February 1992 $5.00 £2.00

STUDIO SOUND

AND BROADCAST ENGINEERING

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BEHIND EVERY VIRTUOSO, THERE'S YEARS OF PRACTICE.

Virtuosity takes practice. And almost two decades of practice have gone into producing the definitive front-of-house console: Soundcraft's EUROPA. The best circuit designs, like our patented padless mic amp—imitated but never bettered. Balanced sends, returns, inserts; fully-parametric EQ and a noise gate on every module. The list goes on.

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EUROPA. Between us, we've designed the best.

Europa

Soundcraft

Soundcraft Electronics Ltd., Cranborne House, Cranborne Rd.
Cranborne Industrial Estate, Potters Bar, Hertfordshire EN6 3JN
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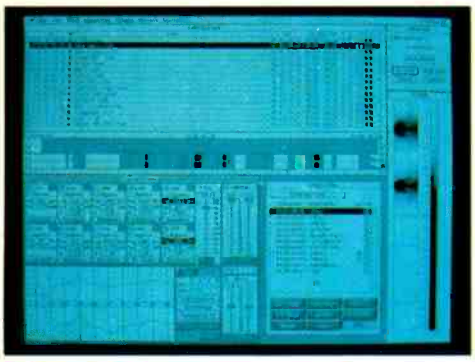
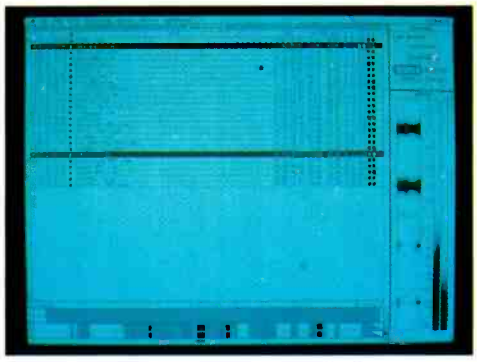
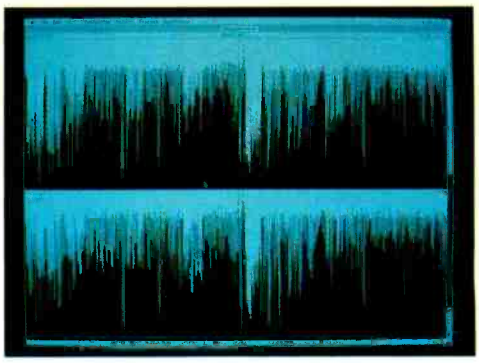
AND BROADCAST ENGINEERING

Recording in the Netherlands — See page 39







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STUDIO SOUND
AND BROADCAST ENGINEERING

February 1992
Volume 34 Number 2
ISSN 0144 5944

EDITORIAL & ADVERTISING 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.

AMERICAN OFFICE
Publishing Services Manager: Fred Vega
Studio Sound, 2 Park Avenue, 18th Floor, New York, NY 10016, USA. Tel: (212) 779-1212. Fax: (212) 213-3484.

JAPAN & FAR EAST AGENT
Contact: Mikio Tsuchiya, Media Sales Japan, Inc, Tamuracho Bldg 3 3 14, Shimbashi, Minato-Ku, Tokyo, Japan. Tel: (03) 504-1925. Telex: J25666. Fax: (03) 595-1709.

Origination by Ashford Scanning Studio Ltd, The Print Centre, 70-72 John Wilson Business Park, Thanet Way, Chestfield, Kent CT5 3QT, UK. Printed in England by Riverside Press, St Ives plc, 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 on the third Friday of the month preceding the cover date. The magazine is available on a rigidly controlled requested basis, only to qualified personnel (see classified advertisement for terms)

ABC

Total average net circulation of 19,166 per issue during 1991.
UK: 6,655. Overseas: 12,511.
(ABC audited)

un A United Newspapers publication

A word to the wise

For years I have been using this page to promote my concerns and point of view about the industry we are in. The guiding thought behind almost all of these pieces, and indeed the complete magazine, has been the idea that we are all after that 'good sound' and that high quality is what we aim for, tempered by the dictates of the real world and the record producer. The 'good enough for . . . ' approach has never been something that we have encouraged and it is surely not a good attitude for a member of any service industry.

Excuse the high moral tone, but I would like to just fire an early warning. The professional industry has recently completed the hijack of the DAT format from the consumer business. The current generation or professional DAT machines with timecode has shown that despite some reservations the format is capable of fulfilling a professional function and the mass market consumer electronics companies have withdrawn from active promotion. We were lucky that RDAT had been over engineered for its intended consumer application and conveniently fitted the recording industry's need for low cost, high performing products.

This year we are going to see two new consumer digital products — DCC and Mini Disc — appear. As for their design and concept, both have much to recommend them but unlike DAT the technical specification for them does not suggest their use in pro situations other than for the occasional sound effect. DCC should have definite advantages over the analogue compact cassette. Mini Disc is, of course, a recording format but the record companies are already beginning to talk about prerecorded discs and this will bring the obvious confusion among consumers in relation to the compact disc.

The compact disc has driven the studio market very hard in a positive way but what effect a technically inferior consumer format would have is difficult to judge. It surely will not be beneficial. The heart of these new systems, and indeed the only reason that they will work, is data compression. This process has much to offer particularly in broadcasting where it allows quality of transmission and multiple channels that would otherwise not be possible showing considerable advantages over the existing media. For hard disk editing/recording stations, data compression presents a method to increase the disk capacity several fold. For systems such as radio station automation, off-line (non-linear) video editing and all applications where the audio is transitory, it presents a thoroughly valid application. However, where audio quality is a concern, and a long term storage format is in use, it would seem best to avoid data compression. It is, of course, tempting when you consider that the storage capacity of your hard disk could be multiplied by at least four times.

While data compression systems are becoming very good, and often almost inaudible, they do not present the answer for music storage within the studio environment. At present, further processing of a data compressed signal is difficult. Within the studio, and for high quality applications, the answer appears to be that you should be very careful. Think of what may be lost if there is no way to go back beyond a data compressed master for remastering and release in some superior future format just because it is convenient now.

Farewell

On a quite different note, this is the last issue of *Studio Sound* that I am responsible for. I have occupied this seat for the last eight years and will be moving on to follow other interests within the industry. I am grateful for your support over the years and for making the occupation of this chair such a stimulating experience.

Many thanks to everyone. ■

Keith Spencer-Allen

Cover: Audio-Technica 4033 microphone **Photography: Nik Milner**

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Logic 2 is the latest breakthrough in audio technology from AMS.

It's the all digital mixing console the professional audio industry has been waiting for.

And it's available at a price never thought possible.

The Logic 2 uses leading edge transputer based technology, has an internal dynamic range of 1500dB and can control up to 256 fully equipped dynamically automated signal paths. However it incorporates a control surface which resembles a traditional analogue console and is both familiar and logical to the operator.

The audio quality, control and flexibility of the fully automated desk will give an immediate competitive edge to any studio, whether it's involved in music recording and mixing, post-production, broadcasting or sound for film.

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Bedroom to Strongroom

As an ongoing expansion scheme Strongroom studios in East London has just added three KFA-built programming suites to the top floor of its premises. This comes just six months after KFAs rebuild of Studio One, that now offers a Neve VR console in psychedelic surroundings designed by artist Jamie Reid.

To build three programming rooms in the middle of a deep recession may seem like folly. However studio owner Richard Boote has realised a plan he has been hatching for several years — to lease each facility to one client on a long term basis.

Boote: 'All the people who'd put a programming room in their bedroom who had become more successful, wanted to go out to work again. There was more of a demand for programming rooms again and we hadn't got one because we'd rented it to Beatmasters.'

He started to promote his idea of offering programming rooms together with facilities such as maintenance, reception, telephone and fax. Rhythm Kings production team The Beatmasters were an obvious client, as was Warner music producer John Coxon, who was installed in a makeshift office on the empty top floor with his programming equipment. Once Boote had convinced them, building went ahead.

The Strongroom in East London, attracting people out of their bedrooms

The programming suites are KFA's The Box systems, prefabricated modules built from 600mm wide panels. Due to the building's low floor-loading levels KFA used less sand between wall and floor panels than usual but still achieved 40dB mid-band isolation between the rooms, which are roughly two feet apart.

KFA MD Mick Fitzgerald, who has sold around 100 of the units to date, says that the extra lightweight systems cost Strongroom only £50,000 in total, two and a half times less than some of the heavyweight units he has built for broadcasters.

Each room measures 4.8m by 3m and 2.3m high with a 1.8 m^2 overdub booth and took five days to erect on-site. They all have individual air conditioning and natural daylight.

Three more programming suites are planned in adjoining buildings and Boote is already talking to two prospective long-term clients. He also wants to add a low-budget track laying facility. 'That's really what Studio One was when we first built it,' he says, 'but we currently haven't got a facility to attract new bands that can only afford £400 a day to put live stuff down.' **Caroline Moss**

Companies get ready for DCC

London-based Chop 'Em Out CD mastering and editing company is vying to become the first independent facility in Europe to offer a complete mastering and preparation service for Philip's new format DCC (Digital Compact Cassette).

A range of purpose-designed DCC mastering equipment will allow the company to accept music material in any format and to produce a fully-verified DCC master, encoded with PASC digital audio and ITTS (Interactive Text Transmission System) information.

ITTS text encoding has been confirmed within the format's 'yellow book' standard, so all commercial tapes will have sub-codes featuring data like the title of the album, the name of the artist, a catalogue number and basic track information.

Chop 'Em Out Director, Avi Landenberg, 'The advent of DCC is demanding a new approach, both from the labels themselves and the mastering community as a whole. We are witnessing the birth of a new breed of engineer able to combine creative publishing skills with substantial mastering expertise.'

● Meanwhile at the Consumer Electronics Show in Las Vegas BASF were demonstrating the first of its blank Digital Compact Cassettes. Vice President of sales and Marketing Daniel Malcorps was however realistic about their main cassette market, 'Analogue cassettes are still the dominant factor in the US media market, with projected sales in 1992 of 1.14 billion units, including 390 million blank and 750 million prerecorded cassettes.'

Soundcraft at the Bar

Soundcraft Electronics have moved their whole operation to Potters Bar, Hertfordshire.

The new premises offers more than double the space available at 80,000 ft^2 and will house all R&D, production, sales, marketing and admin.

With the expanded automated production line Soundcraft claim that they can now build more than 600 consoles per week.

Soundcraft Electronics, Cranborne House, Cranborne Industrial Estate, Cranborne Road, Potters Bar, Herts. EN6 3JN. Tel: 0707 660482.

Correction

In our December issue we inadvertently moved WaveFrame to New York. They're still at 2511 55th Str, Boulder, CO 80301, USA..

Low cost CD-R revolution

Marantz CDR-1 distributed exclusively by HHB Communications in the UK

Something over four years ago a collaboration between Yamaha and Philips produced the *YPDS-201* CDR (CD Recordable) system, subsequently most effectively marketed under the Gotham Audio banner. With a UK price of around £20,000 (approx $36,000) it was, for the first time, possible to manufacture one-off CDs at an almost reasonable cost.

With the launch of **Yamaha's** *YPDR-601*, available in quantity since early Summer last year, the CDR became a more affordable reality. Though well received, at a UK price of £12,000 (approx $21,600) and with blanks costing £19 (approx $34.20) it was still a little too expensive to win widespread acceptance from a recession-hit industry. Only a few units have been sold in the UK, among such buyers can be numbered BBC Radio, Melody Radio and Triple Six Productions. The UK price has now been dropped to £8,000 (approx $14,400).

Now, from **Philips,** the originators of the compact disc format, comes a new CD making machine offering what seems to be full Red Book CDs (the book of rules written by Philips laying down the standards for CD manufacture) at greatly reduced prices. I say prices, plural, because the basic Philips unit is to be available, with some variations, badged by a number of well-known manufacturers with prices ranging from £2,995 (approx $5,391) to £4,495 (approx $8,091). 63 minute blanks are to be under £20 (approx $36) a piece. Before getting into the variations, a quick look at the basic machine.

It's a 3U high unit with detachable rackmount ears. Operationally as simple as a DAT machine, no major new techniques are required to make the jump to CD manufacturer. Connections include electronically balanced analogue inputs and outputs and the two domestic digital interfaces — SP-DIF and optical. AES/EBU is, or will be, offered as an option on most models. With one exception (where it is switchable), SCMS (Serial Copy Management System) encoding that prevents more than first generation digital copies being made, will not be implemented because the device is considered essentially as a professional product.

When copying from another CD, track ID information is carried over; ideal for creating compilations. Automatic track registration, for example from DAT or other hard disk systems, is available or in the pipeline for most models.

There are two stages in recording the fully blown CD. The initial recordings adhere to what is called the Orange Book format — basically the CDR's version of the Red Book. Once the content of your disc is finalised it is 'fixed' and becomes a veritable Red Book CD, replayable on any standard CD player. Once a disc is fixed, no further recordings can take place — and note that it is not possible to fix just part of a disc. Before fixing, the bad news is that recordings can only be replayed on compatible CDR machines. The good news is that, before fixing, you can repeatedly go back and record new data on the unused portion of your disc — remember this is a Write Once medium; you cannot record over existing recordings as with tape.

The least costly model (£2,995-$5,391) is that coming from French company **Micromega,** distributed and badged in the UK by Audio Design. Audio Design have been distributing the £20,000 (approx $36,000) Gotham Audio units (based on the Yamaha YPDR-201) models for some time, and so claim special knowledge and expertise in the field.

In the same price bracket, domestic consumer product manufacturer, **Mission** are producing their own version, and calling it semi-professional so as not to alienate their faithful. They will be attaching a UK price tag of £3,000 (approx $5,400) for a machine with the full basic spec.

A little further up the price ladder is the **Marantz** *CDR-1*, available in the UK through HHB Communications and costing £3,495 (approx $6,291), London-based HHB need little introduction as one of Europe's leading pro-audio distributors with a great deal of experience in digital audio and offering very substantial back-up. The fact that Philips own Marantz won't necessarily mean that they get better support, but presumably channels of liaison are well established. The *CDR-1* features transformer-balanced XLR, unbalanced phono analogue inputs and outputs as well as the standard digital connections as mentioned. A series of 'Smart Boxes' are currently being developed by HHB to allow interfacing with other digital formats for automatic registration of start IDs. The first of these will be for DAT, available early Spring. No price has yet been established.

More upmarket is the **Studer**-badged *D740* at £4,495 (approx $8,091) which offers a number of extras including an AES/EBU in/out, auto-ID registration from a DAT master using the Studer *D780* DAT machine, transformer balanced analogue connections, switchable calibrated/uncalibrated input levels, peak hold on metering, track start/end review facilities, arguably a more professional button layout and more.

Surprisingly, possibly the most expensive of the batch comes from another company known more for their consumer products, **Meridian.** They are effecting a number of professional modifications including an AES/EBU interface, an optional wired remote facility, 'anti-jittered' digital outputs and switchable SCMS. With a price tag of approx £4,500 (approx $8,100) they will be aiming at a more upmarket, professional user. With this in mind the Meridian product is to be distributed in the UK through Canford Audio.

An ever-growing body of home users and professionals know the unquestionable advantages of the CD format. It is robust, compact, quick to use, offers near-instant random access and anyone even vaguely interested in CDR will be well equipped with players. At these prices, then, the medium becomes much more widely viable for a range of applications including station idents, stings and radio commercials, in-house sound effect libraries, sample libraries, serious demos, etc.

So does this herald the end of Yamaha's £8,000 (approx $14,400) *YPDS-201*? Quite possibly not, because this system still offers one significant advantage, to wit, its 'Pre TOC' (Table Of Contents) facility: the disc is pre-divided into 30-second track lengths. If you want a three minute passage, you simply use six tracks for a seamless recording. In this way you can record a three-minute piece, take it away and play it on a standard CD player, and then return the same disc to the CDR machine for further recording. This ability to replay a part recorded disc on a standard player will offer significant advantages to people who want to build up a CD of stings, sound effects or samples over a period of weeks or months whilst actually using the disc as their working source; it also means that a producer can take home a CD of his last set of mixes to listen to over the weekend without wasting an entire disc.

However you look at it, this appears to be the start of a new era for the CDR format.

Jim Betteridge

Serious users the world over are reaping the rewards that the DAT format brings: cost-efficiency, convenience, reliability and audio excellence. As you might expect from the world's No1 DAT Centre, HHB has been working closely alongside the 'World Leader in Digital Audio' to build a DAT product range that really delivers the goods. And the briefest glance at our latest Sony DAT line-up is all it takes to see that there is a solution for every application, from the simplest audio recording to the most advanced audio-for-video post-production.

TCD D3
DAT WALKMAN

Even digital recording on the move can now be a serious business. There's the ultra-compact TCD-D3 DAT Walkman, combining low cost with a superb design and an impressive four hour recording capability. Consider the highly successful TCD-D10 portable family. As well as balanced XLRs, the rugged TCD-D10 PRO MkII adds 'absolute time' recording, with HHB offering the exclusive option of a 48v phantom power modification. We can even supply the original TCD-D10, modified for DC recording.


TCD D10 PROII

But as anyone will tell you, DAT excellence is not based on hardware performance alone.

That's why – following a period of exhaustive worldwide research – we've launched our own range of 'Professional Quality' DAT tapes. Available in the following lengths – 15, 30, 48, 62, 92 and 122 minutes – the HHB 'PQ Series' is the first tape range that really responds to all the requirements of the serious recording professional.

DAT from Sony. For the serious, the very serious and the seriously serious.

PCM-7030/7050
Timecode, Synchronisation & Editing Capabilities

Both recorders can provide the following features: 4 heads for confidence monitoring & insert editing • Modular design with a wide range of card options • Built-in chase synchroniser/Externally Suncable • SMPTE/EBU Timecode Read/Record Capability • Absolute Time to Timecode Conversion • Parallel Remote Interface • Instant Start Memory • Varispeed • Fader Start Capability • Digital Input/Output • 9 pin serial connector/BVE Series video editor control • PCM-7050 offers millisecond accurate editing when used with RMD-7300 Edit Controller

DTC-750ES
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DTC-1000ES PRO
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Studer form UK company

Studer are forming Studer Revox UK which will act as the holding company for both the already established Revox UK together with a newly formed organisation, Studer UK. Brian Whittaker ex of FWO Bauch is heading-up the operations which should be London-based.

RSS half price

Roland has announced a dramatic reduction in the price of their RSS, 3-dimensional, stereo processing system.

The high price of £25,000 (approx $17,000) reflected Roland's need to recoup seven years of R&D, but effectively put the system out of reach for all but the very top-end studios.

Good news for existing RSS owners, though, is that they will be fully compensated for the change in price.

● Meanwhile Cedar Audio have also announced a number of significant immediate prices reductions to their sound restoration and production systems.

There's a 50% saving on the price of the Cedar Computer Platform. The processors and software can now be installed within any suitable PC for only £4000 (approx $6800) — resulting in a total price of around £6000 including PC.

The Realtime scratch and click removal software module has been reduced from £15000 (approx £25500) to £10,000 (approx $17000). A dedicated Scratch Removal System has been reduced from £23000 (approx $39000) to £14000 (approx $24000).

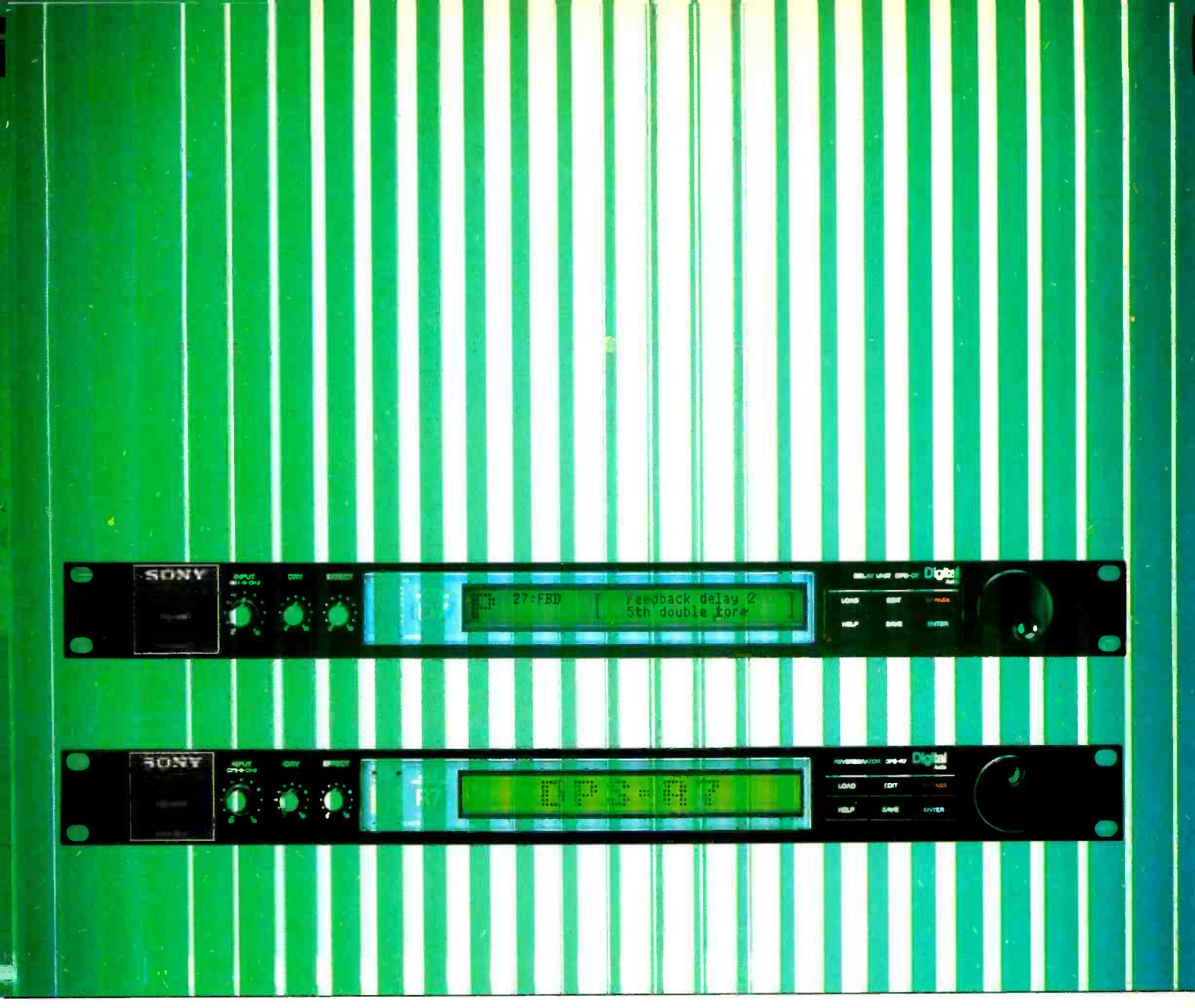
In Brief

● Glenrothes, Scotland. **Soundtracs train staff:** late last year Dave Ward of Gateway conducted a comprehensive training programme for the staff at the Soundtracs automated production plant in Glenrothes, Scotland. The course stretched from general recording techniques to in-depth recording/synchronisation and sound reinforcement.

● Cambridge, UK. **Trevor Cash/Executive Audio:** After months of negotiations Trevor Cash International and Executive Audio have joined forces to form what may be one of the largest dedicated pro-audio and musical instrument sales and marketing agencies in Europe. The new company will be called TCI and based at Unit 12, Barnwell Road Business Park, Cambridge, UK. CB5 8UY. Tel: (0223) 416660. Fax: (0223) 415918.

Exhibitions

17th-19th March, MacWorld Exposition 92, NEC Birmingham.
19th-21st March, Television Show, London.
24th-27th March, AES 92nd Convention, Vienna.
11th-14th April, NAB Convention, Las Vegas.
29th-31st May, 11th International Conference, "Audio Test and Measurement", Mariott Hotel, Portland Oregon, USA.
3rd-5th June, APRS Exhibition, Olympia 2, London.
3rd-7th July, IBC, Amsterdam, Netherlands.
8th-10th July, Pro Sound and Light Asia, Singapore.
26th-28th July, British Music Fair (trade only) Olympia 2,London.
6th-9th September, Plasa Light and Sound Show '92, Earls Court 2, London.
12th-16th September, In the City International Music Convention, The Holiday Inn Crowne Plaza, Manchester, UK.
1st-4th October, 93rd AES Convention, Moscone Centre, San Francisco, California, USA.
18th-21st January 1993, Middle East Broadcast 93, Bahrain International, International Exhibition Centre, Bahrain.



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No matter what you're looking for in audio effects, one thing is certain, - when you choose Sony the quality always shows through.

Unparalleled experience in the development of digital multi-track recording equipment has given Sony that vital edge to develop two more winners - the DPS-D7 digital audio delay unit and the DPS-R7 digital audio reverberator.

DPS-D7
DPS-D7 DIGITAL AUDIO DELAY UNIT
DPS-R7
DPS-R7 DIGITAL AUDIO REVERBERATOR

Whether you need special effects for broadcasting, studio recording or audio and video post production, you can be sure that the sound and engineering quality of the D-7 and R-7 are everything you would expect from Sony.

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Sony Broadcast & Communications

NAMM Show Report

The 1992 Winter NAMM show was held at the Anaheim Convention Centre from the 17th to the 19th January. While the atmosphere at the previous show had been adversely affected by the Gulf war, no such shadow fell on this show. Taking this with the fact that the 1991 Summer NAMM show had been cancelled, the general attitude was very positive.

Many products were having their west coast premiere, after their first showing at the October AES show in New York. However, several manufacturers were previewing new products at NAMM.

Amek/TAC gave the *Einstein* desk its first showing; a 64-input console each with fader and EQ, 24 group outputs and balanced tape returns in a chassis less than 56in wide. Fully-automated, the Einstein used the same *Supertrue* system as the *Mozart* and *Hendrix* making mix data interchangeable between the desks. Price for 64 inputs including automation is a little over $46,000 (£26,000 approx).

A new series of graphic equalisers were on display at the Ashly stand. The GQX series features three models; *1502* stereo 15-band, *3101* mono 31-band and *3102* stereo version. A new power amp has also been added in the shape of the *SRA-120*.

Alesis did their usual trick of hiding their latest mock-up underneath a hefty plastic case. Last year it was the ADAT recorder (still awaiting release) — this year it's the *X-2* recording console; 24 channel, 24 monitor in-line desk with 8 buses and direct ADAT connector. RRP is $5,995 (approx. £3,500) but don't hold your breath until the end of 1992. Also being previewed was the *S4/S5 Quadrasynth* sound module/keyboard and Alesis even went to the lengths of not allowing photographs. On the ADAT front, there were serious rumours that there is trouble with the S-VHS transport side, and that another renowned tape recorder company are on the verge of beating Alesis into the market place with a digital 8-track at a similar price.

After the release of the *D11* digital room delay at the AES show, Audio Logic followed this up with two further models; *D22* (2 input, 2 output) and *D24* (2 input, 4 output) programmable alignment delays. Features include 20 ms increments as standard (which can be decreased to 10 ms with an optional board), and a maximum delay time of 655 ms (stereo) or 1310 ms (mono), which can be doubled with another optional board. Computer control via PA-422 or MIDI, again optional, is possible.

Allen & Heath presented their *GS3* desk; 16-8 or 24-8 with up to 72 EQ'd inputs on mixdown. Full MIDI muting of channels, monitors and effects sends/returns. Price around £1800.

Carver were showing a mock-up of their forthcoming *PDR-10*, recordable CD recorder (CD-R). While the CDs are not re-writeable,the final index can ignore some recordings and can set up the access to them in any order. Price tag is $7500 (approx. £4,300).

Coda came out with a PC *Windows* version of their *Music Prose* scoring package.

Drawmer launched the *DL251* Spectral Compressor which has a built-in enhancer for restoring the high frequency content and dynamics without increasing noise or output level. US price will be under $1200 (approx. £679).

Digidesign introduced *Sound Tools II*, a four channel version of the original *Sound Tools*. Compatible with Opcode's *Studio Vision* and Steinberg's *Cubase Audio*, RRP is $3495 (approx. £2,000).

E-mu added to their Proteus range with the *Proteus/3*. This has 4M of ▶

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Lyrec

Lyrec Manufacturing A/S, Box 123 (Mileparken 22)
DK-2740 Skovlunde, Denmark, Tel +45 44 53 25 22
Fax +45 44 53 53 35, Tlx 37568 lyrec dk

'World' sounds gathered, as the name suggests, from all around the globe and includes such obvious instruments as the Digeridoo and Troubador Harp. The XR version has a larger memory.

Eventide have a new internal sampler board for their *H3000* series which quadruples the sampling time to 95 seconds (mono) or 47.5 seconds (stereo).

Hybrid Arts, now under new management and working hard to improve their profile, released *Digital Master EX*, the expanded version of *Digital Master*, giving 4 channels of Direct to Disk recording with 16 virtual tracks. There was also news of a 12 audio output sample playback module which can be loaded with various forms of digital data, and an *ST-Mac* CD-ROM unit via which data from either computer can be transferred to the other.

JBL introduced their new *M-series* line of signal processors; *M644*, a 4-channel noise gate; *M712*, a 2-channel compressor limiter with full ADSR control; *M552/553* 2-way stereo/3-way mono variable crossover units. Prices are to be announced.

JL Cooper were showing *dataSYNC*, a digital synchroniser for the Alesis *ADAT* system which also conforms to MIDI Machine Control; this is likely to be available before *ADAT* itself!

Korg have followed up their *01/W* music workstation with two new additions; the *01/W Pro* and *01/W ProX*. The main differences are the keyboard sizes (76 and 88 keys respectively), larger capacity memories and the addition of Standard MIDI File compatibility for the on-board disk drive and sequencer. The rackmount *01R/W* and General MIDI-compatible *03R/W* sound modules also made their debuts.

Lone Wolf's *MidiTap*, the Local Area Network (LAN) MIDI patching system, was launched some years ago but has never really caught on within the industry. However, that has not deterred Lone Wolf from their aim which is to provide the LAN capability from a single chip. What they displayed at the show was the *MicroTap*, which offers LAN capability from a small board which can be mounted within existing, modified equipment, or which manufacturers can implement from the drawing board. Specifications are extremely high with 8 channels of A-D conversion, up to 30 digital I/O lines and full *Macintosh* and PC support. Cost per board at reasonable quantities will be less than $50 (approx. £30).

Mark of the Unicorn released a Digital Waveform board for the *Macintosh* which allows direct to hard disk recording with the *Digital Performer* software. This appears to be a direction that many *Macintosh* software companies are taking. A professional desktop music publishing program for the Macintosh was also launched; Mosaic uses a 'WYSIWYG' approach and offers such features as unlimited undos and precise control of all page layout aspects.

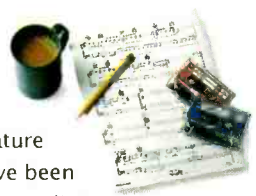
Midiman ventured into the Apple *Macintosh* market with the *Mac Syncman*, a 2in/6 out MIDI interface/Sync box including SMPTE read/write, code reshaper and regenerator. They were also showing the *LMTC*, a $500 SMPTE to MIDI Time Code sync box which connects to the serial port of many Tascam recorders and allows for automated transport control from computer sequencers which support its System Exclusive commands, currently C-Lab Creator/Notator and Steinberg *Cubase*. Unfortunately the advent of MIDI Machine Control and Tascam's MMC-100 may make this product rather short-lived.

Under the logo of 'Makin' it in the USA', Peavey were firing on all cylinders. The *DPM C8* is an 88-key fully-weighted MIDI controller keyboard with four separate MIDI outs and programmable sliders, wheels and footswitches along with 8 zones/layers, while the *CH8fd* adds the DPM synthesis to the package. ▶

The Most Widely Used Studio Microphones.

Take a look around the next time you're in the studio. Ask the most demanding musicians and recording engineers what microphone they use to produce the brightest and clearest sound. You'll find that most of them prefer AKG 414's for recording their music's incredible dynamic range, subtle nuance and emotion.

It's no wonder that the 1990 and 1991 *Billboard* surveys found that AKG microphones are the "#1 Most Widely Used Studio Microphones."



For years the 414 series and its AKG signature sound have been a part of recording the best music in the business. That's why the 414 is a studio classic.

AKG

AKG Acoustics plc.,
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Tel:(04868) 25702. Fax:(04868) 28967

AKG Akustische u. Kino-Gerate G.m.b.H.
Brunhildengasse 1,
A-1150 Vienna,AUSTRIA
Tel: (222)9565170. Fax: (222)956517-245.

Classic.

The 414 is available in two models, the C414 B-ULS and the C414 B-TL.

Prices for both of these are to be announced. Other new products included the Pro-FEX *II*, digital multi-effects processor, and the Spectrum Synth and Spectrum Bass tone modules.

Away from the main part of the NAMM show, Plasmec were previewing the *Macintosh* version of ADAS, their hard disk recording system originally for the Atari ST, at a price of around £850. Mention was also made of a forthcoming PC version.

Roland had a particularly busy show launching five spin-offs from their GS sound module, *Sound Canvas*; *CM-300/500* sound modules, *JV-30* keyboard, *JW-50* workstation and the *SC-155* enhanced Sound Canvas. Also on show was the *GR-1* guitar synth and *R-70* Human Rhythm Composer. On the PC side, the *Super-MPU* Intelligent MIDI Processing Unit replaces the now ancient *MPU-401*. This has independent processors for SMPTE and MIDI and 32 MIDI channel capability.

Soundtracs showed their new Tracmix *II*. This adds off-line editing features to the already established Tracmix *I* automation.

Steinberg were showing *Cubase Audio* on the Apple *Macintosh*, their answer to Digidesign's *Soundtools*. This utilises the same user-friendly front end as their Cubase sequencer software and is compatible with Digidesign's digital hardware. Also on show the *Time Bandit* software for the Apple *Macintosh*. This can take digital audio files in *Sound Designer* or IFF format and alter pitch or time as well as creating harmonies. On the *PC* front, a Windows 3 version of their *Cubase* sequencing software was launched.

Warner New Media have finally released the first CD+MIDI disk which can playback the CD audio side on a standard CD player, and the MIDI information on a CD+MIDI player such as Commodore's *CDTV*. To hear the clarinet solo from 'Rhapsody in Blue' metamorphosed into any sound a MIDI sound module can deliver, including Digeridoo and Troubador Harp on the *Proteus/3*, may not be to everyone's taste, but at least the technology is now with us.

Yamaha were another company which were busy on the professional front. The *DEQ5* digital equaliser can either operate as a dual-channel 1/3 octave graphic or a 6-band parametric. Digital input can be in AES/EBU format or Yamaha's proprietary Y2 format. Additionally, up to 23 DEQ5E expansion units can be operated from a single DEQ5, each via their own unique address. The *Q1131* is a 31 band mono graphic equaliser with two tuneable notch filters. Finally, Yamaha showed the *MC04II* series consoles. Ranging from 12 to 32 inputs, these offer four group and auxiliary busses along with 4 band EQ. All prices are to be announced.

For me, the star of the show came from Passport in the form of a piece of software for the *Macintosh* which is likely to become a standard in any studio dealing with multi-media. *Producer* is an integrated digital audio, video and MIDI sequence shell program which allows you to take MIDI Files, sound files and animations and place them in a visual cue sheet which operates in an extremely intuitive manner. Price unannounced at present, *Producer* is truly incredible in that you can edit the various elements of the cue sheet from their native programs while *Producer* is running, and even locked to sync.

Finally, MIDI Machine Control (MMC) is a new protocol within the MIDI specification which allows any tape transport system to be controlled via commands from a computer. MMC was passed by the MIDI Manufacturers Association (MMA) and Japanese MIDI Standards Committee (JMSC) the day before NAMM started, and both Fostex and Tascam were showing products conforming to MMC. From Fostex, there was an upgraded *MTC-1* controller working their R-8 tape recorder from Opcode's *Vision* sequencing software; Tascam showed their *MMC-100* controller which will work with any of their tape machines that has a serial port. I would expect to see more software and hardware companies following up on MMC, including most of the heavy-weights. The MMC specification is over 100 pages and can be obtained from the United Kingdom MIDI Association on 081-368 2245.

Vic Lennard

Neil McLellan, Strongroom, Neve V48 with Flying Faders.

Photograph: Andrew Cameron Concept and Design: Dave & Paul.

NEIL McLELLAN

At the tender age of 23, Neil McLellan is already one of dance music's hottest properties. A multi-talented writer, programmer, engineer, and producer, Neil is the force behind some of the best-sounding dance records around. His inspiration is drawn from the rave scene, the clubs of New York and London, and the music of Yello, George Clinton, and Frankie Knuckles. So he knows what makes people dance. And his mix ingredients are simple: the Neve V Series console and Flying Faders automation.

SELECTED HIT LIST:

- **SAFFRON** (new album) • **MC KINKY** - Too High • **SOUND SYSTEMME** (album)
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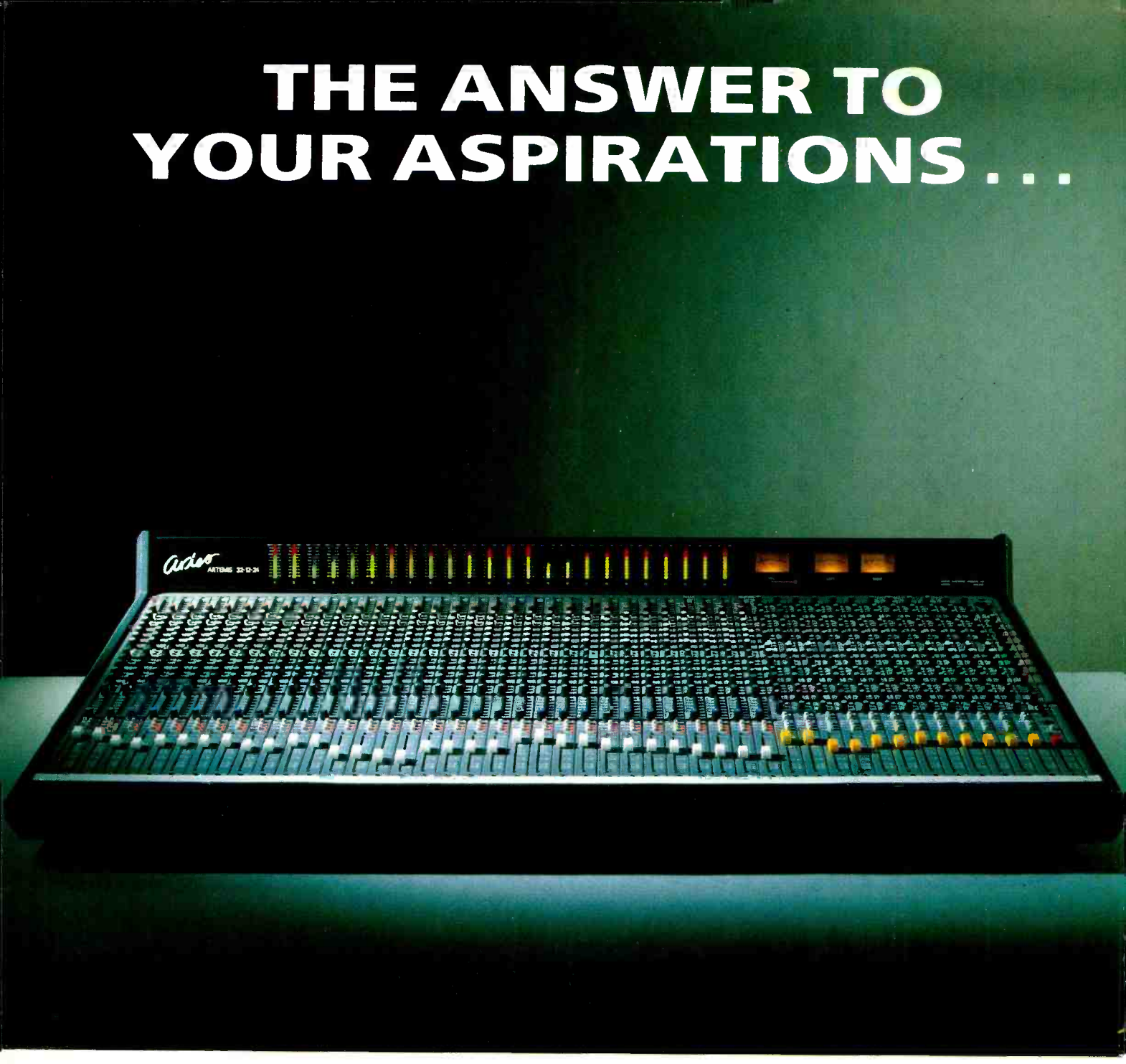

You can achieve your dream studio by owning an ARIES ARTEMIS because Artemis is suitable for the most demanding professionals and its principle advantage is its well-proven reliability.

The Artemis is a 12 bus console available in three different configurations such as 24, 32 and 40 channels with 12 group outputs, 24 track monitoring, stereo master output and control room monitor. The characteristic features of the Artemis are the 12 FX-Returns which can be used additionally in the mix status to process a multitude of signals and a superb 4 band EQ sweepable.

You will certainly appreciate the easy access to knobs and switches which makes Artemis so comfortable to work with, each channel has been specially designed to give you all the facilities you need in a well-spaced manner.

An integral meterbridge with 24 multi-segment LED meters and 3 VU-meters gives an easy reading and enhance the whole console.

Artemis gives you excellent design and a superb audio quality. Your aspirations are now truly achievable.

For more details about the rest of our range, contact Goutam Electronics Products Ltd or any of our Authorised Distributors.

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Paragon upgrade

US company Audio Animation have released new software for their digital broadcast transmission processor, the *Paragon* Transmission. Designed to fit between the final audio output and the FM transmitter, the system controls the station's tonal balance and dynamics. The new *Windows* based software include a zoom-in facility on some of the 16 GUI (Graphic User Interface) screens. The user now has more precise control over areas such as release time, attack time, crossover frequency and mix levels. Additionally, new set-up files have been included to cater for European needs.

Audio Animation Inc, 6632 Central Avenue Pike, Knoxville, TN 37912, USA. Tel: (615) 689-2500. Fax: (515) 689-7815.
UK: Meridien Communications Industries Ltd, 33 Greenwich Market, London SE10 9HZ. Tel: 081-293 0909.

Otari DDR-10 CD Recording

Otari have announced a new option for its *DDR-10* hard disk recorder/editor that allows it to be used as a CD mastering unit. By adding a new combined hardware/software Write Once Compact Recorder, the system can prepare and produce limited runs of Red Book standard CDs in either 3 in or 5 in formats. CD quality digital audio can be recorded directly from AES/EBU output of the *DDR-10* to the encode/record units, with control over sequence, start times and CD subcode parameters. Multiple record transports may be combined into one system providing simultaneous recording of up to 14 discs.

Editing is handled by a new version of Digidesign's Master List program — Master List PDS — which will be familiar to existing users. To create a CD, the user loads the program into the audio playlist, arranges it into sequence, adjusts start times, adds index points and adjusts track volumes. Once the playlist is complete, Master List PDS writes the CD in real time to the user's specifications, recording up to 99 tracks per disc, with each track containing up to 99 index points.

UK: Otari (UK) Ltd, Unit 13, Elder Way, Waterside Drive, Langley, Berks SL3 6EP. Tel: 0753-580777. Fax: 0753-542600.
USA: Otari Corporation, 378 Vintage Park Drive, Foster City, CA 94404, USA. Tel: (415) 341-5900. Fax: (415) 341-7200.

Cable Labels

In accordance with the latest 'Electricity At Work' regulations, Le Mark Self Adhesive Ltd are producing a range of write-on cable labels. The labels can include customized text and graphics, and optional add-on consecutive numbers or barcodes. They come mounted on a release paper in transparent vinyl strips, backed with an adhesive that ensures a 'Herculean' bond. The vinyl is printed across the leading edge of the strip in the client's colours, with standard text in black and write-on areas in white. The labels are applied without the need of tools or plug removal.

Le-Mark Self-Adhesives Ltd, 24 Stephenson Road, St Ives, Huntingdon, Cambs PE17 4WJ. Tel: 0480 494540.

Portable PPM from BCD

BCD Audio have announced the introduction of a portable battery powered PPM unit. The unit is based on a standard Sifam stereo PPM movement fitted with a BS5428-specification driver board especially modified for minimum power consumption. The usual facilities of A&B, M&S, S+20 switching are provided from a front panel lever key. An additional PCB provides a stereo headphone amplifier with a quiescent current of less than 1 mA, and signal present detection incorporating power shutdown.

BCD Audio, 40 Alexandra Road, Windsor, Berks SL4 1HU. Tel: 0753 859420. Fax: 0753 861308.

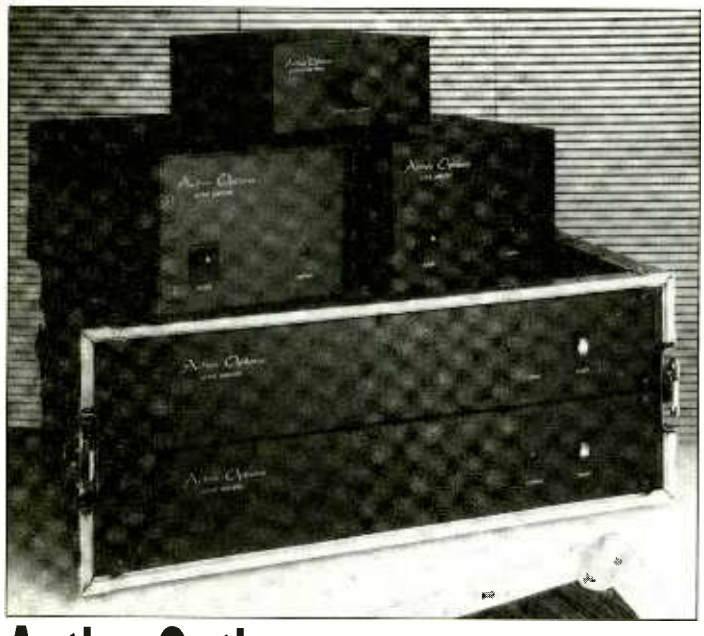
EV amplifier

Electro-Voice have recently introduced the *7300A* amplifier, offering a number of new features not found in its predecessor — the *7300*. The new amp delivers 250W per channel at 8Ω, 400W at 4Ω and 500W at 2Ω. In bridged mode it will deliver 800W into 8Ω and 1000W into 4Ω. All ratings are based upon both channels driven at 1 kHz at less than 0.1% THD.

Instead of a VI limiter circuit, the *7300A* uses a proprietary circuit called 'Output Z Protection', which is said to eliminate premature limiting and be stable with even high reactive speaker loads. The circuit also shares stresses between channels when the amp is in bridge mode and prevents 'flyback' pulses that create dynamic distortions.

Other features include front mounted gain controls and rack handles, XLR and ¼in balanced and unbalanced inputs, and Octal sockets for EV APX crossovers and equaliser modules.

Electro-Voice, 600 Cecil Street, Buchanan, M1 49107, USA. Tel: (616) 695-6831. Fax: (616) 695-1304.
UK: Shuttlesound Ltd, 4 The Willows, Centre, Willows Lane, Mitcham, Surrey CR4 4NX. Tel: 081-646 7114. Fax: 081-640 0106.

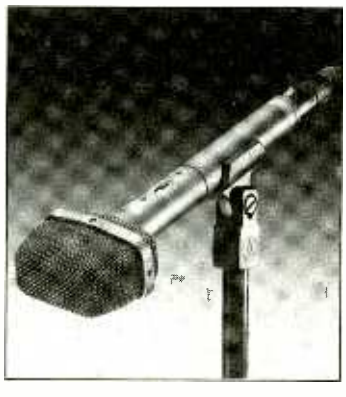


Active Options amps

Active Options have launched two active amplifiers, a two-way (150W per channel) and a three-way (225W per channel), each with built-in dealer configureable active filtering, a clipping level indicator and time alignment electronics. A separate balanced line driver unit with lockable gain control is also included. Any crossover frequency may be selected by plugging small modules into the system, and any differences in drive unit sensitively may be compensated for by an eight position (1 dB per position) attenuator switch mounted on the circuit board. Two-way systems can easily be upgraded to three-way.

Active Options Ltd, 65 High Street, Seal, Sevenoaks, Kent TN15 0AV. Tel: 0732 62981.

Audio-Technica DAT mic



A microphone specifically designed for DAT and high-quality cassette recording has been introduced by Audio-Technica. The *AT822* One Point X/Y stereo condenser microphone is a lightweight, compact design appropriate for hand-held or camera mount applications. It is equipped with a pair of wide-range, closely-matched cardioid (unidirectional) condenser elements producing a 101 dB dynamic range. Frequency response is flat from 30 Hz–20kHz, with a maximum SPL rated at 125 dB. The mic includes a switchable low-cut filter, windscreen, and camera shoe mount adaptor. The standard cable terminates in two mini plugs threaded inside a pair of ¼in phone plug adaptors — also included is a cable terminating in a single stereo mini plug, compatible with portable semi-pro and consumer DAT recorders. The *AT822* operates with a standard 1.5V AA battery which is said to provide in excess of 1000 hours with normal intermittent use.

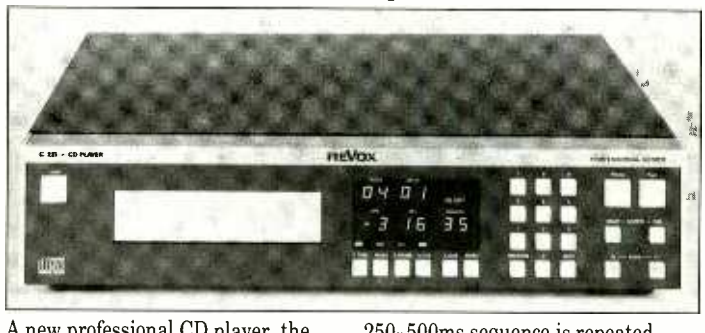
Audio-Technica US Inc, 1221 Commerce Drive, Stow, Ohio 44224, USA. Tel: (216) 686-2600.
UK: Audio-Technica Ltd, Technica House, Lockwood Close, Leeds LS11 5UV. Tel: 0532-771441. Fax: 0532-704836.

Sony DAT Machines

Sony have announced the introduction of two new 16-bit DAT machines — the *PC-204*, and *PCM-2300*. The lightweight, portable *PC-204* is the first DAT recorder to offer double speed recording thus achieving twice the bandwidth normally available. The *PCM-2300* is an affordably priced professional DAT machine employing 1-bit High Density Linear Coversion (HDLC) Pulse D/A, and 1-bit delta sigma type A/D. The machine operates at 44.1 kHz or 48 kHz, as well as 32 kHz for Long Play Mode (12-bit non-linear). Double encoded Reed Solomon Code error correction is used, and various subcodes can be recorded including Start ID, Skip, ID, End ID, Program Numbers, Absolute Time and Date function. Both machines have remote control units.

UK: Sony Broadcast & Communications Ltd, Jays Close, Viables, Bassingstoke, Hants RG22 4SB.
Tel: 0256-55011.
Fax: 0256-474585.

Revox Pro CD Player



A new professional CD player, the *CD221*, has been introduced by Revox. The 19 in rackmountable machine features single bit differential processing and high speed access time. At switch on, various options can be modified including Fader Start, Record Time Display, Auto Pause and Auto Cue. Start and End Review of a track is available with the machine returning to the last cue point. Scan in pause mode cancels audio muting and a 250–500ms sequence is repeated, each additional key press shifts the pause/cue point by two frames, and continuous pressing moves the laser in play forwards or backwards at 50 x play speed. Inputs and outputs are via balanced XLR and phono connections.

Revox UK Ltd, 1 Berkshire Business Centre, Enterprise Way, Thatcham, Berks RG14 4NH. Tel: 0635 76969. Fax: 0635 72556.

Rane Stereo Graphic

Rane have introduced a stereo version of their *ME 30* microGraphic Equaliser. The *ME 60* is a two channel, ⅓-octave, design housed in a two rack-space unit. Each channel includes 30 x 20 mm centre detented gliders arranged between 25 Hz–20kHz with a cut/boost of 12 dB. A constant-Q design is employed to prevent unwarranted interaction between filters. Additional features include sweepable low and high pass 12 dB-octave filters, channel gain, passive bypass, and overload indication. Inputs/outputs are via XLR, ¼in jack, or phono.

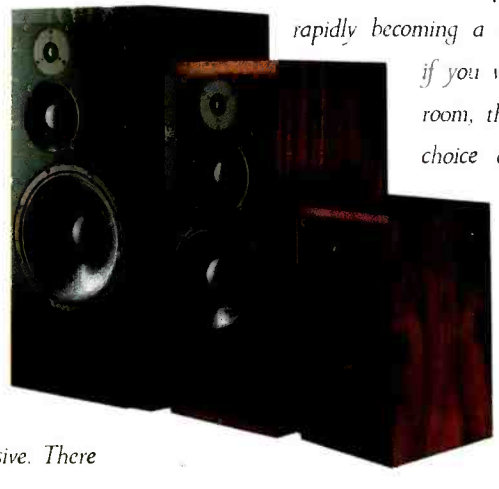
Rane Corporation, 108002 47th Avenue West, Mukiteo, WA 98275-5098, USA. Tel: (206) 355-6000.
UK: Shuttlesound Ltd, 4 The Willows Centre, Willows Lane, Mitcham, Surrey CR4 4NX.
Tel: 081-646 7114.
Fax: 081-640 0106.

When they build a speaker in the Cotswolds, they make sure it will be heard in New York.

Like the surrounding Gloucestershire countryside, the people of the Cotswolds are famous for their silence. But occassionally something comes along that is just too good to keep quiet about. Like ATC loudspeakers.

Their exquisite performance has set tongues wagging from Tokyo – where they have won numerous awards – to New York, where world-famous audio professionals choose to listen to them every day.

So why all this excitement about ATC professional monitors? Is it that they are hand-built to extraordinary standards, or because of their unique ability to deliver clarity and detail at any sound level? One thing is certainly clear, the revolutionary soft-dome midrange driver manufactured by ATC is the envy of monitor designers worldwide.



The ATC range is comprehensive. There are two free-standing, self-powered models for instant plug-in-and-listen professional monitoring. The remarkable SCM100A – with its hefty 312mm driver – provides a low frequency performance to match studio control systems three times its size. There's also the SCM50A, a smaller three-way unit equally popular amongst leading broadcasters and recording engineers. The top-selling passive model is the SCM20, a compact but powerful loudspeaker that's rapidly becoming a near-field monitoring standard. And if you want to build ATC into your control room, the SCM200 and SCM300 provide a choice of large-scale systems to meet the most demanding requirements.

ATC loudspeakers can be auditioned at HHB and a network of leading distributors worldwide. Once you've heard them, you won't stop talking about them either.

EUROPE: HHB COMMUNICATIONS LIMITED. 73-75 SCRUBS LANE. LONDON NW10 6QU. U.K. PHONE: 081 960 2144 TELEX: 923393 FAX: 081 960 1160
USA: STELLAR AUDIO. 58 BEARFORT ROAD. WEST MILFORD. NJ 07480. U.S.A. PHONE/FAX (201) 728 0438

Effects patching system

Combining a modern guitarist's effects rig into a manageable homogenous mass for live or studio work has become something of a black art, peppered with more than just a little old-world ingenuity. The quest for reproducable and controllable results for guitarists who have a rack of outboard processors coupled with amps and, in many cases, a morbid fear of the MIDI that these units sport, has spawned a host of individual solutions as diverse as employing racks of Yamaha *DMP7s* to duplicate amp set-ups, to (at worst) back-to-basics lash-ups that involve a floor full of foot controllers that only the player understands and no-one dares to interfere with.

Centralised control is desirable but elusive and the answer ultimately lies with custom-built switching devices for those that can afford them. The *MC8* from US company Sound Sculpture aims to bring centralised control to more players by addressing the simple problem of interconnecting the instrument to outboard effects and amplifiers through an 8 x 8 relay switched matrix that responds to MIDI patch change information. Configurations of inputs to outputs along with the useful but rare inclusion of gain levels on each connection can be memorised in 50 fully programmable presets and stored in 200 locations arranged in 20 banks of 10. Additionally programme change numbers targeted at seven pieces of MIDI outboard can also be stored with a preset along with two external control jacks which can be used for amp channel or amp reverb switching.

Once the programming has been completed, and levels to and from individual effects have been mixed and their relevant programme numbers have been stored, then on paper at least the *MC8* should enable complete repeatability of given combinations of level optimised effects with the player left with the single decision of how loud the amp should be via its master volume.

Presented in a 1u rackmount the rear panel has jack sockets for eight inputs and eight outputs with impedances of 100 kΩ and 1 kΩ respectively. Extra sockets are provided for the two external control jacks, MIDI in and out, and a socket for a footswitch which peculiarly only increments. This unfortunate attribute is also bestowed upon the four front panel buttons which scroll through the presets, modes, parameters and various functions available to the user — an unforgivable omission for a 1990s device. That being said the programming is fairly straightforward and is carried out in conjunction with 2 lines by 16 characters backlit LCD hindered only by an ineffectual manual. Two LEDs indicate clearly whether the machine is in Play mode (the green one lights) or programming mode (the red one lights) and each function is accessed through the now widely accepted process of pages.

Any input can be routed to any output along with a gain value available in nine steps between -24 dB to +6 dB, excluding Off, by simply selecting the input on a dedicated key and its outputs on another dedicated key. To help matters along, once you decide to make a connection a numerical representation of the gain is given on an eight character line — small but workable — but the ability to name inputs and outputs would have been appreciated. The aforementioned external control jacks can also be programmed in this way per preset.

Programme change numbers can be entered in a similar way along with the MIDI channel and the *MC8* has the added advantage of being able to automap, or learn, which of its presets it should switch to when an external programme change number on a given MIDI channel is sent to it. This is a matter of arming the device to receive the MIDI command and then send the command from a MIDI pedal board or other controller. It works extremely well and doesn't involve any laborious saving routines — once you exit Programme mode the deed is done. Presets can also be named and copied to other memory locations for arranging in banks for performance and there is a MIDI dump, verify and load facility. On the down side the LCD is not terribly bright, has no adjustable contrast, a relatively restricted viewing angle and the lack of a large two-digit preset number display could cause problems in low light when panic sets in. In its favour there are no audible clicks or blips and the integrity of the original source is not compromised in any way. Indeed it could be argued that this is a very sensible way of routing signals and is likely to improve the performance of an outboard rack that uses daisy-chaining between units to achieve the desired result, for example.

The unit comes into its own with a MIDI pedalboard and to the *MC8*s credit this pedalboard needn't be all that intelligent as all it needs to be able to do is send programme change data with confidence as the *MC8* does the rest. *MC8*s can be chained to work together via MIDI for control and via an audio input and output for passing on the instrument signal for the ancilliary unit. Needless to say, the whole process becomes considerably more complicated if a stereo rig is involved and the use of an additional unit will probably be requisite in such circumstances from the logistical point of view alone.

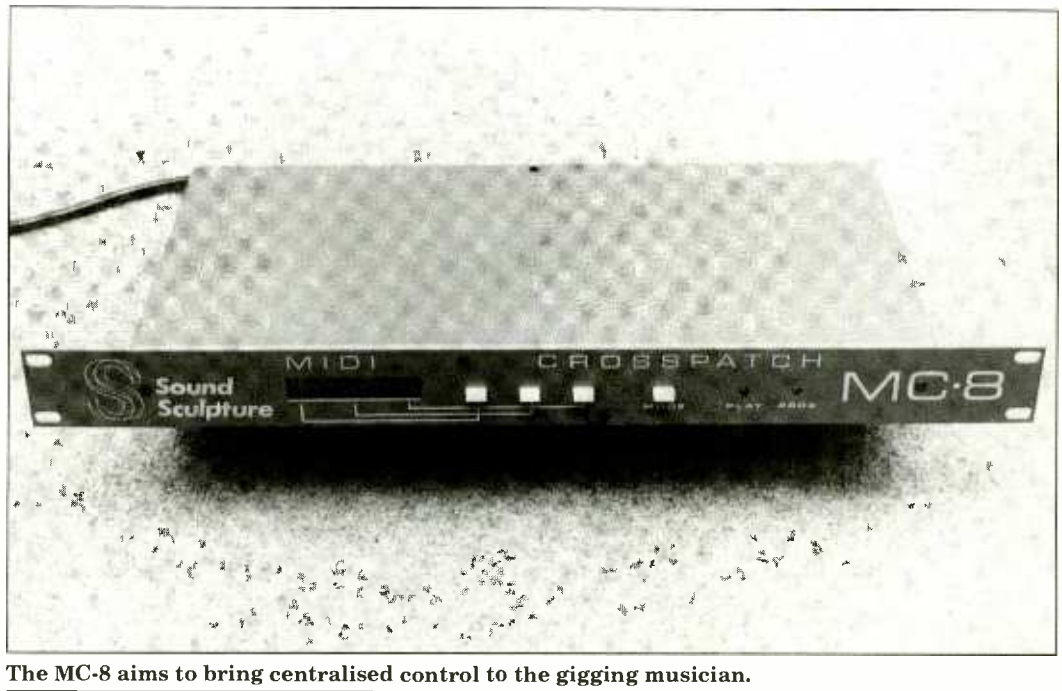
The *MC8* is not the most immediate device on earth but if you understand what is does and what this ability will allow you to do then it is unlikely to disappoint. For many players it will represent something of an ultimate solution and that includes keyboardists as well as the more obvious guitarists. It also has obvious applications in the studio and on a subjective level the quality looks well able to stand up to it.

But it is with the gigging musician that this unit will hold most redemption — an 8 x 8 matrix with storable gain settings, external switching capabilities and all under MIDI control. What could it do for you at £595 inc VAT?

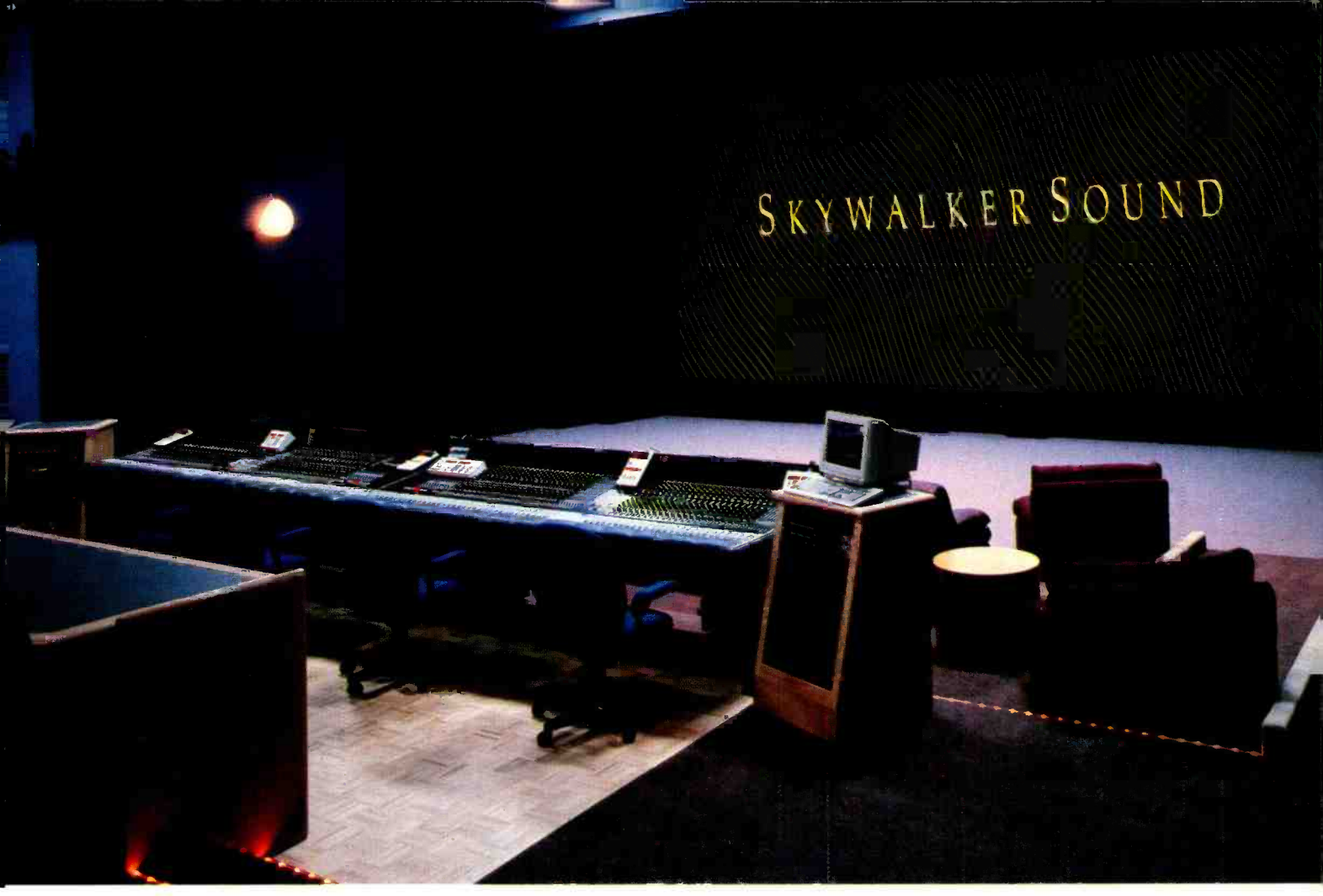
Sound Sculpture, 2805 Wilderness Place Ste. 800 Boulder, Colorado 80301, USA. Tel: (303) 442 1954.

UK: Systems Workshop, 24 Church Street, Oswestry, Shropshire SY11 2SP. Tel: 0691 658550.

Studio Sound's Music News is compiled by Zenon Schoepe.



The MC-8 aims to bring centralised control to the gigging musician.



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Skywalker Sound's new state of the art post-production facility in Los Angeles uses four Otari Premiere™ consoles to meet tight deadlines and create the best possible audio for their clients.

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Otari is proud to supply these specialized post-production tools to the dedicated and talented professionals of *Skywalker Sound.*

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There is no going back!

Malcolm H ll Associates Plc, Hollingbourne House, Hollingbourne, Kent ME17 1QJ, England.
Tel: +44 (0) 622 884 611 Fax: +44 (0) 622 884 664

EV crossover

Electrovoice has introduced the *EX24* stereo 2-way, mono 3-way crossover with 12 selectable crossover frequencies per channel from 80 Hz to 6.3 kHz. Infrasonic filtering is offered along with stereo or mono low frequency output and a switchable horn equalisation circuit.

The 19in rackmount has a choice of balanced or unbalanced jacks or XLR and each channel additionally has low and high output level controls, on/off switches and polarity switches.

ElectroVoice, 600 Cecil Street, Buchanan MI 49107.
Tel: (616) 695 6831.
UK: Shuttlesound, 4 The Willows Centre, Willows Lane, Mitcham, Surrey CR4 4NX.
Tel: 081-640 9600.

Celestion subwoofer

Celestion's largest enclosure, the *SR8* subwoofer, uses the company's *Paraflow* system incorporating two 15in drivers one of which is electronically reversed. The flow of sound from each individual chamber is arranged to exit in phase and produce a natural bandpass response and SPL of 126 dB.

Celestion International, Foxhall Road, Ipswich, Suffolk IP3 8JP.
Tel: 0473 723131.

Martin monitors

Martin Audio's newly released *LE700* monitoring system has been beta tested by Capital Sound Hire on the Simple Minds European tour, APR on The North Sea Jazz Festival and European tour of Spanish band, Meccanno.

The *LE700* uses differential dispersion technology for the design of the high frequency horn and is based on Martin's previous *LE* products.

Martin Audio UK
Tel: 0494 535312.
Martin America
Tel: (708) 758 0652.

TAD LF driver

Pioneer's TAD *TL-1801* 18in low frequency loudspeaker can be used as a woofer or sub-woofer in a multi-way system and is the first TAD driver to use *Kevlar* cone material.

Usable frequency response is stated as 26 Hz to 2 kHz and -3 dB (45 degrees) off-axis at 800 Hz. The frame is made of die-cast aluminium with a 23mm edge-wound, oxygen-free copper, voice coil and a vented ferrite magnetic circuit. With a nominal impedance of 8Ω, sensitivity is stated to be 96.5 dB/1W.

Pioneer, 2265 E 220th Street, PO Box 1720, Long Beach, CA 90801-1720. Tel: 213 746 6337.

Meyer additions and enhancements

Meyer has released the *USM-1* stage monitor, *DS-2* mid-bass loudspeaker and updated versions of its *UPA-1B* and *UM-1B* sound reinforcement speakers.

The *USM-1* is intended for drum, keyboard and bass monitoring and has rigging hardware. It features a *MS-15* 15in low frequency speaker and *MS-2001N* driven modified radial horn and operates with Meyer's *S-1* control electronics unit.

The arrayable *DS-2* consists of two *MS-15* mounted in a folded horn enclosure with a hyperbolic flare with the same dimensions as the company's *MSL-3* with which it also shares recommended flying specifications.

The updated versions of the *UPA-1B* and *UM-1B* employ the new *MS-1401B* 1.4in throat, high frequency, driver and while they can be made sonically compatible with the existing systems, advantages include an extended response to 20 kHz with the region between 500 Hz to 8 kHz being flatter, reduced upper mid-range distortion and greater continuous and peak power handling.

Meyer Sound, 2832 San Pablo Ave, Berkley, CA 94702.
Tel: (415) 486 1166.
UK: Autograph Sales, 102 Grafton Road, London NW5 4BA.
Tel: 071-485 3749.

SHURE GENIUS

Mixed Grilles

Dave Foister serves a selection of new microphones, the CAD Equitek II, VTL CR-3A and the Audio-Technica 4033

The three microphones under discussion here have all been arousing interest in recent months, for quite different reasons: the CAD *Equitek II* because of its striking appearance, the VTL *CR-3A* because of its conscious imitation of an established classic, and the Audio-Technica *4033* because of the results it produces. All three are apparently intended as general-purpose studio microphones, so I tried them on a variety of sources, with an AKG *414 ULS* alongside as a reference.

Conneaut Audio Devices Equitek II

This microphone seems to have been designed to be as eye-catching as possible. Its sheer bulk, together with its anachronistic gold grille set in a modern black body, make sure it gets noticed, and it looks chunky and solid in the tradition of classic large-diaphragm condenser mics.

Closer inspection reveals that all is not quite as it seems. The capsule is much smaller than the housing would suggest, and the constructional precision is not quite in the Swiss watch class. On the review sample, the top and bottom halves of the body were not correctly aligned, which meant that the four switches were not lined up with their legends properly and the gleaming gold Conneaut Audio Devices badge was not central to the grille, which rather spoiled the effect. In addition, the stuck-on band round the neck of the microphone, proclaiming the make and model, was coming unpeeled. Although one does not buy microphones on the basis of appearance, this combination of deliberate flash and slightly shoddy detail sends interesting messages about what might lie inside where it matters.

The review sample was unfortunately supplied without the stand mount, which is a single-arm swivel bracket type in the style of the *TLM-170*. A mount like this is probably essential for such a large microphone, although the body also has a threaded socket for mounting directly on to a stand, with all the inherent limitations on mic placement. There does not seem to be a suspension mount available, although CAD make a big feature of the internal shock mounting of the capsule, which certainly seems effective.

The electronics incorporate some interesting features, such as servo head amplifiers, that presumably compensate for the shortcomings of the capsule, which is apparently less than perfect. The oddest feature is the inclusion of two NiCad batteries (9V PP3 style) which, surprisingly, are not simply an alternative to phantom power. While the microphone will operate for some hours on these batteries alone (or on dry cell equivalents) it will not work at all if they are absent or discharged, even with a phantom supply. The idea is that the batteries provide a reservoir of power to handle loud transients which would otherwise suffer from the current limiting effects of a normal phantom supply. Frankly this has never struck me as a particularly significant problem, but if it worries you then this is the microphone for you. The batteries are trickle charged constantly from the phantom power supply, only being used when needed. The down side of this arrangement is that the microphone must be physically switched off when not being phantom powered to prevent the batteries discharging. Recharging takes up to 15 hours, so a mic accidentally left on overnight will not be useable at all the following day.

Besides the on/off switch there are switches for bass roll-off, a 20dB pad, and polar pattern selection. This is the only one of these three microphones with variable patterns, offering omni, figure-8 and cardioid: the published diagrams suggest that off-axis colouration should be significant, but time did not allow this to be checked.

The sound of the microphone is quite acceptable and useable for most purposes, but does not match its image. Compared with the *414* it comes over as a little thin, lacking low-end warmth and slightly strident in the upper mid; this was particularly noticeable on piano. Having said that, it would probably hold its own against similarly-priced microphones, and gives good results on female vocals, with a smooth yet present sound.

The *Equitek* is being marketed as 'Tomorrow's vintage mic' which strikes me as a bit optimistic. Its variable pattern and workable performance should find it a wide range of applications, but I suspect its own image may be its worst enemy.

CTI Audio, PO Box 120, Harbor & Jackson Streets, Conneaut, Ohio 44030-0120, USA.

UK: Music Lab, 72-76 Eversholt Street, London NW1 1BY. Tel: 071 388 5392. Fax: 071 388 1953

VTL CR-3A

There are no prizes for guessing where you've seen

a microphone looking like this before. A microphone designed and marketed as blatantly in imitation of a classic as the *VTL* is simply asking to be given a rough ride if it fails to deliver the goods, and may deprive itself of a fair hearing. Since *VTL* never mention the original by name, I too will leave the comparisons up to you, but suffice it to say that the construction is not up to German standards.

On the review sample, the engraved legending — white on black — was already showing signs of becoming tatty, and the cat's-cradle suspension mount (which had rust showing on it) fell apart the first time I used it — one of the screws in the clamping lever came out. On the other hand, it is very pleasant to see a cat's cradle supplied as standard, in addition to a screw-on swivel stand mount. The suspension mount is not well-enough balanced to avoid a touch of droop, and it retains the microphone by means of friction on the inner surfaces of the elastic suspension bands, which I can imagine wearing thin with prolonged use.

The facilities the *VTL* offers are straightforward: the polar pattern is fixed at cardioid, and a high-pass filter and a 10 dB pad are provided. A basic foam windshield is supplied as standard, with a high-performance one available as an extra.

If the microphone is to be judged as an imitation, its success is probably proportional to the price ratio between it and the original, or even a little better. Its sound is rather middly; the extremes are noticeably absent, and the result is a bit boxy. This is borne out by the published curves. *VTL* enclose an individual frequency response graph with each microphone, which may be unwise; in the first place, the plot is not properly annotated — it doesn't even say what the level scale is — and in the second place, the plot that came with the review sample is really not much to brag about.

As with most microphones, the shortcomings are only a problem with certain sound sources, and again the results on female vocals were excellent. Indeed the microphone was always acceptable — particularly bearing in mind the price — and only appears less good by comparison with more expensive units. The point is that this comparison — odious as it may be — is invited by the design. The *VTL* risks, again, suffering from its own presentation; it is a perfectly serviceable microphone, but it may produce the same kind of reaction as cheap copies of classic guitars.

VTL Inc., 4774 Murietta Street, Chino, California 91710, USA. Tel: (714) 627 5944, (714) 627 8263. Fax: (714) 627 6988.
Europe: Tony Larkin Professional Sales, The Arches, Unit 6, Furmston Court, Letchworth, UK. Tel: 0462 490125. Fax: 0462 490126.

Audio-Technica 4033

Audio-Technica is still in its infancy in the professional market, and not having encountered it before, the *4033* Transformerless Capacitor Studio Microphone came as a very pleasant surprise. Its styling is distinctive and elegant, the finish is excellent, and the cat's cradle, again supplied as standard, is simple and effective and balances the microphone very well. Everything about the microphone looks and feels sturdy and professional. Once again the facilities are simple; the only switches are for the high-pass filter and the pad, and the polar pattern is cardioid.

But the biggest surprise was the sound. On everything I tried — including a Steinway grand — the output was virtually indistinguishable from that of the *414* — open, transparent and clean, quiet and free of colouration. The main difference was in the sensitivity — the *4033* is a few dB more sensitive than the *414*.

If this is an example of what Audio-Technica has to offer, I await further developments with interest. A variable-pattern microphone with the sound of the *4033* would be a very useful addition to the arsenal indeed. As it stands, I can't imagine it will be long before this microphone is a much more familiar sight.

Audio-Technica Corp., 1348 Naruse Machida, Tokyo 194, Japan. Tel: 0427 295113. Fax: 0427 281710.
UK: Audio-Technica Ltd., Technica House, 11 Lockwood Close, Leeds LS11 5UU, West Yorkshire, UK. Tel: 0532 771441. ■

David Foister is Head of Recording at the Guild Hall School of Music, Barbican, London.

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EXPLORING EQUALISERS

Part 1 of Ben Duncan's look at the engineering and design factors that govern analogue equaliser's sonic quality begins with a recap of the multitude of EQ techniques

Reasons for using EQ and musicians' and engineers' expectations, vary from person to person. The term 'EQ' covers everything from an optional, slight HF dip to make a recorded instrument sound a touch less bright, to multifaceted critical high-Q responses essential to achieve a usable howl-round threshold in stage monitoring. The most common use is to get close-miked instruments to sound natural, good, or just different. In recording, enduring quality is a keynote. The sonic qualities of different console makers' equalisers is a hotly debated topic. This article will step beyond Michael Gerzon's recent global update[1] on the subject, into the realms of real analogue EQ circuits and how they behave.

Direction

I will focus solely on the kinds of equaliser apposite to recording, the circuitry behind the knobs found on recording consoles, or in outboard units that are regularly plugged into consoles: the EQ used to change the tonal quality or 'sound' of a recorded instrument or vocal. This is not so much a type of equaliser more a kind of usage. It's just as relevant to live sound productions, provided we ignore EQ that's addressed at the failings of the transducers and acoustics.

Having introduced the cast, subsequent parts are planned to graphically demonstrate hitherto suspected but uncharted reasons for sonic differences. Advanced computer simulation techniques have been developed to illustrate aspects of EQ behaviour not previously vented in public.

In the beginning

The simplest and most historic kind of tonal adjustment is a progressive reduction ('roll-off') in level below and above mid frequencies, alias bass and treble cut controls. Response curves of this type are created by the 'tone' controls of pre-'70s '*Dansette*-esque' replay systems and traditional electric guitars, as well as, unintentionally, the result of long cables and incorrect equipment matching. The circuitry providing the action requires only passive (unpowered) components, although it may be connected across, or included within, active circuitry. It is preferably buffered (isolated) from the outside world by the same. **Fig. 1** shows a modern execution, configured for this series. The two EQ networks, in boxes, are buffered from each other and isolated from the outside world by op-amps A1,2,3, while resistor sizes have been scaled for a fair balance of noise *vs* loading for use in a recording chain. The high load (>10 Ω) and low source (<50 Ω) impedances provided by A1 and A3 at the input and output respectively are assumed in all the subsequent diagrams and analyses.

Fig. 2 and **Fig. 3** show the family of response curves for the equaliser, stepping a linear pot over a number of equal resistance (or knob position) increments, as opposed to integer dB steps. All subsequent plots in this series will follow this pattern, which focuses on how the control 'feels' to the sound engineer. Notice how for LF and HF alike, the change in EQ crowds at the pot's low resistance end on the right, as signified by the wider graph spacing. Crowding of the actual curves represents the opposite, where EQ changes least per degree of knob rotation. Using a log law pot helps but does not entirely even-out the 'feel'.

Developing a boost

Today, 'cut only' facilities are in vogue for graphic equalisers used for acoustic correction but they would be unduly limiting in a recording session. Low and high frequency boost were originally achieved by causing the cut curves to shelve, meaning the amount of attenuation levels off (as seen in the lower half of **Fig. 6**). The EQ network is then followed by an amplifier that has enough gain to make up the level to 0 dB where the roll-off shelves. This has the effect of making

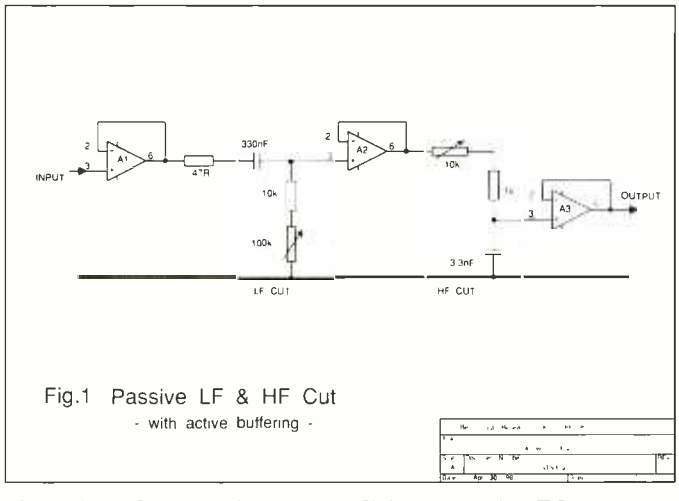

Fig.1 Passive LF & HF Cut
- with active buffering -

Fig. 1: A modern version of a traditional passive EQ

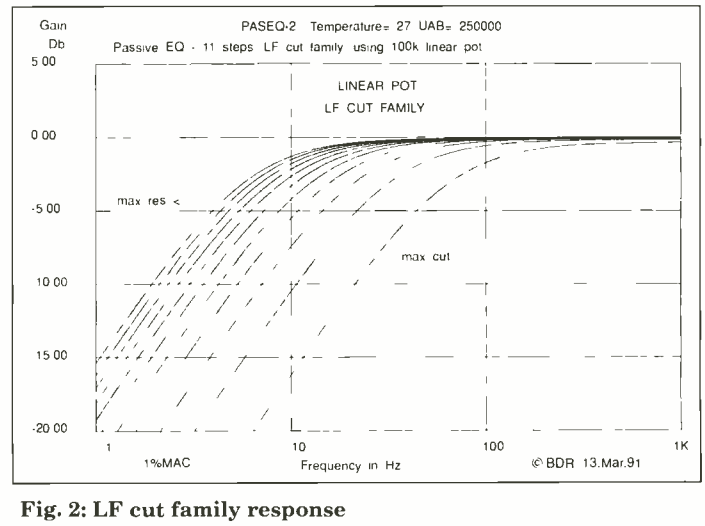

Fig. 2: LF cut family response

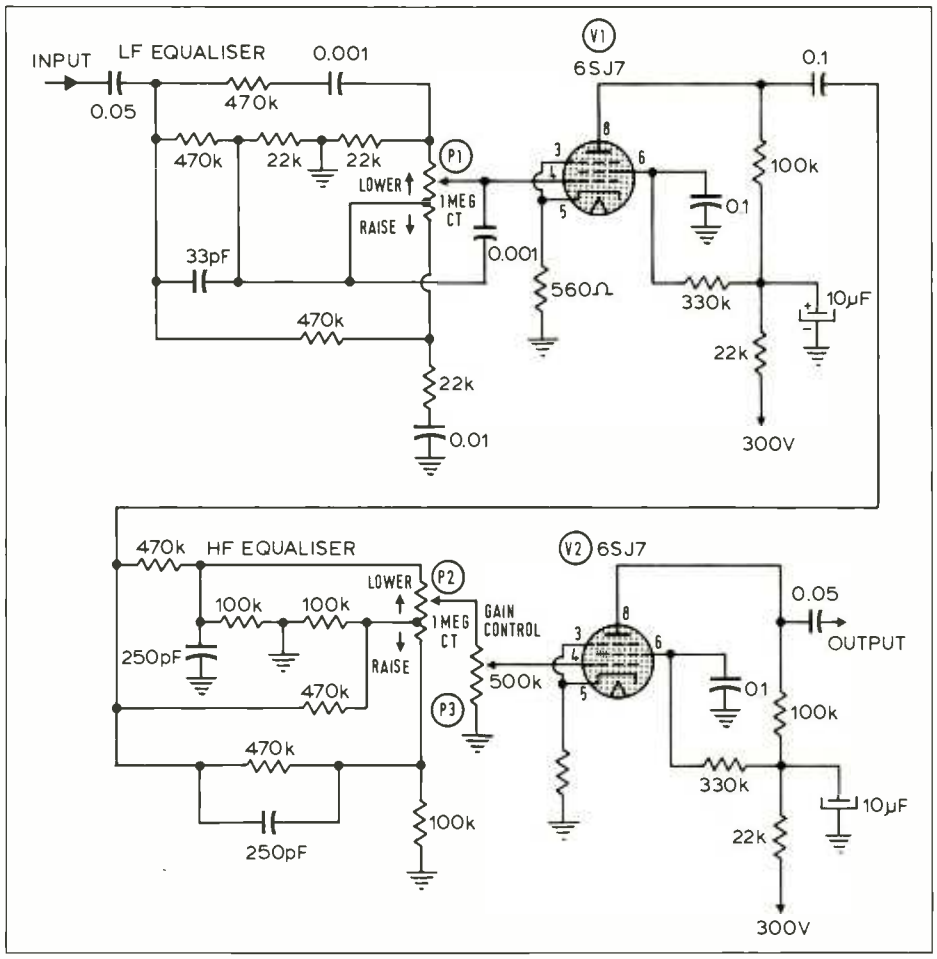

Fig. 4: Passive shelving EQs were followed by amplification for boost settings

the shelved portion the norm, so relatively speaking, the unprocessed frequency area has been boosted. **Fig. 4** shows a typical circuit using this technique, dated pre-mid '50s[2]. Akin to **Fig. 1**, the LF and HF sections are cascaded and isolated by individual amplifier stages, using pentode valves (tubes). Note the 'lower/raise' controls have a centre tap, a fourth, fixed terminal that's a sign of real engineering, dutifully included to positively ensure a flat response in the centre. On how many modern, costly consoles is the EQ so equipped? Later, the perils of the modern short cut, the centre-detent, will be revealed.

Compared to the modern cast, this kind of equaliser had three potential disadvantages, even if redressed with modern op-amp gain stages. First, the gains of the make-up amplifiers use up headroom and/or raise the noise floor. Noise from the second (and to a lesser extent the first) is invariant, broadband, unrelated to, and probably not masked by, the EQ. Today, if anyone cared, the setback might be overcome by using a VCA IC in place of the tubes, to maintain optimum gain structure in concert with the 'lower/raise' controls. Second, the LF and HF sections require individual amplifiers because the gain stage they're relying on for boost isn't by itself frequency selective. It is anyway desirable to avoid interaction between the HF and LF settings.

Interaction at the controls of *any* analogue EQ has two fundamental causes. The problem in **Fig. 4** is down to the impedance sensitivity of passive networks, and the way they can load each other. As illustrated, it can be avoided by giving each EQ section its own amplifier/buffer stage. The other kind of interaction isn't avoidable, and is universal, being down to acoustic and mathematical inevitabilities: barring high Q (not nice with music!), there are limits to the sharpness of curvature in an amplitude plot. Some squashing and warping of any individual response is inevitable when additional EQ effects are sited too close, especially having settings that are contrary, or employ much more or less boost, or cut.

The third setback with passive boost/cut EQs is that to get a reasonable 'feel' from the knobs, meaning the degree of audible effect varies fairly consistently over the span of the control, and 0 dB in the centre, the potentiometers need to have unusual and rather quirky rotation laws, for example anti- or semi-log. Looking on the bright side, we have at least reached the minimum, 2-band HF+LF boost/cut equaliser configuration . . . something almost axiomatic, that's appeared and been found useful on nearly every mixing console for half a century. Together or individually, the two controls can be used to make the program brighter or fuller, or to partly alleviate many kinds of environmental 'noise'.

Baxandall's legacy

The Baxandall 'bass and treble' tone control circuit is familiar, if not famous, in every 'Westernised' household across the globe. It was originally published in the pages of *Wireless World* in 1952. Peter Baxandall's background was in Britain's elite analogue electronics engineering corps, the RSRE. The Baxandall circuit revolutionised tone controls by placing the EQ elements within a negative feedback loop (**Fig. 5**), so the associated amplifier (A2 in this instance) provided not a fixed gain but frequency dependent loss or gain equal to the boost and/or cut respectively. Moreover, both bass and treble were controlled by the one amplifier, virtually without interaction. Baxandall's circuit provided real boost, less hiss, used fewer parts and gave a consistent and almost symmetrical dB boost/cut response using regular, linear control pots.

Baxandall's configuration wasn't the first to exploit negative feedback principles — it had first ▶

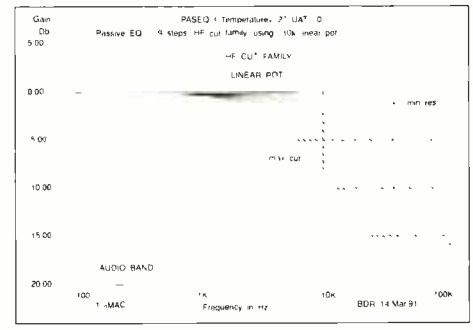

Fig. 3: HF cut family response

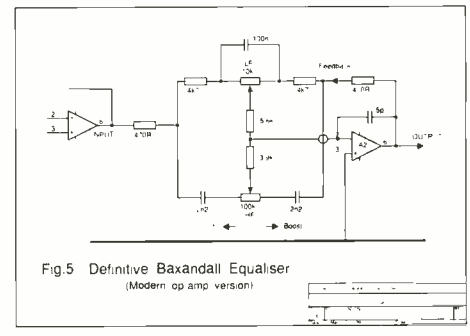

Fig. 5: Definitive Baxandall EQ

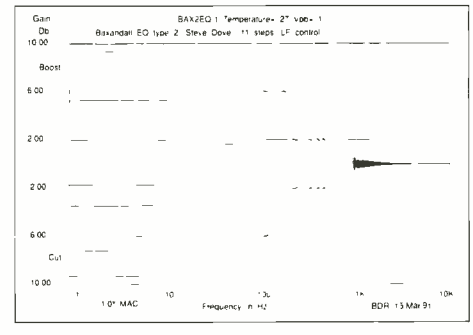

Fig. 6: Baxandall LF control

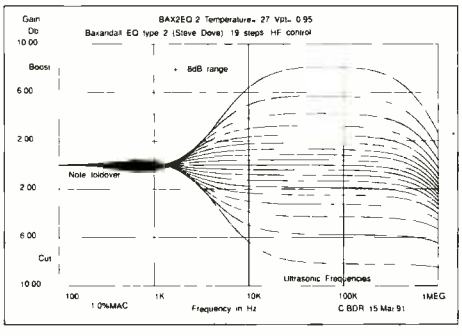

Fig. 7: Baxandall HF control

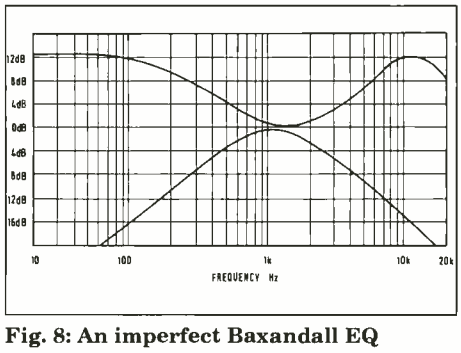

Fig. 8: An imperfect Baxandall EQ

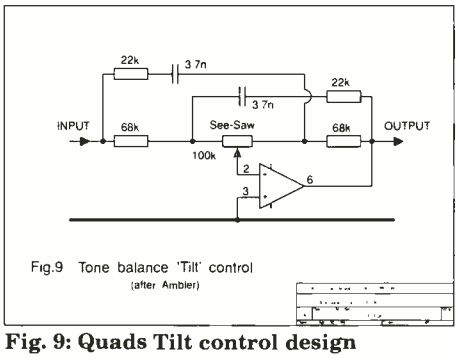

Fig.9 Tone balance 'Tilt' control
(after Ambler)

Fig. 9: Quads Tilt control design

been tried in the late '30s[3] — but previous attempts had met with problems of instability. In the ensuing 40 years, Baxandall's masterpiece has since been employed in countless audio products worldwide, from the lowest breed of 'consumer audio' through to blue chip recording boards. Along the way, Baxandall's circuit, originally built around a valve gain stage, has proved viable throughout four generations of amplifying devices (1955, Germanium bipolar transistor; 1963, silicon bipolar; 1967, the J-FET; and 1970, the affordable IC op-amp) as well as surviving pro-audio's manufacturing and sonic fads.

The 57 varieties

Fig. 5 shows a 'definitive' Baxandall in modern format, the industry standard LF/HF shelving EQ. Baxandall's topology is remarkable for the seemingly endless and sometimes wild permutations in component values and apparent topology it can take without deviating, hesitating or going off the subject. All provide much the same explicit behaviour. Inherently, the slope of boost and cut is limited to a maximum of ±6 dB at extreme frequencies, falling to ±4 dB where the curves begin to affect each other in the midband. The principal way a Baxandall EQ can be badly designed (or made fit for disco mixing) is by closing up the gap between, or even overlapping the LF and HF origins, so the LF 'hinges' above 1 kHz, and the HF below. This gives added boost and cut at the band edges, and more dramatic tonal variations at the cost of having both controls affecting the midrange. When it occurs, interaction is strongest with boost settings.

Different manufacturers' interpretations of the Baxandall result in the boost/cut reponse curves taking-on one of several courses. They may continue steadily falling (**Fig. 8**) or rising beyond audible limits. It will run out of gain, and fall off,▶

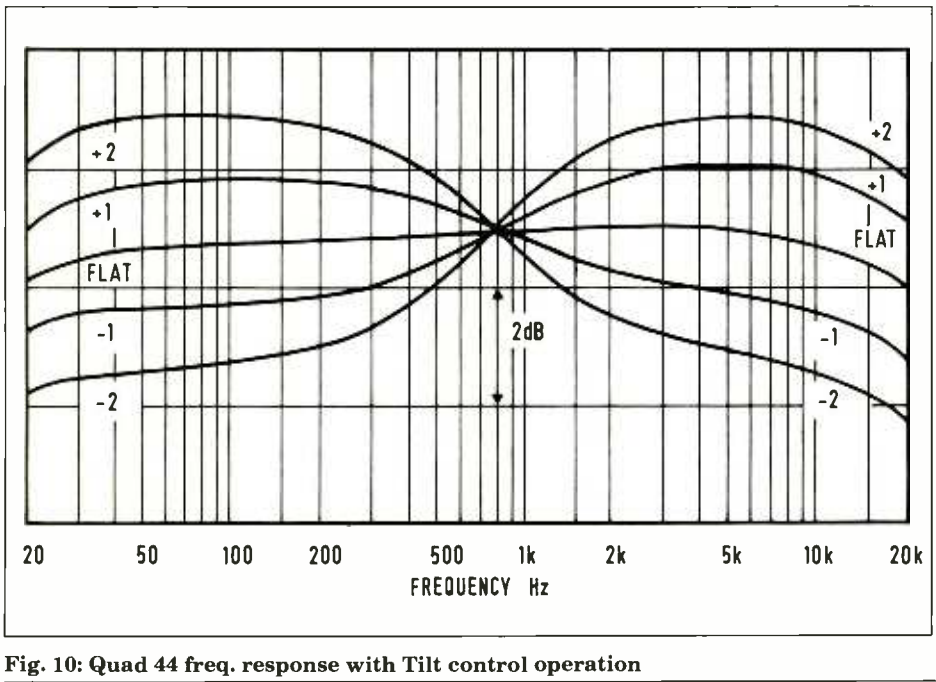

Fig. 10: Quad 44 freq. response with Tilt control operation

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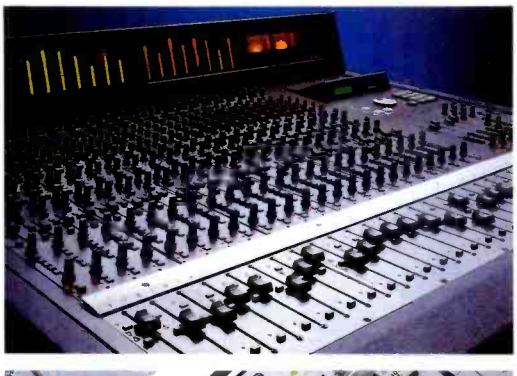

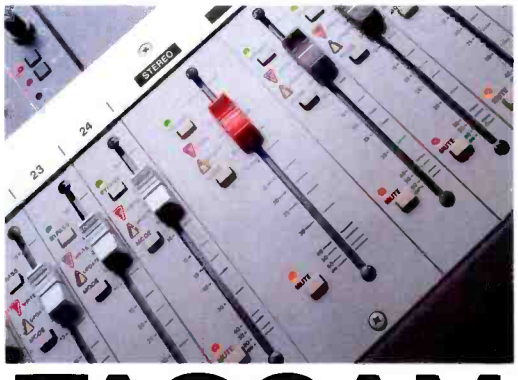

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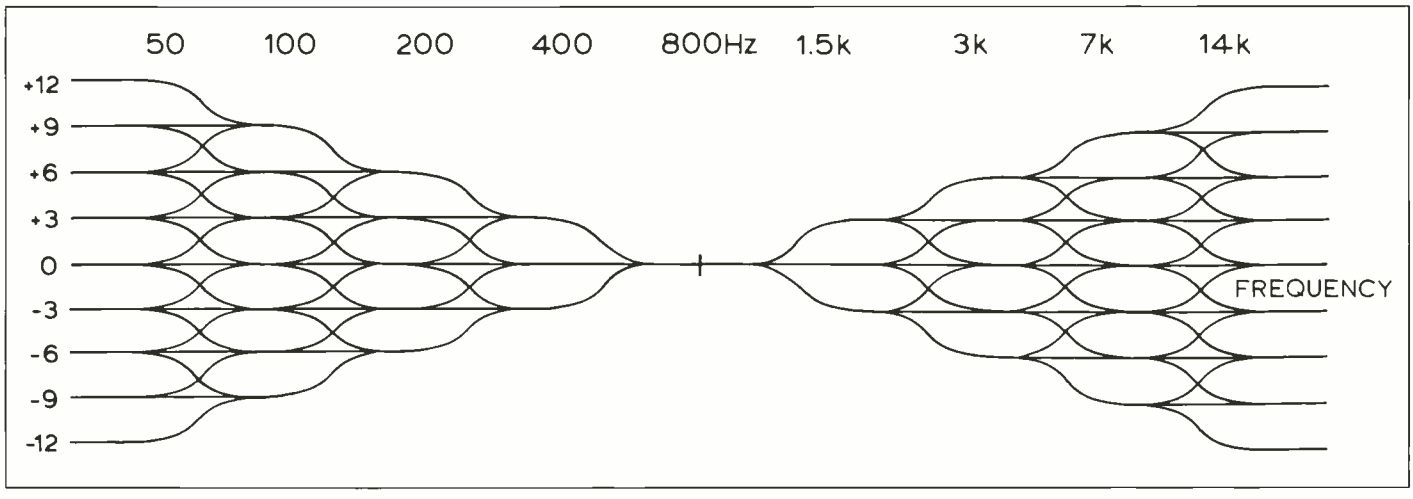

Fig. 11: John Lindsey-Hood's 'The Clapham Junction Equaliser'

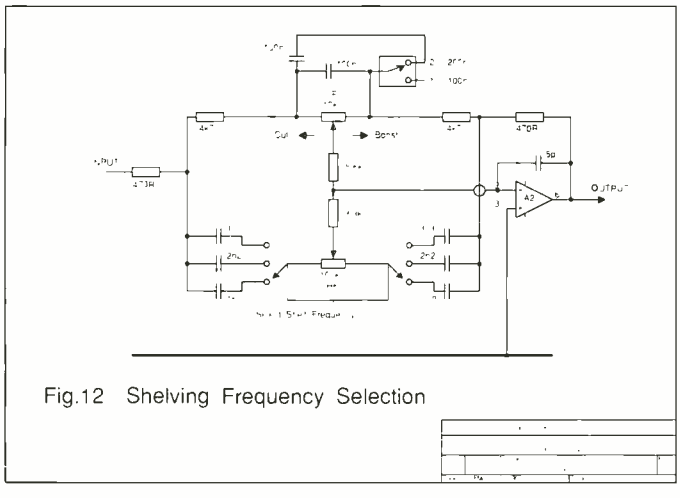

Fig. 12: Switch-selectable shelving appeared in the '70s

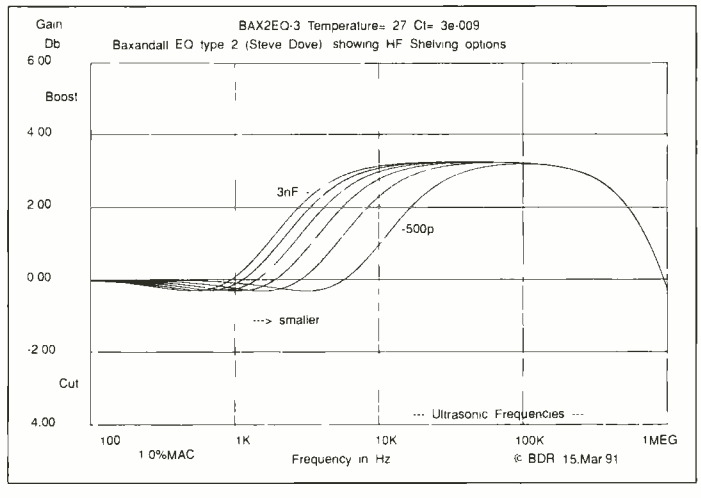

Fig. 13: HF shelving options

but not before it has disproportionately amplified subsonic and ultrasonic nasties, using up valuable headroom on things you can't hear. In a well designed circuit, the response should either be falling back to 0 dB within an octave of leaving the audio band and preferably shelving at least an octave before the band edge. If shelving, the frequency conscious parts shouldn't let it try to continue raised to +*x* dB into VHF realms, as the amplifying device must eventually run out of steam and nasty intermod products will begin bouncing down into audible realms. Much beyond 100 kHz, little more than four octaves above 20 kHz, a decent equaliser's boost curves should be retracing their steps to 0 dB and below, while the amplifying device's bandwidth should be maintained for at least another decade (to >1 MHz). This means for a maximum boost of ±15 dB, the op-amp (A2) should have a GBWP of at least 8 MHz when handling HF EQ. Many don't. The TL071-2-4 series, standard fare in many consoles, have only 3 MHz, less than half the requirement.

Fig. 6 and **Fig. 7** show the family of LF and HF boost/cut responses produced by **Fig. 5**. The HF response has been extended to 1 MHz, to show the full picture. Once the HF roll-off is ignored, the set is almost perfectly symmetrical in the *x* (boost/cut) and *y* planes (LF/HF). Less perfect interpretations of Baxandall's original show a marked *x*-plane asymmetry (**Fig. 8**) between boost and cut curves. The cut curves don't shelve (at least until they're well below the audio range), although whether this matters to the ear is debatable.

A closer scrutiny of **Fig. 6** and **Fig. 7** reveals that the HF control's spacing is less linear, the outcome of a lowish value pot and/or 'stopper' resistors. The effect is a reduced rate of change of EQ around the knob's centre position, a positive asset if the pot hasn't a centre-tap or detent. The HF and LF responses have been plotted separately so their response in each other's territory can be seen clearly. The LF curves taper neatly into 0 dB just above 1 kHz, but the HF curves perform a 'foldover' in the LF territory, showing interaction with the bass EQ even when it's set at 0 dB. The 'foldover' points to potential for some subtle, perplexing, multitonic changes in midrange when the HF knob is adjusted. Perfect symmetry can be gained by splitting and cascading the LF and HF sections, giving them individual op-amp buffers. Many middle and up-market consoles follow this route.

Alternative approaches to LF/HF EQ are few enough to be esoteric. For many years, Quad's hi-fi pre-amps have been fitted with some form of tilt circuit (**Fig. 9**), which combines gentle LF boost with HF cut and *vice-versa*, giving a 'see-saw' response with a maximum boost/cut of ±2 to ±3 dB (**Fig. 10**). The beauty is its simplicity: there is only one knob. The circuit used in Quad's more recent 34 and 66 control units is based on a design published by Ambler[5], modified by Peter Baxandall to give a more uniform tilt over a wider frequency range[4]. In 1982 veteran DIY audio designer John Lindsey-Hood published[6] a sophisticated shelving EQ with so many permutative inflexions it's called 'The Clapham Junction equaliser' (**Fig. 11**). It was the fruition of a string of shelving and tilting developments published in *Wireless World* over a period of 12 years [5789]. For better or worse, none of these schemes has made much of an appearance outside living rooms. Instead, by the early '70s, UK console makers were increasing the Baxandall EQ's versatility by including switch-selectable shelving turnover frequencies (**Fig. 12**). **Fig. 13** and **Fig. 14** show the effect of stepping the

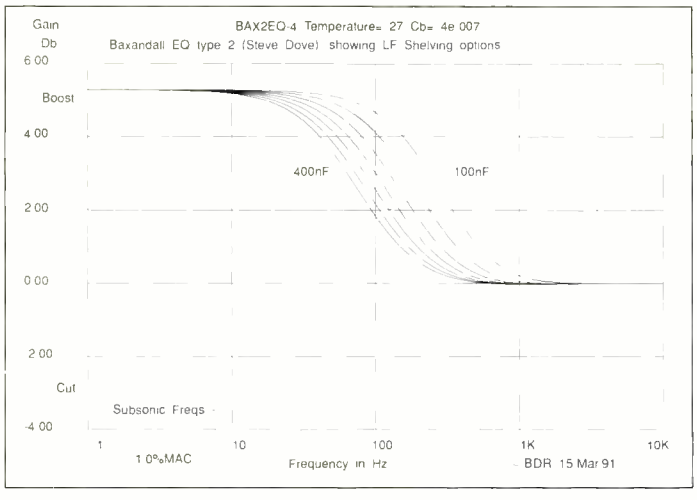

Fig. 14: LF shelving options

capacitors that set the shelf's turnover frequency, with both controls set for moderate boost. With decent rotary switches being costly, most consoles are limited to one or two pushbuttons, giving two or three quite coarse 'shelf frequency' options per band, not the seven much finer adjustments pictured in **Fig. 14.** ■

TECHNICAL TERMS

Clapham junction: Like a railway marshalling yard
FDC: Frequency Determining Capacitor
GBWP: Gain-BandWidth Product; a figure of merit for an amplifying device, signifying the ability to operate linearly with high gain at high frequencies
R.C: A Resistor-Capacitor pair
RSRE: Royal Signals & RADAR Establishment (UK)

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Acknowledgement

All response plots, excepting Figs 8, 10 & 11, were produced by computer simulation using Spectrum Software's *Micro-CAP III* (Circuit Analysis Program). Acknowledgements are due to John Szymanski at Spectrum, Sunnyvale, CA, USA, for rapid assistance with devising special 'tools' needed for efficient, audio-friendly modelling.

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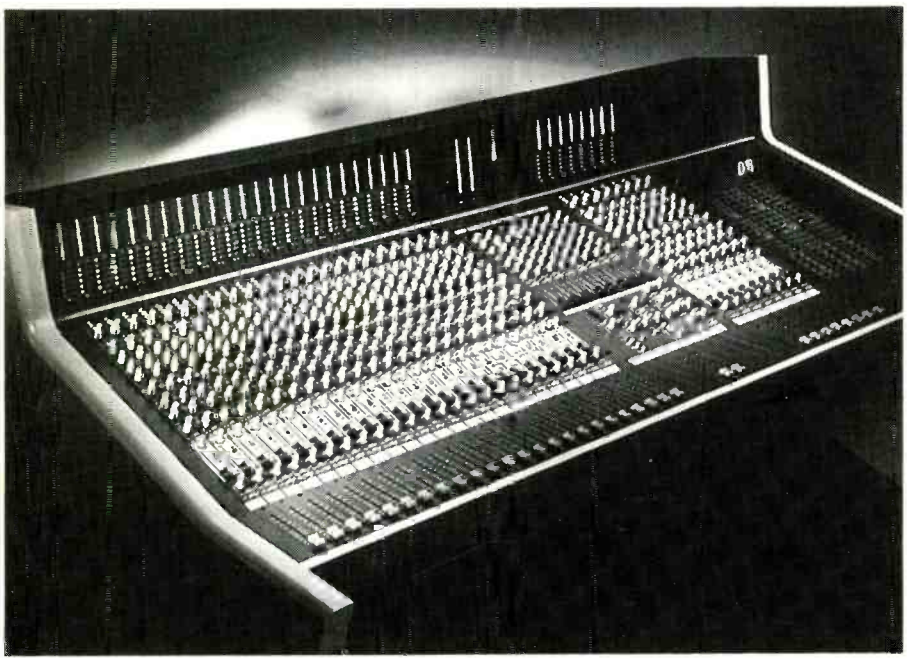

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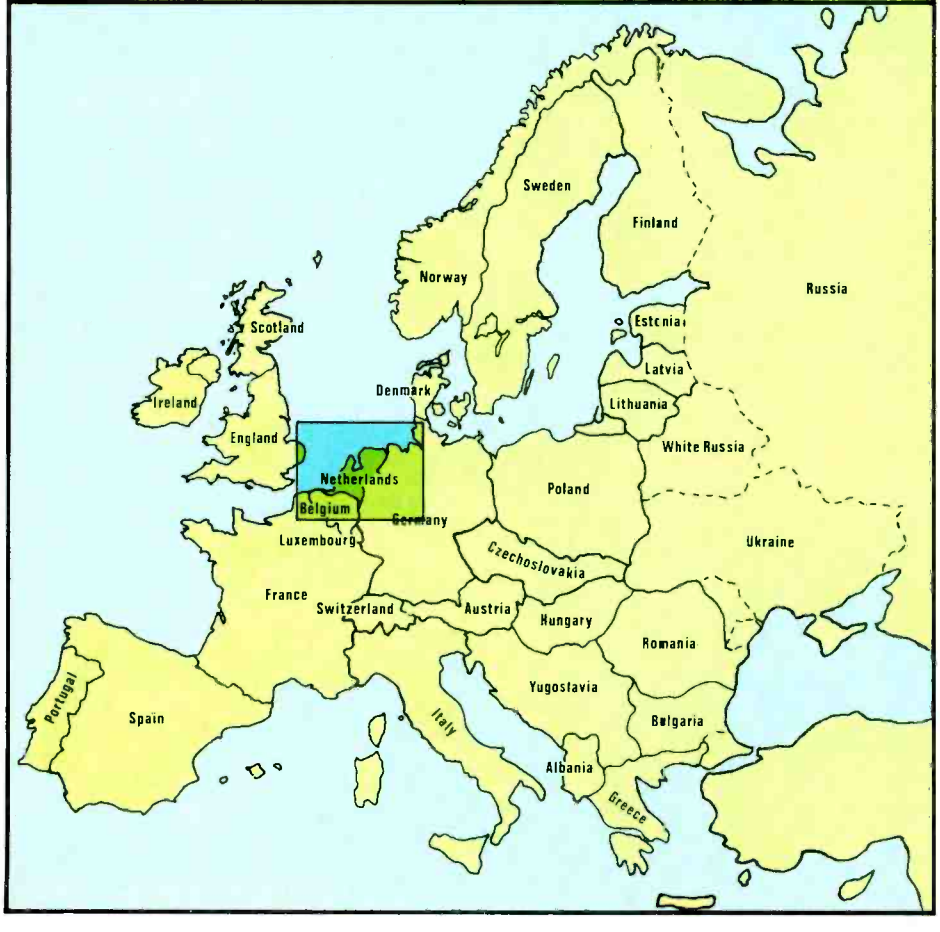

GOING DUTCH

Hans Beekhuyzen gives the low-down on Holland and The Netherlands in the second part of our survey of recording in the European Market.

The Netherlands is but a small country, it's surface measures only a quarter of that of the United Kingdom. With 15 million inhabitants the population is only one third the size of the British population. This means that, statistically, The Netherlands is a very crowded place. In the encyclopedia it is described as the country with the highest number of people per square metre. As a recording country it is very active as well. There are over 500 recording studios registered, scaling from a multi-studio company to the smallest you can imagine. If you look at the digital multitrack-to-inhabitants ratio, The Netherlands comes sixth, with a ratio of 1:1.6M. The ratio in the USA is 1:1.5M. And the maximum driving distance between any two studios is only two hours, three if the traffic is extremely bad!

The people

So is Holland a small but very busy country? Well, it is, yet then again it is not. Let me first explain that geographically Holland is the north-western part of The Netherlands and that the majority of all commercial activities find place in this area. The major cities are The Hague (government), Amsterdam (culture) and Rotterdam (trade and ▶

The canals of Amsterdam, a modern day metropolis.

transport). In these cities the pace of living is the highest of The Netherlands. A town like Amsterdam has all the things that make a metropolis; culture, multi-racial population, museums, above average criminal behaviour, etc. It is not a town where you can lose yourself easily. And although the working pressure and production is amongst the highest in the Western world, people in general are more relaxed than in cities like New York, London or Hamburg. One of the first remarks American artists make when they work in Dutch studios is: "Working here is so relaxed".

The Dutch are, by tradition, tradespeople and therefore very internationally orientated. They are quite tolerant, although they sometimes think differently of themselves. They like to think they are the complaining kind, never satisfied. There is a frequently used saying in Holland: 'The grass further on is always greener'. But this attitude might just be a defence against extremes, that they definitely do not like that amongst themselves, (for foreigners it's different!) 'Just be yourself, that's already strange enough'; as another saying goes. For a foreigner this attitude is most pleasant, one feels comfortable when the host plays the role of the underdog. There are other things visitors from abroad like, there is always someone that can communicate in a modern language, be it English, German or French. Some level of English is spoken by a large number of adults, and even a number of children speak the language, due to the English and American TV series that are broadcast with subtitles. German is very like Dutch and the older people especially speak German to a certain extent. French is spoken only by the more educated people. In studios both English and German should be no problem, the larger studios will have French speaking staff as well.

Money

The Dutch Guilder (Gulden in Dutch) rates for about £0.28, or, put differently, one Pound Sterling is about DF1 3.50. In The Netherlands the international indication for the guilder (DF1) is not used. Instead a cursive 'f' is used, finding it's origin in the latin word 'florin'. There are banknotes of 1000, 250, 100, 50, 25 and 10 guilders and coins of 5, 2.50, 1, 0.25, 0.10 and 0.05 guilder.

Like in many European countries there are cash machines on nearly every street corner. They accept Master Card, Eurocard and the Eurocheque card. To cash-in on other credit cards you will normally have to go to a main branch. Travellers cheques and Eurocheques can be cashed in at every bank.

Hotels and Restaurants

Hotels in The Netherlands are fairly priced and available in all classes. The most expensive hotels in Amsterdam are not as expensive as comparable hotels in London or Berlin. Usually the Studio Manager will have a good contact at one or two hotels that offer the best facilities for recording artists.

Dutch cuisine is absolutely excellent, although real Dutch food is seldom served. Generally restaurants are based on French cuisine but you will find Italian, Indian, Greek, Argentinian and other foreign restaurants throughout the country. One word of warning though: due to the colonial past there are a number of chinese restaurants that serve indonesian gourmets of chinese food. There was a time when a so-called Chinese restaurant was nothing more than an Indonesian restaurant. Good, but different. Then things were simple. But over the last ten years a number of Chinese restaurants have appeared specialising in real chinese food. These are quite good and usually specify which chinese cuisine they follow. (Cantonese, etc.)

Studios

When you look at the AV market there are two areas of importance: Hilversum and Amsterdam. Hilversum is 'broadcast-town'. It is the home of the public radio and TV. If you ever want to do a promo on TV, or radio, get some help. The public broadcast system is quite complex. The Hilversum area is also the home of PolyGram and therefore a large number of affiliating companies are found in this area. But don't be fooled by the names, all towns mentioned up until now are within one hour's drive of each other, traffic jams taken into account!

The largest studio in The Netherlands is Wisseloord of Hilversum. They are internationally known and artists like Def Leppard, Mick Jagger and Elton John have recorded here. There are four studios, differing in size and equipment. Another large studio, formerly known as Soundpush, is now owned by the Bolland brothers and mainly used for their own productions. The same goes for Bullit Sound, owned by Bullit Productions, Bullit is owned by Willem van Kooten, who was the very popular DJ 'Joost de Draaier' in the sixties and seventies. All other larger recording studios are single studio venues and a large number of them have SSL consoles installed. Some studios have digital multitracks, like Wisseloord (both PD and DASH), Soetelieve of 's-Hertogenbosch and Bullit (DASH).

Others deliberately chose analogue, like Studio 150 of Amsterdam that found the sound quality of an Otari *MTR-100*/Dolby *SR* far superior. Studio 150 is quite internationally orientated and have recorded Def Leppard and Randy Crawford.

If you would like to record in a classic dutch town, Studio Arnold Mühren of Volendam might be your choice. Volendam is a traditional fisherman's harbour, but also the cradle of a large number of Dutch musicians. Arnold Mühren used to be the bass player of The Cats, a band that was very popular in the late sixties and early seventies. Zeezicht Studio of Spaarnwoude might be of interest too. It is the studio where the young dutch saxophonist Candy Dulfer records her albums. Spaarnwoude is in a very pleasant part of Holland and near to Amsterdam. So if you would like to be out of town, but not too far away from city life, Zeezicht (literally Sea sight, although the sea is a half-hour drive away) might be good.

Fendal Sound of Loenen might be fine too. Only a 15 minute drive from Amsterdam, Hilversum or Utrecht, this SSL equipped studio is situated in the green fields of central Holland.

If you like a fun atmosphere, the cosy south might be your choice. That area is not so urbanised as the west and the pace of living is slower. Yet all the advantages of the civilised world are there.

MMP of Waalwijk is a quality studio with Sean Davies acoustics, Westrex Console and a large studio floor. ▶

THE NEW PANASONIC PROGRAMMABLE DAT. JUST LOOK WHAT YOU CAN GET OUT OF IT.

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ES-BUS AND SERIAL CONTROL PROTOCOLS.

Such is the versatility of the SV-3900, it can be used equally successfully to record music or as a scientific research tool. You can, for example, interface it with a wide variety of digital devices – CD players, workstations, recorders. Or, alternatively, it can be networked with up to 31 other SV-3900 DAT machines. (To achieve this you can use either the RS-422 industry standard computer interface, or the optional SH-MK390 remote controller.)

Communication on ES-bus and P2 interface is two-way. All tape and transport modes and functions can be controlled by computer, which in turn can receive and act upon technical and diagnostic information imparted by the SV-3900. Absolute/program times, counter number, error rates and the sampling frequency setting can all be read by the control computer.

With suitable software, the potential applications are almost limitless.

You could for example compile an overnight radio broadcast by using pre-recorded material from one machine, library selections from another and then patch into network news broadcasts at the appropriate times. (It goes without saying of course that traditional eight track cartridges are a thing of the past.)

Other less obvious applications include sophisticated telephone call management, data capture and satellite radio broadcasting. And because any sort of digital information presented in IEC II or AES/EBU format can be handled, the SV-3900 can even be used as a data recorder for remote applications such as monitoring oil flow in pipelines (Information could be downloaded over the phone, or other network.)

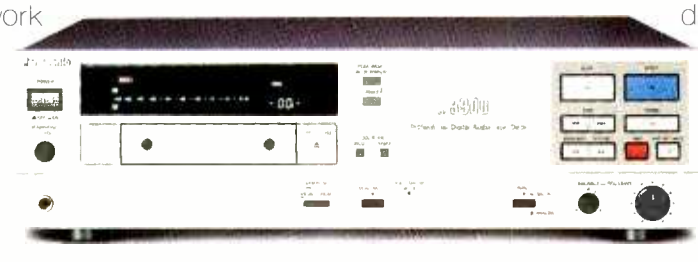
Analogue data logging is of course possible using balanced inputs between −14dBu and +26dBu with > 92dB dynamic range.

ONE-BIT ADCs.

Naturally the SV-3900 also offers stunning audio performance. One-bit ADCs linked to 64X oversampling anti-aliasing filters mean a complete absence of zero – cross distortion, and ensure total transparency and lucid detail at both high and low levels.

Similarly, the high resolution 4DAC system ensures low distortion and enhanced linearity at low levels on playback. Other useful touches include an error rate display (on-machine or output to the control computer) to keep you informed on the condition of tape and heads. A new tape transport system that allows access to any point on a two hour tape within 27 seconds. And, as you'd expect, sampling rates can be switched between 32, 44.1 and 48Khz.

The list of features packed into this machine is truly remarkable. But go down to your Panasonic dealer and you'll find the most impressive feature of all is tied on with a piece of string. A price tag of around £1300.



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STUDIO SPOTLIGHT

Wisseloord Studios
C. Van Renneslaan 10
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PO Box 1625
1200 BP Hilversum
Tel: (0) 35 217256
Fax: (0) 35 44881

Bookings: Marcel Gelderblom

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Acoustic designs Eastlake, monitors Quested, consoles SSL *4000* series. Recorders: Studer *A800/A820* (also available at extra cost) Sony *3348/3324*, Mitsubishi *X-880*, Dolby SR. Separate digital editing suite with digital console and EQ.

The rental company Hilton Sound Europe is also situated on the Wisseloord complex with their large equipment inventory

Soetelieve of s-Hertogenbosch is equipped with a Sony MPX *3000* console and a *PCM-3324A*.

Up north the people are more reserved, especially in Friesland where there is a scenic lake district. The number of studios there are limited, however.

Travelling

Although there are a number of airports in The Netherlands, such as Eindhoven, Rotterdam and Beek, the main Dutch airport is Schiphol near Amsterdam.

The train from Schiphol to Amsterdam leaves every 15 minutes and will take you to Amsterdam Central within 20 minutes. The fares are good, £1.30 for a single, second class ticket. The first class ticket is just under £2. Hilversum single will cost you £3.50 (£5 in first class) and the travelling time is about 50 minutes.

These fares are in contrast with the Schiphol taxis, which charge £0.66 per km, about one pound a mile. A trip to Amsterdam Central would cost about £10, a trip to Hilversum about £40. Dutch taxis are expensive and the Schiphol taxis are the worst. It must be said, though, that they are of high quality. On these routes, however, they will not be faster than the train.

Public transport, in general, is good in The Netherlands, the trains and buses are comfortable and the number of services they run is high. But since the highway system is quite good too, it might pay off to rent a car. Rental rates are about the same as in the UK.

Road signs are everywhere and the indications are very clear. Outside the town borders road numbers are always indicated, as are the nearest towns and the final destination of that route. In a smaller town there are always signs to the nearest large city. The large cities use a pointing system that uses the postal code. This code is built around four digits and two letters. The first two digits are unique to the town, the third stands for a district and the fourth digit stands for a small number of streets. The indication system uses the third and fourth digit.

The traffic jams in The Netherlands are quite moderate. There are three or four places where you will find real traffic jams, one that might delay you for half an hour, or even more. These are caused by inbound traffic to Amsterdam and Rotterdam in the morning and outbound in the evening. They will be of little consequence for a recording artist or producer. Compared to the London area the traffic jam problem is almost non-existent in Holland. Exceptions excluded, of course.

Unions and government

The Netherlands are free of union interference. This means that there need not be a tape-op, tea-break or limited recording time per day. This, in general, is an advantage but people that are not used to this freedom tend to exaggerate. Although it is possible to record 18 hours, 7 days in a row, there is no point in doing so. Both the artist and the recording engineer will wear out eventually.

To record in The Netherlands it suffices to have legal admission to enter the country. For inhabitants of the EEC this means that they can visit The Netherlands for a period of three months without any documentation. If you need to stay for a longer period, a permit must be applied for. This will hardly ever be the case since most artists will spend at least a weekend at home within a three month period. When they return a new period of three months will begin. Even if you need to be in The Netherlands for a longer period, a permit can easily be obtained as long as you do not work for a Dutch company. As said before, the Dutch are tradespeople and will not stop you from spending money in The Netherlands! Only when you do work that could have been done by a Dutchman, would it be better to check. So if you want to do a gig in between the recording sessions, some paper-work has to be done. The 'Arbeidsbureau', the labour exchange bureau, is the place for more information, but many studios, or the organisers of the concert, should be willing to take care of that. If you are from a country outside the EEC (or, rather, have a non-EEC passport), you probably need a visa. It might be wise to apply for a business visa and make clear that your business is spending money. For the rest the same applies as for EEC inhabitants.

- Recent D&R contracts include the Amsterdam local broadcast organisation SALTO who have decided to buy four Airteq consoles including the SiCo communications systems for their four broadcast rooms.
- Recent deliveries of the Avalon console went to Studio Nederland in Amsterdam; and RBS studios in Rotterdam.

USEFUL CONTACTS AND INFORMATION

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Police The Hague, Tel: +(31) 70 3104911
Police Amsterdam, Tel: +(31) 20 5599111
Dutch Embassy, London, Tel: 071 584 5040
Dutch Tourist Board London,
Tel: 071 630 0451
Liaison Committee for Dutch orchestras,
Tel: +(31) 2020 9000

Bullit Sound Studios, Tel: +(31) 2945 4027
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A Netherlands FACTSHEET is available from Studio Sound on request.

HOLD THE BUS!

Zenon Schoepe pursues a deluxe mobile in the streets of Tokyo

Mobile recording has taken on a decidedly luxury feel in the crowded streets of Tokyo with Sound Creators Incorporated's Neve *VR* equipped Mobile 1. Rather than opt for the more traditional heavy duty truck conversion, SCI has taken the unusual action of adapting a Mercedes Benz *0303* passenger coach, as SCI Director Fumiaki Saito explained. 'It's an unusual vehicle to use but I started in the broadcast market with all its heavy duty trucks and no matter how practical they may be they have no style whatsoever. When it came to choosing transport for SCI's new Mobile 1 I chose a heavy duty coach instead which, apart from the style aspect, has the additional bonus of offering considerable comfort to the engineers which is not very usual.

'In Japan our name is synonomous with quality in the same way that Mercedes-Benz is and I think we now have the best mobile in the world; and one that has a toilet too.'

Finished in Benz Snow White, like all automobiles of German origin the impression is one of power and a certain understated mean feel which begs the question of how it drives. Saito enthused. 'Apart from being powerful its stability is exceptionally good and it's quite a pleasure to drive but it's also very safe as we've got all the little extras like anti-lock braking.'

The underfloor space, which would normally have been used in an unconverted Benz for passenger luggage, has been ingeniously converted into storage space and racks for power supplies and power amps as well as offering easy access to any remedial wiring. The side floor, between this space and what remains of the original seating area, has been removed allowing equipment to be loaded from outside without having to negotiate the relatively narrow step well into the compartment.

The coach is essentially split in half with the 48 input Neve *VR* squeezed into the width of the 2.5 m x 12 m x 3.6 m control room at the very back of the vehicle. Genelec *S30*s provide the monitoring with the space either side of the engineer position taken up with outboard racks. The front half of the coach houses a kitchen, toilet, tables and very comfortable seating arrangement for all those long hours of being stuck in Tokyo rush-hour traffic.

Work surfaces are also provided for any ancilliary equipment that can be operated happily from outside of the control room and at the time of my visit SCI was conducting a 48-track recording of a live TV games show and this area was being used for video and talkback feeds from the TV studio. SCI engineer Toshiyuki Hayashi explained that the job was not an easy one as apart from the smarmy, sibilant and shiny-suited games-show host, they had an orchestra, band and audience to contend with, not to mention 20 or so rather over enthusiastic and excitable contestants with very poor mic technique.

Consequently the outboard racks were filled with ten Urei *1176*s, which are exceedingly popular in Japan, and supplemented by a mere Yamaha *SPX90*, *REV 1* and a Roland *DEP5*. The ubiquitous Sony *3348* was being used — it has become a *de facto* standard in studios throughout Japan and is now expected by engineers for live work of any substance.

'As a rule we tend to just supply the equipment and engineers are by separate arrangement.' said Saito. 'So clients either supply their own or we put them in touch with the many friends we have in recording studios.' That being said Mobile 1 goes out for ¥700,000 (about £3100) per day, including Sony *PCM 3348*, full maintenance, driver and all the trimmings, and is interestingly no more expensive than SCI's standard truck Mobile 2 with its 48-channel Neve *V* and 2.3 m x 9 m x 3.3 m control room with JBL *4320*s. SCI also runs a Studer *089* equipped medium-sized van and Saito said he was watching the market and the economy to see if it could support another mobile. 'At present it is a time to be cautious.' he said.

Dealing with around 500 concerts a year SCI has recorded such notable acts as Cheap Trick, Deep Purple, Blood Sweat and Tears, Shirley Bassey, Jeff Beck, Mountain, Santana, Hall & Oates and is now also becoming increasingly involved with TV shoots. However, his belief is that three mobiles is about enough for one company in Tokyo as any overambitious expansion could upset the happy balance between SCI and the five other mobile organisations with a total of eight trucks serving the Japanese mainland and the 20, or so, serious venues in Tokyo.

'We're very friendly with our competitors because we're all busy, the market capacity has been met and the activity is intense. We talk to each other all the time and even divide up the work between ourselves. It's very friendly and civilised.' ■

THE GOLDEN AGE

Keith Spencer-Allen looks back over forty years of Sony microphones

The idea of any vintage product coming from Sony may seem a contradiction in terms, but time passes and Sony has been a serious manufacturer of microphones since the early 1950s — over forty years. They have a long history of unusual and interesting models, many of which may have been forgotten about. Some models, however, have gained a reputation and are still maintained as working mics although this undoubtedly requires much dedication from the user as the electronics age.

Sony mics did not receive any real distribution in Europe until the 1980s and so most of the experience with the early models comes from the USA. In this piece we have taken a look at the older Sony mics — those available before 1970 — featuring a few of the more interesting models. Also included are some candid comments from US engineers of repute about certain of these vintage Sony models and how they relate to other mics in differing applications. Alongside we have included a chronological table of the introductions of most Sony mics till the end of the 80s including several ranges that we have not covered here such as the dynamics, the ECM electret series, the ECM lavalier types and the wireless types.

Sony's other products largely mask their microphone business but, if you ignore the high profile products, they have a range that compares in breadth with most of the other microphone manufacturers. ▶

C-16A

C-19B

● The *C-500* was launched at the end of the 60s and was characterised by a unique housing design. The grille section was also slightly wedge-shaped with the capsule being centrally suspended. The polar pattern was described as being 'sharply directional' and maintained a tight cardioid pattern up until 3 kHz when it lobbed and became more omni in response. The frequency response on axis was fairly flat (20 Hz – 20 kHz ±3 dB) with a selection of three LF cuts and an 8 dB pad. Internal amplifier electronics were FET and achieved quoted figures of – 49.8 dBm output –0 dBm = 1 mW/10 µbar at 1 kHz); self noise of less than 24 dB; max SPL of 154 dB; and a dynamic range of 130 dB — all requiring a phantom power voltage of 48 – 54 VDC. The mic was attached to a stand via the side-mounted support arm which had an integral shock isolation in the base. This was not a small mic, being 9 in tall with the support arm (227 mm) and weighing in at 2lb 4oz (1 kg).

● A simple yet striking microphone, the *C-220* was a large stereo ('polydirectional') condenser microphone with a very reflective finish — the absolute opposite to modern matt black designs. With dimensions of 10 in long and 1 3 in diameter (255 mm × 33 mm), the lower section contained the vacuum tube amplifier while the upper perforated section housed the twin capsules. These could be mechanically rotated through 90 degrees by a screw slot on the top of the mic from a coincident position to being in the same plane. The mic is connected to the dedicated CP-3MS power supply ▶

C-220

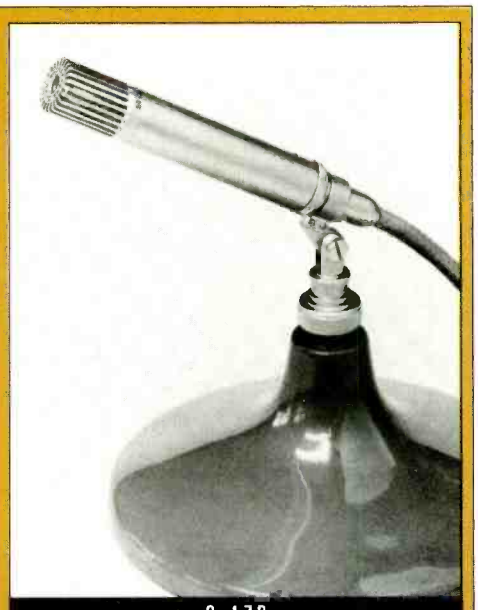
C-107

● The *C-16A* was a mic from the late 50s. A compact vacuum tube model (5in long, 127 mm), it featured a small capsule and an omnidirectional polar pattern. Of particular design interest is the way in which the mic body tapers towards the capsule so reducing the shadow of the mic body upon the omni pick-up pattern. Power requirements were provided by the CP2-A power supply. Frequency response was quoted as 30 Hz – 16 kHz with an output level of -73 dB (0 dB = 1 V/µbar, 1 kHz).

● The *C-37A* is one of the early Sony classics that not only became, perhaps, the best known but also set certain design criteria that can be seen in mics in the current Sony range. First launched in the mid to late 50s, the *C-37A* was a large diaphragm (1.5 in, 37 mm) vacuum tube microphone with a switchable cardioid/omni polar pattern. The mic was supplied with the CP-3B power supply that also contained high and low-pass filters, level and output impedance selection. The tube used was the 6AU6 which was later to be used in the recent Sony *C-800* mic range. Changing between polar patterns required the use of a screwdriver at the back of the mic grille. Frequency response was given as 30 Hz – 16 kHz ±2.5 dB with an output level of -53 dBm. While there may be the appearance of a heavy mic it remains a relatively light, 1lb 7oz (560g).

● While looking quite different to the *C-37A*, one Sony brochure described the *C-17B* as being identical in performance to the *C-37A*. While this ▶

C-37A



C-17B

and stereo controller by a nine-pin socket. Although almost infinite variation of pattern is possible combining mechanical and electrical manipulation, the specification identified L/R, M/S and variable axis as operational modes. Frequency response is quoted as 40 Hz - 15 kHz ±5 dB; output level was rated at -54 dB (0 dB = 1 V/10 µbar, 1 kHz) and the mic was provided with three LF cuts and a single HF roll-off. In terms of weight, the *C-220* was lighter than it looked at 1lb 4oz (570 g).

● Launched in 1965, the *C-107* was a variable pattern condenser microphone with a small diaphragm. The electronics were vacuum tube. Mechanically the mic attached directly to the end of a mic stand but was adjustable in angle with the integral hinge section.

● The *C-19B* was a relatively compact (for the time) omnidirectional vacuum tube microphone. Launched in the mid to late 50s it has a small capsule, sideways mounted. What is quite noticeable, however, is the old Sony logo. The frequency response is quoted as 30 Hz - 16 kHz ±2.5 dB which it maintained over 360 degrees until about 4 kHz where the response at 90 degrees started gradually tailing off closely followed by 180 degrees being about -7 dB at 16 kHz. There were also two gentle roll-off positions from 200 Hz and 400 Hz respectively. Output level was rated at - 73 dB (0 dB = 1 V/µbar, 1 kHz). The *C-19B* was connected via a five-way cable to the CP-2 power supply.

C-500

C-55P

may have been a slight simplification there were certainly similarities. The *C-17B* was only a fixed cardioid pattern using a half inch capsule (15 mm) giving an upper frequency response of 20 kHz from 30 Hz, ±3 dB. The tube used was the 6DH3 and powering was from the CP-3 supply that also adds the HF and LF roll-offs, level and impedance match. For the early 60s when the mic was launched it was small — 4in (100 mm) long and ¾in (18 mm) in diameter with a weight of just under 7oz (200g) — the power supply weighed 15 times more!

● Launched in 1970, the *C-55P* is one of the other Sony mics that became widely accepted in the US and Japan. Basically it is a fixed pattern cardioid FET pencil-type design but showing much thought in the mechanical construction. The unique aspect was that the capsule could be moved through 90 degrees to become forward or side facing or anypoint in between. Movement was effected by gripping the turning button on either side of the grille and adjusting the angle of the capsule within the grille which remained in the position it was when pressure was released. It was also possible to rotate the complete grille assembly on the mic axis. All this allowed quite extensive adjustment without removal from a boom. The mic had pad, LF and HF cuts, a non-reflective finish and a wide range of accessories. Frequency response was 40 Hz - 16 kHz ±2.5 dB with an output level of -50 dBm (0 dBm = 1 mW/10 µbar), and a max SPL of 154 dB.

The recent launch of two new tube mics in the *C-800* series from Sony have almost brought one area of their mic design back where it started. The *C-800* is described as the 'successor to the *C-37A*' and uses a 6AU6A tube that is a development of the original 6AU6 for the C-37A. The physical appearance may not show any similarity but the capsule and approach to electronic design does.

The Engineers comment

Practical experience with a microphone is the only real way of evaluating its worth. As part of this article, some well known US recording engineers were approached for any comments they had about these old Sony mics and also if any of them still had any application in their work. To place their comments in context we have also included some more general information about their wider choice of microphones for different requirements.

George Massenburg, producer and engineer: Firstly, Massenburg feels that he should put microphone choice in perspective.

'Generally, I use microphones that are reliable. No matter how great a microphone sounds it doesn't do any good unless it's working dependably. Sometimes even the best old microphones will vary from day to day due to bad connections in the tubes or something to do with the capsule.'

For vocals Massenburg has his specials.

'Generally for vocals I use one special old AKG *C-12* and one old Neumann *U-67* that has been extensively reworked with new thin diaphragms that allow for an extended high end.'

He has very specific tastes in miking acoustic instruments as well.

'For piano, AKG *C-24* with GML MS box; acoustic guitar, AKG *C-12*; strings AKG *C-12*; for room mics B&K *4003s* with spherical diffussors. Cellos are Schoeps *CM5* hypercardioid capsules as are sometimes drums and double basses. The Sony *C-37A* are really good cello mics if you can keep them working. I used the Sony *C-37A* on all the Nelson Riddle-Linda Ronstadt records — it used to be my favourite cello and tom mic but unfortunately it is so hard to keep them working that we have now generally given up on them. The Sony *C-55P*, however, was an excellent microphone. Sony should never have discontinued that mic. It was a great mic that should be used to this day. It's reliable and it's hi-fi.'

Allen Sides of Ocean Way and Record One: Under Allen Sides' direction, Ocean Way has always made extensive use of vintage microphones. In fact he sees them as a key part of the studios success with possibly one of the largest collections in the world. Mic choice for vocals include Neumann *U-67*, *U-47* FET, *M-269*, AKG *C12* or Elam *251E*. However, the Sony *C-55P* is always used for acoustic guitar, percussion, solo trumpet and acoustic bass. For drums left/right overheads are Sony *C-55Ps* or *C35* FET with toms being Sony *C37A* or AKG *C12-A*. Choice for bass drum is made from Sony *C-500*, Neumann *U47* ▶

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FET or AKG *D122*. In other areas the Sony *C-37A* is used regularly on strings.

Sides also feels strongly about the *C-55P*.

'Ocean Way owns about 30 of the Sony *C-55P* and it is all around one of the best microphones I have ever used. I think they should consider manufacturing it again.'

David Smith of Sony Classical Productions, New York

David Smith is primarily involved with the recording of classical material for the Sony record label although his own experience goes back through a very wide range of music recording.

'Close miking does not really apply to the recording that we do but I can refer back to my experience. For vocals I have always used a large diaphragm mic like a Neumann *U-87* or *M-49*, AKG *C-414* or *C-12*, etc., because these mics are inherently coloured sonically giving the lower mid-range the *oomph* that the smaller capsule lacks. The mics I have mentioned all have 32 mm capsules whereas the smaller mics would have 12 to 15 mm capsules and are less coloured. Judy Collins used to sing into a Sony *C-37* when produced by Arif Mardin as it gave her voice incredible warmth which the *M-49* she uses today completely lacks.

'For acoustic instruments — this is split between large and small diaphragm mics, Pianos are done sometimes with Neumann *U-87*s or *M-49*s and sometimes with *KM-84*s. The current Sony *C-48* is a superb microphone for the piano. In the case of the acoustic instruments depending on whether they are featured or whether they must be woven into a larger acoustical picture largely determines the choice on microphone. Guitars like the top end of small diaphragms such as the Neumann *KM-84*.

'Some of the small diaphragm Sony mics are popular on acoustic guitar as they are fast and have the transient capability to bring the individual strings out of a strum without sounding hard. For drums and percussion, there is much argument here between the condenser school and the dynamic school with the choice largely dependent on the type of music and the musician. Some of the Sennheisers sound good on drums as do some of the small Neumann condensers.

'Much of Paul Simon's studio recording with Phil Ramone used the Sony *C-37A* as a snare mic. Rarely have we heard anything that fat on a snare that could still retain the sound of the drum. Again some of the small diaphragm Sonys are used on conga drums and cowbells because of their 'snap'. We frequently used the Sony *C-37A* on guitar amps because it warmed the sound up and removed the stridency from the amplication of the instrument.

'All of the recording I do today at Sony is classical using small diaphragm condensers although we do still use the Sony *C-48* on the tight miked recordings of the Boston Pops under John Williams with producer Tom Shepard and engineer Buddy Graham. They are used primarily for percussion and brass to fatten them up and make them sound bigger within the overall pick-up of the orchestra provided by Schoeps or B&Ks.' ■

A CHRONOLOGY OF SONY MICROPHONES

	WIRED MICROPHONE		WIRELESS MICROPHONE	REMARKS
	CONDENSER/ELECTRET	DYNAMIC		
1950		F-800A FP-1		Birth of Sony professional mic
1955	C-37A C-16, C-19			
1960	C-17 C-57	FP-70, FP-71 FP-2 F-91		Pipe type mic
1965	C-220A, C-107, C-38 C-55A, C-38A ECM-50	F-75, F-113		FET circuit Miniature electret mic
1970	C-500, C-55P, C-37P C-38B, ECM-22P, ECM-51 ECM-22P, ECM-51 ECM-85 C-55AC	F-115	WRT-42, WRR-45	Back electret VHF($L_1T_2O_3$)
1975	C-47, ECM-50P, ECM-56 ECM-30 C-74, C-76 C-48	F-660	WRT-57, WRR-57/55 WRT-27, WRR-27	N.W.S. P.W.S.
1980	C-35P C-575P	F-760 F-770	WRT-27, WRR-27, 57 (900MHZ BAND) WRT-27A, WP-27 WRR-37	500 mW Transmit
1985	C-535P, C-536P ECM-55, 66, 77, 44 ECM-672 ECM-MS5/DC-MS5	F-720/730 F-BM7	VHF 200 SERIES WRT-67 VHF 400 SERIES WRT/WRR-25H WRT-628, WRR-628 etc	New lavalier mic Linear/comp UHF synthesiser for Japan
1991	C-800 Series			

Calrec RQD6400 Compressor-Limiter

A technical report by Sam Wise

The Calrec *RQD6400* is a compact, dual, stereo compressor/limiter — developed initially for broadcast applications and is derived from modules developed for Calrec's range of custom broadcast mixing consoles. It is part of a range of outboard effects devices that presently includes the *RQP3200* Microphone Pre-amp/Compressor and Expander Gate.

Calrec have a pedigree going back over many years of producing top quality broadcast electronics. For most of that time they have been independent, though for a period they were a part of the AMS PLC group of companies. The *RQD6400* does not disappoint the expectation of quality, having good overall performance and first class stereo matching in every respect. Besides this, it has an easy to use layout and looks very nice. The front panel finish is deep brown stove enamelling; covers and extrusion side frames are grey-brown, and the rear panel is mid-grey. Front and rear panel legends are of high quality stoved epoxy screen printing in white, which on the front panel is high contrast and easy to read. These should be quite durable.

Construction

The *RQD6400* and its sister *RQP3200* are housed in cases constructed from extruded aluminium side rails. These are screwed through extruded aluminium front and rear panels which incorporate a small lip to support the top and bottom covers. The top cover and bottom covers are easily removed by loosening four screws on each, providing complete access to both sides of the single main internal, double-sided, plated-through, fibreglass printed circuit board. Mains wiring is safely shrouded at all connection points, with go and return pairs of wires being contained in shrunk sleeving — adding to noise immunity. The mains input IEC connector incorporates a filter, assisting in the rejection of mains-borne noise. A clamp to prevent the unplanned departure of the mains cable is included. A separately mounted 20 mm mains fuse is accessible on the back panel. The power transformer is securely mounted on a separate plate, well secured to the side rails and rear panel.

The PCB appears carefully laid out, though not obviously optimised for immunity to external magnetic fields. A screened legend identifies all components for ease of servicing. The variable control potentiometers are mounted on the top of the PCB, with the mode selection switches on the bottom. Everything is optimised for both ease of production and maintenance. Two further small PCBs, containing the gain reduction meter displays, are permanently connected to the main PCB with ribbon cable and fixed to the front panel. The integrated circuits used indicate selection for performance rather than cost.

Plugs and Sockets

All connectors are PCB mounted and secured through the rear panel, consisting of male and female 3 pin PCB mounted Neutrik types. The PCB screw fixings for these connectors are installed for increased reliability. Each of the two pairs of channels has two female input and two male output connectors, plus one female VOICE-OVER connector.

Internally the chassis/PCB and mains/transformer screen earths are separated. These are brought out to two 4 mm banana style binding posts. A pivoting link allows these earths to be easily paralleled. This flexibility allows the *RQD6400* to be connected to virtually any type of earthing system. Unfortunately, this also makes it possible to operate the equipment without any earth at all — an issue we are used to in audio but which will increasingly come under the control of EC regulations.

Front Panel Controls Compressor Section

The *RQD6400* provides comprehensive adjustment of compressor and limiter parameters, laid out in an easy to use manner. Located at the left of the front panel is the VO (voice-over) gain control — sweeping from a gain of -10 to +70 dB. This effectively sets the voice-over threshold. A push switch below allows voice-over to be preset and switched in when required. Control calibration was checked and it was determined that with the voice-over input signal level set to match the control position, a gain reduction of 3 dB is produced. The voice-over threshold matches the front panel legend within 1.5 dB at all voice-over gain settings. **Fig. 1** shows the actual compression characteristic of the voice-over system. The shape of this is fixed, giving a rapidly increasing rate of programme reduction as voice-over level increases. In use this proved to be quite effective.

The next control is RATIO, variable from 1.5:1 up to 10:1. As shown in **Fig. 2** the calibrated positions closely approximate the actual ratios, the largest error being on the 2:1 setting which is closer to 2.5:1.

Further to the right is the THRESHOLD control with FAST ATTACK switch beneath. **Fig. 3** reveals that once again, the panel legend corresponds very accurately with reality, with the compressor knee almost exactly at the threshold setting.

In **Fig. 4**, the effect of the FAST ATTACK switch is revealed. The input signal is a 0 dBu sine burst at 2 kHz of 25 msec duration. The lower curve shows the FAST attack position, with full gain reduction being achieved in 3-4 msec. In SLOW mode, the gain is still being reduced at the end of the input burst signal. Defining exactly what is meant by attack and decay times is difficult. Calrec have defined their published figures according to the electrical time constants within the unit. However, the standard for specifications published in BS 6840:Part 8:1988/IEC 268-8:1973 are utterly

MANUFACTURER'S SPECIFICATION

COMPRESSOR CONTROLS

Ratio	1.5:1 to 10:1, variable
Threshold	-20 to +10 dBu, variable
Attack Time	Normal : 4 ms, Fast : 0.2 ms
Recovery Time	0.1 to 4 s, variable AUTO facility : 0.1 s initially, rising to 1.5 s
Make up gain	0 to 20 dB, variable
Voice-over Input	Variable gain from 70 dB (Mic) to -10 dB (Line) 10 dB above input gives approximately 20 dB gain reduction Voice-over can operate with Compressor/Limiter functions switched off
Gain Reduction	Shows gain reduction up to 24 dB, increased resolution at low reduction levels

LIMITER CONTROLS

Ratio	100:1, fixed
Threshold	-4 to +16 dBu, variable
Attack Time	100 µs, fixed
Recovery Time	75 ms to 1 s, variable

AUDIO PERFORMANCE

Noise	-87 dBu at unity gain
Distortion	Typically less than 0.02%
Frequency Response	20 Hz to 20 kHz, ±0.25 dB
Input/Output Balance	better than -50 dB, 20 Hz to 20 kHz AUTO effect beyond 1 s, 0.1 s initially rising to 1.5 s

OTHER

Size	1 u, 19in rack mounting, depth 340 mm within rack including connectors
Weight	3.5 kg
Power Supply	240 V/1 A or 120 V/2 A, selected by internal wiring change
Price	£1495 UK Professional Price

different, and quite difficult to apply in practice. What is important really is that the range of attack times provided are audibly suitable, and that there is no error between the pair of stereo channels. In this regard the *RQD6400* is superb.

RECOVERY time is next, variable from 0.1 to 4 secs, with AUTO beneath. AUTO causes the recovery time to vary during the recovery cycle, with a fast initial recovery and slower late recovery. This is shown in **Fig. 5**, where the upper curve is a fixed 0.1 sec recovery, and the lower curve is in AUTO mode. Once again, relating these recovery rates to a meaningful standard of measurement is difficult, but the ratios between the front panel printed rates matches the measurements, and the range of control does the job.

The last control in the compressor section is GAIN. This is used to restore the output level lost during compressor operation, and has a range from 0 to 20 dB. There are no front panel calibrations, but the maximum and minimum settings were verified by measurement. Below is the compressor ON switch with yellow LED indicator. The limiter section of the unit is after

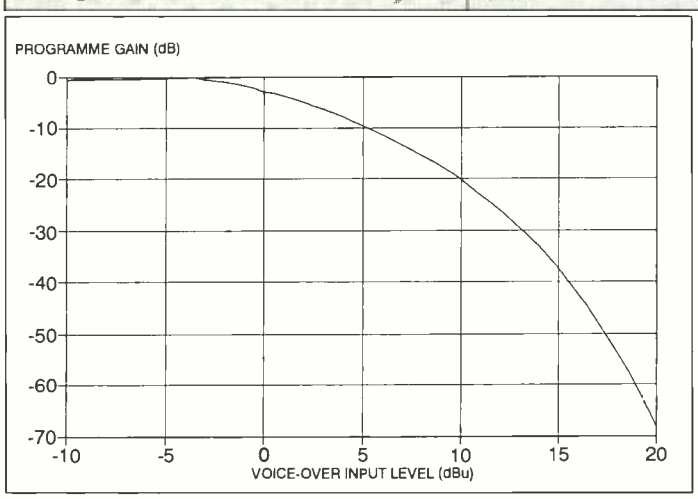

Fig. 1: Compressor 1, left channel gain (dB) versus voice-over input level (dB). Voice-over control set to 0 dB.

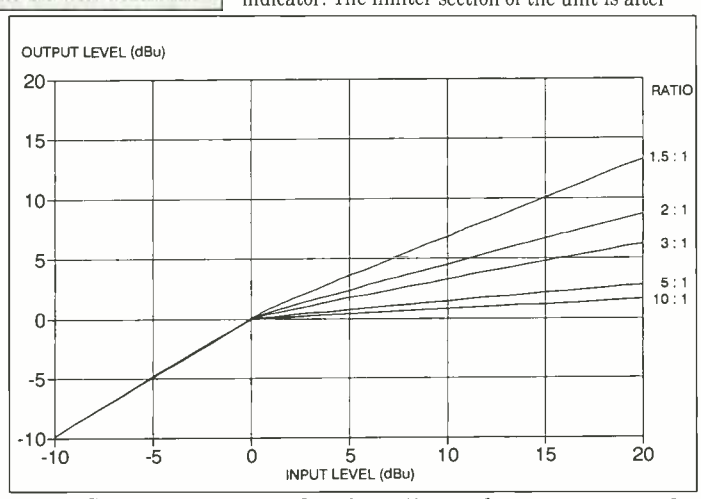

Fig. 2: Compressor curve showing effects of the ratio control. Threshold: 0 dBu, ratio: 1.5, 2, 3, 5 and 10, recovery: min, attack: fast.

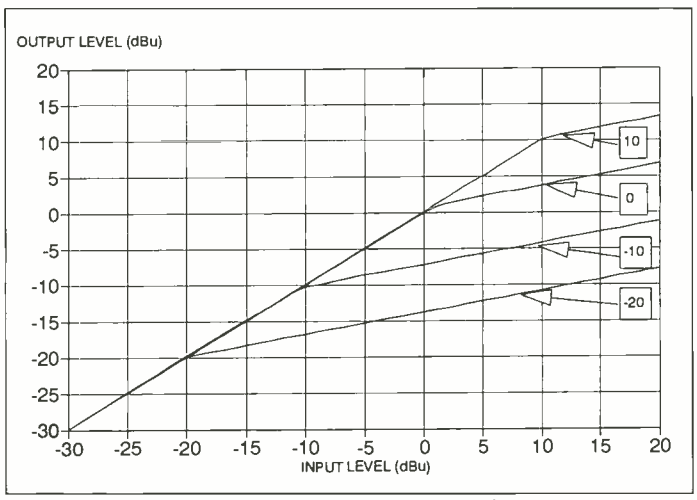

Fig. 3: Compression curves showing effect of the threshold control. Threshold: –20, –10, 0 and 10dBu, ratio: 3, recovery: min, attack: fast.

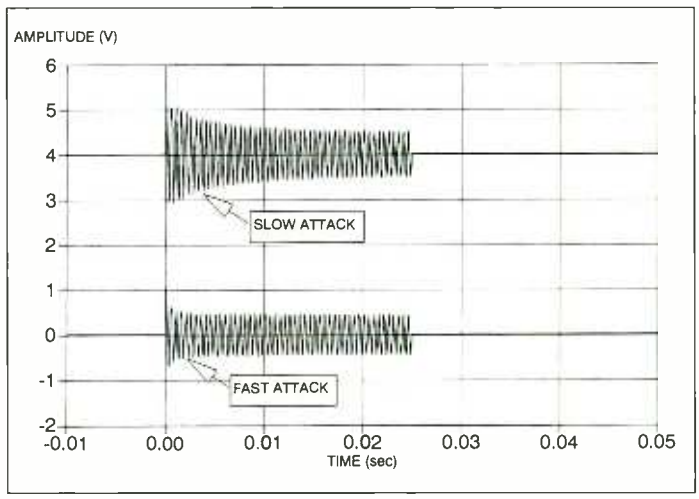

Fig. 4: Compressor attack characteristics with 2 kHz burst at 0 dBu. threshold: –10 dBu, release: 0.1s.

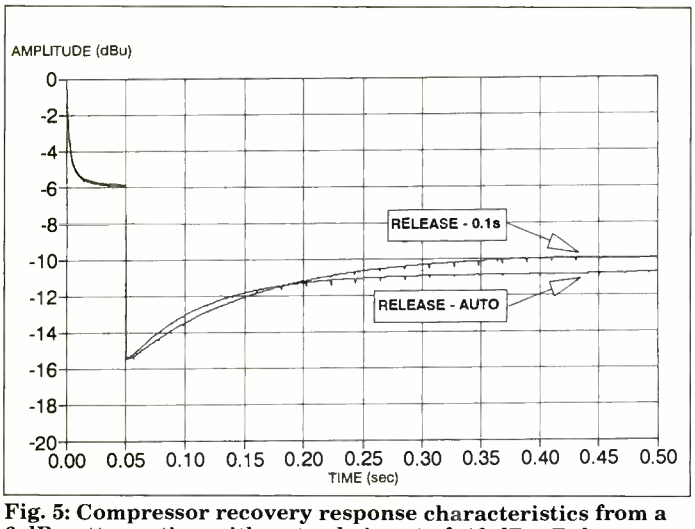

Fig. 5: Compressor recovery response characteristics from a 6 dBu attenuation with a steady input of -10 dBu. Release: 0.1s, recovery time: auto.

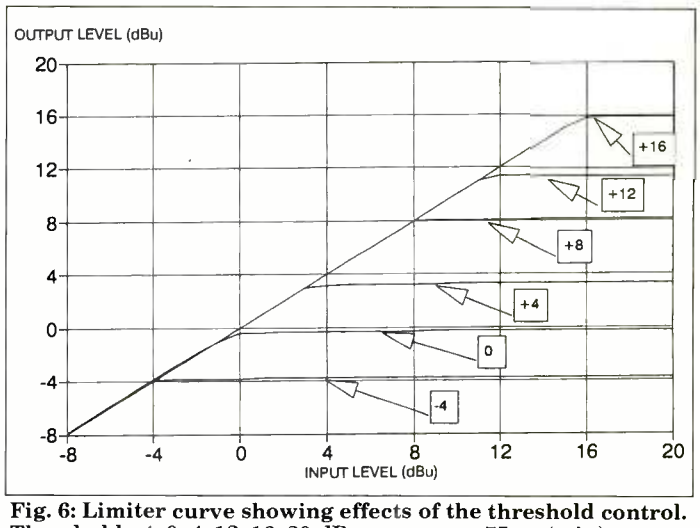

Fig. 6: Limiter curve showing effects of the threshold control. Threshold: -4, 0, 4, 12, 16, 20 dBu, recovery: 75ms (min).

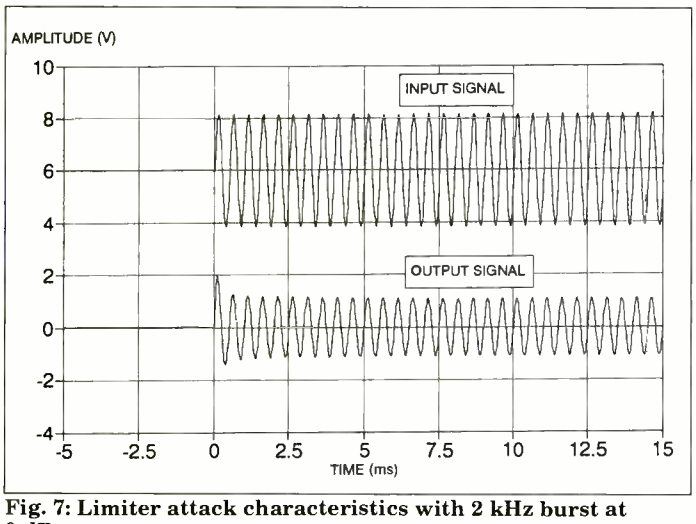

Fig. 7: Limiter attack characteristics with 2 kHz burst at 0 dBu.

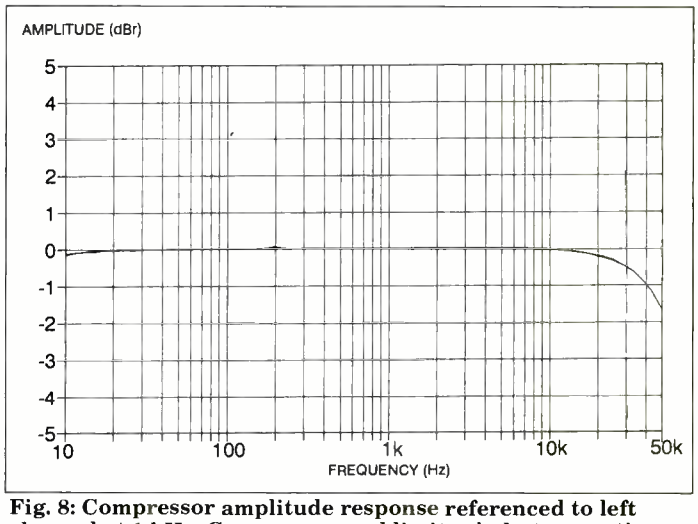

Fig. 8: Compressor amplitude response referenced to left channel at 1 kHz. Compressor and limiter in but not active. Voice-over out.

this gain control, thereby preventing accidental output of excess level.

Above the compressor section is an LED ladder array GAIN REDUCTION meter. This is scaled from 1 to 24 dB, with fine increments of 0.5 dB at the low end, rising to a coarser resolution of 1.5 dB per step at the top. All meter scale points were found to be accurate within 0.15 dB. Although the meter is located within the compressor section of the unit, it in fact displays the total gain reduction introduced by both the compressor and limiter sections — a good practice. When a stereo compressor/limiter section is switched out, the meter dims, but continues to indicate the gain reduction which would be applied if it were in circuit.

Limiter Section

The right of the compressor section are the limiter controls, beginning with THRESHOLD. This again is highly accurate as shown in **Fig. 6**. The fixed limiter ratio of 100:1 is also evident from the **Fig. 6**, since above threshold, there is no visible increase in level. **Fig. 7** shows the actual attack characteristic where limiting is virtually complete within ½ cycle of a 2 kHz sine wave, or less than 250 µsecs — equating to the electrical time constant of 100 µsecs. The yellow peak limit LED illuminates as soon as threshold is crossed, and the peak limiter is switched into circuit by the ON switch beneath, with associated yellow LED. RECOVERY time adjustment is adjacent, variable from 75 msec to 1 sec. The AUTO position results in fast initial and slower later recovery of signal level. Both of these operate much as those in the compressor section.

At the centre of the unit are IN switches with adjacent red LED, one for each of the two stereo compressor sections. These are literally bypass switches, connecting the audio output either directly to the input (bypass) or to the compressor/limiter processed output. In between the IN switches is a LINK switch which gangs the two stereo pairs into an accurately tracking quadraphonic limiter/compressor. Indeed, the four channels tracked so well with both static and dynamically changing levels, that there was no discernable image shift either measured or audible.

Frequency Response

Measurements have so far confirmed operation of the unit as a dynamics controller. Its audio performance is also quite acceptable. Using a signal of fixed amplitude gives a frequency response as shown in **Fig. 8**, typical of all channels. At ±0.12 dB from 20 Hz to 20 kHz, it is well within specification.

Noise and Distortion

Broadband noise performance is given in **Table 1**,

meeting the noise specification when using the RMS rectifier. The ⅓ octave bandwidth noise spectrum, shown in **Fig. 9**, is almost completely without blemish, giving a nearly smooth, ideal 10 dB per decade slope.

'Distortion' is specified by Calrec as typically less than 0.02%. **Fig. 10** shows that this is valid for a CCIF intermodulation distortion measurement using 17 kHz and 18 kHz test tones for signal levels from -10 dBu to +25 dBu. With compression and limiting disabled distortion remains below 0.02%. When the compressor is active, intermodulation distortion rises a bit beyond this above a +15 dBu input level, no matter which threshold setting is used. DIM distortion levels are approximately the same under the same conditions. This is a good performance.

Total harmonic distortion versus level for a 1 kHz signal over the same range with the compressor active is shown in **Fig. 11**. This is very similar to the intermodulation curves, rising above 0.02%, at higher operating levels. When the compressor is not active, distortion remains below 0.02% for all frequencies from 20 Hz to 20 kHz up to an input level of +25 dBu.

Inputs and Outputs

The input impedance is 20 kΩ, with an input overload level (2% THD) of +29.2 dBu, high enough for any application. Output impedance is 25 Ω, with the same overload level of +29.2 dBu into a load of 100 kΩ. Reducing the output load to 600 Ω results in a maximum output level of +23 dBm.

Inputs and outputs are electronically balanced. The input common mode rejection ratio is shown in **Fig. 12**, substantially bettering the specification at lower frequencies, but falling out of limits at about 8 kHz. Never-the-less this is a good performance.

Crosstalk performance is also good, as shown in **Fig. 13**, being better than 70 dB at all frequencies up to 10 kHz between any signal paths.

Channel phase and level differences from 20 Hz to 20 kHz are also almost immeasurable, being fractions of degrees and less than 0.2 dB.

Summary

As befits a company of Calrec's stature, the *RQD6400* performs admirably, both on the bench and on listening tests using a wide range of

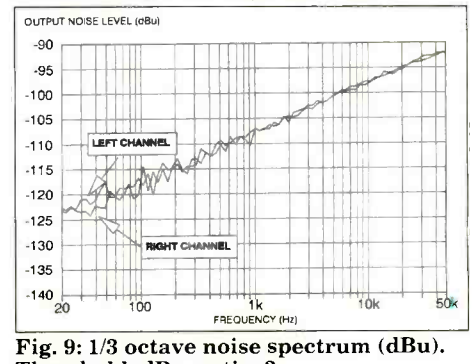

Fig. 9: 1/3 octave noise spectrum (dBu). Threshold: dBu, ratio: 3.

material. Operationally, it is a pleasure to use, with no need to search around the front panel or to struggle with dual concentric controls. The only complaints are that the specifications published are loosely defined, and that no servicing information was provided with the unit.

**Calrec Audio,
Nutclough Mill,
Hebden Bridge,
West Yorkshire
HX7 8EZ, UK.
Tel: (0422) 845244. Fax: (0422) 842159.**

TABLE 1 — BROADBAND NOISE LEVELS

Conditions	22-22k r.m.s.	400-22k r.m.s.	A - wtd r.m.s.	CCIR r.m.s.	CCIR Q-peak
Channel 1L Compressor in	-87.5 dBu	-87.6 dBu	-90.1 dBu	-80.8 dBu	-76.7 dBu
Channel 1R Compressor in	-87.7 dBu	-87.8 dBu	-90.3 dBu	-80.9 dBu	-77.0 dBu
Channel 2L Compressor in	-89.6 dBu	-89.7 dBu	-92.0 dBu	-82.6 dBu	-78.7 dBu
Channel 2R Compressor in	-87.1 dBu	-87.1 dBu	-89.5 dBu	-80.0 dBu	-76.1 dBu

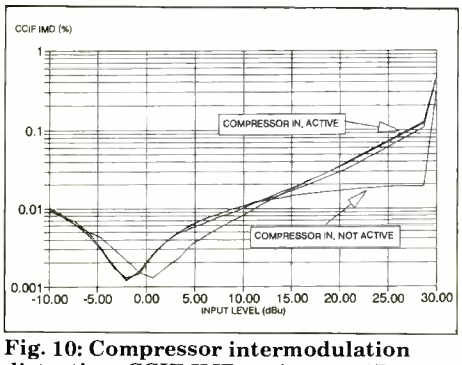

Fig. 10: Compressor intermodulation distortion. CCIF IMD: twin tone 17 kHz/18 kHz, 1:1. Ratio: 2 threshold: -10, 0, +10 dBu Attack and recovery times are at fastest settings.

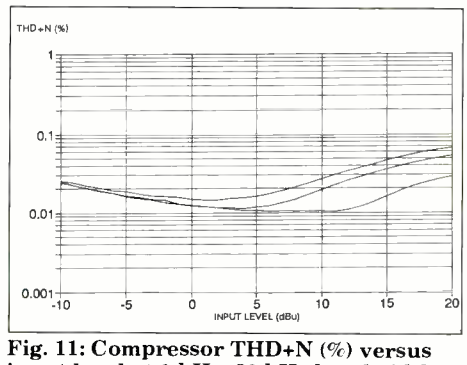

Fig. 11: Compressor THD+N (%) versus input level at 1 kHz, 80 kHz bandwidth. Compressor in, ratio: 2, threshold: -10 (bottom curve at right), 0 (middle curve), + 10 (top curve).

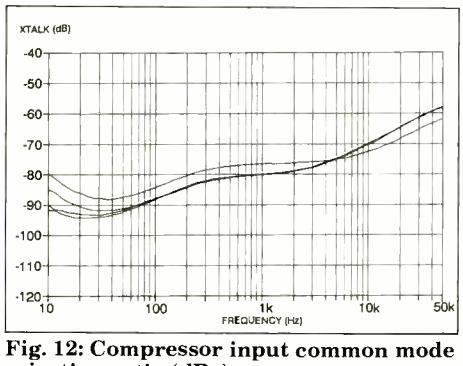

Fig. 12: Compressor input common mode rejection ratio (dBr).

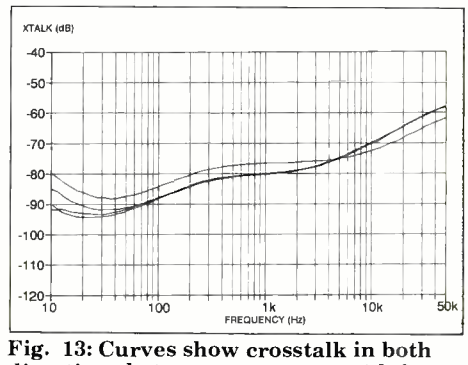

Fig. 13: Curves show crosstalk in both directions between compressor 1 left and right and compressor 1 right to compressor 2 left. Input signal: +10 dBu, compression: 24 dB and output level: +6 dBu

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Barry Fox

Baffled at the Albert Hall. The dim bulb debate and will Winston Churchill have the last word?

I went to the Albert Hall for a Prom concert to hear the Berlin Philharmonic play Mahler. The seats were good, £35 a time (plus ludicrous bar prices for half-filled glasses of cheap plonk wine) and I sat next to someone who kept complaining that the sound was nowhere near as good as you get from a CD at home. 'It sounds muffled,' she said.

And, by golly, she was right.

The Albert Hall has a good bass end, especially compared to the Barbican, which soaks up low frequencies like a sponge. The strong bass emphasises any top end roll-off.

It was a hot and humid night. The hall was sold out and full of sticky bodies. Most important, the Albert Hall stage is low and by tradition the 'promenaders' stand packed like sardines in the central arena. From the front stalls seats the promenaders' heads are only just below the level of the strings on stage.

The head is a remarkably efficient baffle. That is how humans hear directional sound, with the head shielding the ears from side sound.

Small wonder that the strings sounded muffled.

Add to that the fact that we are now breeding a generation of music listeners who expect all string instruments to sound close-miked, and it is hardly surprising that a live Prom at the Albert Hall sounds mellow, like an old radiogram.

I am not suggesting that the BBC change their practice radically and close-mic the Proms like a rock concert but I do seriously suggest a simple solution.

The tuned percussion (glock, triangle, bells) were positioned high at the back of the orchestra. So was the small brass section. Their sound cut through loud and clear, sailing out over the heads of the string players who were all at the same level on seats on the stage floor. Why not rake the string sections? Put them on a slope or on stepped tiers climbing up from the front to the stage rear. That would lift the high frequency sound sources clear over the heads of the promenaders.

As things stand, the Albert Hall muffled string sound is as unreal as the JVC/Capital jazz over-amplified big band sound. Perhaps the BBC have become so involved in getting a good radio and TV sound balance for home listeners that they have forgotten the people who are paying a considerable amount of money to be there and listen live.

Postcript: After I wrote this I saw Edward Greenfield's review in the *Guardian*. He remarked how the sound was 'very different' from the Berlin Phil on record — not so bright, clear or analytical.

Many thanks to all those readers who have shown interest in the Winston Churchill/Norman Shelley saga. I believe it justifies my continuing pursuit of Decca and EMI Records. But will callers and correspondents please note the EMI has now made it abundantly clear that the matter is closed unless we can produce even harder evidence that some of the recordings of Winston Churchill released first by Decca, and now EMI, were in fact made by actor Norman Shelley. What harder evidence? Well the resurrection of Churchill and Shelley might perhaps do. Otherwise, do not expect EMI to acknowledge doubt of pedigree on the sleeve notes.

In support of this position, and after much nagging from me, EMI Records' legal department have at long last released the evidence on which the company bases its refusal to alter the sleeve notes. Currently these notes simply give the dates on which Churchill made the original speeches. As many of these speeches were originally made in Parliament, long before recording was allowed there, it is undisputed fact that these speeches were recorded at a later date.

As I suspected, the expert opinion on which EMI relies, comes from Peter Orr, Spoken Word Consultant for Argo.

Orr acknowledges that his involvement in the recordings began when he was 'responsible for making selections from the 12-LP set for reissue on Argo cassette'.

It was the Argo cassette release of 1983 which quite wrongly claimed to contain 'historic recordings taken from radio transcriptions'. The BBC objected to this claim, because some of the recordings were clearly made in a studio or home. EMI dropped this claim from the later Argo release and the now present company admits that 'a mistake was made (but) the possible reasons for such are manifold'.

In his expert opinion Peter Orr suggests that 'the press, perhaps in collaboration with (Robert) Berkovitz (of Sensimetrics, the company which analysed the tapes for the *Studio Sound* article) are trying to build a story on what is, at least as presented by the two articles I have seen, decidedly flimsy evidence and a generous measure of speculation'.

Orr casts doubt on the Sensimetrics analysis, contesting the claim that the formant patterns on which it relies, are immune to external influences. 'Changes in speed alter the frequency configuration, as does the introduction of filters; then, distortion and other factors can displace the pattern'.

Orr also takes it from the articles that the Sensimetric tests were experimental and that further comparisons should have been made, for instance between the Churchill recordings in question and known recordings of Norman Shelley such as Winnie the Pooh.

'Certainly' says Orr, 'he (Berkovitz) has no business advising Decca and EMI to 'go back to the original recordings and re-release them without the grossly artificial echo,'. . . This is merely presumptuous: who does Berkovitz think he is?'

Decca has also unearthed a copy of a telegram sent by Churchill to Decca after Decca had given Churchill a copy of the single LP 'The Voice of Winston Churchill'.

'I am most grateful to you and your colleagues for your good wishes and all you have done to produce the record', it reads.Why a telegram, rather than a signed letter? The date is hard to read but looks like December 1964. If so it was the year before he died and he was 90 years old and, frankly, ga-ga. Had Churchill even heard the record? Did he, personally, write the telegram? Form your own conclusions.

Claire Sugrue, Senior Legal and Business Affairs Executive of EMI Records says: 'We must agree to differ and retain our respective positions in this matter . . . as repetition of previously stated arguments can only be fruitless'.

I agree. And for the record, my position remains that it is customary for a record company to label and log its master tapes with clear and accurate information on the recording date, place and artist. If the Decca tapes are accurately marked and logged, then there are three things that I do not understand.

How did Peter Orr and Decca come to release the Argo compilation in 1983 with the incorrect claim that the recordings were all radio transcriptions? Why do the Decca and EMI releases refer only to the dates when the original speeches were made, not the recording dates which were often, of necessity, later? And why, if accurate information on recording dates and places exists, do Decca and EMI not simply provide a copy of the tape log to shut me up and settle this matter once and for all?

Decca has unearthed a copy of a telegram sent by Churchill

Over the years I have many times quipped that the record industry gets into messes over nonsense like Copycode, because the people who run the record companies know nothing about technology and 'cannot change a light bulb'.

Recently a BBC TV programme wanted to have a few sound bites from me on some topic or other and sent round a video news crew.

After they had set up their lights one of the crew tactfully pointed out that one of my lampshades was burnt and a fire risk because I had put a 100 watt bulb into a 60 watt maximum fitting.

Now I shall have to find another phrase.

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Martin Polon

Our 'under fire' US columnist suggests a course of action for large studios to enhance their marketability

Well, girls and boys and other assorted fans of this ever-popular column, there you have it. Written proof of just how popular this missive (oops!) really is! I hope it is as clear to all of you, as it is to me, just how much my efforts to bring sanity to a troubled world are truly appreciated by my dedicated and enthusiastic readers.

All kidding aside and it is clear, I hope, that all of the above is just that; we really have arrived at a strange turn in the road for the creative community involved with capturing musical entertainment to be placed into the hands of the recorded music consumer. Yes, we have looked at the status of the recording studio community before and we will undoubtedly look at it again. That is not unexpected in an magazine titled *Studio Sound*. What is, perhaps, unexpected is just how much the competitive field has changed in the business of running recording facilities. At the beginning of the 1980's, it was clear that the function of recording music for eventual release on some form of musical media rested firmly in the grasp of the large, and frequently famous, recording complexes. Roughly ten years later, and that dominance has been broken. To some extent, the presence of, frequently artist-owned, project 'rooms' or home 'studios' has drained away much of the preparatory effort involved in the creation of an album project. That has concommitantly eliminated a large part of the profit base for the mainstream studio.

But it would be too easy to lay all of the blame at the door of the home and project studio crowd. Vicious competition from an 'over-built' large-studio population has played as much, if not more, of a part in the current financial conundrum facing many major facilities. Studios are being pitted against each other almost on a daily basis. That being the case, it might well be advantageous to examine the forces that drive the decision making process in selecting a studio facility.

Studio selection for a recording project is rarely, if ever, the province of just one individual or even one entity. The decision is far more likely to encompass a number of individuals — either acting alone or as part of a group, such as the band that will be doing the recording. In effect, the decision is usually — virtually though not actually — the result of a committee effort. The various elements of this process include label artist and repertoire personnel, label financial and accounting personnel, the group being recorded and the album project's producer. By looking at these entities and the factors that they emphasize as influencing studio selection, we can suggest a course of action to enhance the marketability of large studios in general.

D*R*E*C*K
DIGITAL RECOGNITION
ENVIRONMENTAL COSTS and KNOWLEDGE
The Honourable Secretary
4 The Lodge
Little Whiffington Under Thames
Great Britain ZZ9 T0P

Martin Polon,
Studio Sound Magazine,
London.

Sir, Sirs or whomever,

We must ask you in the most extreme terms to cease and desist immediately any further discussion about recording studios or any other audio studio for that matter. It seems that your laboured efforts to bring sanity to the world audio industry's byzantine quest for yet a whole new set of facilities for the recording and release of digital, or other, audio threatens to further despoil our already threatened environment.

Do you realise that you have written at least 237 previous columns about this topic. Every time I hear of another one of your misanthropic efforts, I can actually hear the trees 'sigh' for the passing of several of their brethren to provide the paper necessary for your missives.

I warn you, that if you do not stop chronicling the incredible misogyny of the world's music and audio industries, we will be left with no choice but to take action. It is a drastic step, but your access to Tofu will be rescinded by the council. Heed our warning.

Yours environmentally,

Henry G. L. Smythe-Smith
Honourary Secretary

Label A&R staff

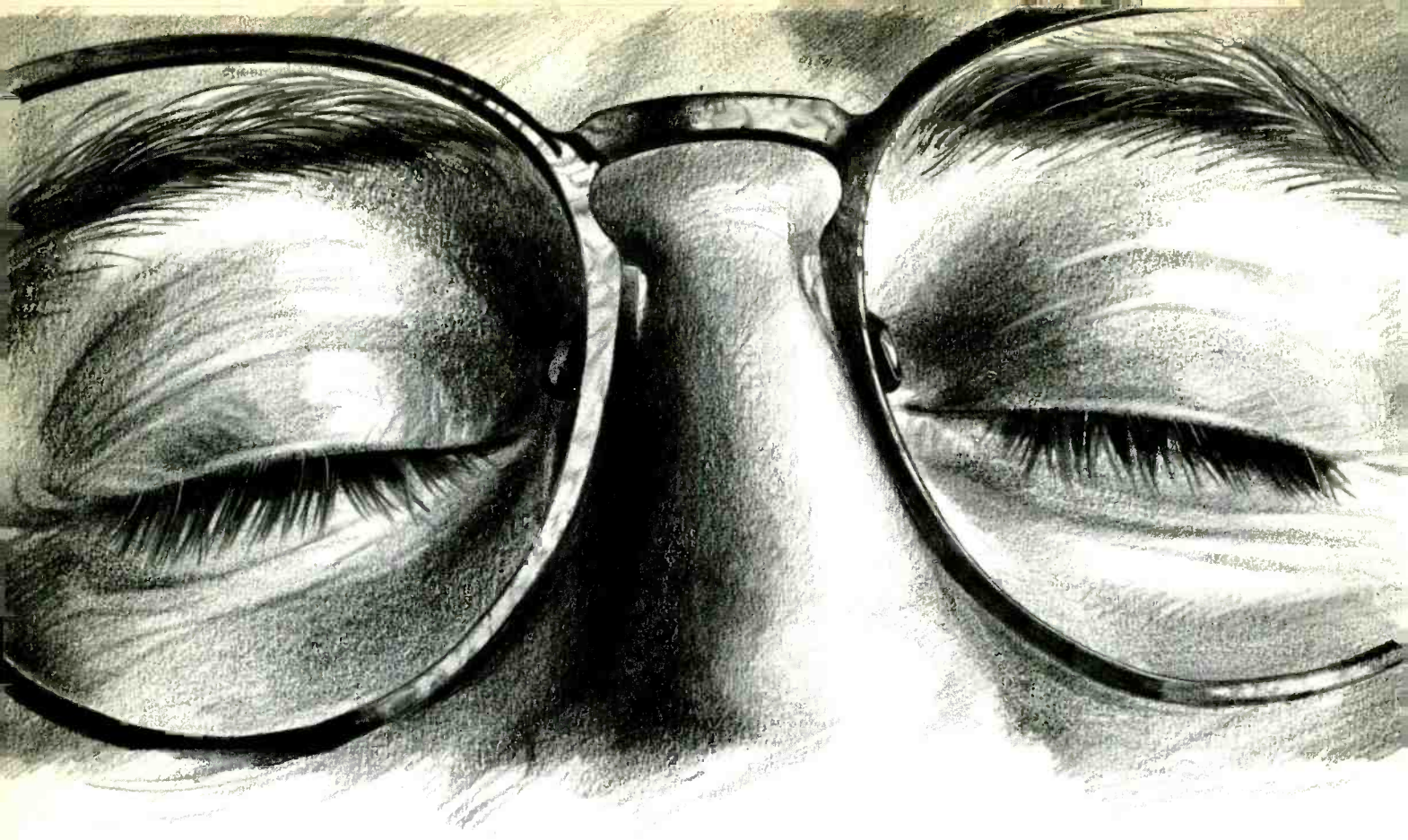
1] The primary concern of major and minor label A&R (artist and repertoire) staff expressed in a recent survey, and in numerous interviews, is cost containment. This is not to say that quality or skill issues are unimportant, but almost to a person, these record label managers confirmed that all else being equal or even nearly equal — price remains a major 'deal maker'. The feeling was stated that so many studios today have such superb facilities and excellent staff, that the community that creates record projects can indeed afford to pick and choose. 'All things being equal', however, remains a powerful caveat to distinguish between one studio and another.

2] Studio staff operation skill, especially in guiding the progress of the group doing the recording, also received high marks from the label executives. One veteran artist and repertoire specialist commented thusly: 'I love it when I can turn a project over to the studio people and I know that they will keep the musicians in the group from wasting enormous amounts of time and energy trying to create some particular "sound" or "effect" or "riff" or what-have-you that is just not viable. I have one particular artist who has put a quarter of a million dollars into his 'home' studio and ends up spending at least twice as much time on an album project at home as opposed to being in an "real" studio. In fact, he likes the "home" studio feel so much, that now I put him in a commercial facility that has configured a number of their rooms with "home and project" technology. He gets what he wants and I know that the studio engineer will help focus him on the project at hand.'

3] Teamwork is another issue mentioned frequently. To some extent, see above. In other words, the ability of a particular studio's staff to become part of the overall project is rated very highly indeed . . . please and thank you! But from this perspective, that means meeting the label's needs as much or more than meeting the artist's needs. Forming a close bond with the recording group is not necessarily a business enhancer for a given studio in this environment.

4] Technical skill is another area that A&R specialists emphasise. The ability to obtain desired musical qualities with the equipment at hand is considered very important, especially when done in an expedient manner. Whether meeting the needs of the label or the band, knowledgeable technical help is a must. This does link back into the issue of cost containment, to some extent. When a studio is being rented for so many hundreds of dollars per hour plus the cost of all of the back-up musicians and other elements for which the 'clock is ticking,' rapid knowledgeable response to technical issues is a must! What is obviously abhorred is for the studio technical staff to be lethargic in responding to specific requests for support.

5] Maintenance capability is another 'five-star' item to many A&R staffers. Said one 'great lady' of the ▶



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GCV KEPPENS

record business, 'I absolutely insist that there be a separate and extremely competent maintenance person available at all times when we are in the studio. If I am buying "four walls", the maintenance "tech" is a built-in, just like the console. Also, I expect the latest in test gear and complete redundancy so that we do not lose a session. After all, as in most businesses, time is money!'.

6] The 'City' and the 'Sound' are frequently issues raised by label managers in making studio choices. What is most frequently heard (and it is not as pressing an issue as the others), is the need to be in Hollywood/Los Angeles, or the New York area, sometimes in Chi-Town (Chicago), infrequently in Motor City (Detroit), or for country and some pop — the Nashville sound etc. The way it is described by one A&R executive poses an analogy to another industry. 'No one in the record business is going to have a career crisis over doing an album in an established city, with an accepted "Sound" in the same way that nobody in the computer industry has ever been fired for buying or waiting to buy Big Blue — IBM.'

The producer of the recording

1] The 'sound' of a particular studio is a very important issue to many producers. Certain studios become known for particular musical trends and projects involving country, jazz, rhythm and blues, soul, heavy metal and other styles. To some extent, this is a kind of 'natural selection' since as a studio becomes more and more musically selective — the staff become significantly better at that specific musical genre. Acoustics of specific rooms are frequently tailored for the desired format and specific technological needs are met as well.

2] A concommitant reputation as the site of success is also important to those producing a record project. A veteran record producer suggested that, 'certain studios have a reputation for their success in being the site for the production of spectacularly successful hit recordings. It becomes a kind of cult thing . . . like baseball players who wear the same underwear through out their team's winning streak. It is not an altogether tangible thing, but it certainly includes all of the physical elements — acoustics, technical facilities, etc., and the staff and other things. A "Hit" studio remains just that for a given time frame until "lightning" strikes again.' A more positive way to describe the 'Hit' phenomenon might be the number of gold and platinum awards hanging on the walls of a given facility.

3] Technical facilities are especially important to a producer, since the 'tools of the trade' must be available. One producer describes his search for the ideal technical facility 'as a quest for the most and the best!'

4] Cost is also an important issue for the producer, but especially so if the producer has cut an 'All-In' or all-inclusive deal with the record label. In such a case, the producer directly participates by having responsibility to 'bring in the project' at a given figure. If production costs are kept down, the surplus reverts to the producer's fees in many cases.

Record label financial staff

1] Timeliness of studio billings to the record company is a very important issue for label financial staff. Some studios have very real accounting problems and have been known to bill the label six months after the completion of the project. In many cases, the project's file has been closed and must be reopened. With some projects waiting, for telephone and catering charges to come in, is inevitable. But, those studios who bill promptly usually make friends of those who deal in the business side of the record industry.

2] Billings to the record company must be neat, orderly and complete. One studio owner described her displeasure with the process. 'For years, this one label would not give me any business. I mean we had a few "nickle and dime" jobs but nothing else. It seems my bookkeeper was a bit of a slob . . . lovely woman but still a slob. The bills were disorganized and hard to comprehend. Not to mention the coffee and doughnut stains. When I changed bookkeepers, to enjoy the services of a compulsive perfectionist, I found that the "Kibosh" against us at the record label disappeared. They finally were getting the neat and squeaky clean bills they wanted.'

> The 'Rep' of a studio is probably the strongest draw for several groups who were interviewed for a detailed study

3] If there is one thing that will 'kill' a studio in the record industry instantly, it is the practice of 'padding' or 'cooking' the invoices to the record company. A label financial type waxed eloquent on the subject: 'Frequently, it isn't even a real effort at dishonesty. What happens is a studio will low ball a project — either intentionally or by accident. They end up with a price that is so low that it is impossible to profit on the project. So they'll add this odd charge or that odd charge and then something else for good measure. Bad way to do business. The balance of power at the record companies is such that we often do not prevail in a decision process. But when we find hanky-panky — there is no question but that — the studio is history. And people who do what I do are really a bunch of undisciplined gossips. So the impact of such nefarious behaviour is quite cosmic in the industry.'

The 'group' being recorded

1] The 'Rep' of a studio is probably the strongest draw for the several groups who were interviewed for a detailed study. Everybody, especially new groups but also faltering older groups — wants to see if indeed 'lightning' can strike twice. Reputation will bring back a group who had put together a very successful album at a facility and it will also draw a group trying to 'rub off' some of the residual 'magic'.

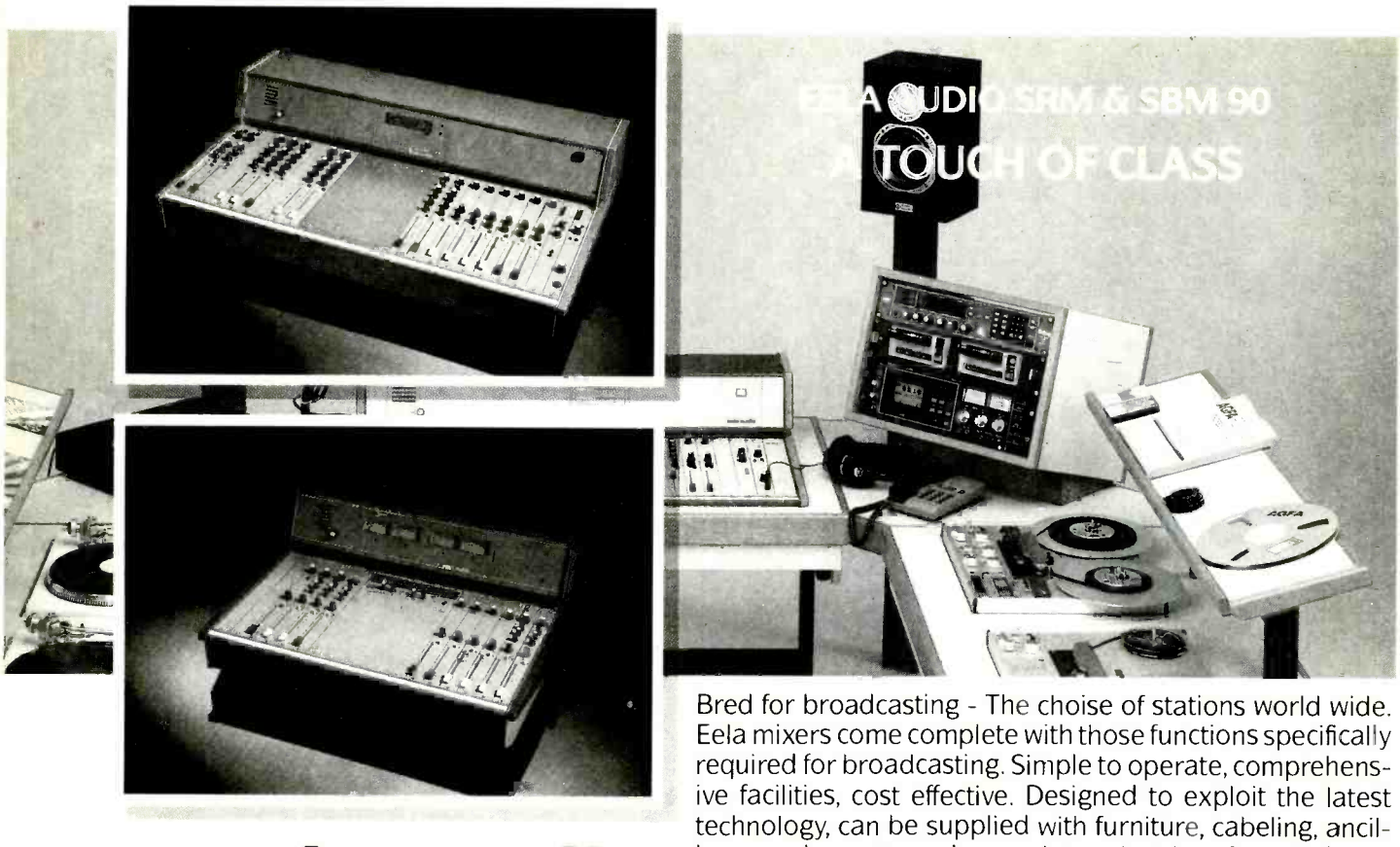
2] The 'Sound' of a facility is also very important for a group. To some extent, see 1] above. A lead drummer for a name group opted, 'if we are going to cross over from rock to country — say a rock-a-billy project — we would want a studio with a great country "sound" to enhance the project.'

3] 'Gear' is often mentioned as a major motivator. But it is an accepted fact that the more the merrier and only the best will do. It is still reality that you can measure the success of the 'boys' (or 'girls') by the number and size of their toys. Only top notch facilities technically need apply, thank you!

4] 'Perks' still can influence a group's choice if, and it is a very big 'if', the record label will pay for the peripheral services. These can include a top notch kitchen or caterer, special locations including rural and resort settings, video game rooms, etc.

Now it becomes immediately apparent that the topic of D for 'digital' has not been given major item status in the above shopping list of what the all and sundry look for in selecting a recording venue. That is because generally all major facilities, and many minor ones, have gone either digital or else made a major investment in state-of-the-art analogue which may include a lot of vacuum tube processing and monitoring, and complete Dolby *SR* processing for the tape machines. It is not unusual to find a mixture of both camps at many facilities. So high quality — be it digital or analogue — is considered as given. Studios with less than the best simply do not get even consideration for project work.

Now the bottom line for all of the recording studio owners, operators, managers and 'wannabees' who read this, is to try to pick and choose those elements in their own operation that need enhancement. Needless to say, one person's meat is another person's poison — to correctly paraphrase an old saying. Pleasing the A&R people may not satisfy the producer or the financial staff at the record label. Indulging the group could well be a problem, especially if the project is on the sort of tight budget that is so often the case today. Unilaterally, it is the group recording that wields more and more power as their records become more and more successful. Ultimately, and finally, the power of studio choice for a record project will rest with the group doing the project — especially after all other elements required remain equal amongst several studios. The trick for studio management these days is to reach the top tier for selection by being able to satisfy the specific concerns of the A&R people, the project's producer and the financial staff. ■



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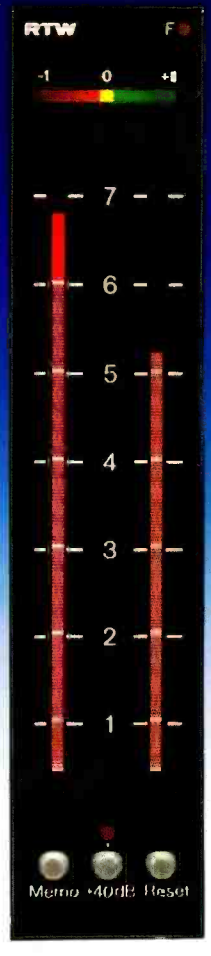

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MICROPHONES

This survey is a complete listing of microphones suitable for studio, live and location work from information available. We would be pleased to hear of omissions for inclusion in future surveys

M/fr	Model	Type	Polar	Max SPL	Details
ACO Pacific	ACM48UP	C	C		compact multipurpose
AKG	D58	D	NC		noise cancelling
	D70	D	C		
	D80	D	C		
	D90	D	C		
	D95S	D	HC		
	D109	D	O		lavalier type
	D112	D			bass applications
	D125	D	C		
	D130	D	O		
	D190	D	C		
	D310	D	C		general purpose live
	D321	D	HC		general purpose live
	D330	D	HC		general purpose live
	F510	D	O		gooseneck
	D541	D	C		gooseneck
	D558B	D	NC		gooseneck, noise cancelling
	D590	D	C		gooseneck
	D202	D	C		voice and general purpose
	D222	D	C		variable LF
	D224	D	C		variable LF
	D990E	D	U		shotgun
	C34	C	M		stereo
	C414-ULS	C	M		large diaphragms, low noise
	C426	C	M		stereo, large diaphragm
	C522ENG	E	2xC		hand held stereo
	C562BL	E	H		circular boundary mic
	C567E1	E	O		lavalier type, music or speech
	C568EB	E	HC		medium distance dialogue mic
	C747	E	HC		high gain live use, tight pattern
	C525S	E	HC		
	C401	E	HC		
	C1000S	E	C/HC		switchable response
	The Tube	C	M		vacuum tube mic
	C460-ULS	C			modular system: C, O, HC capsules
	C426B	C	V		stereo, suitable MS/XY
	C451EB	C	C		with CK1 capsule; wide range other types
	C408	E	HC		miniature percussion/drum mic
	C409	E	HC		mini instr mic on goose neck
	C410	E	HC		miniature headset mic
	C406				miniature gooseneck mic
Amfon	BL-9	C	C		10 dB pad, two HPF filters
	BL-3	D	C		
AMS	ST250	C	S		switchable X/Y, M/S, remotely controlled
	Soundfield	C	V		4-channel and 2-channel O/Ps; continuously variable pattern
Audio-Technica	AT801	E	O		
	AT803B/D	E	O		mini lavalier
	AT804	C	O		studio recording mic
	AT805B	E	O		mini lavalier
	AT811	E	U		
	AT812	D	U		
	AT813	E	U		
	AT814A	D	U		
	AT815	E	SC		shotgun
	AT825	C			stereo mic
	AT831B	E	U		mini lavalier
	AT835		SC		short shotgun
	AT838G	D	U		console mounting

MICROPHONES KEY

TYPE

- C = Condenser
- D = Dynamic
- E = Electret
- R = Ribbon

POLAR PATTERN

- O = Ommi
- C = Cardioid
- SC = Supercardioid
- HC = Hypercardioid
- 8 = Fig-of-8
- U = Unidirectional (used to signify directional pattern that does not qualify under any of the above categories)
- H = Hemispherical, ie boundary response
- MS = MS stereo
- NC = Noise cancelling
- BN = Binaural (as in dummy head)
- O/C/8 = denotes pattern choice
- V = Variable pattern, continuous
- M = Multiple pattern, switched

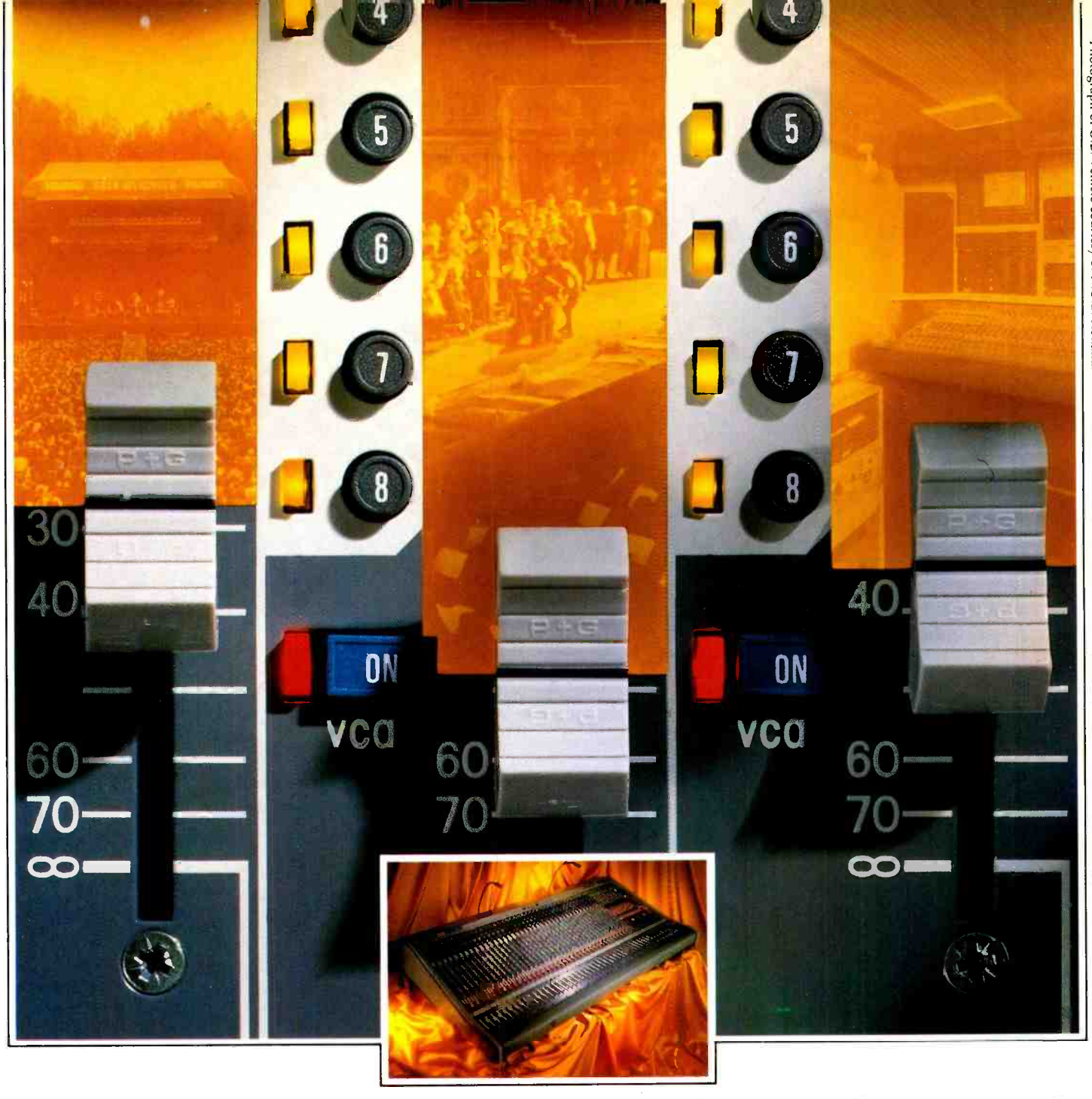
M/fr	Model	Type	Polar	Max SPL	Details
Audio-Technica Cont'd	AT841A	E	H		boundary type
	AT851A	E	U		boundary type
	AT871A	E	U		boundary type
	AT877	E	SC		
	AT4031	C	U		
	AT4033	C	C		studio condenser
	AT4049	C	O		
	AT4051	C	U		
	AT4053	C	HC		
	AT4071	C	SC		long shotgun
	AT4073	C	SC		short shotgun
	ATM10	D	U		studio recording mic
	ATM11	C	U		studio recording mic
	ATM15A	C	U		instrument mic
	ATM25	D			drum mic
	ATM31	C	U		studio recording mic
	ATM35	C	U		instrument mic
	ATM41HE	D	U		Hi Energy stage/rec mic
	ATM61HE	D	U		Hi Energy stage/rec mic
	ATM63	D	U		studio/rec/instr mic
	ATM73A	C	U		headset mic
Beyer	MC740	C	V	134	stand mount
	MC742	C	S	134	stereo, adjustable capsule angles
	MC734	C	C	138	vocal use
	MC736	C	SC	123	lightweight shotgun, hand use
	MC737	C	SC	122	lightweight long shotgun
	MCE5	E	O	116	tie clip mic
	MCE6	E	O	146	tie clip mic, high level
	MCE10	E	HC	116	cardioid version MCE5
	MCE80	E			LF filter
	MCE81	C	SC		for stage use
	MCE86	E	SC		low cost shotgun
	MPC40	C	H		boundary type, circular base
	MPC50	C	H	130	boundary mic in wood plinth
	MPC60	C	C		boundary mic, capsule raised
	M69	D	HC		high sensitivity, music/voice
	M88	D	HC		instrumental mic
	M160	R	HC		double ribbon, string instruments
	M200	D	C		low cost
	M260	R	HC		instrument mic
	M300	D	C		vocal/general use
	M400	D	SC		vocal/general use, presence boost
	M500	R	HC		vocal
	M600	D	HC		vocal, variable LF
	M700	D	HC		vocal use
	M420	D	HC		high quality, live speech use
	M422	D	SC		low cost speech mic
	HM560	D	8		headset mic
	M58	D	O		extra long reporter's mic
	M380	D	8	140	bass instruments, large overload margin
	TGX480	D	HC		high output PA
	TGX180	D	HC		high output vocal
	TGX280	D	HC		high output PA
	MC833	D	SC		stereo ENG
	TGX580	D	HC		high output vocal
	M424	D	HC		high output - gooseneck mountable
	SHM20	C	HC		miniature
	M101	D	O		slight HF emphasis
	M130	D	8		suitable for use in MS stereo
Bruel & Kjaer	4003	E	O	154	pencil type, line level, power supply
	4006	E	O	143	as 4003 but phantom power
	4004	E	O	168	as 4003 but high intensity
	4007	E	O	155	as 4004 but phantom power
	4011	E	C	158	first order cardioid (P48V)

M/fr	Model	Type	Polar	Max SPL	Details
Bruel & Kjaer	4012	E	C	168	as 4011 but line level power supply
	5930				head/torso simulator with phase matched 4006 pr for stereo
	DDO297				attachment to boost high freq response (4003/6 only)
	UAO777				attachment to boost omni response (4003/6 only)
	WA0609				attachment to enhance directional characteristics (4003/6 only)
CAD	Equitek II	E	O/C/8	148	large stand mount, transformerless
Coles	4038	R	8		stand mount
Crown/ Amcron	PZM-6R	E	H		small PZM, enhanced HF
	PZM-6F	E	H		as PZM-6R but flat response
	PZM-11	E	H		ultradiscrete PZM
	PZM-20	E	H		permanent installation
	PZM-30R	E	H		larger PZM, enhanced HF
	PZM-30F	E	H		larger PZM, flat response
	PCC-160	E	C		phase coherent boundary
	PCC-200	E	C		as PCC-160, variable gate
	PCC-190	E	C		as PCC0160 with on/off switch
	CM-200	C	C		general purpose/vocal
	CM-310	C	DF		high gain before feedback
	SASS-P	E			stereo system using PZM technology
	SASS-B				boundary mount system for B&K 4006 mics
	GLM100		O		subminiature type
	GLM200		HC		subminiature type
	CM-30	C	SC		miniature mic for hanging applications
	LM300	C	SC		miniature gooseneck mount
Electro-Voice	ND257A	D	C		vocal mic
	ND357A	D	SC		vocal mic
	ND457A	D	HC		vocal mic
	ND757A	D	SC		vocal mic, roll-off switch
	ND857	D	SC		vocal mic, roll-off switch
	ND308A	D	C		instrument mic
	ND408A	D	SC		instrument mic
	BK1	C	C		hand held vocal mic, gen instr
	635A	D	O		hand held voice
	C090	C	C		tie clip mic
	DS35	D	C		high gain live vocal use
	RE10	D	C		
	RE11	D	C		
	RE16	D	C		
	RE18	D	C		
	RE20	D	C		stand mount, general purpose
	RE27ND	D	C		general purpose
	RE38ND	D	C		instr mic
	RE45/ND	D	SC		hand held short shotgun
	RE50	D	O		hand held voice
Fostexc	M11RP	R	U		
	M22RP	R	S		MS stereo
	M33RP	R			outdoor applications
	M44RP	R			
	M77RP	R	U		LF applications
	M88RP	R	8		speech use
Gefell	MV692/93		O		
	MV692/M70		C		
	MV692/ UM70		O/C8		switchable
Milab	D-37	D	C		vocals, guitars, drums
	VIP50	C	V	112	transformerless, variable filters
	DC96B	C	C	118	multipurpose, large capsule

M/fr	Model	Type	Polar	Max SPL	Details
Milab Cont'd	VM44	C	C	128	slim style, transformerless
	LSR2000	C	C	133	stage vocal mic
	LC25	C	C	128	transformerless, line level option
	MP30	C	H	110	boundary type
Neumann	KMS140	C	C	138	hand held vocal mic
	KMS150	C	HC	142	hand held vocal mic
	TLM50	C	O	136	transformerless, sound related to M50
	GFM132	C	H	137	triangular boundary mic
	KM100				modular microphone system, range of capsules
	KM130	C	O	140	
	KM131	C	O	140	flat direct field response
	KM140	C	C	138	
	KM143	C	C		bass roll-off
	KM145	C	C	138	bass roll-off
	KM150	C	HC	142	
	TLM170	C	V	140	transformerless, stand mount
	U87	C	O/C/8	117	stand mount, multipurpose
	U89	C	V	134	similar but smaller than U87
	SM69fet	C	O/C/8	123	stereo, fully variable angles
	USM69i	C	V	132	stereo, fixed selectable patterns
	KU81i	C	BN	130	stereo dummy head system

M/fr	Model	Type	Polar	Max SPL	Details
Neumann Cont'd	RSM191	C	MS	134	MS stereo shotgun
	KMR81i	C	SC	128	short shotgun
	KMR82i	C	SC	128	long shotgun
Pearl	CC30		C		double capsule, transformerless
	TL-4				double membrane system with two amplifiers
	MS2/MS8	C			stereo MS
	TL6		C		
	PA54	C	C		transformerless
	TLC 90	C	C	142	live sound use
	MD88	D	C		general use
Peavey	ERO10	E	O		small capsule, recording
	ERC12	E	C		large capsule, recording
	PVM38	D	C		vocal, live use
	PVM380N	D	C		vocal, live use, tight pattern
	PVM520TN	D	C		stand mount, instrument use
	PVM580TN	D	C		hand held, vocal use
	PVM45	D	HC		general instrument use
	PVM48	E	C		general instrument use
	PVR-1	E	O		small capsule, flat response
	PEL20	E	O		lavalier
	PEL25	E	U		lavalier
	PVN535N	D	C		hand held vocal mic
	VCM-1	E	C		hanging
	PSM-1	E	C		boundary surface mic

M/fr	Model	Type	Polar	Max SPL	Details
Ramsa	WM-S1	E	U	148	sub miniature, wide band
	WM-S2	E	U	138	subn miniature, for brass
	WM-S5	E	U	158	sub miniature, for percussion
	WM-S10	E	U	138	sub miniature, headset type
	WM-D70	D	SC		vocal use
	WM-D65	D	SC		vocal use
	WM-D55	D	U		general use
	WM-P50	D	U		instrumental use
	WM-P40	D	U		instrument/vocal use
Sanken	CU41	C	C	140	twin capsule, general purpose
	CU44X	C	C		twin capsule, general purpose, transformerless
	COS-11	E	O	123	ultra miniature lavalier:
	CMS-7	C	S		X/Y and MS stereo, hand held use
	CMS-9	C	MS		stereo mic for ENG
Schoeps	Collette				modular mic range with choice series of amplifiers and capsules
	MK2	C	O	130	
	MK3	C	O	132	tailored for use in reverberant soundfield
	MK4	C	C	131	
	MK4S	C	C	130	tailored for speech
	MK41	C	HC	130	
	MK5	C	O/C	131	
	MK6	C	O/C/8	132	
	MK8	C	8	132	
	MK21	C	C	130	'subcardioid' off axis signals lower in level but same tonal balance
	BLM03C	C	H	130	small boundary mic for Colettes
	BLM3	C	H	130	boundary mic
	CM03	C	O	130	compact flat clip-on type
	CMH541C	C	HC	132	hand held vocal mic
	CMH54C	C	C	131	hand held vocal mic, range of powerings
	CMH52C	C	O	132	hand held vocal mic, range of powerings
	CMTS501	C	O/C/8	125	stereo mic, also as CMTS301 for 12 V operation
	KFM6U	C	S	120	*Sphere* stereo recording system
	VMS021B				stereo M-S X-Y recording
Sennheiser	MKH20	C	O	134	switchable near/duffise field
	MKH30	C	8	134	
	MKH40	C	C	134	
	MKH50	C	SC	134	
	MKH60	C	SC	125	short shotgun
	MKH70	C	SC		shotgun
	MD-421U-5	D	C		general purpose, percussion
	MD-422	D	C		general purpose
	MD-441D	D	SC		general purpose music
	K3 series	E			modular system with choice O/C/SC capsules
	MKE2002	E	BN		dummy head binaural stereo mic
	MKE2	E	O		small clip-on mic
	MKE212	E	BN		boundary layer mic
	MKE42	E	C		stick mic, approx 45 cm long
	BF531	D	SC		general purpose music
	BF527	D	SC		general purpose music
	BF509	D	C		general purpose ,percussion
Shure	SM58	D	C		live vocal mic
	SM57	D	C		drums, amps, vocals
	SM87	C	SC	142	vocals
	SM85	C	C	142	vocals
	SM81	C	SC	146	acoustic instruments, drum O/H
	SM80	C	O	147	as SM81
	SM98	C	C	153	mini mic for drums, horns, gtrs
	SM99	C	SV		miniature gooseneck mounted
	SM83	C	O		miniature lavalier
	SM84	C	SC		miniature lavalier
	SM90	C	H	141	boundary type,
	SM91	C	H	144	boundary type, half cardioid response
	SM99SE	C			miniature gooseneck
	SM7	D	C		vocals
	55SH Mk2	D	C		redesign of original 55 series
	520D		O		'Green Bullet' harmonica mic
	SM59	D	C		horns
	VP64	D	O		ENG, A/V production
	VP88	C	MS	129	stereo
Sony	ECM-44	E	O	122	lavalier, low cost
	ECM-55	E	O	126	lavalier. multi use
	ECM-66	E	C	130	lavalier. musical applications
	ECM-77	E	O	120	lavalier. miniature
	C-38B	C	O/C	140	stand mount, multi use
	C-48	C	O/C/8	128	stand mount, high performance
	C-74	C	SC	126	shotgun (17 ins approx)
	C-76	C	SC	126	shotgun (27 ins approx)
	C-535	C	C	138	pencil type, multi mic use
	C-536	C	SC	138	pencil type, multi mic use
	ECM-672	E	U	114	short shotgun type, camera mount
	ECM-MS5	E	MS	130	suitable hand held use
	ECM-979	E	MS	130	capsules 90° to axis
	ECM-33F	E	C	134	hand held/stand use
	ECM-23F11	E	C	134	tight cardioid pattern
	F-720	D	C		general purpose/speech
	F-730	D	U		vocal recording
	F-760	D	U		multipurpose voice
	F-115	D	O		all weather outdoor uses
	C-800G				
	C-800				



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MICROPHONES

Manufacturers' and Distributors' addresses

ACO Pacific Inc, 2604 Read Avenue, Belmont, CA 94002, USA. Tel: (415) 595-8588.

AKG, Akustiche U Kino-Gerate GmbH, Brunhildengasse 1, Wien A- 1150, Austria. Tel: 222 956517.

UK: AKG Acoustics Ltd, Vienna Court, Catteshall Wharf, Catteshall Lane, Godalming GU7 1JG. Tel: 048 68 25702.

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UK: Shuttlesound, 4 The Willows Centre, Willow Lane, Mitcham, Surrey CR4 4NX. Tel: 081-640 9600. Fax: 081-640 0106.

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USA: AMS Industries Inc, 3827 Stone Way North, Seattle, WA 98103. Tel: (206) 633-1956. Fax: (206) 547-6890.

Audio-Technica Corp, 1348 Naruse, Machida, Tokyo 194, Japan. Tel: 0427 29 5113. Fax: 0427 28 1710.

UK: Audio Technica Ltd, Technica House, 11 Lockwood Close, Leeds LS11 5UU, West Yorks. Tel: 0532 771441.

USA: Audio-Technica US Inc, 1221 Commerce Drive, Stow, OH 44224. Tel: (216) 686-2600.

Beyer Dynamic Electrotechnishe Fabrik, Theresienstrasse 8, Postfach 1320, Heilbronn, D-7100 Germany. Tel: 71 316170.

UK: Beyer Dynamic UK Ltd, Unit 14, Cliffe Industrial Estate, Lewes BN8 6JL. Tel: 0273 479411.

USA: Beyer Dynamic (USA) Inc, 5-50 Burns Avenue, Hicksville, NY 11801. Tel: (516) 935-8000.

Bruel & Kjaer A/S, Naerum, DK-2850, Denmark. Tel: 2 800500.

UK: Bruel & Kjaer (UK) Ltd, Harrow Weald Lodge, 92 Uxbridge Road, Harrow HA3 6BZ. Tel: 081-954 2366.

USA: Bruel & Kjaer Instruments Inc, 185 Forest Street, Marlborough, MA 01752. Tel: (617) 481-7000.

Conneaut Audio Devices, Harbor & Jackson Streets, PO Box 120, Conneaut, OH 44030, USA. Tel: (216) 593-1256. Fax: (216) 593- 5395.

UK: Music Lab, 72-76 Eversholt Street, London NW1 1BY. Tel: 071-388 5392. Fax: 071-388 1953.

Crown International Inc, 1718 West Mishawaka Road, Elkhart, IN 46517, USA. Tel: (219) 294-8000.

UK: Shuttlesound Ltd, 4 The Willows Centre, Willow Lane, Mitcham, Surrey CR4 4NX. Tel: 081-640 9600. Fax: 081-640 0106.

Electro-Voice Inc, 600 Cecil Street, Buchanan, MI 49107, USA. Tel: (616) 695-6831.

UK: Shuttlesound Ltd, 4 The Willows Centre, Willow Lane, Mitcham, Surrey CR4 4NX. Tel: 081-640 9600. Fax: 081-640 0106.

Europe: Electro-Voice SA, Mark IV Industries, Keltenstrasse 5, CH-2563, Ipsach, Switzerland. Tel: (032) 51 6833. Fax: (032) 51 1221.

Fostex Corporation 560-3, Mayazawacho, Akishima, Tokyo, Japan. Tel: 0425 45 6111.

UK: Fostex UK Ltd, Unit 1, Jackson Way, Great Western Industrial Park, Southall, Middlesex UB2 4SA. Tel: 081-893 5111.

USA: Fostex Corporation of America, 15431 Blackburn Avenue, Norwalk, CA 90650. Tel: (213) 921-1112. ▶

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Panasonic, Matsushita Electric Ind Co Ltd, PO Box 51, Osaka Central 530-91, 1006 Oaza Kadoma, Osaka, 571, Japan. Tel: 06 908 1121.

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USA: Panasonic Professional Audio Division, Matsushita Electric Corp of America, 1 Panasonic Way, Secaucus, NJ 07094. Tel: (201) 348-7000.

Pearl Microphones, Box 98, S-26501, Astorp, Sweden. Tel: 042- 588 10.

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Peavey Electronics Corp, 711 A Street, Meridian, MS 39301, USA. Tel: (601) 483-3565.

UK: Peavey Electronics Ltd, Hatton House, Hunters Road, Weldon North Industrial Estate, Corby, Northants NN17 1JE. Tel: 0536 205520.

Sanken Microphone Co Ltd 2-8-8 Ogikubo, Suginami-ku, Tokyo 167, Japan.

UK: Stirling Audio, Kimberley Road, London NW6 7SF. Tel: 071- 624 6000.

USA: Audio Intervisual Design, 1032 North Sycamore, Los Angeles, CA 90038. Tel: (213) 469-4773.

Schalltechnik Dr-Ing Schoeps GmbH, PO Box 410970, 7500 Karlsruhe, Germany. Tel: (0721) 4 20 16.

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USA: Posthorn Recordings, 132 W 26th Street, 10th Floor, New York, NY 10001. Tel: (212) 242-3737.

Sennheiser Electronic, D-3002, Wedemark 2, Germany. Tel: 05130 583-0.

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USA: Sennheiser Electronic Corp, 6 Vista Drive, PO Box 987, Old Lyme, CT 06371. Tel: (203) 434-9190. Fax: (203) 434-1759.

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UK: HW International Ltd, 3-5 Eden Grove, London N7 8EQ. Tel: 071-607 2717.

Sony Corp, PO Box 10, Tokyo AP, Tokyo 149, Japan. Tel: 03 448- 2111.

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Did you hear that?!

Dear sir, A recent advertisement from AMEK puffing the MOZART *RN* console includes a statement indicating that 'academic research has endorsed our experience, finding evidence that signals as high as 100kHz are used by the brain to add fullness to music'. Perhaps AMEK should explain whose brain can be so added with fullness from signals that are at least an octave higher than the average ultrasonic garage door transmitter! Try as I might, I just cannot hear, even when straining to do so, these signals. The human ear, membrances and ossicles are soft tissue and fundamentally absorb frequencies above 18kHz or so, producing no sensations at the brain. The generally accepted limit of human hearing is in this region. If recent research indicates that the range has been extended to 100kHz, we should all be told, for the sake of the audio industry.

The AMEK desk is presumably used to make recordings, which invariably filter those frequencies above 26kHz or so in a very dramatic manner. The available quality media, either CD or DAT can only reproduce significantly more noise than signal at 100kHz and the average loudspeaker is possibly no more reactive than a wet sponge at these frequencies.

Come off it AMEK who are you kidding! It's this sort of codswallop that keeps alive the myths and legends of the hi-fi brigade.

P Brooke, County of Spires and Squires, Irthlingborough, Northants, UK.

The malady lingers on

Dear Sir, I have read with interest in the January 1992 edition of Studio Sound a letter from Michael Chamness of SpeakEasy Loudspeakers regarding computer virus.

I would like to add to his letter by advising readers of the following information:

1. The fixes and programmes mentioned in this letter are only found on the *IBM PC* and compatibles not Apple *Mac's* or *Atari's*. These also suffer from the blight of viral software but the problems can not be fixed as stated in the letter, nor, can the software mentioned be used as a cure.
2. From our experience what appears to be a virus is often some other form of problem — we really can recommend two excellent (cost effective) companies in the UK for dealing with such problems they are:

Synergic Computer Systems on 0895 441350 and S&S on 0908 230660 — they tell me that a lot of computer virus software originates in Eastern Europe and that the programs mentioned do not always detect or deal with European strains, but are optimised for the American variant.

We know this because we were running McAfee Virus Detection software and it missed a virus that caused us to lose some work — Beware!

Yours sincerely, Kevin Taggerty, Moose Music Publishers, 175a Station Road, West Drayton, Middlesex UB7 7NQ, UK.

Sony surprise

Dear sir, I read with interest the article 'CBS-Sony Studios', by Zenon Schoepe, *Studio Sound*, January 1992.

However, I was a little surprised to discover that they were performing 20 bit recording using a SONY DES 900 A D converter. I suspect this would have been a dCS 900 ADC with a Sony label applied for reasons I know not.

Yours sincerely, Paul Maddox, Marketing Manager, Data Conversion Systems Ltd, The Jeffreys Building, St. John's Innovation Park, Cowley Road, Cambridge CB4 4WS, UK.

Letters should be addressed to: The Editor, Studio Sound, Spotlight Publications, Ludgate House, 245 Blackfriars Road, London SE1 9UR, UK.

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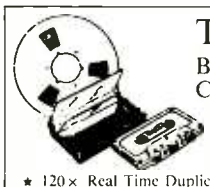

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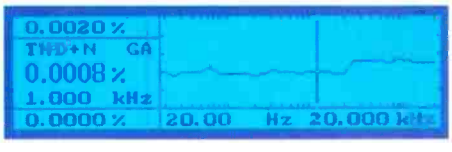

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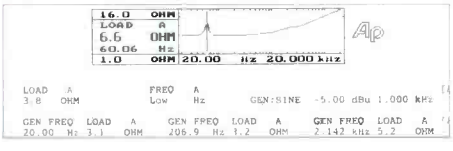

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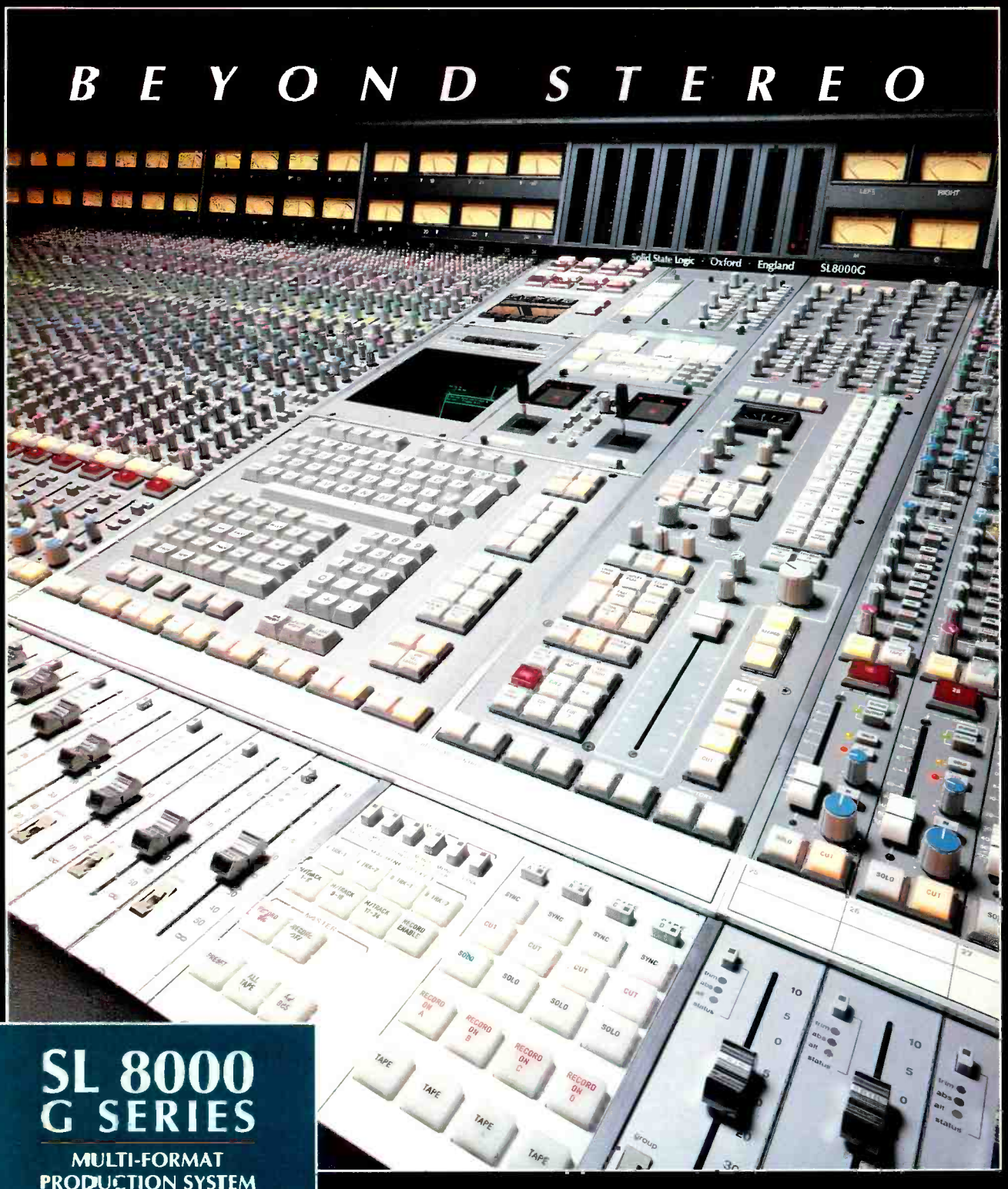

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