is over >10dB. The step size of 1dB is also handy, allowing channel gain to be altered gradually when recording without the listener being aware.

Frequency response at 35dB gain is shown in **Fig.7**, virtually matching that of the *HV-3*. However, both HF and LF responses are comparatively slightly curtailed with the *C101*, being 0.15dB down at 20Hz and 0.05dB down at 20kHz—not a lot. In between things are very smooth indeed.

Fig.14 shows the effect of the optional high-pass filter set to a standard 40Hz. Again channel matching is nearly perfect.

Phase and level difference at all gain conditions are very small, reaching the worst result of 0.11dB error at 20kHz and maximum gain as shown in **Fig.8**. Channel gain difference was typically 0.03dB.

In **Fig.9** (top curve) the input common mode rejection ratio is shown, giving an very credible 10dB at 50Hz, reducing to 65dB and 55dB at 200kHz on Channels 7 and 8 respectively—similar to the *HV-3*.

Equivalent input noise at 65dB gain using a 200Ω source resistance is -128.4dB on both channels. **Table 3** gives RMS noise over 22Hz to 22kHz at the various gain settings.
This performance is almost identical to that of the Millennia *HV-3*.

The lower curve in **Fig.9** is third-octave band noise. The rising characteristic is a result of measurement technique, but comparing the *HV-3* performance, it can be seen that the *C101* has marginally more LF noise. We did choose Channels 7 and 8 for measurement deliberately since they are located closest to the power supplies in the *C101*, thus showing up the worst case results.

Fig.10 shows the interchannel crosstalk performance, which is excellent at better than 90dB over the audio band, though not quite as good at the *HV-3*. However, it is much better than any recording venue will ever be. The left-hand end of the upper curve once again shows up the slightly worse LF noise while matching the *HV-3* at the more audible higher frequencies. Most of this measurement is noise rather than crosstalk.

Total harmonic distortion is shown in **Fig.11**, once again a little higher above 1kHz than the *HV-3*. Since performing the review measurements, Trevor Stride has improved the distortion performance of the *C101*—his new result is shown in **Fig.15**—using his Audio Precision which is performing better than mine at the time of review.

Fig.12 again shows the DIM versus level result—a little higher than the *HV-3* but still credibly good. A final measurement on the *C101* (not performed on the *HV-3*) is in **Fig.13**—SMPTE IMD versus input level. At levels below -14dBu, the result is mainly noise, but it begins to rise a little at higher levels at 35dB gain, while still being low at 0 on the graph which equals +25dBu output.

Since it has a transformer inside, we had a look at square wave performance. The square wave is beautiful at 1k, 10k, and 30k. Just a little gentle rounding of edges is visible up to +27dBu with virtually no ringing.

In absolute specification terms, the *C101* falls a little short of the *HV-3*, except for line driving, which will be a very important issue for many users. However, the *C101* remains an excellent performer—delivering measured results better than any mixer channel preamplifier which we have tested. Its remote gain control and splitting options make it a very interesting system component for many uses—including high end sound reinforcement where the mic amp rack can be placed on stage—virtually eliminating noise pickup on lines.

Subjective performance

Reviewing microphone preamplifiers is in some respects like reviewing hi-fi loudspeakers. Almost invariably they have been designed to overcome perceived shortcomings in the built-in microphone preamps contained within standard mixing desk systems—making them somewhat esoteric products. In this world of opinion rather than measurable fact we enter the realm of human perception mechanisms which are apt to be affected by many things which are little to do with the products at hand. However, it is clear that present measurement techniques do not reveal all that we can hear and sometimes even mask what is really important.

I remember a recent experience of purchasing a CD player for my home hi-fi. A 'real hi-fi' shop opened about nine months before in our local market town where they encouraged purchasers to undertake listening tests when evaluating products. For once we decided to pay the little bit extra and ventured in. Our criteria was simple, we needed one button track selection to aid with track transfer to create dance backing tapes, otherwise we did not care what we bought. So we asked to listen to every machine which had 15 to 20 individual track selection buttons. There were three—a reasonable number to listen to during an hour's listening session. In fact our decision took about 20 minutes listening to a modern jazz track, a very clean semiacoustic rock track, and Vivaldi's *Four Seasons*. We both agreed that the Marantz XXXXX was best. Having bought it, I was in a waiting room some weeks later, picked up a hi-fi mag to read while I waited, and found that the unit we purchased had been rated rather highly by the reviewer. Next day I visited the reference library and found that many other reviewers felt the same. We had purchased the CD product of the year. I have yet to measure the differences between the machines, for unfortunately the shop closed about three weeks later due to insufficient business. But, it startled me as a pragmatic engineer that my wife and I could so successfully match the opinions of the effusive hi-fi reviewer community, and under rather poor and unqualified listening conditions via a loudspeaker and power amplifier that we were not familiar with. Still, my desire is to quantify what we are hearing as well as to introduce a small amount of hopefully well controlled listening evaluation.

But, comparing microphone amplifiers is not such an easy thing as CD players. For one thing, the exact match of source material, etc. is missing, reducing the reliability of listening tests. Even managing to use two different devices to record the same concert has drawbacks, for the microphones need to match and they must be placed in the same sound field, or a microphone splitter must be used—defeating the purpose of a purist microphone amplifier in the first place. Still, added to my own opinion, I can voice that of Gunter Pauler of Pauler Acoustics, at least on behalf of the Millennia unit. Herr Pauler runs a classical recording and transfer business and has been evaluating microphone preamplifiers and A–D convertors for some time, having made a series of recordings which have been transferred to DAT using different ▶

GALAXY

STUDIOS

A recording studio complex

with four live studios with daylight, a 330 m^2 music hall,
for classical music, popmusic, jazzmusic, . . .
for band, group, orchestra, . . .

Equipment

a Neve Capricorn console, Neve 51 desk, Amek Angela,
two Sony 3348 recorders, Genelec 1035, 1024 and
1022A monitoring, Sonic Solutions editing and
mastering system, . . .

GALAXY STUDIOS

Tel: (+32) 14 31 43 43 Fax: (+32) 14 32 12 24
Kievitstraat 42, B-4200 MOL BELGIUM (EU)

techniques. He has sent these out to a number of other recording engineers that he knows to get their opinions. They have come to the conclusion that the Millennia *HV-3* sounds best of the units evaluated. But, they have not yet listened to the Creation preamp, so cannot compare its performance. So, the products in this review remain without the final verdict of a listening comparison.

For our own evaluation, we did not manage to use the Creation preamp in earnest either. Either we were busy, the *C101* was needed elsewhere, or both. However, we did use the *HV-3* on several live recordings using a spaced pair of B&K *4012* microphones. The *4012* is the cardioid version of this famous microphone, the preferred *4003* omni model not being available in the high-voltage version at the time of review. On the first occasion, the recording had to made of a live concert with no opportunity for a trail run or level set. The microphones were placed at a hopeful location and two percussionists asked to beat hell out of a bass drum and pair of cymbals to get a peak level. The gain switch was backed off a step for safety (5dB) and I joined the orchestra for the concert on double-bass while a Tascam *DA-30* did the recording for us. This combination, even without any trial, certainly gave the best recording I have yet achieved with this amateur orchestra. Dynamic peaks were handled with ease, and on the quietest passages there was no background noise apparent due to the preamplifier or microphone—the truly enormous dynamic range of the system providing protection from both clipping and the noise floor.

Several recordings have been made since by my colleague of his church choir, all revealing somewhat unflattering shortcomings in their performances with outstanding clarity. (It is rumoured that one choir member has lost his seat as a result.) On each occasion, in the local church, in Liverpool Cathedral and in another large building the same pattern occurred—rig the microphone in a sensible place where audience complaints will be few, get a loud organ chord to set the level, and join the choir. Again, the *HV-3* and B&K combination did the job without discernable flaw.

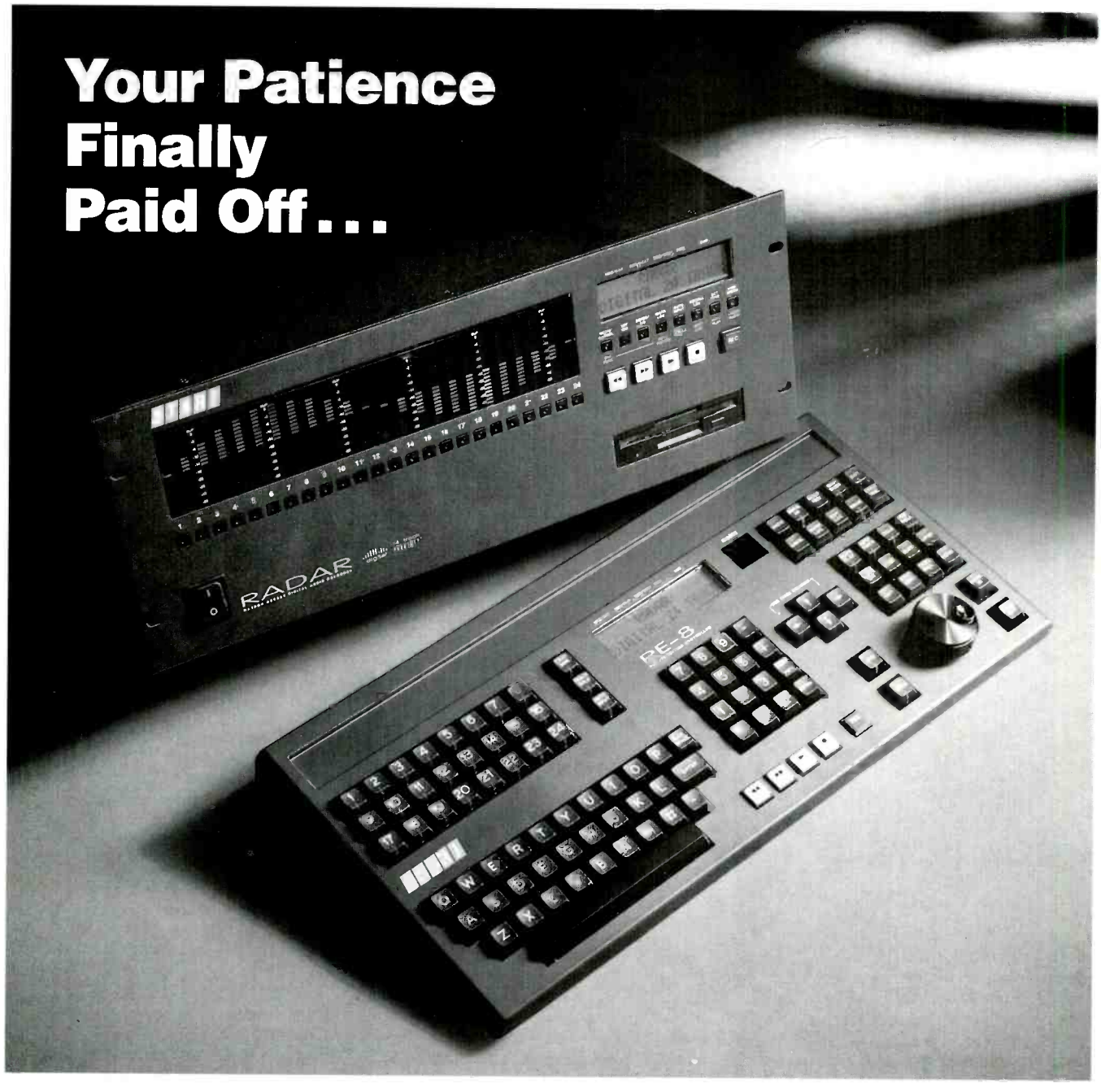
In all of these somewhat imperfect recordings, we found the *HV-3* and *4012* combination to be transparent in the extreme, leaving every flaw of the amateur groups exposed for scrutiny. However, there were also moments of great beauty with astounding naturalism.

Hopefully, for proper recording sessions, there will be more time for microphone placement, level setting and so on, since the recording process is in the plan—unlike the experiences above. But even under ideal conditions the security of such a large dynamic range, excellent quality and so on. will be hard to beat. This sort of simple setup using purist techniques is why the *HV-3* was designed.

Should you require the more elaborate multimicrophone setups, operated at a distance, which the *C101* allows, you are also unlikely to be disappointed. We did run some tests using the unit with low line level input material and could not tell the difference whether it was in circuit or out. But the ultimate test of a real recording was just not possible. ■

Millennia Media, 9624-C Keifer Boulevard, Sacramento, CA 95827, USA. Tel: +1 916 363 1096. Fax: +1 916 362 8241.
UK: Garwood Communications, 8A hassop Road, London NW2 6RX. Tel: +44 181 452 4635. Fax: +44 181 452 6974.

Creation, Unit 3, Mount Farm, Churchill, Oxfordshire OX7 6NP, UK.
Tel: +44 1608 658946.
US: Sonic Image Ltd, 1100 Wheaton Oaks Court, Wheaton, Illinios 60187. Tel: +1 708 653 1919. Fax: +1 708 665 4966.
Japan: Timelord, 2-4-16, 1F Den-En Chofu, Ohta-ku, Tokyo 145. Tel: +81 3 3721 4431. Fax: +81 3 3721 4432.



RADAR – the Digital Revolution in Multitrack

RADAR is a professional, disk based digital audio recorder with major advantages over tape-based systems. You can get random access, cut, copy & paste editing, looping, track slipping, instant-undo, and more. Of course, it will hard lock to all SMPTE frame rates and supports sampling rates from 32 kHz to 48 kHz.

Compact and reliable, this great new digital disk system is as comfortable on the road as it is in your studio. Dependant on your application RADAR can grow along from 8 to 16 to 24 tracks per machine. And the sound? As you would expect from Otari – great!

Yes, your patience has paid off! Call us or your Otari dealer for more information.
Otari – Technology you can trust.

OTARI®

European Headquarters:
OTARI Deutschland GmbH
Rudolf-Diesel-Straße 12
D-40670 Meerbusch
Tel. (Germany) 49 / 21 59-5 08 61
Fax (Germany) 49 / 21 59-17 78

MIDEM

Monday, 30 January – Friday, 3 February 1995 • Palais des Festivals, Cannes, France.

IF YOU'VE GOT IT, SHOW IT AT MIDEM

The Premier International Music Market
In this uncertain world one thing is certain. MIDEM is the industry's greatest one-show for professionals only. Nothing comes close to the prestige and epic scale of MIDEM. Which is why your name on a stand at MIDEM '95 will be like no other statement you can make. But whether you participate at MIDEM as an Exhibitor or Visitor just be sure you get there.

The Ultimate Global Meeting Point
MIDEM is where the key people from all sides of music, the movers and shakers, make the deals that define the industry for the year ahead. And where you get the inside track on vital industry issues.

One Stop For The World
A stand at MIDEM puts your company in the spotlight, it says everything about your image and savoir-faire. And it means you can meet your clients in the seclusion of your own private HQ to optimise your five supercharged days in Cannes.

New Lower Cost Tariff
To make sure the cost of visiting and exhibiting is in reach of smaller companies, we've introduced a new lower cost "individual" tariff for MIDEM'95.

The DTI May Help
If you are a UK company wishing to exhibit at MIDEM'95 you may qualify for a DTI subsidy **providing you book by 30 September 1994.**

A Dazzling Setting
The Côte D'Azur, Cannes. Five glittering days. Great artists. Brilliant concerts. A monster media event. What more needs to be said? Cancel the wedding, postpone the vacation, do whatever you have to but get there.

Call Peter Rhodes now on 0171 528 0086 and he'll give you all the details you need about MIDEM'95, including advertising rates for the Showguide and the MIDEM Daily News. We look forward to hearing from you.

REED MIDEM ORGANISATION LTD – Tel: 0171 528 0086 Fax: 0171 895 0949
METROPOLIS HOUSE, 22 PERCY STREET, LONDON W1P 9FF
A MEMBER OF REED EXHIBITION COMPANIES

CLASSIFIEDS

Please call Steve Grice for or Phil Bourne Rates & Details 44 (0) 71 620 3636

The attention of advertisers is drawn to "The Business Advertisements (Disclosure) Order 1977", which requires that, all advertisements by persons who seek to sell goods in the course of business must make that fact clear.

All job advertisements are bound by the Sex Discrimination Act 1975.

Advertisement copy must be clearly printed in block capitals or typewritten and addressed to: **Steve Grice, Studio Sound, Spotlight Publications Limited, 8th Floor, Ludgate House, 245 Blackfriars Road, London SE1 9UR.**

RENTAL

SERVICES

FOR SALE. 2 original AKG C 12 microphones in best condition incl power supply not under $10.000 – best offer desired. STUDER Mk II 24 track, 3.500 hour, very good condition. £7.500. Send a fax to Austria, 0316/381461.

CD AND CASSETTE DUPLICATION. Also Digital and Analogue Editing and Mastering. Mail order is our speciality. **Tam Studio,** Odense. Phone (010)45 6615 0430 or Fax (010)45 6615 0887.

WANTED: Klark Teknik 360 equalizers, Genelec 1037A Active monitors, used or ex demo products required. Please call +46-42-136060 or fax +46-42-187497.

Buying and Selling quality professional equipment throughout Europe

nick ryan ☎ +44 (0)892 861099 Fax: +44 (0)892 863485

Sounds incorporated

AUDIO TOYSHOP

PHONE
+44 (0) 272 467711

FAX
+44 (0) 272 730505

Used Equipment List

CONSOLES:
Neve VR 60 3 available! 2 with flying faders, 1 with GML, all fully loaded ..... £ call
Neve V1 48/48, no automation, sub mixer, excellent condition £55,000
Neve 8108 56 channels, in line, bar graphs £50,000
Neve 8068/8078 rebuilt, 4 band 1066 eq, 32 buss, can only appreciate in value ..... £ call
SSL Stereo modules £1,600
SSL Prog eq/pan SL683E £3,250
Amek G 2520 40 frame 36 fitted, Mastermix, sounds wonderful £25,000
DDA AMR 24 28 channels, Optimix automation. Bargain £16,000
Calrec UA 8000 48 channels, automation, dynamics ..... £ call
Midas 36/8/2 TR console, completely furnished, 3 psu, 8x8 matrix sounds wicked £4,500

TAPE MACHINES:
DAR Soundstation 2 8 channel ..... £ call
AMS Audiophile MB recent, excellent ..... £ call
AMS Audiophile head ideal for sharing 2 rooms with 1 Audiophile £1,500
Mitsubishi X 850 Remloc, meter bridge, little use. Bargain £16,000
Otari MTR 90 Mk2 low hours, with overbridge £11,500
Otari MTR 90 spares, loads ..... £call
Studer A 800 Mk 3 very low hours ..... £ call
Studer A 80 Mk2 good runner £4,950
Fostex D-20 timecode DAT £2,750
Otari MTR 12 ½" + ¼" £2,750
Studer A80 ¼" £575
Studer A80 ¼" CTC, meter bridge £950
Dolby SP 24A 24 channels, Dolbey A £1,250
Dolby 361 A £225

OUTBOARD:
NeveAmek 9098 in stock, on demo and sounding wonderful ..... £ call
Neve 33135 Vintage Eq's pair, racked £875
Neve 3314A compressers pair, racked ..... £call
Neve 33608 psudeo stereo £150
Neve spares psu, modules etc, loads ..... £call
Fairchild 602 fast limiter, pair £1,750
Audio & Design Vocal Stresser £750
Urei LA 4 one only £350
Urei 546 parametric eq £425
Drawmmer DL 221 compressor 275
DBX 162 stereo version of 160 ..... £550
DBX 164 quantity available £330
BSS DPR 502 dual MIDI gate £350
Orban de-essers 2 available £250
Valley Keepex 2 10 in rack £1,500
Valley Gatex quad gate £275
Klark Teknik DN 510 dual MIDI gate £425
Klark Teknik DN 300 30 band £350
Klark Teknik DN 322 ..... £350
BBE 822 sonic maximiser £275
Rebis gates & compressors ..... £ call

FX:
Lexicon 224 white remote £1,250
Lexicon PCM 70 immaculate £1,200
AMS RMX 16 several available V 3.0 ..... £1,600
AMS RMX 16R several, reverb & delay £1,750
AMS RMX 16 remote £250
AMS DMX 15 80S several, various spec £1,300
Klark Teknik DN 780 reverb, excellent £895
Ursa Major 8x32 reverb with remote £750
Roland R 880 reverb & remote £975
Roland SRV 2000 reverb £275
Yamaha REV 1 with remote £1,350
Yamaha REV 5 excellent £550
Bel BD 16S stereo delay £350
Audicon plate as EMT 140, American £175
Aphex Type B anal exciter £120

MICROPHONES;
Neumann U 47 VF14 valve ..... £call
Neumann U 48 VF14 valve £2,600
Neumann SM 2 stereo valve, serviced £1,500
Neumann SM 69 Fet, stereo, MINT £950
Neumann TLM 170 MINY, with shocks £875
EAR The Tube rare, stunning ..... £ call
EAR Mic pre's ..... £ call
AKG C 414 ULS boxed, MINT £550
AKG C 451/CK 1 black, MINT, 1 left £175
AK8 CK 61 ULS boxed, MINT £100
AKG CK 1 3 available £75
Milab LC 25 3 available £375
Beyer M 201C £120
Shure SM 87 ..... £150

MONITORING:
Quested H 210 3 years old £1,850
Quested 412 mega, powered, 4 way ..... £call
Rogers/BBC LS 5/8 active, amps £1,500
Westlake BBSM 12's ..... £call
Quad 521 BBC Spec £450
Quad 405 ..... £175

VARIOUS:
Sony DAE 1100, 1610 complete system £13,000
Sony BVH 1100 1" C format video £1,750
Fostex 4010 timecode generator £375
Fostex 4030 synchronizer £325
Audio Kinetics Pacer & Pad £750
Function Junction MIDI matrix £350
Bantam and GPO patch bays ..... £cheap
EMT 950 broadcast turntables £450
Elvis impersonations ..... £ cheap
Traffic Wardens eliminated ..... £ unlikely

WE P/X, BUY, SELL AND BROKER ALL STUDIO EQUIPMENT AND COMPLETE STUDIOS THROUGHOUT THE WORLD. SPECIALISING IN ESOTERIC AND TUBE EQUIPMENT – CALL US WITH YOUR REQUIREMENTS.

OTHER SERVICES: Studio design, installation and servicing. Custom modifications, racks for Neve eq's, compressors and mic amps; phone for client list and details. New equipment supplied, please phone for a competitive quote on any new equipment, packages tailored to your requirements.

TONY LARKING

PROFESSIONAL SALES LIMITED

WORLDWIDE DELIVERY

ENGLAND'S LARGEST STOCKIST OF

NEW & USED

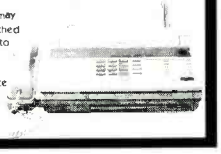
PRO-AUDIO EQUIPMENT

CALL NOW! TEL: 0462 490600 FAX: 0462 490700

DIAL A FAX

FOR A COMPLETE UP TO DATE EQUIPMENT LIST ON YOUR FAX

Dial 0336 413 733 on your fax machine & press start when instructed. Some machines may need to be switched to polling mode to use this service. Calls @ 39p per minute cheap rate and 49p per minute all other times.



USED GEAR WANTED

CONSOLES . 16 TRACK . 24 TRACK . ADAT . OUTBOARD
MONITORS . STUDIO MICROPHONES . PRO VIDEO

Why continue on with your old equipment when Tony Larking Professional Sales can give you a cracking good part exchange deal or purchase your unwanted equipment for cash?

PLUS: FINANCE AVAILABLE - USE YOUR EXISTING EQUIPMENT AS A DEPOSIT!

SITS VAC

TECHNICAL SALES

c.£25K + Car + Benefits

WADSWORTH

"The New Force In Audio and Broadcast"

Wadsworth have long been recognised as one of the country's leading distributors of cables, connectors and other electro-mechanical products.

We have recently launched a new catalogue closely focused on the professional audio and broadcast markets and are looking to support sales activities by the recruitment of an additional salesperson.

The successful candidate will already have established contacts within the industry, be able to demonstrate a successful sales track record and have a genuine desire to succeed in this competitive market.

Wadsworth enjoy an excellent reputation for their pro-active approach to their employees, which includes first class training, full field support and genuine career development opportunities.

In the first instance please send your CV in confidence to our retained consultant Ian Hunter at Rapid Resourcing, PO Box 7005, Basingstoke RG27 9YY.

FOR SALE

FOR SALE

1 AMS Audiofile M&+ harddisk audio recorder/editor

16 output machine (8 out fitted)

software version 11.04
with a harddisk capacity of
8 hours

20,000 pounds sterling.

Contact only by fax:
+(32) 2 374 63 36

REAL RECORDINGS

THE CASSETTE DUPLICATING SPECIALISTS
Real time & high speed loop bin duplication, printing & packaging. Blanks wound to length
TEL: 061-973 1884

GIGANTIC STUDIO EQUIPMENT SALE
NEVE, TELEFUNKEN, AKG, NEUMANN, ETC
during the
AES in SAN FRANCISCO
NOV. 10-13 at COAST RECORDERS
1340 Mission (Bet. 9th and 10th)
SAN FRANCISCO
Fax: (415) 252 7524 Tel: (415) 252 7102

FAIRLIGHT SERIES THREES
Sold, repaired, serviced, hired. Stock constantly changing, please phone or fax for list.
Tel: +44 (0)71-700-1852. Fax: +44 (0)71-607-1410
23a Benwell Road, London N7 7BL
HORIZONTAL PRODUCTIONS

NEW TAPE HEADS supplied for most makes, tape head re-lapping/re-profiling. Same day turn round. Head Technology, 11 Brittania Way, Stanwell, Staines, Middx. Tel: 0784 256046.

CRYSTAL | WHY PAY MORE FOR DATS?
ALL DATS ARE NOT THE SAME - SOME COST TWICE AS MUCH!

DAT STORAGE RACK-£3.50+VAT!
* HOLDS 10 DATS * LOCKS TOGETHER *FREE STANDING OR WALL MOUNTED*

COMPACT 1U PATCHBAYS
ONLY 35.99+VAT!
32 WAY JACK/JACK
24 WAY JACK / 8 WAY MIDI
EASILY REVERSIBLE NORMALISING

DATR30 - FROM £2.50+VAT!
DATR46 - FROM £2.69+VAT!
DATR61 - FROM £2.90+VAT!
DATR92 - FROM £3.39+VAT!
DATR122 - FROM £3.81+VAT!

TEL/FAX 0223 208937 | CREDIT CARDS ACCEPTED

NORTH ROAD WENDY ROYSTON HERTS SG8 0AB

SERVICE ENGINEER

Expansion of Amek's Product Range has created vacancies for suitably experienced engineers. The duties will include commissioning on site of Amek, TAC and Langley products in the UK and overseas.

Service engineers also provide technical support on all the company's products by telephone and assist with customer training.

Opportunities may exist for extended overseas work from our Far East and North American support centres.

Applicants should have experience of professional audio systems and appropriate personal skills are required as well as technical ability.

Write to Peter Harrison at Amek's headquarters in Salford including all information you consider relevant. Please give a telephone number (indicate day or evening) on which you can be contacted.

Amek Systems & Controls Ltd
New Islington Mill,
Regent Trading Estate,
Oldfield Road, Salford, M5 4SX

Barry Fox

Potential demands on conventional CD architecture are straining the format to breaking point—the future CD standard emerges

In 1988, with nice foresight, Nimbus predicted the need for a new high-density CD format. This not for music, however, but for the storage of picture information. Since that announcement, just about every company with more than a passing interest in CD has developed some technique or other for increasing the storage density of a CD.

Top marks for cheek must go to ODC of California for 'announcing' a new HDCD standard and even giving it a name—the *Blue Book*, to go with the *Red*, *Yellow*, *Green*, *Orange* and *White Books* used by Philips.

Nimbus were right, six years ago, when they said that there was no pressing need for an HD music disc. Most people are perfectly happy with the sound quality they get from CD, and are using hi-fi equipment which nowhere near exploits the full potential of the CDs they buy. For those who want more, or who can be persuaded that they want more, there are already several proposals (from Michael Gerzon and Peter Craven in the UK, Philips in Holland and Pioneer in Japan) for burying up to 500 kilobits/second of extra information in the audio data stream. This can be used to expand the bandwidth or dynamic range, provide remix options, add multichannel surround sound, or display still pictures or low-quality video. Ordinary players ignore the buried data.

Bit burying will doubtless work and find specialist uses. But loosely targeted talk of extra options that need new players and decoders risks confusing the casual customer. CD has been a success because it is a simple proposition for an idle public.

HDCD for video could be another simple proposition. It offers to accommodate a full-length feature movie on a single-sided, 5-inch disc, with broadcast or laser-disc-quality pictures. The problem here is that Mark I *White Book* Video CDs which can handle an hour or so of VHS quality video, are already on sale. Talk of Mk II HDCD in late 1995 risks killing Mk I sales stone dead. But there is now irresistible pressure on Philips, official gatekeeper of the CD standards, to write a new Book for HDCD. So here are a few of the technical tricks they are likely to use.

The storage capacity of today's CDs was carefully chosen 15 years ago, to match the solid-state laser technology then available at affordable prices. The standards specify a laser diode which emits an infrared light-beam with a wavelength of 780 nanometres. A lens focuses this beam into a spot which reads a spiral track of pits, each with a minimum length of 0.83 micrometers. The spiral has a fixed pitch of 1.6 micrometers. The disc spins at a speed which continually varies as the laser moves along the spiral track, from the centre of the disc to the outer edge. This keeps the linear speed at which the laser reads the pits constant at a minimum of 1.2m/s, and usable data is transferred at 1.4Mbits/s. If the pits are made smaller, to increase density, the whole delicate balance is upset. The laser must focus more tightly, into a smaller spot, or it will read several pits at the same time.

Two factors allow tighter focusing of the laser beam into a smaller spot. The wavelength of the laser light must be made shorter. This shifts the colour from infrared (normal CD player wavelength of 780mm), though visible red (670nm) and towards blue (425nm). The lens which focuses the laser beam must have a larger Numerical Aperture. NA is a measure of the len's ability to gather light over a wide area and focus it accurately. But there is a trade-off. As NA increases, and the beam spot is made smaller, so the depth of field of focus becomes smaller. The existing CD standards specify an NA of 0.45, as the best compromise between a small spot and focus problems—as with slightly warped discs.

To quadruple capacity of a disc, the pitch of the tracks is reduced to half the CD standard (0.8 microns instead of 1.6 micrometers) and the disc-tracking speed halved (from 1.2m/s to 0.6m/s) by halving the rotational speed. This makes the digital pits a quarter their normal size. Mastering plants can cut 4x discs, because they already use blue gas lasers. But existing players cannot read them.

To capture picture quality which matches broadcast television of 12-inch Laser Disc disc, requires MPEG-2 coding with a data rate of at least 6Mbits/s, so the smaller pits must be read faster. If the recording is to run for 135 minutes, enough for virtually all feature films, the CD must have at least 7x density. A disc of this density can only be read with a blue laser, because only blue light has a wavelength short enough to focus into the small spot needed. Solid-state blue lasers will not be ready for use in home players for at least five years.

Nimbus in the UK, JVC in Japan and Philips in the Netherlands, have worked on an alternative approach which will be used for HDCD. The digital bit-rate is continually varied to meet the needs of the pictures on screen. The MPEG-2 standard allows for this.

Where the images on screen are mainly stationary, a data rate of only around 1 Mbit/s is sufficient to capture crisp detail. But when objects move, up to 8Mbit/s are needed, for instance to capture skin and hair textures.

HDCD will use only the bits needed, continually varying the bit rate as the picture content changes. This lowers the average bit rate to 3Mb/s or 4Mb/s. So a 4x disc is able to store a full-length movie with picture quality equivalent to a 7x or 8x disc which can only be replayed with a blue laser. But even a 4x density disc is right on the borderline of what can be achieved without a blue laser. So HDCD will be designed for a playing time of 105 minutes, which is long enough for most feature movies. The laser in the player will emit red light, with a wavelength of 635nm, instead of infrared at 780nm. The lens that focuses its beam will have an NA of around 0.55. The motor in the player will continually vary the speed at which it spins the disc, to vary the bit rate. The speed range is so wide, a factor of at least eight, that HDCD players will need a completely new kind of motor.

The new HDCD will also make more efficient use of the pits on the disc, by using less powerful error correction. Pressing plants are now much more skilled at making discs than 15 years ago. So there should now be less errors to correct. ■

ILLUSTRATION: CARL FLINT

Dual Domain Audio Testing

It's About Time

AUDIO PRECISION...We're in the studios, stations and networks and on the factory floor. You've seen Audio Precision at the trade shows and in the magazines and technical reviews...so now you're about to select your audio test and measurement equipment.

***It's about time* to look at the System One and Portable One from Audio Precision.**

SYSTEM ONE is the industry standard. Over three thousand benches, factories, studios and stations around the world rely on System One for the final word in audio measurement:

- ☐ Complete analog and digital domain testing
- ☐ State-of-the-art performance and speed
- ☐ Now available with *FAST*TRIG, for subsecond audio channel testing
- ☐ Graphic results on PC screen; copies to printers and plotters
- ☐ GO/NO-GO testing against limits; automated procedures
- ☐ 2 to 192 channels

PORTABLE ONE *PLUS* has established itself as the compact, affordable leader in audio test sets.

- ☐ 12 different measurement functions
- ☐ Sweeps, graphs and printer port
- ☐ New GPIB control interface option
- ☐ Robust polycarbonate case
- ☐ Full stereo capability

System One and Portable One...two test sets each with the quality and performance that you have come to expect from Audio Precision.

We'd like to take some time to talk with you. We'll be happy to discuss your application and arrange for an onsite demonstration.

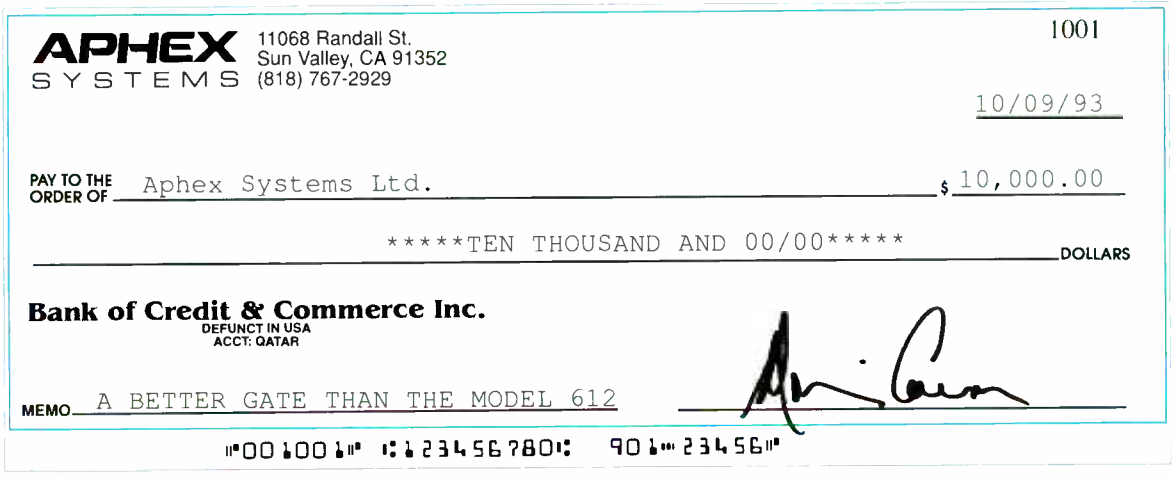
Audio Precision...The recognized standard in Audio Testing

Audio precision

P.O. Box 2209
Beaverton, OR 97075-3070
503/627-0832, 800/231-7350
FAX: 503/641-8906

INTERNATIONAL DISTRIBUTORS: **Australia:** IRT Electronics Pty. Ltd., Tel: 2 439 3744 **Austria:** ELSINCO GmbH, Tel: (1) 815 04 00 **Belgium:** Trans European Music NV, Tel: 2 466 5010 **Brazil:** INTERWAVE LTDA., Tel: (21) 325-9221 **Bulgaria:** ELSINCO, b.e. Strelbishte, Tel: (2) 58 61 31 **Canada:** GERRAUDIO Distribution, Tel: (416) 696-2779 **China, Hong Kong:** A.C.E.(Int'l) Co. Ltd., Tel: 424-0387 **Croatia:** AVC Audio Video Consulting, Tel: (41) 624 622 **Czech Republic:** ELSINCO Praha spol. s r.o. Tel: (2) 49 66 89 **Denmark:** npn Elektronik aps, Tel: 86 57 15 11 **Finland:** Genelec OY, Tel: 77 13311 **France:** ETS Mesureur, Tel: (1) 45 83 66 41 **Germany:** RTW GmbH, Tel: 221 70913-0 **Greece:** KEM Electronics Ltd., Tel: 01-6478514/5 **Hungary:** ELSINCO KFT, Tel: (1) 269 18 50 **India:** HINDITRON Services PVT, Tel: 22 836-4560 **Israel:** Dan-El Technologies, Ltd., Tel: 3-6478770 **Italy:** Link Engineering s.r.l., Tel: 0521/648723 **Japan:** TOYO Corporation, Tel: 3 (5688) 6800 **Korea:** B&P International Co., Ltd., Tel: 2546-1457; B&P (Kumi Office), Tel: 0546 53-7347/8 **Malaysia:** Test Measurement & Engineering Sdn. Bhd., Tel: 3 734 1017 **Netherlands:** Heynen b.v., Tel: 08851-96300 **New Zealand:** Audio & Video Wholesalers, Tel: 7 847-3414 **Norway:** Lydconsult, Tel: (47) 66-988333 **Polanc:** ELSINCO Polska sp. z o.o. Tel: (22) 39 69 79 **Portugal:** Acutron Electroacustica LDA, Tel: 1 9414087 / 9420662 **Singapore:** TME Systems Pte Ltd., Tel: 747-7234 **Slovakia:** ELSINCO Bratislava spol. s r.o., Tel: (7) 784 165 **South Africa:** SOUNDFUSION Broadcast, Tel: 11 477-1315 **Spain:** Telco Electronics, S. A., Tel: 1 531-7101 **Sweden:** Tal & Ton Elektronik AB, Tel: 31 80 36 20 **Switzerland:** Dr. W.A. Gunther AG, Tel: 1 910 41 41 **Taiwan:** R.O.C.: Cha Wei Electric Trading Co., Tel: 2-5612211 **Thailand:** Massworld Company Ltd., Tel: 662-294-4930 **United Kingdom:** Thurlby Thandar Instruments, Ltd., Tel: (0480) 412451

Better Gate Finally Found, Aphex Forced to Pay $10K!


APHEX SYSTEMS
11068 Randall St.
Sun Valley, CA 91352
(818) 767-2929

1001

10/09/93

PAY TO THE ORDER OF Aphex Systems Ltd. $ 10,000.00

*****TEN THOUSAND AND 00/00***** DOLLARS

Bank of Credit & Commerce Inc.
DEFUNCT IN USA
ACCT: QATAR

MEMO A BETTER GATE THAN THE MODEL 612

⑈001001⑈ ⑆123456780⑆ 90⑈234561⑈

In 1987 Aphex offered to pay $2,500 to anyone who could find a better gate than their Model 612. When no challengers appeared, Aphex upped the offer to $10,000! Still, no one met the challenge! The Aphex Model 612 Expander/Gate became the industry reference standard in studios and in sound reinforcement around the world. Until now.

Introducing the all new **Model 622 *Logic Assisted Expander/Gate***™.

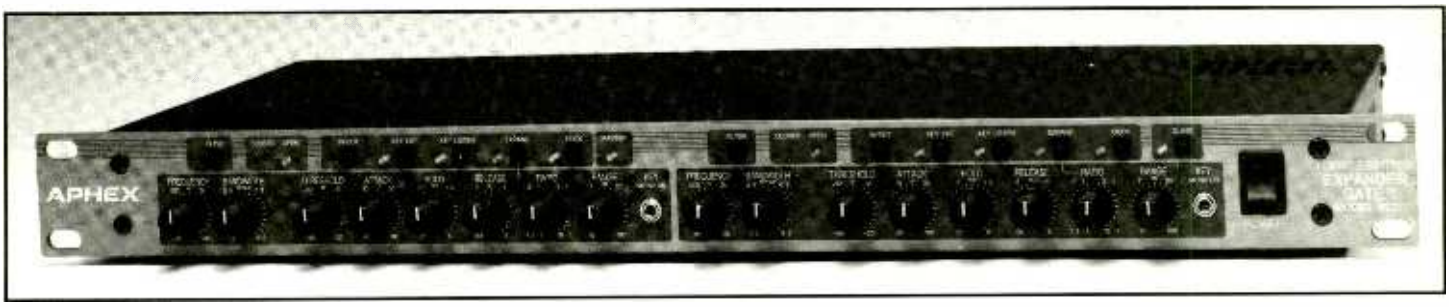
The Logic Assisted Gate circuitry of the Model 622 assures positive, accurate and reliable triggering, patents pending.

The ultra pure audio path features the exclusive Aphex VCA 1001 offering unmatched speed without clicks. Combined with enhanced servo-balanced I/O, the Model 622 boasts a dynamic range in excess of 20-bit digital!

Other special features include:

- Key input monitor via front panel headphone jacks
- 24dB/octave parametric Key input filters
- Dedicated Expander mode
- Relay bypass with remote control
- Switchable ducking mode
- 5-Year Limited Warranty
- Made in the U.S.A.

Listen to the Model 622 Logic Assisted Expander/Gate at your Aphex dealer today. You will agree it was worth every dollar Aphex had to pay ... itself.



APHEX SYSTEMS ***Improving the way the world sounds***SM

11068 Randall Street, Sun Valley, CA 91352 U.S.A ▮ (818) 767-2929
100% owned, engineered and manufactured in the U.S.A.