

June 1992

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STUDIO SOUND

AND BROADCAST ENGINEERING

**APRS PREVIEW
SPAIN**



DELTA SR: THE PERFORMER

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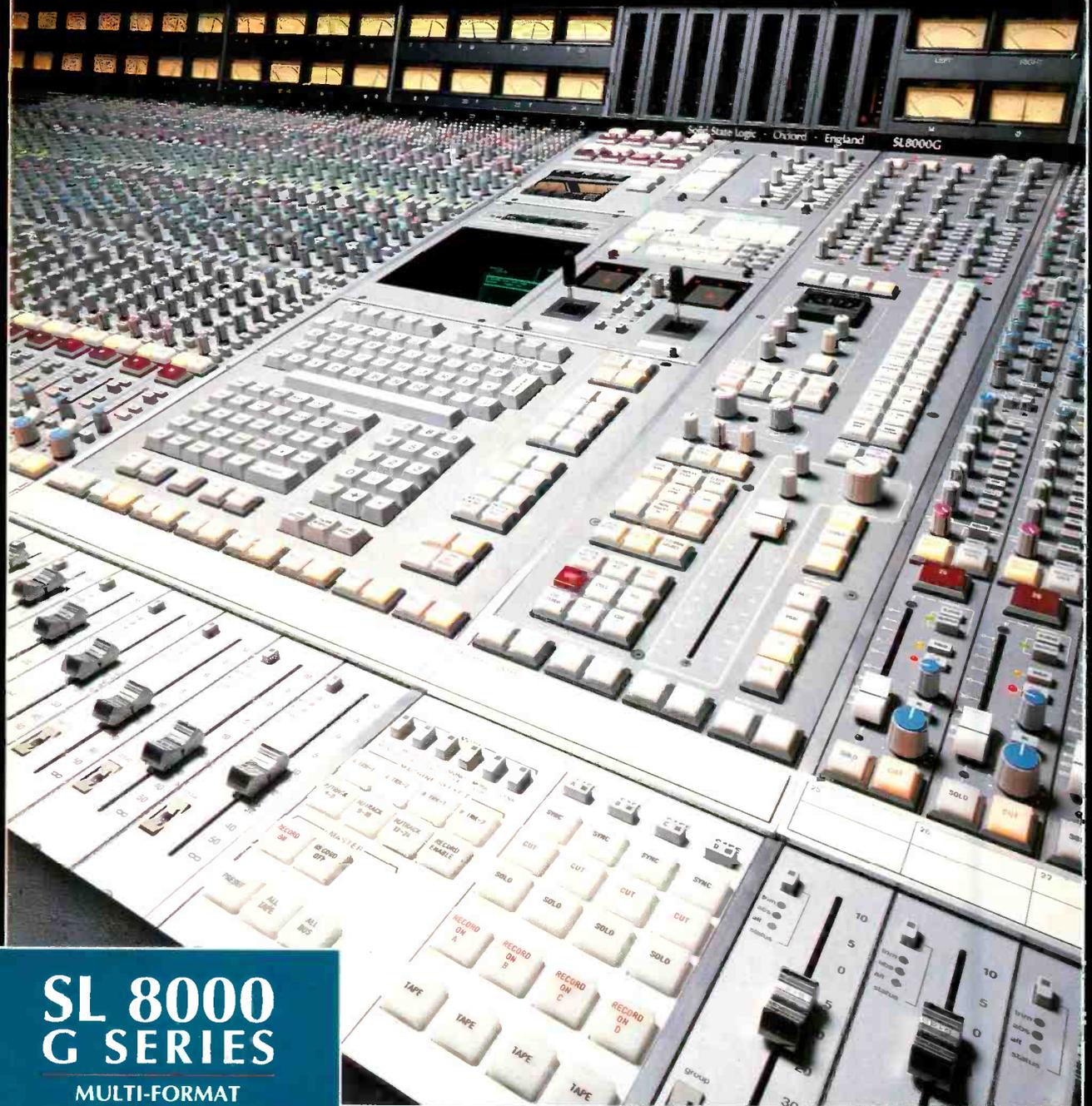
Delta SR



Tea for two at CTS Studios — see page 51

Editorial:	Studio Sound's viewpoint on events and trends and their implications	5
News:	Jools Holland's view of studio life; goodbye to the Trident 80; news reviews of the <i>Digital Master</i> and an update for <i>Flying Faders</i>	9
NAB Las Vegas Review:	Keith Spencer-Allen reports from this year's NAB show in Las Vegas	17
Music News:	News and developments from another side of the business	22
Dublin's <i>Messiah</i>:	Mike Lethby on the 250th anniversary of the first performance of Handel's <i>Messiah</i>	25
Air Movements 4:	A pictorial update of the creation of Air Studios at Lyndhurst Hall	33
APRS London Preview:	A guide to manufacturers, agents and exhibitors at Olympia 2 in London	37
21 Years of CTS:	Patrick Stapley traces the history of this world renowned studio	51
The Reign of Spain:	Sergio Castro describes the working conditions when recording in Spain. Part Six of our survey	59
Roland S770/750:	Mike Collins reviews Roland's top end sampler	65
Recordable CD:	The biggest revolution this year has been the accessibility of CD-R. Francis Rumsey accesses the technology	71
Sounds Off:	The domination of CADAC technology in the theatre sound world is explained to Patrick Stapley	78
Optifile:	Patrick Stapley reviews this automation system from AD-Système	81
Journeyman:	One man's experience in choosing the right console and automation system. Jim Betteridge is that man	87
Business:	Barry Fox relates a horror story of how a studio went off the rails	93
Perspective:	A rogues' gallery of sales people by Martin Polon	95
Split Decision:	Passive microphone splitters by Sam Wise	99
Craft:	A new column by Keith Spencer-Allen dealing with the practical side of the studio. This month — the Talkback	106

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STUDIO SOUND

AND BROADCAST ENGINEERING

June 1992
 Volume 34 Number 6
 ISSN 0144 5944

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NEWSTRADE DISTRIBUTION (UK)

UMD, 1 Benwell Road, London N7 7AX, UK. Tel: 071-700 4600. Fax: 071-607 3352.

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Origination by Ashford Scanning Studio Ltd, 2 Norfolk Road, Fairwood Industrial Park, Ashford, Kent TN23 2TT
 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.

The magazine is available on a rigidly controlled requested basis, only to qualified personnel (see classified advertisement for terms)



Total average net circulation of 19,166 per issue during 1991.
 UK: 6,855. Overseas: 12,511.
 (ABC audited)



Degradation

Those people who move into a new studio or who replace a console in a studio have an opportunity to hear their control room in its purest state. That is without a mixing console in it. Last year Philip Newell wrote an article called 'The Acoustics of Mixing Consoles' (August 1991). He looked at the acoustic effect of placing consoles and studio furniture in control rooms and concluded the effect was so important that 'considerably more attention' should be given to the subject. To take the argument a stage further we have turned our attention to console monitor sections. Listening to a CD directly connected to a room's monitor system and then listening to the same CD through your desk's stereo returns, through its own monitor circuits, can be very revealing. Sound degradation can be quite significant. We hope in the future to try and assess just how much degradation is apparent. In the mean time we would ask engineers and producers to try the experiment for themselves and let us know what they find. A revealing CD of voices or acoustic music is best for this test.

At Your Service

At the AES in Vienna there were signs of something that if continued could be very damaging for communication in the pro-audio business. There were also signs of it before the APRS and nothing to say it will not continue up until AES in San Francisco. It is quite simply information, or rather the lack of information. As a pro-audio trade publication our prime task should be to associate ourselves with that pro-audio trade and be supportive of it. Suddenly it seems harder to do that. A 'for instance' — the press room at last year's APRS was overflowing with press releases from numerous manufacturers, compare that room with the one in Vienna this year and you would find hardly any information. That's our hard luck you might think, well initially it would be but surely magazines like this one are here as an information service. If we don't have the input we can't hope to inform.

It seems though that the reason for this information drought isn't to do with any corporate cloaking but the fact that when the recession bites the first thing to go for some companies is the marketing and in turn press information. As we are just entering the main exhibition season I would ask those companies who may be cutting down on their press contact to think again. Even if its just a fax or a single sheet of paper without a photograph it is worth the effort.

● This issue sees a welcome addition to our regular columnists. We welcome back Keith Spencer-Allen who begins a column called 'Craft'. The idea is to highlight different areas of recording studio work aka craft; and discuss ways of improving them or changing them. But we need your help here too. Some of Keith's ideas might raise some eyebrows and we're hoping that while the eyebrows stay raised the pen might also go to paper and give us some feedback which we could publish alongside future columns. ■

Julian Mitchell

Cover: AKG Direct 32-track optical disk-based recorder

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An analogue price!

PCM-3324S

To celebrate the tenth anniversary of the DASH format, Sony is launching a new generation of digital multi-track recorders. The new 24 track PCM-3324S builds on the proven performance record of the DASH format, offering all the benefits of digital recording at a price more associated with analogue technology.

Modular design

Apart from its extensive range of facilities, the new recorder features 13 separate hardware options. There is a choice of two types of remote control unit, four types of remote interface, three types of digital interface, timecode reader, stereo sampling memory, confidence monitor head and a remote meter unit. This extraordinary versatility allows users to configure the machine to their own requirements.

VLSI technology

Extensive use of dedicated VLSI technology has helped squeeze the exterior dimensions of the PCM-3324S, reduce

weight and cut power consumption to just 800w - even when fully configured.

Speed of operation

The all digital tape servo delivers the same performance as the PCM-3348 and provides a five fold increase in acceleration and deceleration compared with previous 24 track recorders. Coupled with high speed pre-stripe at four times real speed, it ensures that no time is wasted "waiting for the machine".

Superb performance

The latest 1-bit pulse conversion technology, coupled with ultra low noise circuitry, ensures that the sound quality of the PCM-3324S is the best ever.

Modular design, advanced technology, high speed, superb performance and an analogue price - an irresistible combination.





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After more than twenty years, UREI Compressor/Limiters remain the of choice of audio professionals, having earned a reputation for excellence as hard working tools of the trade. It is difficult to find a recording or broadcast studio that does not own at least one UREI Compressor/Limiter. And engineers in the Sound Reinforcement and Installed Sound industries have long considered our products as vital links of any high quality audio equipment chain. With experience as our teacher, and modern technology as our guide, we are proud to offer three LA Series Compressor/Limiters, beginning with the LA-22.



The LA-22, a dual channel unit, contains three Gain Reduction circuits, can be used as a Dynamic Expander, and is equipped with a Full Parametric Filter on each channel. Its unmatched versatility sets it apart as a truly unique multi-function tool. Designed with innovative "spectral agility," the user has the option to reduce or expand gain across the total audio bandwidth or at a chosen center frequency with variable "Q" of 1/6 octave to 2-1/2 octaves. With proper settings in the expansion mode, you can use the LA-22 to "lift" vocals in a live or studio mix or increase intelligibility in paging systems or radio broadcasts.



Full Parametric EQ Section.

Conversely, in the gain reduction mode, the compression can be frequency focused to control levels to prevent feedback, for De-essing, De-popping or to creatively "fatten" the sonic character of particular instruments and vocals. The parametric filter circuit, completely accessible via the rear panel barrier strip, can be accessed and routed to the Side Chain, thus making the LA-22 a frequency dependent gain reduction or expander system.



As a pure Compressor/Limiter, the LA-22, along with the LA-10 single channel and LA-12 dual channel models, offers unparalleled performance

and seamless transition, employing proprietary Smart-Slope™ compression ratios. All three models feature transformer isolated output stages, optimized by a patented active circuit to assure the elimination of distortion and saturation frequently associated with transformers. Active Balanced Bridging

Inputs easily handle amplitudes in excess of +24 dB and both input and output connections can be achieved by your choice of XLR-type, 1/4 inch phone or Barrier Strip connectors. Exceptional signal integrity, low distortion and superb dynamic range is common to all models.

All three LA Series models are housed in a compact 1U rack space and are designed to deliver years of reliable service, in the studio or on the road. Whether your application is sound reinforcement, recording, broadcast or for permanent install, you'll find LA Series to be a trustworthy and hardworking addition to any system. From the people who set the standard, UREI.

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Helicon Mountain

Although not many people could accuse Jools Holland of being boring, he was determined that this description would not apply to Helicon Mountain, the studio he built four years ago into old stables in Greenwich, South-East London.

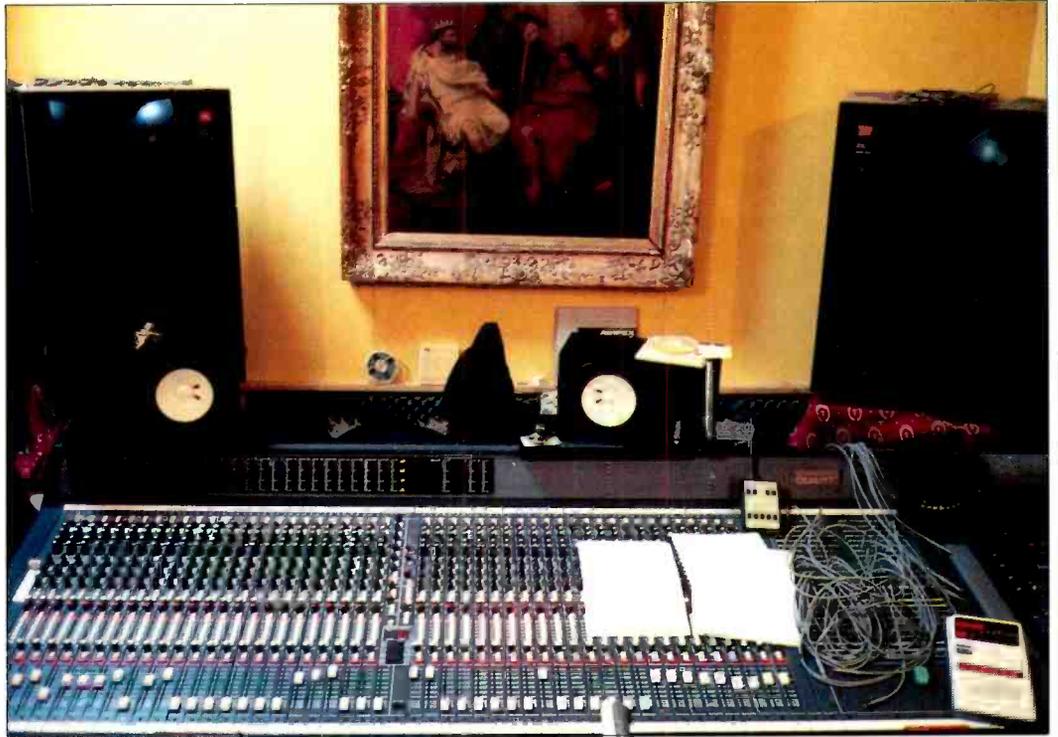
Positioned on a grassy bank above a railway line, the first impression of Helicon Mountain is of an old railway station complete with Waiting and Ladies Room sign, Victorian advertisements and cigarette machines, benches and porters trolleys. However Holland has 'dressed the facade', that is to say he has covered the outside of his old stables with railway artefacts. 'It's because we're near a real railway station and it was fun to do, like light opera', he explains. 'In summer people go outside to sit on the benches and drink their tea.'

The studio was originally intended for Holland's private use and he strove to avoid the bland hessian, pine and greyness which unfortunately still characterises many small studios. His aim was to build somewhere which was visually stimulating and benefitted from natural daylight.

'Laurie Latham always says that when people are in the studio they're not painting and decorating,' he says. 'In other words they're not just doing their job — they should be making their own piece of art or poetry.'

Helicon Mountain is intended to inspire artistry in every way possible starting with its name. Mount Helikon was a mountain in Greek mythology where poets, scribes and musicians supped at a stream to enrich their artistic powers.

Accordingly, the subject matter of the many paintings lining the studio and control room walls have a significant connection with the arts. In the control room is an imposing copy of Matisse's *Dance* signed with the name Elmyr, the copier of Matisse and Picasso, but in reality daubed by a local forger. Next to it is a line drawing of dancers which Miles Davis gave to Holland in his *Tube*-presenting days. Above the console is a Victorian painting of *King Lear and his three daughters* and on the adjoining wall is *Hope*: marooned on a rock she plucks at the broken strings of her harp and is



Above the Soundtracs Quartz console a baffling painting of *King Lear and his Three Daughters*

intended to inspire in times of desperation.

Combined with a shelf of old books such as volumes of Grove's *Dictionary of Music and Musicians* and a tapestry screen which can be used to form an impromptu guitar booth the effect is like walking into a parlour cluttered with treasures and Holland is quick to point out that working in this environment would not suit everyone. Although the Yamaha piano looks at home in this setting, technology like the Soundtracs console, Saturn multitrack and racks are a little incongruous.

But despite the apparently random positioning of the pictures, their function is more than decorative. For example, most of the large canvases are filled with Rockwool and act as baffles. *King Lear* in particular, says Holland, absorbs a lot of sound. It is his dream to have a larger studio, the rear wall of which will be lined with bookshelves to which 'volumes' can be added or removed depending on the degree of liveness or deadness required.

This approach threatens to go slightly too far, especially when Holland points out his main cherubs hanging on the wall behind the console and nearfield cherubs resting on the desk monitors. But he says that it appears to work. 'I asked the advice of lots of engineers and producers and it involved much fiddling about repositioning pictures and other parts of the room' he says. 'But it sounds good and is really aimed at people who can play acoustic instruments.'

A recent testimony to this came from ex-Fairground Attraction

member Eddi Reader who came in to record with five musicians all playing together in the small studio. 'She kept saying how good it sounded after she'd been using separate rooms in larger studios', says Holland. 'She said the sound she got was very big.'

And other clients in the 18 months since Helicon Mountain has operated commercially include Laurie Latham working with the Christians, Diesel Park West, Squeeze (of which Holland is no longer a member) and Comedian, Vic Reeves, who writes his material in an office above the studio. Holland also uses the studio for his own projects, the most recent being an album entitled *A-Z of London* with the tracks taking their names from famous London streets.

Holland describes a happy balance between third party studio bookings and times when the studio is free for

his own use. 'The studio would still be here whether it was sitting empty half the time or not', he says.

'Renting it out is an incentive to update equipment and keep everything in smooth working order.'

'Helicon Mountain', says Holland 'has broken the mould in much the same way Strongroom has gone down a set route to attract the dance market with its dizzy paintings. We are offering an inspirational selection of art which serves a more than decorative function'. And there is no doubt that he has created a studio based on artistic sensibility, tongue-in-cheek humour and a very special brand of logic.

Caroline Moss

**Helicon Mountain,
The Station, Station
Terrace Mews, London SE3 7LP.
Tel: 081 858 0934.**



The first impression is of an old railway station

Trident's farewell

Trident Audio Developments, the UK manufacturer of audio mixing consoles, has recently announced the end of a decade of producing the highly regarded *Series 80*.

After producing nearly 500 consoles the last is soon to be delivered to The Idris Studios, a music facility in Kuala Lumpur, Malaysia.

Trident Director, Kim Templemann-Holmes commented, 'The 80 has been, singularly, the most successful series of consoles built by Trident and certainly ranks among the top models in the industry.' Holmes also added, 'After nearly a decade of producing 80s we look forward to introducing its successor, The Trident 90.' The new fully automated console will debut at this month's APRS show.

Contracts

● Audix has won three new PA contracts and will install its *Vector* system into the LWT South Bank TV Centre; The Bank of England Bread Street refurbishment and IBM in Portsmouth.

● Recent BSS contracts include their French distributor, Regiscene Europe supplying 28 *TCS-804* dual time correctors to France Telecom. *DRP-901* Dynamic Equalisers have been sold to Bob Clearmountain, Mutt Lange, Steve Lipson, Randy Staub and Bob Rock.

● Air Studios, London, have ordered a 72-channel *Neve VRP Legend* console for their main hall studio at Lyndhurst Hall.

● Europe 2, one of the largest programme providers in France has recently placed an order with Canford Audio sarl for 13 *Sonifex* Discart machines.

● Yume Studio in Japan has recently installed a Soundtracs *Quartz 32* production console into their recording complex in Maebashi City.

● Studiosound, part of Mercury Theatres, and one of the UK's leading film dubbing studios has chosen Solid State Logic's *ScreenSound* audio-for-video editing system.

● Steve Phillips, a member of Mark Knopfler's band The Nottinghill

Billies, has bought a *Spirit Studio* for home use. The Warehouse has sold *SAC100* consoles to two local hospital radio stations.

● Barcud, leading Welsh independent TV facility company, have installed two of Solid State Logic's *ScreenSound* digital audio-for-video editing systems and a *SoundNet* digital network in its Caernarfon studios.

● One of the world's most respected interdenominational Christian organisations, Campus Crusade for Christ, has bought a DAR *SoundStation II* digital audio production system for their media production division in Vancouver.

● An Allen & Heath *GS3* mixing console has recently been installed in the Programmers Suite at producer Pete Waterman's PWL Studios in London.

● The BBC has chosen Nimbus Information Systems to develop a CD-ROM version of their Gramophone Library catalogue using NIS' data protection service — CD-Secure.

● Yae Sung Recording is the first studio in Korea to install Audiomatic's *Uptown* moving fader console automation system.

● Lightworks' RAM editor has been ordered by GL-PIPA, a post-production house in Paris.

● Cedar Audio have sold two of their newest module, the Phase/Time Corrector to Digipro SA who own studios in Paris, Brussels and Amsterdam.

● Central TV's Nottingham facility have equipped all their studios with Calrec *RQD6400* rackmounting compressor/limiters. The BBC World Service have ordered more of Calrec *RQ* rackmounting units. BBC Wood Norton have bought one of Calrec's *Compact Series* desks.

● The entire Wembley Stadium concert to commemorate Freddie Mercury and raise money for AIDS was recorded using on a Raindirk *Symphony* mixing console in the Manor Mobile.

● Universal Studios in Hollywood has bought their second *SoundStation II* digital audio production system for their sound post-production facility.

● Greenpeace Communications, the international video and photographic arm of Greenpeace has bought their second Adams-Smith *Zeta-three* VTR Emulator to their audio for video editing system.

● The post-production studios 1 and 2 of Swiss TV in Zurich have chosen

a Studer 990 mixing consoles, several Studer A812 time code machines and a Studer A820 MCH with Dolby SR.

● Hilton Sound is the world's first customer for Sony's new DASH format multitrack the *PCM-3324S*.

Agencies

● Focusrite Audio Engineering have announced additions to their European dealer network. ASC of Belgium (Tel: +32 2 520 0827) and Pro Audio Netherlands (Tel: +31 20 683 1277) were finalised at AES Vienna.

● Outboard Electronics have appointed Lisbon-based hire and sales company J Gonclaves as their distributor for Portugal. J Gonclaves. Tel: +35 1 1 54 40 29.

People

● Mark Lever has joined WaveFrame Corporation as vice president of sales. He was previously with Everything Audio in Burbank, California.

● Brian Latham has joined Shuttlesound sales team to help establish their West Penn Wire cable and University Sound product lines.

● Peter Josting has been appointed by Soundtracs as Technical Sales Manager involved with product training, support and design.

Exhibitions

3rd to 5th June, APRS Exhibition, Olympia 2, London, UK.

3rd to 7th July, IBC, Amsterdam, Netherlands.

8th to 10th July, Pro Sound and Light Asia, Singapore.

26th to 28th July, British Music Fair (trade only) Olympia 2, London, UK.

6th to 9th September, Plasa Light and Sound Show '92, Earls Court 2, London, UK.

12th to 16th September, In the City International Music Convention, The Holiday Inn, Crowne Plaza, Manchester, UK.

1st to 4th October, 93rd AES Convention, Moscone Centre, San Francisco, California, USA.

7th to 8th October, The Playback Show, RDS, Dublin, Ireland.

18th to 21st January 1993, Middle

East Broadcast '93, Bahrain International Exhibition Centre, Bahrain.

16th to 19th March 1993, 94th AES Convention, Berlin, Germany.

31st October to 4th November 1993, 95th Convention, New York,

In-brief

● **Apogee help MIT:** Apogee Electronics Corp is assisting the Massachusetts Institute of Technology in developing an advanced Television system that may soon become the official US standard in HDTV. The Apogee *AD-500* and *DA-1000E* digital converters are currently being used to support the audio phase of MIT's digital-based system.

● **Mayking first for London:** Battersea-based Mayking Records have begun pressing CDs at a brand new plant in their existing site. It will be the first CD plant in London.

● **New Court Acoustics:** Court Acoustics Limited have been formed. The management team consists of MD: Stephen Court; Sales and Marketing: Alan Kilford; and Financial Director: Terry Simpson. Court Acoustics are based at Lectra House, 119 Arthur Road, Windsor, SL4 1RU, UK. Tel: 0753 833524.

● **Yamaha hold workshops:** Yamaha Digital Products Division is to host a series of hands-on *DMR 8* workshops for Independent Dance Production companies at the Yamaha R&D centre in London.

● **Offer for readers:** University College Salford is launching a summer school in July and August and readers of *Studio Sound* will be able to take advantage of a special discount. Contact David Thorley for details. Tel: 061 834 6633 Ext 409.

● **Second CD-ROMs in Print:** Nimbus Information Systems have teamed up with Meckler to produce the second edition of *CD-ROMs in Print*, a complete guide to all CD-ROMs currently available.

● **AP Set for hire:** Nottingham-based Audio Synthesis are now able to offer for hire Audio Precision standard System One and *Dual Domain* (DSP) test sets. The service is proving popular with manufacturers and rental companies who need powerful batch test and R&D measurement capabilities but cannot justify the capital cost of ownership. Audio Synthesis, 99 Lapwing Lane, Manchester, M20 0UT Tel: 0602 224138.

DIY CDS PDQ



RECORDABLE CD opens up an extraordinary spectrum of application possibilities for the professional user. Fortunately, there's now a remarkably affordable professional solution: the Marantz CDR-1 from HHB. Compact Disc players are in universal use. Now, thanks to CD-R, this existing hardware can bring instant access to custom recordings. Jingles, commercials, sound FX and ident music can be triggered or cued with micro-second precision. And while CDR is a natural archiving medium, studios can at last provide record industry clients with a digital format they can appreciate at their convenience. Disks are recorded to the full red-book standard and a



highly versatile remote protocol supports a multiplicity of powerful control options. Alongside fully digital inputs and outputs, balanced analogue I/Os use the latest 'Bitstream' converters to provide the best sound quality. The CDR-1 can re-record on part-recorded discs. And even at HHB's new low prices for blank CD-R media, that's a professional economy that is very difficult to ignore.

All these exciting features would mean little without superb after-sales service, and an extremely keen hardware cost. With the CDR-1 from HHB, keen is only putting it mildly. So don't delay, for the full story call HHB Communications - PDQ.

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DIGITAL MASTER PREVIEW

The advances in relatively low-cost digital audio over the past two years have been impressive. The technology has generally followed two distinct paths; computer direct-to-disk systems and the use of S-VHS/Video 8 tape-based systems. While the latter are bound to be cheaper, they still have the very real disadvantages caused by the inherent lack of random access.

Of the direct-to-disk systems, practically all are designed to run on the Apple *Macintosh* computer. *Studio Vision* from Opcode, *Cubase Audio* from Steinberg, *Digital Performer* from Mark of the Unicorn and *Soundtools* from Digidesign are examples of those currently on the market. *Soundtools* was originally available in two versions, the second of which ran on the Atari *ST*, but this is no longer supported. While a few two-track systems are available for the *ST*, they are not of professional quality and do not have the possibility of being extended to four tracks and beyond.

Of the computer-based systems, many allow for cut, copy and paste facilities in the manner of a cue list, visual or otherwise. Such systems have a distinct disadvantage — no editing. No adjusting of envelopes, mixing of digital samples or alteration to the waveforms is usually possible. Some systems allow for background noise to be replaced by silence by using a threshold setting but any editing which alters the actual waveform is usually not supported.

Hybrid Arts have nearly five years history in both RAM-based and direct-to-disk digital audio — *ADAP 1* and *2* and now *Digital Master* which draws on the technologies of both of the former systems. The basic hardware is a 3U rackmount which contains a pair of microprocessors so removing the problems associated with having to use the Atari *ST*'s 68000 processor. Connection to the *ST* is via the 40-pin cartridge slot and DMA (Direct Memory Access) port, while SMPTE transfer is via the RS-232 serial port. A pair of XLRs provide for stereo analogue input. On the digital side, there are SPDIF phono in/outs, which can also handle AES/EBU, along with a BNC Bit Clock for the optional Chase Lock board. Hard drive transfer is via SCSI and any drive with an access time of less than 30 ms should work — that will include most commercial units.

Four software programs are

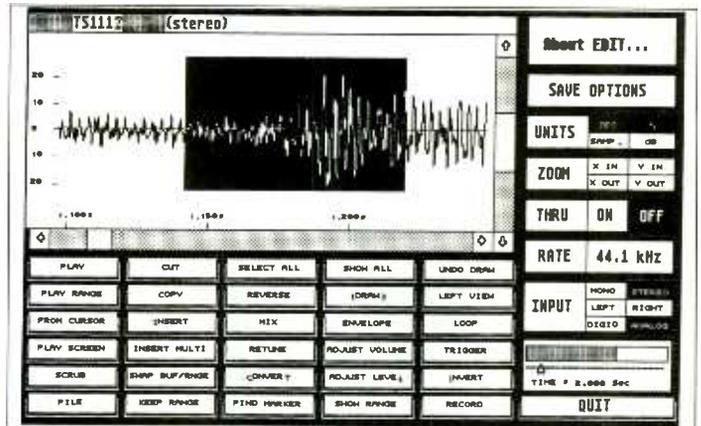
included with *Digital Master* as standard. The *Digital Recorder* (DRE.PRG) handles the initial recording, allowing you to set the manner of input and recording rate. Features include being able to audibly monitor the input and see the level via a pair of on-screen input meters.

Once the initial recording has been made, there are three manners of viewing the waveform; positive amplitude, full wave or quickview as a rectangular block, which is obviously the quickest to redraw. Parts of the waveform can be marked, with the *ST*'s TAB button allowing you to tap in up to 300 successive markers in real-time. Markers can be named and set to SMPTE times, while the region between any two markers can be 'scrubbed'. Up to eight windows can be displayed on the screen at once allowing for cut, copy, paste procedures to take place.

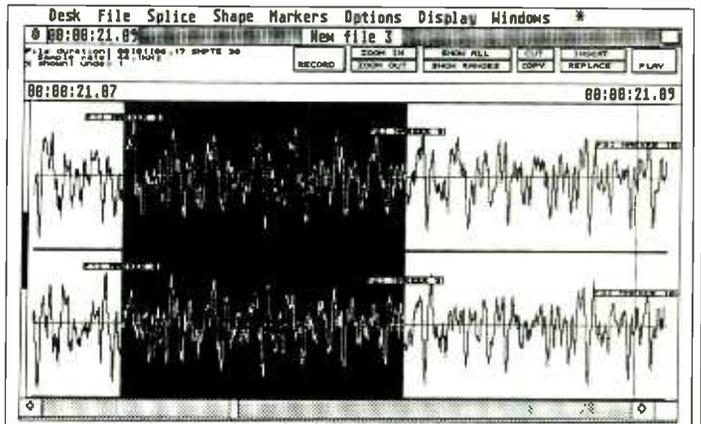
Cuts can be exported to disk and then imported to a different file by use of the File Manager and back up to DAT is also supported. Editing includes cut and insert for 'slipping' of sound, previewing the result of a cut and crossfading with linear, log, reverse log shaping. Sections can be inserted with crossfades created for each end by use of the clipboard, and silence can also be inserted at any point.

Within the *Digital Recorder* is a *Play List* page which allows you to take marked areas of the current recording and play them back in any order. Such sound segments can be triggered over MIDI or manually and this particular mode is useful when you only wish to be working with the results of a single recording. The *Cue Program* is a more powerful variant which allows for the cue listing of sounds created within the *Digital Recorder*. The Event List allows for up to four voices with placement of mono voices to the left or right while the levels of each sound can also be varied. As with most other cue lists, the On and Off times can be set against incoming SMPTE.

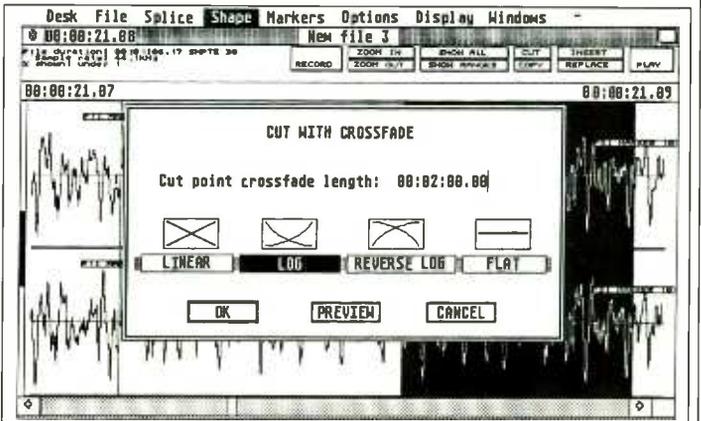
The *Edit Program* can be used for two purposes; to edit recordings taken in the *Digital Recorder* or to create short recordings which are then manipulated in RAM. To this end, the use of a 4 Mb Atari *ST* is important and will give around 17 s of stereo recording time at 44.1 kHz. Various editing functions are available including the alteration of a recording's envelope and level, and



Digital Recorder



Edit Program



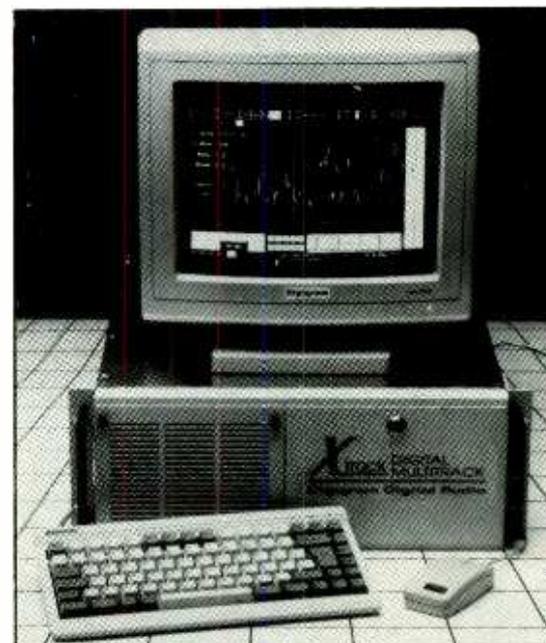
Cutting and crossfading

TITLE:		[SMPTE: 00:00:32:15]	
ON TIME	OFF TIME	EVENT	DESCRIPTION
00:00:02:07.0	00:00:00:00.0	Note - C3	
00:00:03:19.1	00:00:04:00.1	KICK.SND	:50 %
00:00:04:13.3	00:00:04:17.3	LOOSEHAM.SND	:50 %
00:00:13:07.0	00:00:13:24.0	HARDWARE.SND	:50 %
00:00:15:22.0	00:00:16:03.0	KICK.SND	:50 %
00:00:17:04.2	00:00:17:15.2	SHARER.SND	:50 %
00:00:18:25.2	00:00:19:03.2	CHKICK.SND	:50 %
00:00:20:10.0	00:00:21:22.0	CHTOW2.SND	:50 %
00:00:22:03.2	00:00:30:00.2	TALKPAN.SND	:50 %
00:00:23:14.0	00:00:31:05.0	MARKED.SND	:50 %
00:00:24:20.3	00:00:26:20.3	SOUND.SND	:50 %
00:00:26:02.1	00:00:26:05.1	CHKC1.SND	:50 %
00:00:27:06.3	00:00:27:09.3	ELSEHATS.SND	:50 %
00:00:29:20.1	00:00:29:23.1	CHKICK.SND	:50 %
00:00:30:10.0	00:00:30:21.0	CHKIC2.SND	:50 %

Cue List

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by DIGIGRAM



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- Fully Independent record and playback channels
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- Multiple levels of UNDO and REDO functions
- Graphical Volume Envelope editing
- Full catalogue support for effects library.....etc.

DIGIGRAM SA

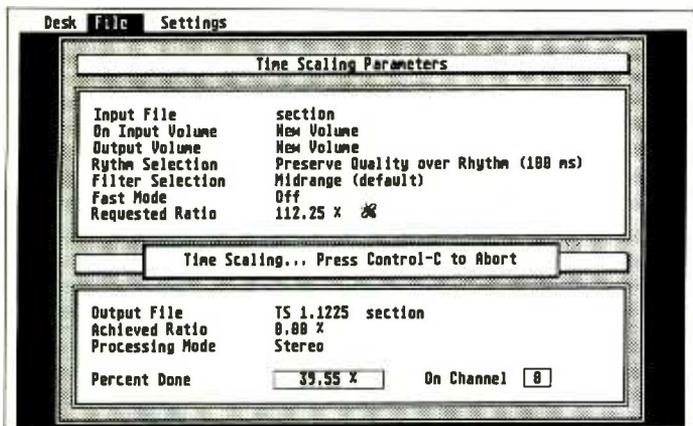
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Time Scaling from *Timepage*

includes the ability to redraw part of the waveform where a glitch has occurred.

Timepage is the fourth program and, as the name would imply, allows for the time-stretching of recordings. The alteration of time scale can be in length, tempo, percentage (between 70% and 130%)

and chromatic (within four semi-tones). Where *Digital Master* scores over many other similar programs is in the integrity it can assign to the rhythm; as time scaling algorithms often work in blocks, the rhythmic integrity is often affected. *Digital Master* gives four options so allowing you to impose your wishes on the

program. Digital filter options are included and the algorithms are apparently designed to work in stereo without affecting the phase differences of the two sides. Although only a brief time was spent with *Timepage*, it appears to work impressively.

Apart from the facilities, Digital Master is a much cheaper system to purchase; the two-track unit costs £2,700 (\$1,588 approx.) and includes the digital I/O, SMPTE reader/generator and the DMA-SCSI host adaptor. This rises to £4,000 (\$2,353 approx.) with a 4 Mb ST, 14 in monitor and a 100 Mb hard drive included.

Atlantic Audio UK Ltd, 2 Manor Gardens, London N7 6JY.
Tel: 071 272 8944 (ext 248).

or Relay Event can be reflected back to the Preset — so, for example, a mute made half-way through, a mix can be written from that point back to the Preset before the start of the mix.

If the transport control keys on the console are hard-wired directly to the tape machine, a conflict of priorities can sometimes arise where the machines receives a double command — one from the console key and another from the synchroniser — causing a function like Record to drop-in and simultaneously drop-out. A Select Transport facility permits individual Enable and Disable selection to rectify the problem for each transport command and builds this into the overall system setup default.

It is now possible to enter the name Labels while the main screen is selected — before Labels could only be named with the Label Box selected.

Improvements have been made for implementing Trims between time code points, and P and E can be used in the respective time code fields to set a Trim from the Preset to End. If the Trim function is opened by the TRIM Key on the Global Master Module, pressing it again will now both close the Trim screen and execute the adjustment.

Neve Electronics, New Cambridge House, Bassingbourn Road, Litlington, Royston, Herts SG8 0QD UK. Tel: 0763 852 222. Fax: 0763 853 500.
US: Siemens Audio Inc., 7 Parklawn Lane Drive, Bethel, CT06801.
Tel: +203 744 6230

console at any time irrespective of automation being switched in. It is also possible to reset just the channel buttons, leaving faders and mutes unaffected, by using the Mask function.

In addition to the Store List, a Presentation List has been introduced in which Stores can be arranged in a user-defined order providing a convenient method of resetting the console, to deal with a series of scene changes for example.

Events have now been incorporated into the system allowing On/Off and Momentary relay control of external equipment such as cart machines, video devices, switch triggered effects, tape machines, etc. The facility requires additional hardware which is supplied at extra cost to the software. The facility also has the ability to address Multitrack Record Enable, and this function can be provided directly from the channel strip relating to the track send/return.

The Reassign Channels function replaces Swap Channels and offers a more streamlined method for reassigning mix data between channels or groups of channels. Particular consideration has been given to reconfiguring a mix between consoles of differing size or layout.

Stored Mixes can now be individually copied from hard to floppy disk, and vice-versa; previously it was only possible to copy the entire contents of a disk. The new software allows different levels of hierarchy — that is Client, Project, Title, Mix — to be copied, or transferred.

The status of a Mute, CHANNEL key,

Flying faders

Neve have released Version 3 software for their *Flying Faders* automation system. This is the fourth major software update to the system which has currently sold in excess of 200 units worldwide. A charge will be made for the new issue which features: Master Touch Record function; Stores and Presentation List; external Event/Relay control; Reassign Channels facilities; Mix Copy and Mix Back up routines; Preset selection for mutes and CHANNEL buttons; setup priority for transport commands; Label and Trim enhancements.

The Master Touch Record function permits selected faders and mutes to be put into a record state which will be retained until switched off by the engineer. The facility allows a basic mix structure to be created without having to reset the status back to write at the start of each pass. In addition, faders and mutes preselected for Master Touch may be temporarily switched to Isolate so that when Master Touch is engaged the status will switch from Isolate to Record — this can be useful for 'dropping-in' preset configurations.

The Stores feature allows up to 99 snapshots, which include faders, mutes and automated channel buttons, to be stored either in RAM or to disc. Stores can be reset to the



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Multi Gate*

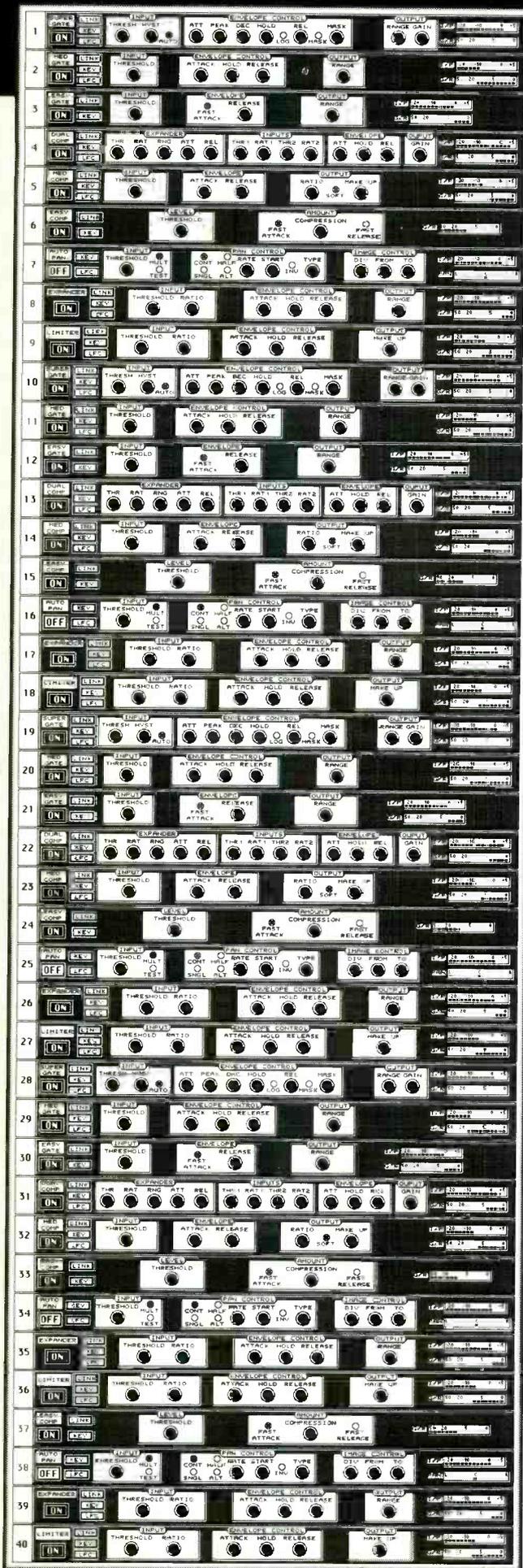


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Also known as Midi Gate in the UK and Europe.

The revolution in digital audio control is here...

Virtual Dynamics



AMEK's unique Virtual Dynamics software-based gain shaping system gives unprecedented control over signal levels and envelopes and allows many new possibilities in recording and mixing methods.

When added to the AMEK/Steinberg SUPERTRUE automation system, Virtual Dynamics units are resident within the software and can be called to the screen at any time, offering a choice from nine devices. One device may be assigned to each channel, so that a 40-input console can have 40 Dynamics units operating simultaneously. Channel insert points are not used leaving these free for additional external devices if required. A further option allows the addition of a MIDI output for every 8 input channels, creating new possibilities in MIDI gating and control techniques.

Three Gates are available. Two Gates offer standard features, but the ADSR Noise Gate provides a complete waveshaping facility with advanced features such as Hysteresis, Peak Level, Mask and Low Frequency Compensation.

Three Compressors give a wide range of control, but the Advanced Compressor has a comprehensive Expander, Envelope section and Dual-Slope Compression ratios.

The Limiter and Expander once again provide standard features but the Auto Panner (requiring two channels) allows a vast number of possibilities in image shifting including Divergence and Width controls, triggered panning (by threshold or external key) and numerous modes from one shot to continuous panning with several LFO options.

All other devices may be linked for stereo or multi channel operation.

User-defined settings for any device may be stored in a library and all devices assigned to a mix are stored with the mix automation data.

AMEK's VIRTUAL DYNAMICS use the normal channel VCA and thus do not add any more VCAs to the system. Audio performance is stunning with clean, distortionless, transparent sound even on the most complex of signals.

Unique amongst audio products and available only from AMEK on its MOZART, HENDRIX and EINSTEIN consoles, Virtual Dynamics brings a revolutionary new technology to the studio environment and once used, is a 'must have' system.

AMEK

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NAB '92 REPORT

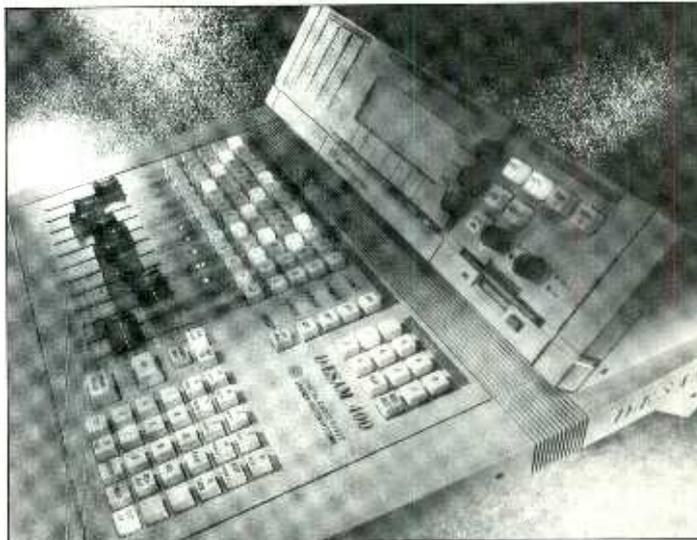
Las Vegas continues to be the almost perfect venue for a major trade show like the NAB and the newly remodelled convention centre just improves it. The scale of operation continues to be as impressive with in excess of 1200 exhibitors from all aspects of the broadcast and allied industries. Audio continues to become an increasingly important part of a picture dominated business. There seemed to be more audio product scattered around the general show than in the dedicated audio and radio hall which reflects the way that the numerous products now span both areas.

Sound and pictures

The surprise of the show which demonstrates this trend had to be the **SSL Scenaria** which was announced just a few days before. This system, of which much will be written, comprises a 38-channel fully automated digital mixing console, a 24-channel hard disk recorder, *VisionTrack* random access video storage, a multitrack audio editor, routing and machine control. The system integrates fully with *ScreenSound* and *SoundNet* allowing simultaneous control of picture and audio in the digital domain. Judging by the crowds round the booth, interest was widespread.

The closer integration of sound and picture was also being furthered by the video manufacturers. One of the most prominent was **Avid Technology** who had launched a nonlinear video editor called the *Media Composer* about three years ago. It has always had some audio capability but the NAB saw the addition of *Audio Scrub* with *Pitch Change* and 4-channel simultaneous playback with 48 kHz 16-bit audio to add to much improved picture quality. **Avid** also showed a new product call the *Audio PixStation* that is a 24-track lay up and editing system with the ability to sync to digital video playback.

Avid also proposed an *Open Media Framework (OMF)* system with the intention of developing common standards to allow a more integrated post-production environment — most realistically with the *Media*



Graham-Patten Systems' low cost digital mixer D/ESAM 400

Composer. Fifteen manufacturers have announced that they are interested in working to this end and on the audio side, these include **NED** with the *PostPro* and **Digidesign** with *ProTools* and *ProEdit*.

Video graphics company **Silicon Graphics** have also been working with a number of other manufacturers to similar ends. Their audio partner is **Waveframe**. Their joint development is a 4-track disk recorder and interface to be known as *TidalWave* and will function under the control of the Silicon Graphics *IRIS* workstation. **WaveFrame** also showed an 8-track disk recording system that includes all hardware to run at just under \$15,000 (approx. £9000). Known as the **WaveFrame 401**, this will be fully compatible with other *WaveFrame* systems.

Video

While still close to the area of audio and video integration, there were several developments in the area of audio mixers for the video editing environment. **Graham-Patten Systems** introduced considerable upgrades for the *D/ESAM 800* digital mixer mainly in the area of memory enhancement and the configuration of virtual machines, as well as a lower cost digital mixer, the *D/ESAM 400*. This handles up to 32 analogue or digital inputs with 12 outputs.

All channel settings, routing and crossfades can be stored and instantly recalled, either internally

or under the control of a video editor.

Sony were also showing a new digital edit suite mixer. The *DMX-E3000* is a 16-input design that fits a 19 in rack frame with EQ and delay on each channel. **Sony** also showed two models of analogue mixers in the *MXP-390* series. Both have 12 channels (8 stereo, 4 mono), a 16-button monitor matrix and supports *ESAM-II* protocol for interfacing.

Another interesting product is the **Zaxcom DMX-1000**. This is a 20-channel digital mixer with a full range of processing features and automation based upon what they call a 'timeline'. It is possible to define 20 audio events within a single timeline which is graphically displayed in a LCD window, can be stored in memory and recalled through an external interface.

In a completely different area, **JVC** were showing a portable DAT machine with a difference. The *XPD1 PRO* is a compact handheld machine with a removeable battery pack. Inputs are analogue and SPDIF but the sample on show had *SCMS*. There is a sizeable mic that clips to the side but is designed to be removed and used independently. The mic can either be used in a directional or MS stereo mode but uniquely also houses the A/D converters and can output 48 k, 44.1 k or 32 kHz sampling rate as well as having attenuation, level and LF cut controls. US price will probably be around \$1500 (approx. £900) when it becomes available later in the year. **JVC** were also demonstrating their time code DAT machines introduced

last year but now equipped with 9-pin control.

Prodisk

Otari were showing how far the *ProDisk-464* disk recording and editing system had developed over the past year. The *CB-158* added a dedicated hardware panel for transport and edit functions removing the need to use a mouse. Software that adds *CMX EDL* conforming, as audio fast wind feature and a *Batch Back up* system enabling the user to back up projects and sound libraries in groups. Of particular interest was the *ProDisk Back Up Station* — a simple piece of software running on a small *Mac* that enabled up and downloading to take place off-line to and from removeable hard disk drives used in the *ProDisk* as well as to and from the 8 mm back up tape cartridge. This currently happens at 3x real-time and the disk is then just removed from the back up drive and placed in the *ProDisk* ready for work. This seemed a very elegant system with immense time saving possibilities now that removeable drives appear to offer fewer disadvantages.

Consoles

Two major new consoles were in evidence. The *MPC* from **Harrison** (by GLW) is designed for motion picture sound post-production. The design will allow the user to operate a console that is either traditional in signal/channel approach with dedicated channel functions, or on a virtual basis just using touch screen that is an integral part of the system — or any combination of the two. As with the *SeriesTen* there is full dynamic automation of all console functions but in most other areas it differs considerably. At the *IBC* **Harrison** will be showing a digital signal path version of the *MPC* and this will be followed by D/A hybrid models as developed. By the time of publication two three-man consoles will have been delivered to **Sony Columbia** in Los Angeles.

The **Neotek Esprit** is a broadcast-type production console with a wide range of options in the area of custom frame layouts, VCA control, metering, external systems integration, etc. ▶

As well as sophisticated talkback communications, the *Esprit* has eight aux buses and the agility to create multiple mix minuses.

Alesis showed products to compliment the *ADAT* system.

The *X-2* is a 24-channel, 8 bus in-line console with the ability to use up to 64 inputs in mixdown. Other channel features include 4 bank EQ, 6 aux sends, 2 cues and 16 returns. Other products included the *AI-1 ADAT* to AES/EBU and S/PDIF interface, and the *AI-2* Bus interface for machine control of *ADAT*.

Still in the area of mixing, **GML** were showing a high specification rackmount mixer *HRT9100* with a wide range of applications. Up to 12 units can be cascaded to give a total of 142 channels if required. The design is all discrete class A. Outputs are 2 stereo pairs, 4 bus outputs and a direct input from each channel. On the automation side GML were showing version *V6.6* software featuring *Smart Start*. This is a system designed to address the discussion about the use of keyboards

and screens in automation systems and their necessity. The new software 'downloads' the automation into the fader area and precludes the need to use anything other than the fader area for operations including read/write and update modes. The system will even store a mix in RAM in the fader area prior to the automation being booted-up where it will then be stored. GML also announced that they can now read *SSL G* series automation data as well as *Flying Faders* and *Flying Faders VR*.

JL Cooper introduced an automation expansion system for the Tascam *M-3700*. The *PRO3700* adds moving fader graphics, SMPTE display and additional status information. The hardware consists of a user installable board and a software package to run on a *Mac*. The *Mac* allows off-line editing on automation data, recording and generation of MIDI events, increased memory capacity and background saving of mix data.

Magneto-Optical recording systems



Sanken shotgun CQ-1 mic

were much in evidence with sophisticated recorder, player, master control systems with quasi-networking features aimed primarily at broadcast applications. Systems were seen from **Kowa** and **Asaca**, the latter also having sister products for video.

We end with one of the most intriguing products. Japanese

microphone manufacturer **Sanken** were showing the *CQ-1* 4-channel shotgun mic! Externally, this looks similar to a standard shotgun mic but with the electronics placed in a parallel tube that also holds the mic mounting. Internally, the mic contains 19 capsules, similar to those used in the **Sanken COS-11** lavalier mic. These are apparently mounted vertically and divided into different frequency ranges. The output is arranged as L, C, R and S. Intended primarily for HDTV sound, the reasoning is that HDTV, as with film, requires a solid centre image primarily for dialogue. A standard shotgun centre image would not ensure fixed localisation of the centre channel with regard to the stereo image. With the left and right signals derived from the same mic array, coincidence can be achieved between all the front signals. It was not possible to hear the mic in operation during the NAB — this is promised for the San Francisco AES. And **Sanken** quite openly admit that it is going to be very expensive.

3

more



GOOD REASONS FOR CHOOSING STUDER.....

THE D740 CD RECORDER



STUDER's D740 was the first CD recorder to be introduced to the market. Subsequent manufacturers have introduced similar products but the D740 remains head and shoulders above the rest; all of the following features fitted as standard not as options.

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- ▶ Automated creation of CD compilations

The D740 communicates directly with the STUDER D780 R-DAT Machine via its parallel AES/EBU Control Port for perfect automatic transfers.

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STUDER



Orban's Optimod Studio 460

In brief

From Neve, *Flying Faders Junior*, a version of *Flying Faders* made more affordable by the exclusion of some of the features of the full system; from Teac a new portable DAT recorder, the *DA-B20*; a dual sample rate converter from Roland. The *SRC-2* allows conversion of two digital stereo signals of a wide range of types and sampling rates and then output at one of six rates with

selectable sync mode, emphasis, etc; from 3M an enhanced version of *275 digital* audio mastering tape offering lower dropout rates and improved windability; UREI showed the *LA* series of 1U compressor limiters which includes a dual channel *LA-22* with frequency adjustable compression and expansion; JBL introduced the *M* series comprising two variable crossovers, a noise gate and a gating compressor/limiter; AKG demonstrated version 2.0 operating software for the *DSE-7000*

RAM workstation. Changes include improved production features and overall faster operation; from NED the announcement of significant increases in the RAM capacity of the *Synclavier* and *PostPro* systems to 768 and 256 Mb respectively. Release 3.1 of *MultiArc* software includes numerous enhancement while being the first NED software to be fully *Mac System 7* compatible; Lexicon were showing the *LFI-10* digital audio format interface that allows conversion between AES/EBU,

S/PDIF and SDIF-2 at any one of four sample rates. Viewing and modification of aux data is also possible; from Orban, the *Optimod Studio 460* offers a wide range of signal processing for use in the studio including a Silence Gate, stereo coupling, voice AGC, HF De-esser and Density control; from Illbruck, as well as the standard Sonex foams, came a range of 'acoustical barriers and composites' under the *ProSPEC* name; Audio Animation were showing the *SDH101* which is a digital processing platform that configures itself according to the RAM card plugged in by the user. Initial cards will be a 10-band parametric EQ and phase chaser but more will follow as demand indicates; Geffen had a front end touch screen system *ExpressFX* allowing simple control of sound effects from an Akai *DD1000*; from Brainstorm, a useful time code box, the *SR-15 Stripalyzer* that distributes and reshapes time code, strips pilot tone and offers time code analysis. Keith Spencer-Allen ■

..... RELIABILITY SERVICEABILITY AFFORDABILITY



THE D780
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R-DAT
MACHINE

STUDER'S D780 R-DAT Machine comes complete with QUICKSTART function (RAM) for perfect on cue instant start in broadcast, studio video, film, and post production environments.

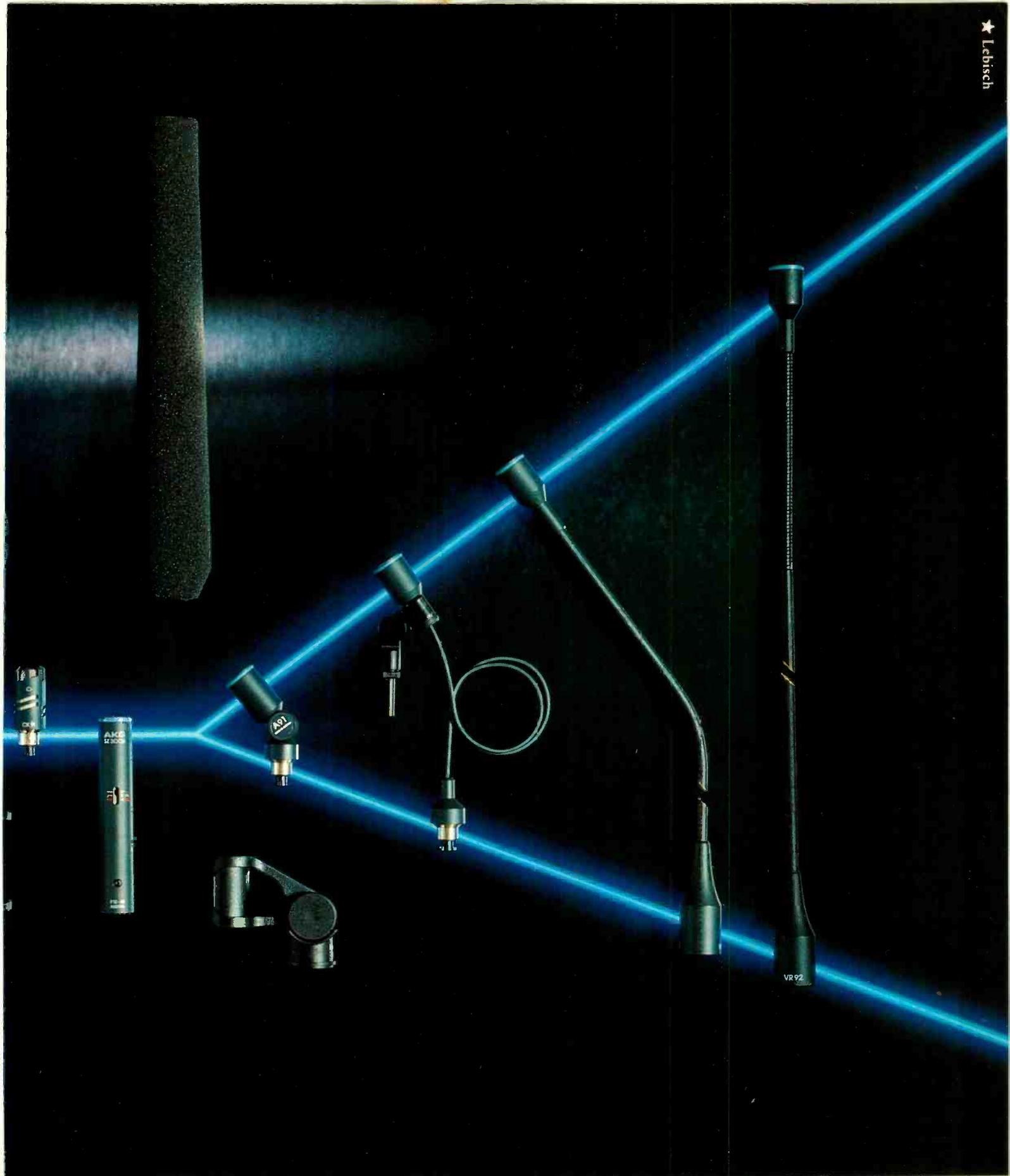
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MIDI generator

Quasimidi is a German company that specialises in MIDI oriented one box peculiarly named solutions for keyboard setups. These include the *Powermerger*, which combines a 2-in, 1-out MIDI merge with a 1-in, 3-out thru box and program sender and the *Esmeralda* master keyboard controller. The latter acts as a MIDI program sender and zone creator with 128 memories for any MIDI keyboard and additionally features a dual MIDI data filter, transposer, velocity curve controller and tempo display.

The incomprehensively christened *Turbo-Volcon/D* — the subject of this review — addresses the requirement for access to MIDI continuous controllers and, not surprisingly, also manages to incorporate keyboard zoning and merging capabilities plus a stab at synth programming.

For a unit of its size (250 mm x 110 mm x 50 mm) it is usual in sporting a 16 character by 2 line LCD which is certainly not legible from a variety of angles. Operation centres around 8 pots (not continuous), 8 buttons, a four-way cursor controller button cluster and STORE and MODE buttons. Connection to the outside world comprises 2 MIDI ins and 4 MIDI outs with power coming up from an external 9 V supply. The astute will have presumed that the pots are used to act on continuous controller information and they'd be right but first a whizz through the other capabilities.

Turbo-Volcon/D allows eight independent overlapping keyboard zones to be distributed between two keyboards with merging which can then be spread out among the connected expanders at the other end. Zone configurations can be stored in 128 named programs, and each zone therein can contain slave patch number, MIDI volume, MIDI transpose, velocity split (useful), velocity curve (eight profiles) and controller on/off. This is in addition to global settings for all things connected such as naming MIDI channels by synth. All settings are battery backed up and the device supports MIDI dump and load.

As with any box that does so much the likelihood of it being underused is strong especially as the sense of relief that overcomes the completion of a zoning patch lingers and does not encourage experimentation just for the sake of it. It is a complicated



Quasimidi's Turbo Volcon/D 128

business not helped by peculiar abbreviations on the LCD and an appalling manual. Nevertheless, once configurations are entered the solution is a compact, friendly and indispensable one for live work, for example.

On the more interesting MIDI controller control front, *Turbo-Volcon/D* operates on a number of different levels. Templates are provided that allows the eight pots to influence controller data on 16 MIDI channels. In this mode each of the eight buttons switches dedicated control to the pots of channel aftertouch, modulation, breath controller, foot controller, portamento time, MIDI volume, MIDI pan and expression with access via the pots to channels 9-16 achieved by a shift function.

This process is facilitated significantly by the appearance of bargraphs on the LCD corresponding to the relative levels of the controllers currently being acted on. This visual display is great because MIDI for all its wonders is fundamentally low on visual feedback and the ability to see what a MIDI controller setting is actually doing is infinitely preferable to using your ears particularly when working on obscure controllers in complex synth patches. As such it is a handy and instant means of writing controller data into a sequencer, although the pots don't have a positive feel nor seem to offer

repeatable and precise resolution. In the context of 'general' control then I am probably splitting hairs.

However the device also takes a run at being an 'easy programmer' via systex for a variety of synths. These include Kawai *K1* and *K4*, Roland *D20*, *D10*, *D110*, *MT32*, *JX8P*, *U110*, *D50*, *U220*, *Alpha Juno 1* and *2/MIS50*, Oberheim *Matrix 6* derivatives, Korg *M1* and *T1* derivatives, Yamaha *DX7*, *TX816*, *SY55*, *SY77*, *Wardolf Microwave* and Ensoniq *VFX*. In many ways this most ambitious of facilities falls foul of all the little shortcomings of the device the most.

Programmers are arranged in pages which are selected by the eight buttons above the pots, at which point the LCD indicates which parameters the pots are assigned to. Unfortunately, there is no visual indication of where you are in each pot's scheme of things — you have to use your ears. Compounded by the fact that once you switch pages the pots are likely to be in different virtual positions and turning one negates your previous setting — there is no nulling. The system works if you are methodical about your approach and address each page in turn completing your tweaking in confidence and moving on to the next page never to return in case you should disturb the settings.

Unfortunately this is not how synths are programmed, especially when some of the innards of a

faceless module are presented as knobs ripe for fiddling with — the temptation is irresistible — and the result is a frustrating process of getting something sort of good, recklessly going back to a previous page to make it sort of great, losing what you had but finding something else sort of good, and chasing your tail until you drop. As an example, the *K1* programmer assigns two pots to split the waveforms between them: finding the exact waveform you started working with is very difficult with the degree of fineness that the pots offer and it becomes a severe limitation.

However, the device is still valid if all you want to do is adjust relevant oscillator-equivalent levels or envelopes of existing sounds — a basic editor only not a full-blown programmer. A useful feature is the device's allowance for individual parameter controls to be arranged in a master patch from which multiple synths can be adjusted simultaneously. This is perhaps a better implementation.

Turbo-Volcon/D can do a lot, maybe a bit too much, but is likely to appeal to broad range of users as a result.

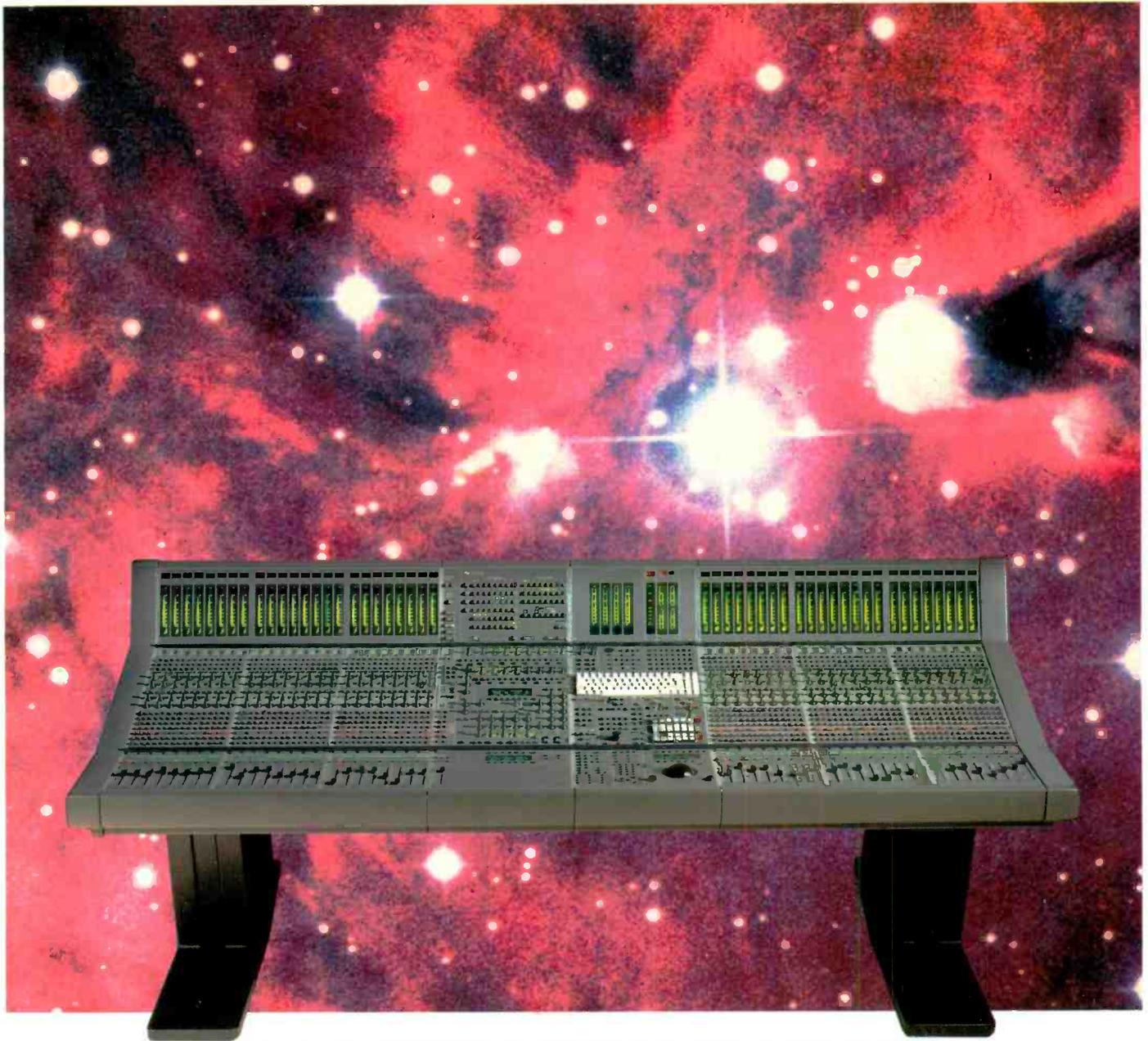
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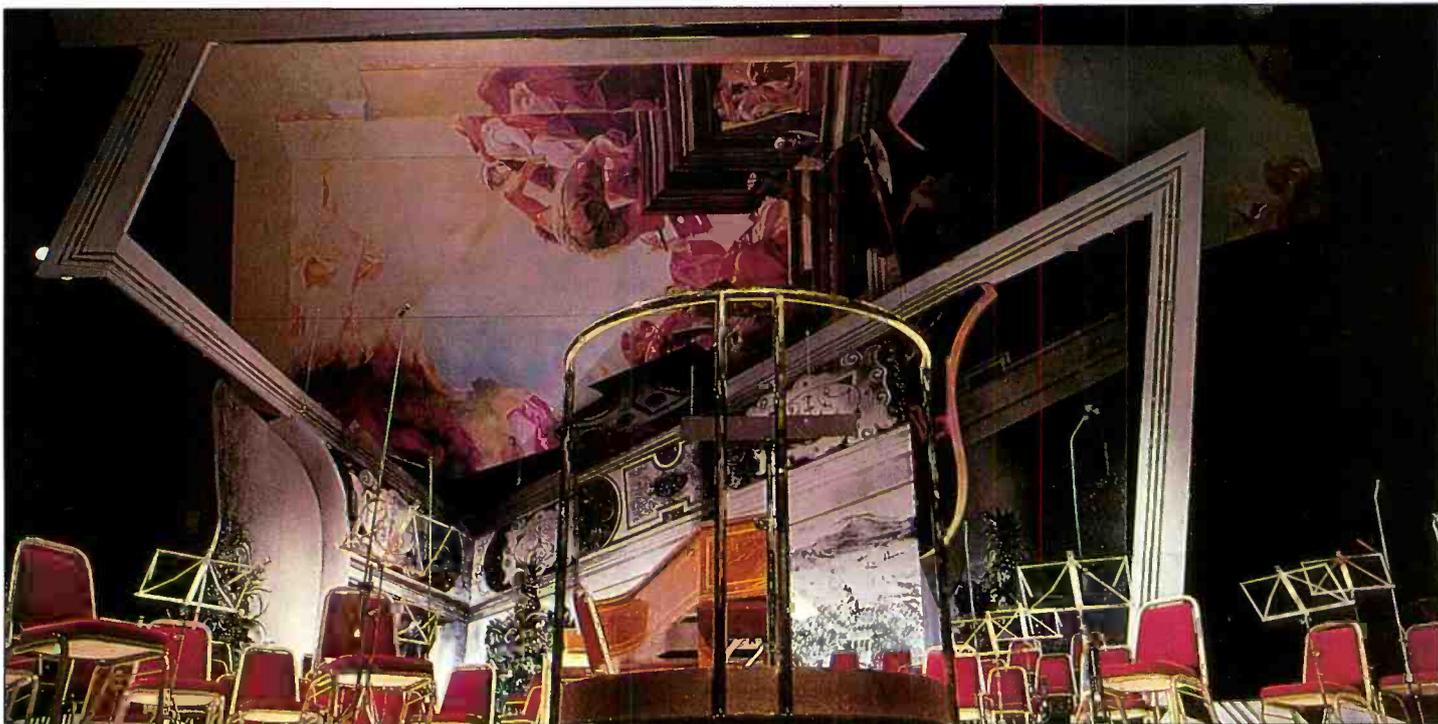
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DUBLIN'S MESSIAH



The stage set: a collage of images inspired by Renaissance ceilings and Hogarth engravings

Handel's *Messiah* celebrated its 250th anniversary in Dublin where it was first performed. Mike Lethby reports

Exactly 250 years ago this April 13, George Frideric Handel treated an audience of 300 in Dublin's New Music Hall to the Premiere of his latest work. He'd arrived in Europe's second city four months earlier, invited to give a series of oratorio concerts during the Dublin season. The warmth of their reception convinced him to pen a new and special oratorio to conclude a successful season.

With Handel himself conducting from the organ, *The Messiah* — written in just three and a half weeks — was performed in aid of gaol prisoners and two local hospitals. It went down rather well.

A Dublin newspaper reported: 'Words are wanting to express the exquisite delight it afforded to the admiring crowd. The sublime, the grand and the tender . . . the most elevated, majestic and moving words . . . charm the ravished heart and ear.' With its centrepiece Hallelujah Chorus it became essential devotional material for churches across Europe. By the time of his death in 1759 it was the most popular of all his oratorios; it is now regarded as the definitive choral work.

The 250th anniversary was marked by celebratory performances around the world. But it was Dublin, perhaps better known today for the timeless quality of its Guinness than its contribution to the Renaissance, that remembered the man in style.

There was a small performance on April 13th on the site of the old hall in Fishamble Street. The

same evening, just a mile away by the Liffey docks, The Point Theatre and Tony Boland, Director of production company Planet 24, staged another concert for an audience of 5,000, using subtle sound reinforcement and a minimalist microphone system devised by engineer Onno Scholtze from Philips Classics. On hand to record the event, promoted by Jim Aitken, were an RTE/Channel 4 live TV broadcast crew and a Philips Classics CD and CDV recording team.

Planet 24, who cut their teeth on C4's *The Word*, number among their team such award-winning luminaries as Charlie Parsons, Bob Geldof, Tony Boland and publisher Waheed Alli.

The 35-member orchestra and 52-voice chorus of the Academy of St. Martin in the Fields, under



The bronze tablet that commemorates the charitable event

conductor Sir Neville Marriner, chorus master Laszlo Heltay and leader Kenneth Sillito provided the artistic input. Top soloists were: Soprano, Sylvia McNair; Mezzo Soprano, Anne Sofie von Otter; Alto, Michael Chance; Tenor, Jerry Hadley, and Bass, Robert Lloyd.

Philips Classics Productions and the Academy had already recorded a CD single and video of *The Hallelujah Chorus* coupled with *Unto Us A Child is Born* for Easter release. Philips' live recording of the *Messiah* was rush-released in May while an accompanying video and CDV are scheduled to follow later this year.

Shuttlesound, who supplied the Electrovoice speaker systems used by PA company The Mikam Sound for the concert, invited me to Dublin's fair city to witness this unique event as it unfolded. And this, begorra, is the way it was.

The Point Theatre

'The Point Depot' is how taxi-drivers know this large, rectangular Victorian stone building down by the Liffey docks. Once it was home to trams; now it is better reached by private car, a short journey from the city centre. You could easily compare its location to London's ill-fated Docklands Arena, but in commercial terms The Point has fared rather better. In fact, it has provided a much-needed new focus for the city's thriving musical scene.

Even when empty, The Point's auditorium has a remarkably dry acoustic character despite expanses of plastic seats and bare stone walls. This is largely due to the swags of loose cloth which adorn the peaked roof's underside. These, I was told, were installed at considerable expense sometime after the venue's opening following early criticism of the acoustics. ►

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So if rumours still persist out there that The Point sounds like a tin barn, I am happy to confirm that this is no longer the case. The dampings have certainly tamed what was once a very 'lively' live room.

The carpet tiled floor also helps — or at least it does in this configuration, when there's a large flat stalls area with tiered seating on three sides. The Point's seating layout can be re-arranged at will; although a very large stage (such as the one for this concert) does reduce a potential 6,000 audience capacity to around 4,500 to 5,000.

The visual effect isn't particularly attractive by day, with a bleak sun trying to peep through the red drapes at the windows. And the theatre wears its industrial heritage on its sleeve with modernist expanses of blue steel beams supporting new side balconies; bulbous aluminium air conditioning tubes burrow around the ceilings. But at curtain up, when warm uplighting glows on the swags and subdues the high-tech bits, it turns into quite good-looking multipurpose venue for the arts.

That roof, meanwhile poses other problems related to the building's construction and its location by Dublin's busy dockside. External noise can — and does — intrude with unpredictable results. On the first rehearsal night a brief hailstorm 'sounded like distant machine-gun fire through the mics', according to one of Philips' engineers. A passing ship's foghorn also found its way onto one early pre-show multitrack take. It was for this reason, as much as for any musical fine-tunings, that the Philips team had decided in advance to slot in two extra days of recording takes in the building.

The set

The Point's proscenium arch and the front of the lighting truss were pressed into service by leading theatre and opera designer, David Blight, as part of his set for *The Messiah*. Lit by Andrew Leonard of Lighting Dimensions, there was a collage of images — a melange of monochrome motifs around the edges and a colour stage backdrop in exaggerated 3-D perspective.

The colour part suffered the indignity of being described by a national newspaper as 'a pastiche of the Sistine Chapel ceiling'. Being something of an



RTE's sound supervisor, Jack Peoples, at the SSL 5000 series console

artistic Philistine, I sought the views of Mr Blight, who explained the colour images were based on his collection of photographs of less famous Renaissance ceilings, while Hogarth featured strongly in the black and white stuff.

More candidly, he confided that the complex images would provide a hand diversion for the less devoted whose attention might flag in the 3½ hour set. 'It's a long show,' he noted, 'so there's plenty to look at.' His set certainly lent an ambiguous artiness to The Point's basic charms.

The live sound

Dublin-based PA company The Mikam Sound provided the house sound for the concert. Under owner Mick O'Gorman, the company first cut teeth on Ireland's thriving folk music scene and later expanded into the rock and amplified classic markets. Mick himself has recently added the managership of Brian Masterson's new Windmill Lane Studios complex to his CV (see *News* in *Studio Sound* May '92).

Mikam won the gig because, says O'Gorman, 'We were the only sound company in Ireland with a serious track record in live orchestral work. We were introduced to it by Brian Masterson. We'd started originally by doing gigs involving Irish pipes, orchestras and drum kits, miking the orchestras conventionally. And when every other Irish PA company seemed to think rock would go on as it was forever; I thought it might slow down as I got older — and fortunately I was right!'

They were justifiably apprehensive about the critical reception their work would receive. Mikam, although widely experienced, had never before been exposed to the purist fraternity's slings and arrows that regularly greet any major attempt to present the classics in a non-traditional format.

There are many engineers on shows like this who would secretly love to go the whole hog and run a PA system big, bold and brassy. Only a fortunate few have the right opportunity to make a success of it. But with amplified classics having grown into a lucrative minor fringe industry over the past few years, we can count ourselves lucky that there are enlightened engineers around who ▶



Front of house: in the foreground Mick O'Gorman's prized 1974 vintage Neve Melbourne (right) and (centre) a DDA D series desk



The Point Theatre auditorium has a remarkably dry acoustic character.

are content to apply sensible, conservative acoustic principles to this controversial field.

Mick O'Gorman is one who's tuned in to the need for moderation, and while he asserts to his team 'put a lot of work into balancing and EQ'ing the system', he's quick to acknowledge that a key element was Onno Scholtze's microphone layout. 'Everything coming down the wires from the mics,' affirmed Mick, 'was solid gold.'

Mick stated his brief in the simplest of terms. 'The *Messiah* meant no noticeable amplification; nothing but subtle reinforcement for those areas of the room which would have been acoustically "dead". With an orchestra there's a very fine line between having it amplified at all and going completely over the top.'

He neatly sums up the PA company's dilemma: 'If you get it wrong, you simply detract from the performance. From an engineer's point of view it appears we're doing very little — but we spent a lot of time making it sound that way!'

From the back, it was only when the massed voices of the choir raised the VU needles high that you were aware if listening to any sound reinforcement. That was exactly the result that was needed to counter the sceptics.

Minimalist microphones

Onno Scholtze of Philips Classics designed the orchestra and choir microphone arrangements. Schoepes omnis featured throughout, except for a few 'spot' 451s and 414s, used purely for TV feeds.

A string of four Schoepes were strung 12 ft up in a line across above the conductor's head, with two in the centre and one each about 4 ft out from the centre. Commented FOH engineer Paul Ashe-Browne: 'Those were not placed as widely as you'd imagine, but the results were excellent.'

The choir had another four mics at the same height but equally spaced across the tenors, altos, sopranos and basses.

All the mics were fed into Mick O'Gorman's most prized acquisition — a 1974 vintage Neve Melbourne desk.

O'Gorman: 'It really is beautiful. We had some

work done in it — the noise specs and dynamics are perfect for this type of show, and the mic preamps respond so well to the dynamics of an orchestra.'

Its L+R outputs, through BSS TCS-804s, provided two separate delays for left and right. Mick: 'It was very simple. The front truss has four EV Deltamax's and two of our own 15 in subwoofers, using Amcron amplifiers and the Deltamax processors.'

EQ for the front truss employed two Lindsay graphics — 'they're very old, very quiet and very phase-coherent, plus they were built with discrete components, so it's not hard to keep them up to scratch.'

The BSS's other two outputs were split to the rear truss in two parts. The main part comprised a pair of EV Motivators, while the second part had two HR6040 horns to cover high end in the rear balcony, from a mono feed, crossed-over at around 1k2.

Mick: 'Delay lines always used to be in mono. Now we have this dual delay we can really make the sound float in space, since the ear is relatively poor at placing sounds vertically.'

The Neve outputs were then patched back into Paul's FOH DDA D Series desk, used mainly as a submixing desk for the discrete mics. Paul: 'Philips have a Lexicon 480L for the recording and we're using it to add more reverb out front as well.' Mick comments: 'We love the old Neve but we're very happy with the DDA too — we bought our D Series eight years ago and it's never failed us.'

BSS splitters beside the stage served the various house, recording and broadcast factions and as you'd expect with a purist setup, compressors and gates were notable by their absence. There were two days of 'pick-ups' — retakes for the cameras and to eliminate external sounds.

The PA: details

The Deltamax speakers Shuttlesound supplied to Mikam Sound are correctly known as DML-1152As. A compact (30 x 18 x 16 in, 99 lb) two-way full-range unit, it is bi-amped and used in conjunction with the DMC-1152A electronic controller which provides frequency dividing, time delay and equalisation. The controller also monitors driver excursion and temperature as well as amplifier clipping among its protective functions.

The Motivators are a range of enclosures developed by Shuttlesound, they state, 'to produce a true full-range cabinet while maintaining the economics and coherent performance of a two-way system... an unusual yet effective solution.'

Mikam's Motivators are the passive 5P2 type, rated at 800 W overall and comprising two 15 in drivers (one tuned for LF, the other optimised for midband/bass) with a 2 in titanium HF compression driver on a constant-directivity horn.

O'Gorman says: 'We love the Deltamax's, particularly in situations like this, they're very transparent. At times we've driven them to the limit under compression — but you wouldn't know it.'

He adds: 'We surprised Shuttlesound and EV by telling them that in the Motivator, they've a classic speaker on their hands. It's better than the Meyer equivalent, even though it's not marketed as such and we'll buy more of them. It's exceptionally flat from 100 Hz upwards.'

Mick attributes his company's success to date partly to 'the fact that a lot of the people in Ireland who had the cash for amplification were folk groups. You have a different view if your first ►

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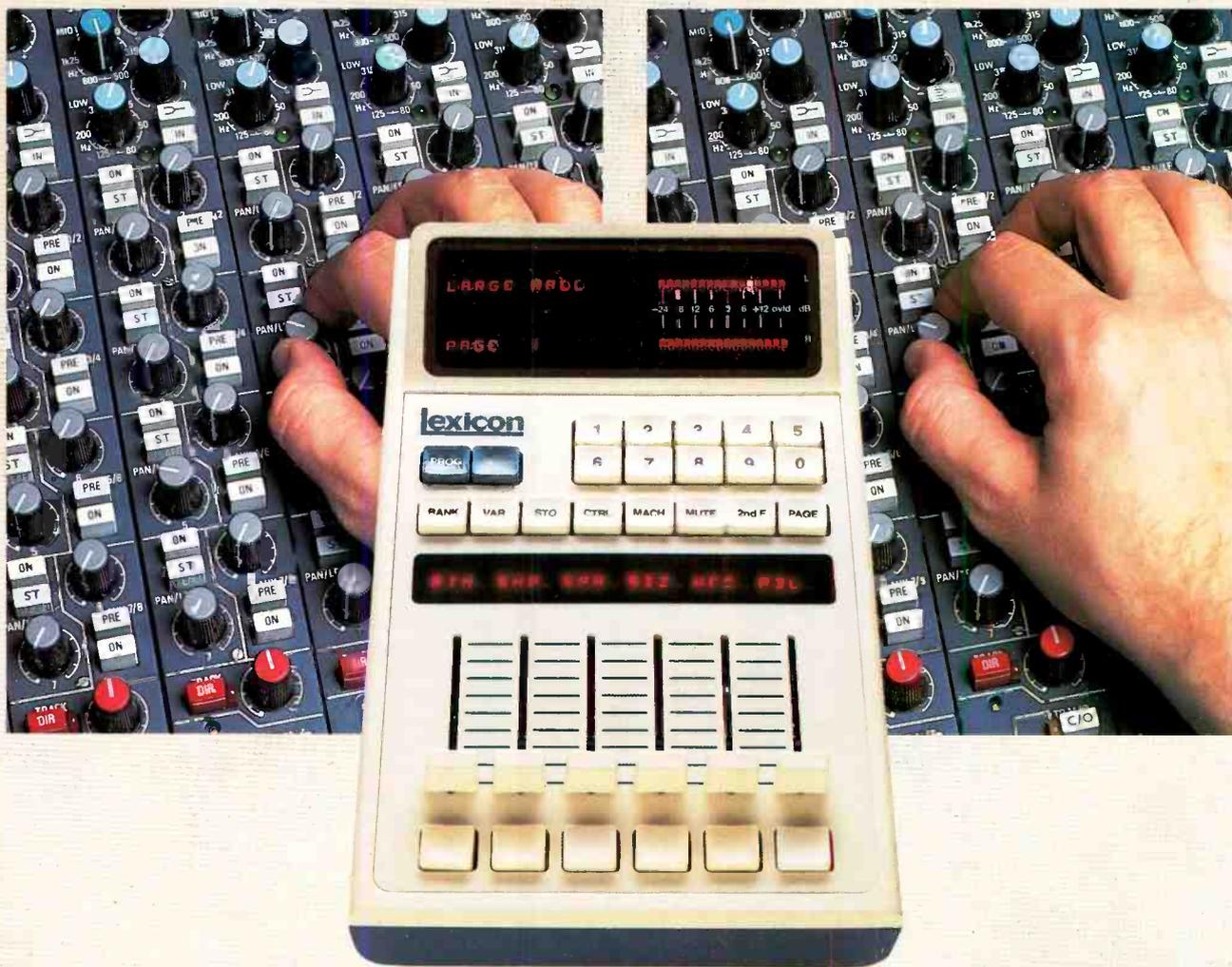
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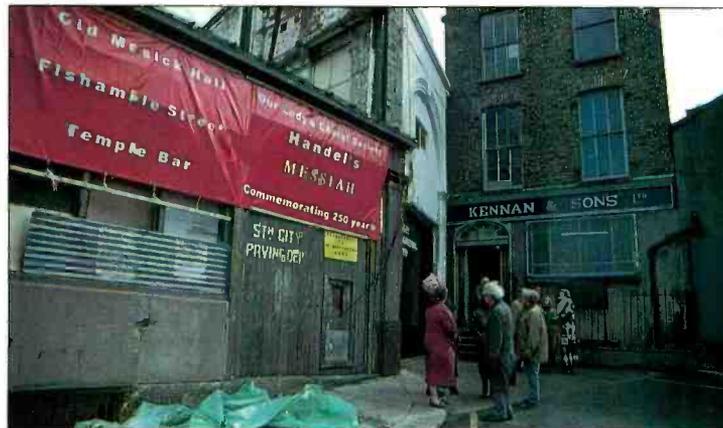
Talk about perfect timing. As audio is increasingly generated, edited, processed and recorded in the digital domain, along comes Yamaha with the DMC1000 – an all digital production/recording console with 22 inputs, 10 busses and 4 auxiliary busses, capable of handling all the major digital formats.

Touch sensitive moving faders, dynamic automation of all console parameters to timecode, 4 band parametric Eq on all inputs plus 2 FX processors make the DMC1000 ideal for audio post production. And as digital audio moves into the video edit suite, there is full ESAM II implementation and an accessible delay on each channel for frame delay correction. Of interest to all will be the familiar control surface, with extensive monitoring and talkback facilities.

But perhaps the best news about this console of tomorrow is that the DMC1000 is available from HHB today, for around £20,000.



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amplified instrument is a violin, not an AC30. That influenced our choice of equipment, and our general approach.' He reflects: 'We have a good empathy with the broadcast people too — there's none of the typical conflicts you often find.'

The old Musick Hall in Fishamble Street. Site of the first performance of the Messiah in 1742

Recording and Broadcast

Jack Peoples supervised the sound mix for RTE, who used terrestrial links, and Channel 4, hooked up by Bright Star satellite.

There was another nod to Onno's mixing concept. Jack: 'It gives us great stereo, but with good pick-up outside the centre too. We've various spot mics, one for every orchestra section and four mics on the choir. But they only make up about 15% of the total mix — the majority comes from Onno's omnis.'

RTE's SSL 5000 Series desk was bought for Eurovision in 1987. Jack: 'In Ireland we do a lot of big music programmes. We specified the physical dimensions; we've got instant reset and I'm using the *Total Recall* to show me my home fader positions — so I can come back to them after altering my mix settings.

'I've also got an extra 28 into 4 stereo inputs on an SSL rack above the desk, so I can handle brass,

THE PRODUCTION TEAM

LIVE PRODUCTION:

Promoter	Jim Aitken
PA Sound	Mick O'Gorman & Paul Ashe-Browne
Lighting	Andrew Leonard (Lighting Dimensions)

PLANET 24:

Producer	Tony Boland
Director	Barrie Gavin
Assistant Producer	Claire Dibble
Lighting Designer	Alan Woolford
Designer	David Blight
Music Producer	John Evans
Vision Mixer	Sonia Lovett
Production Executive	Waheed Alli
Executive Producers	Charles Levison & Charlie Parsons

RTE:

Unit Managers	Michael Mullins & Jerry Hayes
Lighting Director	Bernard Kavanagh
Sound Supervisor	Jack Peoples
Cameras	Jim Campbell
Vision Supervisor	Reg Scarff

PHILIPS CLASSICS:

Executive Producer	Job Maarse
Recording Team	Marthe de Fransisco, Onno Scholtze, Stan Taal, Jan Wesselink & Nico de Koning

woodwind, etc., mixes in stereo.'

Outboard included two REV5s, a REV7 and an SPX90. Plus a DMP-7, he says, 'in case we're stuck for another 8 channels.

'What's unusual is that we're working with Philips who are choosing and arranging the orchestra mics. The CD will be interesting. Usually I'd decide the mics in consultation with the PA and broadcast people; this time, Philips are in the driving seat, which is interesting — and it makes it easier for me.'

In Philips' backstage control room, located alongside a low-rise extension housing artist's dressing rooms, production offices and canteen, the disembodied voice of RTE's TV director could be heard on the monitors, preparing his camera team for the show's start. 'Can you find the President? She's up there in the front row . . . yes, yes — handsome shot, that's very handsome!'

Concentrating hard on their recording equipment and cues sheets were Marthe di Fransisco, producer for the CD recording; Stan Taal, video sound producer for the laser disc take. Alongside them were Onno Scholtze, now in his 'live' role of recording balance engineer, with recording engineers Jan Wesselink and Nico de Koning.

Listening to the monitors as the first movement unfolds, the success of Onno's minimalist miking technique softly revealed itself. In the dry hall acoustics — aided by a subtle Lexicon sheen — the overhead mics captured the orchestra's coherent, natural, dynamics with clarity and depth. Equally, there was fine separation of vocals and instruments — with due credit too, of course, to the balance engineer: Mr Scholtze.

A word from our composer?

Despite David Bright's reservations, aficionados were unlikely to have been bored. I'm assured the classical fraternity doesn't rate this ensemble quite so highly as was once the case; but we were clearly in the presence of quality. Both the instrumental and vocal departments' smooth, beguiling power were beautifully blended by Sir Neville Mariner's baton.

More surprisingly, the blend was little marred by the amplification. Sure, some critics came prepared to draw blood at the sight of speakers (though they were hard to spot). Personally, I've rarely heard better. In a hall of this size, with so critical an audience, it was commendable.

The same paper's critic who (wrongly) spotted the Sistine Chapel also gloomily suggested this concert might be the next in a series of cheap-shot attempts by classical music marketeers to seduce the masses with pop-style posturing — to the detriment (as this argument typically runs) of real classical music. I don't think this view is unjustified in its purest sense; but they would do well to remember that these composers strove to provide the popular music of their time. Unfortunately for them, recording technology was a quill pen and their reputations depended largely on well-heeled aristocratic patronage.

Given the chance to premiere his meisterwerk for 5,000 eager listeners at The Point Theatre, instead of just 300 at that little hall at Fishamble Street, I suspect George Frideric Handel would have relished every single minute. ■

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February First delivery of the **Stelladat** in the US.

Development of the software version 1.5 of the **Stelladat** human interface menu system.

March Celebration in Neuchâtel for the launching of the first 100 **Stelladats** production batch.

The **Stelladat** Time Code software first level of development.

During the AES in Vienna, presentation of the **Stelladat** Time Code hardware module.

April First delivery of the **Stelladat** Nicad and AC charger power supplies.

Development of the **Stelladat** 4-channel mixer and the fast charger for Nicad power blocks.

First delivery of 25 **Stellamode** high performance D/A Converters, the second **Stellavox** digital product.



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Stellavox Japan Ltd.
Nesi Tokiwadai 201.1-38-3 Tokiwadai, Itabashi-ku, Tokyo, Japan.



Above: the back hall Control Room from the recording area. This is to be the 'Rock & Roll' Room. The desk will be the old customised Neve that is currently at Oxford Circus. The room will have its own artist's relaxation area at the back with toilet and shower, and the machine room will be off to the left. Inset: the same location a year ago

AIR MOVEMENTS 4

A pictorial update of the innovations unfolding in the creation of the new Air Studios at Lyndhurst Hall

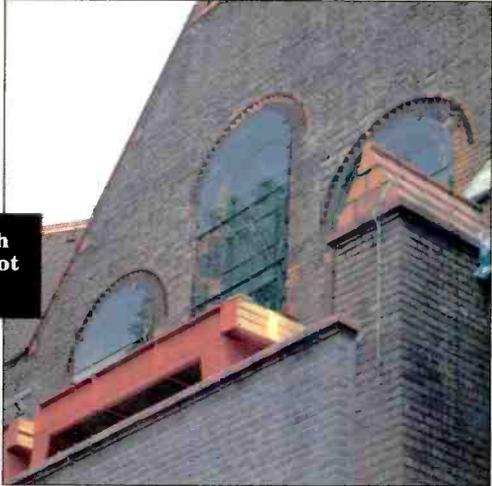
Below: looking from the rear of the back hall Control Room. Directly behind it is the central air-conditioning shaft and the main hall

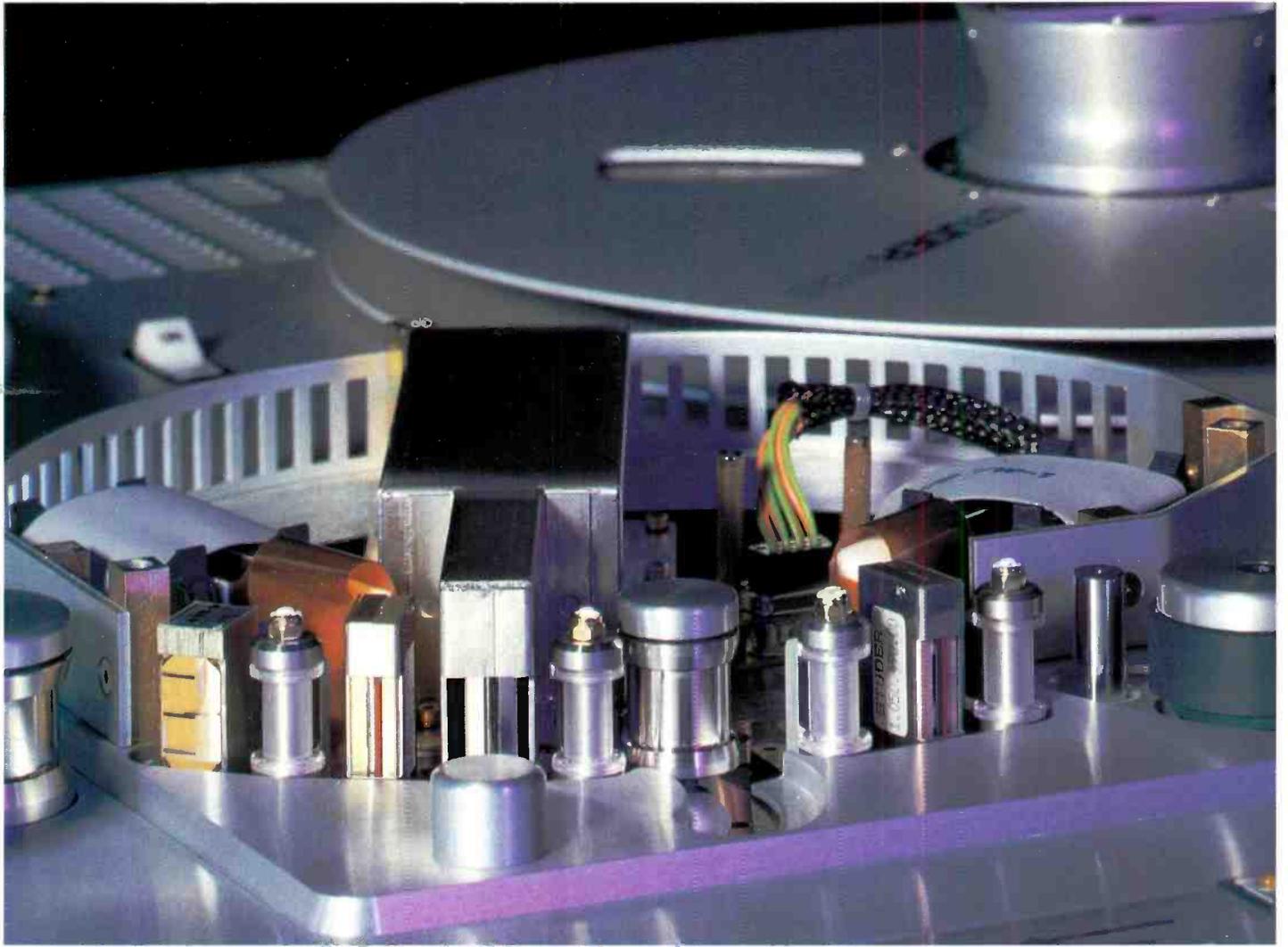




Above: the upper Mix Room where an AMS *Logic 2* digital desk will be installed, a purchase announced at the AES in Vienna. The desk will look from left to right as you look at it. Directly below there will be another Mix Room, this time with the Solid State Logic *SL8000* multiformat desk. Again a recent addition announced in Vienna. (The main hall will feature a Neve *VRP Legend* console. Top Inset: looking through where the Mix Rooms are to be one year ago. Bottom Inset: the original photograph of what is to become the upper *Logic 2* Mix Room

Right: most of the church windows have now been covered with large protective coverings. Although English Heritage would not allow them to be used on the street side of the building





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our D820 MCH. This is professionalism as we see it. Such replacements are hardly necessary on a STUDER product, but should something like this occur, it is always good to know for how long the machine will be out of order... a couple of minutes, that's all.

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APRS PREVIEW

The APRS Exhibition will be held from the 3rd to 5th of June at Olympia 2, London. A list of exhibitors has been compiled with details of their products and services available at the time of writing



AKG Direct

A

- **ACME**, Stand 149: Books including *The Lexicon of Digital Audio* and the second edition of *The Lexicon of Computer Music*.
- **Acoustic Design Group**, Stand A09: Exhibiting drawings and photographs of completed and current projects.
- **Active Sound**, Stand 141: no information received
- **AES**, Stand 110
- **Akai Pro Audio**, Stand A04: A digital offset editor for two A-DAM multitrack recorders. V2.0 software for the S1100 creating hard disk recording functions. Software upgrades for Akai's optical disk system including Mac editing software with full jog function in the Q-list and Edit Cuts pages.
- **AKG Acoustics**, Stand 001A: Direct optical disk multitrack with up to 32 channels and advanced autolocator. *Blue Line* modular condenser microphone system. New BSS programmable *FCS-926* Dual Equaliser Analyser, *DPR-901* Dynamic Equaliser and other devices.
- **Qusted** monitored systems.
- **Alice Soundtech**, Stand 132: range of broadcast consoles.
- **Allen & Heath**, Stand 024A: First UK showing of *Ace* console series in formats up to 32/8/16 with V4 mute automation. Compact *GS3* series consoles and upgrades to *Spectrum* series.
- **Amek Systems & Controls**, Stand 014A: Console series *Big By Langley*, typically £12,000 for 28/24 inline with *Minitrue* automation and complete recall system. First UK showing of *Einstein 24* bus console with automation options. Media film and video dubbing console with switchable pan configurations and *Ruper Neve* designed circuits.
- **Ampex Recording Media**, Stand 010A: Product including *Grand Master Gold 499* with the ability to run at +9 dB.
- **AMS Industries**, Stand A20A: *Optica* lower cost editor and *AudioFile* 'sub system' that can be loaded with *Optica* compatible drives for transfer between the two. *Spectra* high resolution colour interface fitted to *AudioFile Plus* systems and retro-fittable. Streamlined *SoundField* microphone.
- **Apogee**, Stand 120: Showing *AD-500* and *DA-1000E* portable converters.
- **ASC**, Stand 112A: Production version of *DART* floppy disk-based cart machine and *Trackstar* radio automation and jukebox control software.
- **Audio Design**, Stand A12: Own brand CD-R with AES/EBU interface, rackmount and ability to convert DAT idents to CD format. *Smart Box* format converter and other black boxes, including *Masterclock*, as AES-W/C said to create audible improvement.
- **Audio Developments**, Stand 010: *Pico* mixer updated to *AD146* with three types of input module and ability to convert MS to XY. *AD261*; new *ENG* mixer with two MS matrices and impact resistant casing.
- **Audio Kinetics**, Stand A11: Low cost events card option for *ES.Lock 1.11* synchronisers, V4.0 software with ▶



Apogee portable converters



BSS Varicurve

Short Menus and improved emulation. Updated software for *Penta 5* and *Eclipse 8/16* machine controllers. ● **Audiomation**, Stand 148: Console automation systems for theatre and studio use, including the *2000 Series*. MIDI based *600M* interface for virtual consoles. **Sellmark** distributed products including 60 mm conductive plastic fader and *Digipot* motorised controller. ● **Audio Solutions**, Stand 162A: range of amplifiers and active speakers ● **Audio Technica**, Stand 102: Microphones including the *40 Series* professional condensers. The latest is *AT4033* floating element condenser with low mass diaphragm. ● **Audix**, Stand 169: *ALB* live broadcast mixing system with balanced inputs and outputs, plus mix minus feeds and ergonomic light wood console. ● **Autograph Sales**, Stand A01A: range of Meyer sound products ● **Avcom Systems**, Stand 012: Telex

cassette duplicators including new *ACC* series, with no-clutch drive and expandable to 27 copy positions

B

● **BASF Magnetics**, Stand 152: Magnetic recording products, including latest CD quality tapes for cassette duplication. ● **Basys**, Stand 136: ● **Beyer Dynamic**, Stand 021A: New UHF and VHF wireless microphone systems, the latest being *CT170* base station transmitter. *M424* talkback microphone. Stereo microphones. ASL intercome products. ● **British Record Producers Guild**, Stand 157: ● **Bruel & Kjaer Pro Audio**, Stand 108: Complete line of omni and cardioid condensers with accessories. ● **Bryant Broadcast**, Stand 155: no information received.

C

● **Cadac Electronics**, Stand 107: New lower cost *J* type theatre console with enhanced computer interfacing and the ability to swap module positions. VCAs with 15 masters, Control Module stores 12 cues. ● **Calrec Audio**, Stand 154: Large broadcast production console, *Q Series*, with stereo or mono inputs an eight stereo groups. *Minimixer II* with stereo line or mono mic/line modules. *RQ* series outboard. ● **Canford Audio**, Stand 012A: Sonifex Discart cart replacement machines. Complete range of equipment from catalogue, ranging from cables and connectors to furniture. ● **Cedar Audio**, Stand 118: *SRC* DSP functions for Cedar editor or production system with sample rate conversion and varispeed facility (*SRC-EX*) *DC-1* stand alone de-clicker. ▶

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Cedar Audio De-Clicker DC-1



C L O S E R T O T H E

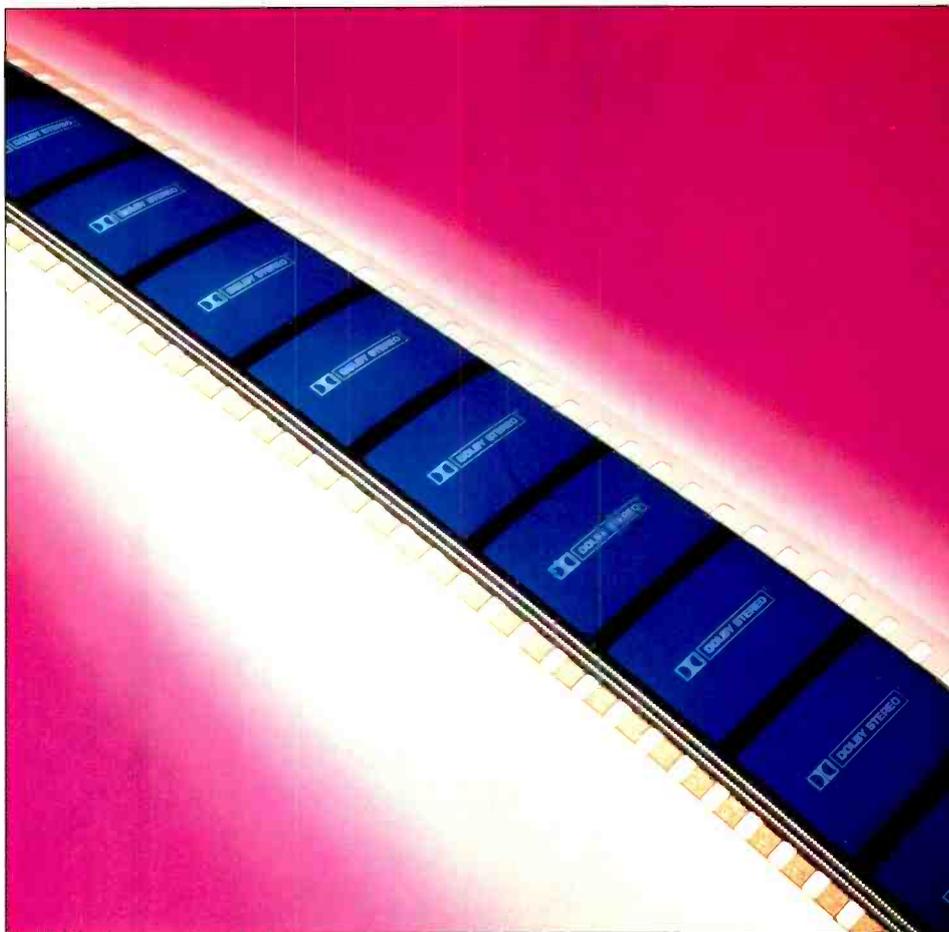
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- **Cosmo**, Stand 165: No information received.
- **Court Acoustics**, Stand 100: Complete range of **Court** products now available from newly formed company led by Stephen Court.
- **Cunnings Recording Associates**, Stand 168: No information received.

D

- **DDA**, Stand A10A: £10,000 *QMR* console with 12 bus architecture and 24 or 32 — input frame with MIDI muting. *Profile*, *Interface* and *DMR-2* recording desks. Sound reinforcement consoles from *Q DMR-12* recording desks. Sound reinforcement consoles from *Q Series*.
- **Deltron**, Stand 160A: no information received.
- **Dialog 4**, Stand 161A: First APRS appearance of digital encoder and decoder designed for CD quality plus talkback channel through ISDN using ISO/MPEG/MUSICAM data compression.
- **Digigram**, Stand A02: Direct to disk recorders using PC-based *PCX3* card with 6 or 12 times compression. *XTracks* workstation with 10 hours record on 600 Mb HD. *DigiMaster/DigiCueList* cart replacement system.
- **Digital Audio Research**, Stand 161: *SoundStation* enhancements Internal Digital Mixing and *SigNet* multi-access networking. Enhanced *DASS100* digital converter.
- **Digital Audio Concepts**, Stand A03.
- **Dolby Laboratories**, Stand 030A: *Spectral Processor* with unannounced capabilities, plus lower cost multitrack SR. Model 430 dialogue cleaner. *DP5500* studio to transmitter link.
- **Philip Drake Electronics**, Stand 018A: 9000 series audio and video distribution for analogue audio, digital audio and analogue video. 9400 series for analogue audio.
- **Drawmer Distribution**, Stand 027A: Outboard including ▶



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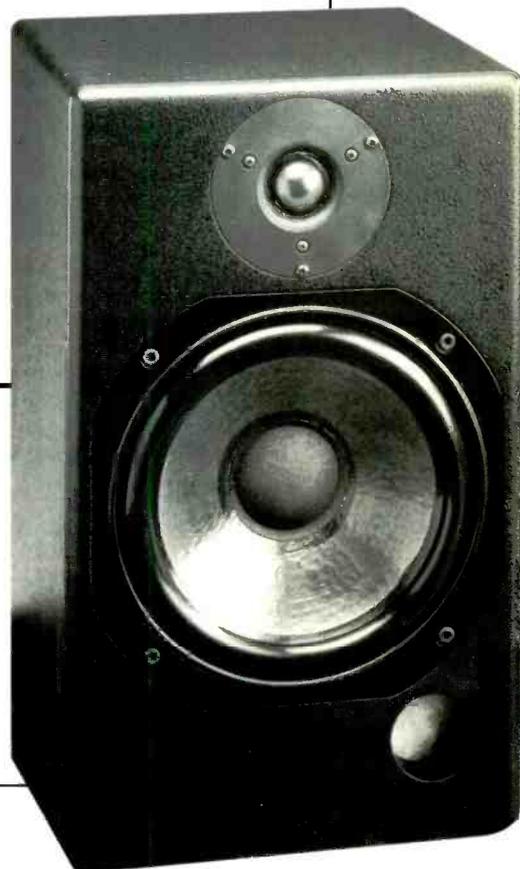
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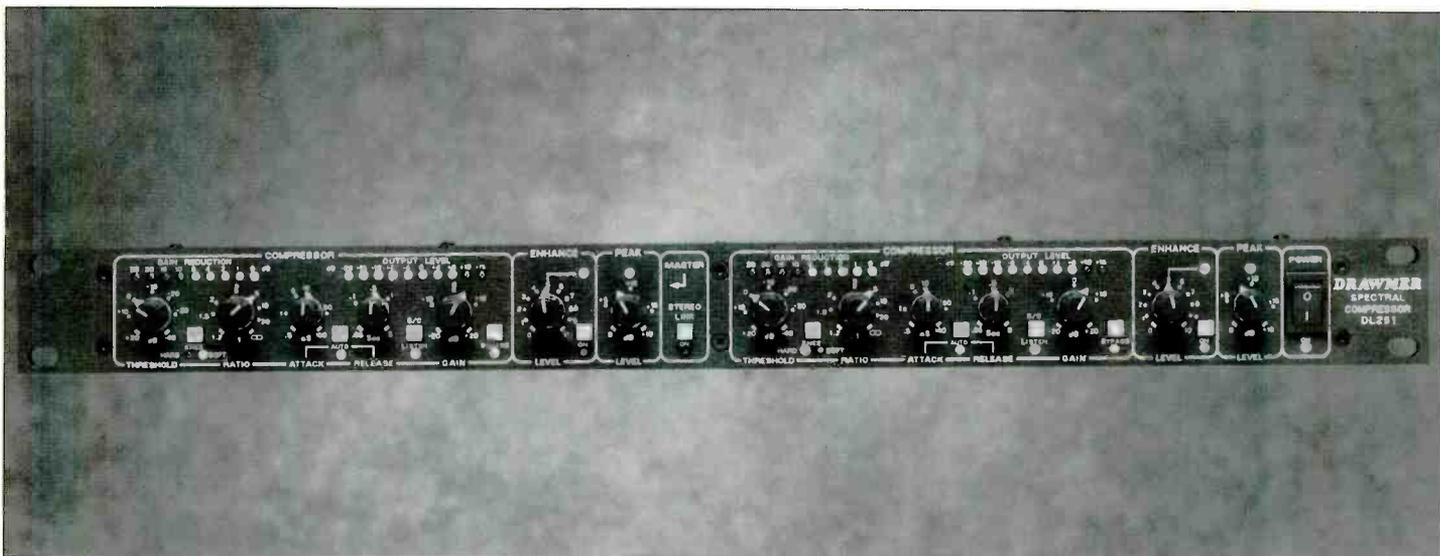
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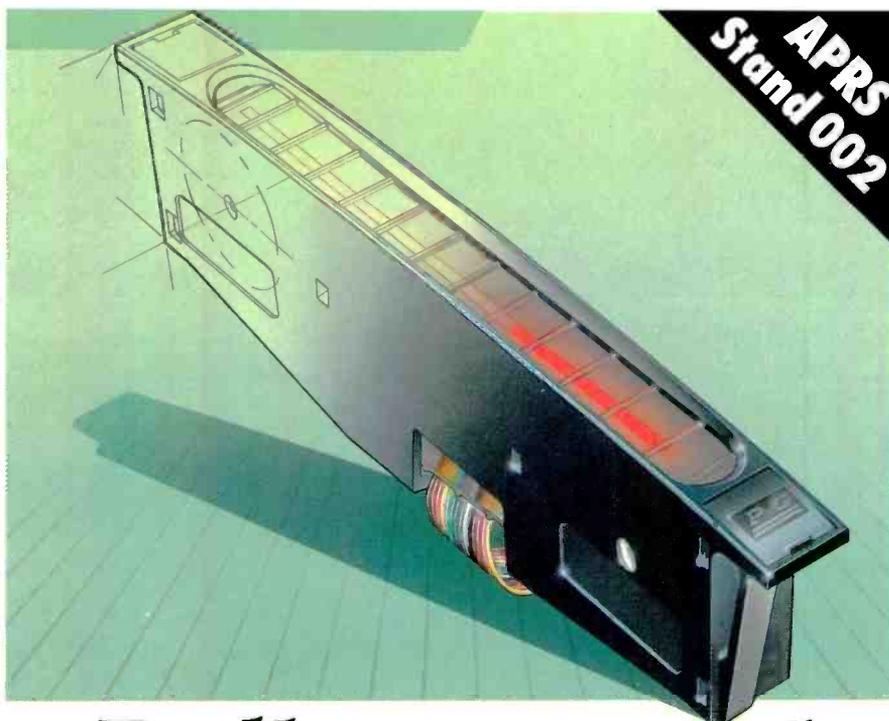
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● **Eardley Electronics**, Stand 004: range of components for pro-audio use. ● **EMO Systems**, Stand 007: *E448* for testing loudspeaker leads fitted with Neutrik *NL4FC* Speakons. *E496* adaptors to connect *E445* tester of XLR cables to 5-pin DMX lighting cables. Inductor based graphic equalisers.

F

● **Focusrite Audio Engineering**, Stand A18A: Demonstration unit *Studio Console* with GML automation. Preamp/equaliser and dynamics modules. 12 mic preamp system with remote. Unspecified new product. ● **Formula Sound**, Stand 009: Hospital radio or discoteque *PM-90* desk with up to eight channels. System *2000* desk with telcom facility. *AMX-6* rackmounting mixer. ● **Fostex**, Stand 148A: *D20B* time code equipped DAT recorder now with chase synchroniser and reduced price. *PD2* professional DAT location recorder. *DCM100* MIDI controlled rack mixer with eight stereo inputs. ● **Future Film Developments**, Stand 019: Parchfields, and other audio and video connection system.

G

● **Gotham Audio**, Stand A17: no information received. ● **Graff Electronic Machines**, Stand 106: no information received.

H

● **Harman Audio**, Stand 029A: Steinberg software for sequencing and editing using *Cubase* system on *Atari*, *Mac* or *PC* platform. *JBL* Array Series sound reinforcement system with 4892 enclosure and *ES5200* controller. *M355* subwoofer. **Audio Logic D22** and *D24* alignment delays. ● **Hayden Laboratories**, Stand A10: ● **HHB Communications**, Stand 006A: **Marantz** CD-R with interfacing to allow transfer of DAT idents to CD. **HHB IPRO** kit with DAT recorder, stereo ►



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mic and cabling in case. **Sony PCM-2700** with AES/EBU added and **TCD-D10** Proll with 48 V phantom. Other DAT recorders. A digital production centre based on **Yamaha DMC1000** digital desk. ● **Hill Audio**, Stand 113A: ● **Hilton Sound**, Stand 142: Details of hire services across Europe including latest products **Sony PCM-3324S DASH** recorders and 'a la carte' recording packages. ● **HW International**, Stand 117: Distributors of Shure and Hafler.

I

● **Industrial Acoustics Co**, Stand A14: details of present design projects.
● **Institute of Broadcast Sound**, Stand 181:
● **Kelsey Acoustics**, Stand 140: Products from latest catalogue including cabling, connectors, casings and accessories.

K

● **Kemps**, Stand A25 ● **Key Audio**, Stand 150A
● **KGM Studio Specialists**, Stand 024
● **Klark Teknik**, Stand A12A: New **DN728** configurable delay line with six outputs and 5µs resolution. **DN800** Active Crossover with plug in cards. Midas XLR console in 16-channel version for O/B. ● **Korg**, Stand 164: featuring **Sound Link** digital audio system.

L

● **Lindos**, Stand 131: **Lindos LA100** audio analyser with latest V5.6 software. ● **LMC**, Stand 138: products for installation and touring live sound applications including **Crest Audio** amplifiers, **EAW** speaker enclosures and **Soundcraft** mixing consoles. ● **Lyrec**, Stand 112: New DCC duplicating equipment under agreement with Philips, including DCC slave and **TR55 DCC QC** deck, plus **Kronos 5** and **Tachos 90** cassette loaders in DCC versions.

M

● **3M**, Stand 135: Magnetic Product including 996 high output tape. ● **Marquee Audio**, Stand 139: New **Adams-Smith Q-Gen** time-code cue system, a cost effective multi-standard video pulse generator with genlock. Other **Adams-Smith** plus latest from **Soundcraft**, **BSS**, **JBL**, **C-Audio** ►



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and EMO. ● **MBI Broadcast Systems**, Stand 008A: On **Soundcraft** stand, recent Series 30 large scale production console with several module options and 'zoned' frame for flexible layout possibilities.

MCPS, Stand 015:

● **Media Directories International**, Stand 130:

● **Media Products**, Stand 151: 6000 Series audio patch system with high density BPO paneling and three levels of rear connection.

● **Meridian Communications**, Stand 103: New **BED Technologies**

AudioPlex Pro-Line system for 16-channel copper cable of 64-channel optical fibre transmission.

● **Mix**, Stand 167: US pro-audio publication.

N

● **National Sound Archive**, Stand 146.

● **NEAL**, Stand 014: New real-time and double real-time copiers with two or four channels.

● **Neutrik Marketing**, Stand 004: Combination XLR and jack socket. Full range of connectors and measurement equipment. ● **Neve Electronics International**, Stand 026A: New *Capricorn*

digital production console with assignable architecture that gives control over 256 audio paths from 24 or more fader positions. Dynamic automation, equalisation, dynamics. Also recent *Neve VR Legend*. ● **New England Digital**, Stand A01: showing their digital audio recording and editing workstations.

O

● **Otari UK**, Stand 023A: 464 hard disk-based recorder with enhanced editing functions and Phase 1 DSP. Series 54 music recording console now with automation and machine control centre section. Plus recorders and duplicators. ● **Out Board Electronics**, Stand 173: New *SS2* theatre automation system. Can control 128 fader channels, 128 x 8 matrix and 128 channels of mutes. Showing fitted to **Soundcraft Europa** with special interface.

P

● **PAD Group (Pressers and Duplicators)**, Stand 116 ● **Peavey**, Stand 158A: New software-based *Autograph* automated equaliser and *PC-4KXL* electronic crossover. Latest *DPC-750* amplifier with digital power conversion technology. *SDR20/20* multi-effects unit with up to eight effects. ● **Penny & Giles**, Stand 002: new endless belt controller with optically derived digital output and LED level bargraph. *M3000* motorised fader and other controllers.

● **Plasmec Systems**, Stand 025: *ADAS* hard disk recording system now in versions for *Atari*, *PC* and *Mac*, with stand-alone version for radio use. Latest **Mosses & Mitchell** patchbays.

● **PRECO Broadcast Systems**, Stand A05: **D&R** consoles including new *Aircom* radion studio mixer. Cart and cart replacement systems, FM transmitter, Personality Processor, test equipment. ● **Pro-Bel**, Stand 121: Latest test equipment *5245* digital audio signal generator.

● **Professional Monitor Co**, Stand A16: New monitors with transmission line design. *AB1* midfield monitor and *BB5-P 20* Hz studio monitor, as *BB5* but with amplifier system. ● **Pro Sound News Europe**, Stand 143: ● **Pro Sound News International**, Stand 133. ● **Publison**, Stand A26. ▶



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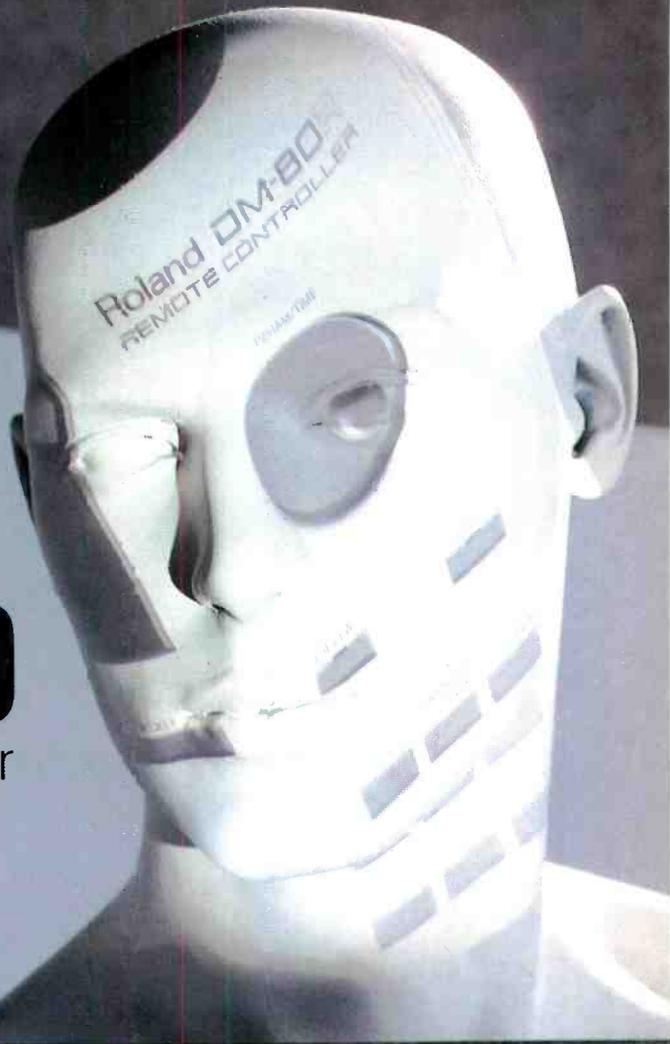
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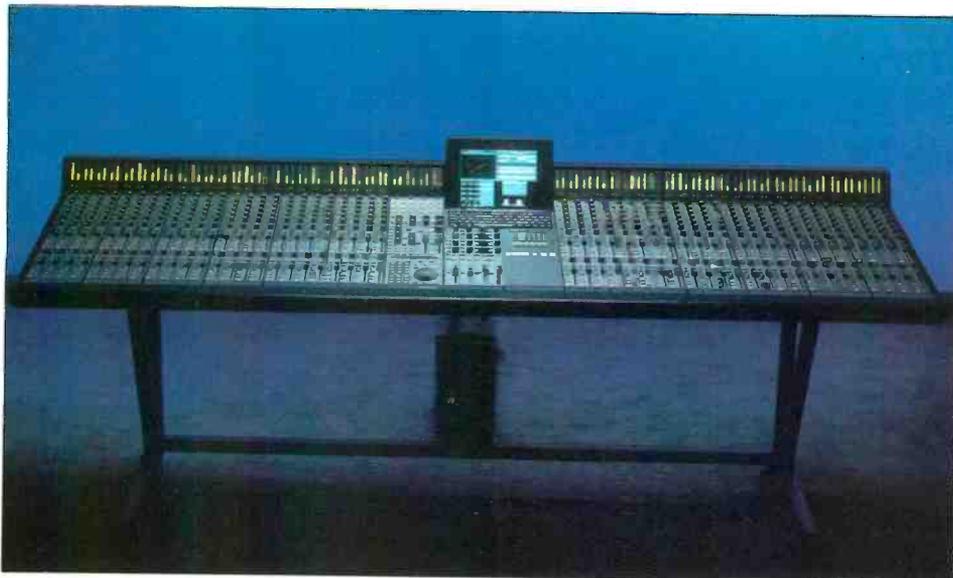
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Q

● **Quad Electroacoustics**, Stand 018: *ESL-63P* electrostatic monitors. Amplifiers *520f*, *510* and *240*. ● **Q-Logic**, Stand 177.

R

● **Raindirk Audio**, Stand 156: featuring *Symphony* console. ● **Raper & Wayman**, Stand 119: *Digram XTrack* PC-based digital audio workstation. **Audio & Design CD-R**. ● **Recording Engineer & Producer**, Stand 105: US pro-audio magazine. ● **Roberston Taylor**, Stand A07. ● **Roland UK**, Stand 134A: New *DM-80* four or eight-track hard disk recorder with expandable storage. *RSS* racial processor. *SBX*-take on *1000* sync box. *SN550* single ended noise reduction, *RSP-550* multiple effects unit. ● **R-Technology**, Stand 107A.

S

● **Scenic Sound Equipment**, Stand A06. ● **Sellmark**, Stand 147. ● **Sennheiser UK**, Stand 117A: New Sennheiser *EM1046/SK50* radio system with modular eight channel receiver frame and miniature UHF body packs. New **Soundlab Symphonic** Microphone System for string instruments. **Neumann** microphones. ● **Sergeant Pepper Album**, Stand 114A. ● **Shuttlesound**, Stand A14A: new *AudioCAD* layout and costing package for contractors. New **Electro-voice** microphones. Products including *Ameron* and *Rane*. ● **Sifam**, Stand 020: Latest examples of 'a million' knobs, dials and switches. ● **Solid State Logic**, Stand 143A: New *Scenaria* digital audio and video system. Includes 38-channel dynamically automated digital mixer, 24-track random access recorder and *VisionTrack* random access video recorder with interaction between the two media. ● **Sonifex**, Stand 171: New *Keydisk* facilities for *Discart* digital cart machines, allowing material to be called up from hard disk. Also analogue carts and *HY02* telephone balancing. ● **Sonosax**, Stand A15. No information received. ● **Sony Broadcast & Communications**, Stand 002A: New *PCM-3324S DASH* recorder with modular interface options. Rock 'n' roll edit capability on *PCM-700 DAT* recorder when used with *BVE* edit controller. Complete CD mastering setup with *ATRAC* data encoding. *DPS-7* digital filter. *DMX-E3000* digital audio mixer. ● **Soundcraft Electronics**, Stand 008A: five new consoles. *8000* replacement *Vienna* with optional VCA. New Theatre Version *Venue II* with extra LED illuminated input functions. Entry level *Delta SR* with up to 32 channels. *BVE100* audio for video developed with *RAI Spirit Auto* with VCAs (Stand 023) ● **Sound Technology**, Stand 172: *C-Lab Notator Logic* sequencer and scorewriter package for *Mac*; object orientated data manipulation, 1/3840ths resolution, 0.05 bpm



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● **Soundtracs**, Stand 028A: New *Solo Logic*, adds 12-bit resolution VCAs to Solo Midi with .5 frame accuracy for mutes and frame accuracy for faders. *Exiom* PC-controlled rackmount mix system with dynamic recall of all fader mute and equalisation settings. Tracmix 2 fader and mute automation. ● **Stafford O'Neill**, Stand A27: Specialist insurance for recording studios and entertainments business. Formerly Northwood O'Neill. ● **Stirling Audio**, Stand A19A: Apex *CDR-40* with large illuminated transport controls and remote capabilities. Lexicon *LFI-10* data verification and standards converter. Timeline *Micro Lynx*; WaveFrame *401* eight-track disk recorder. Recent enhancements to Euphonix *Crescendo* console. ● **Studer Revox**, Stand 004A: new products include *Dyaxis II*; 927 in-line console and *Dyaxis Lite*. ● **Studio Audio & Video**, Stand A24: recording cards for the PC. ● **Studiomaster**, Stand 175: ● **Studio Sound**, Stand 163: ● **Studio Spares**, Stand 021: Items for this year's catalogue including over 70 types of connector, cables, microphones and Acoustiles. ● **Surrey Electronics**, Stand 001: Time chart printout facility for the In-Vision PPM10 on-screen PPM metering system with true twin movement emulation. Also PPMs and variable emphasis limiter. ● **Syco Systems**, Stand A19A: no information received.

T

● **TAC**, Stand 014A: Complete line of consoles on stand shared with Amek products. ● **TAM Studio**, Stand 013: New small scale CD production service using a bank of CD-Rs. Price initially from £25 a unit. ● **Tannoy**, Stand 025A: UK launch of *PMB6.5* nearfield, previously available in US. New *CPA5* Sub Bass in Contractor Series. ● **TC Electronic**, Stand 150: ● **Teac UK**, Stand 118A: New DA-60 professional DAT recorder and *CD-601* CD player for broadcast use. New *MMC-100* time-code generator with MIDI machine code. Other new digital products possible. New *134*, enhanced version of *133AV* cassette. ● **Thatched Cottage Audio**, Stand 159. ● **Thear Technology**, Stand A08: possibly the only service company at the show. ● **Tony Larking Professional Sales**, Stand 005: UK launch of Manley 'designer's reference series' of valve microphones and other audiophile products from Vacuum Tube Logic USA. Used Neve EQ's in twin rack pack. *LA Multigate* with 16 gates. Midi

Mute containing 32 mutes. *LA Classic* compressor.

● **Touchstone Productions**, Stand 163A: no information received.
 ● **Trident Audio Developments**, Stand 007A: New Trident *90* console in pre-production form. Replaces Series *80*. New modules have five inputs and three signal paths. Dual VCA automation is standard. ● **TSC — The Synthesiser Co**, Stand A17A/016: a large range of computer-based recording systems.

U, V, W, X, Y, Z

● **Wadia Digital**, Stand 109: *WA4000* reference A/D convertor. ● **Yamaha**, Stand 159A: New *DEQ5* digital equaliser with 40 memories. New *D2040* frequency divider, equaliser, delay and compressor/limiter. Mac controllable *CBX-D5* four-track hard disk system. *EMP700* multi-effects device. New mid-priced *MCO411* live console and flagship *PM4000*. *P4050* four-channel amplifier. ● **Zonal**, Stand 134: DAT in lengths from 15 minutes, plus other tapes including mag film. ■

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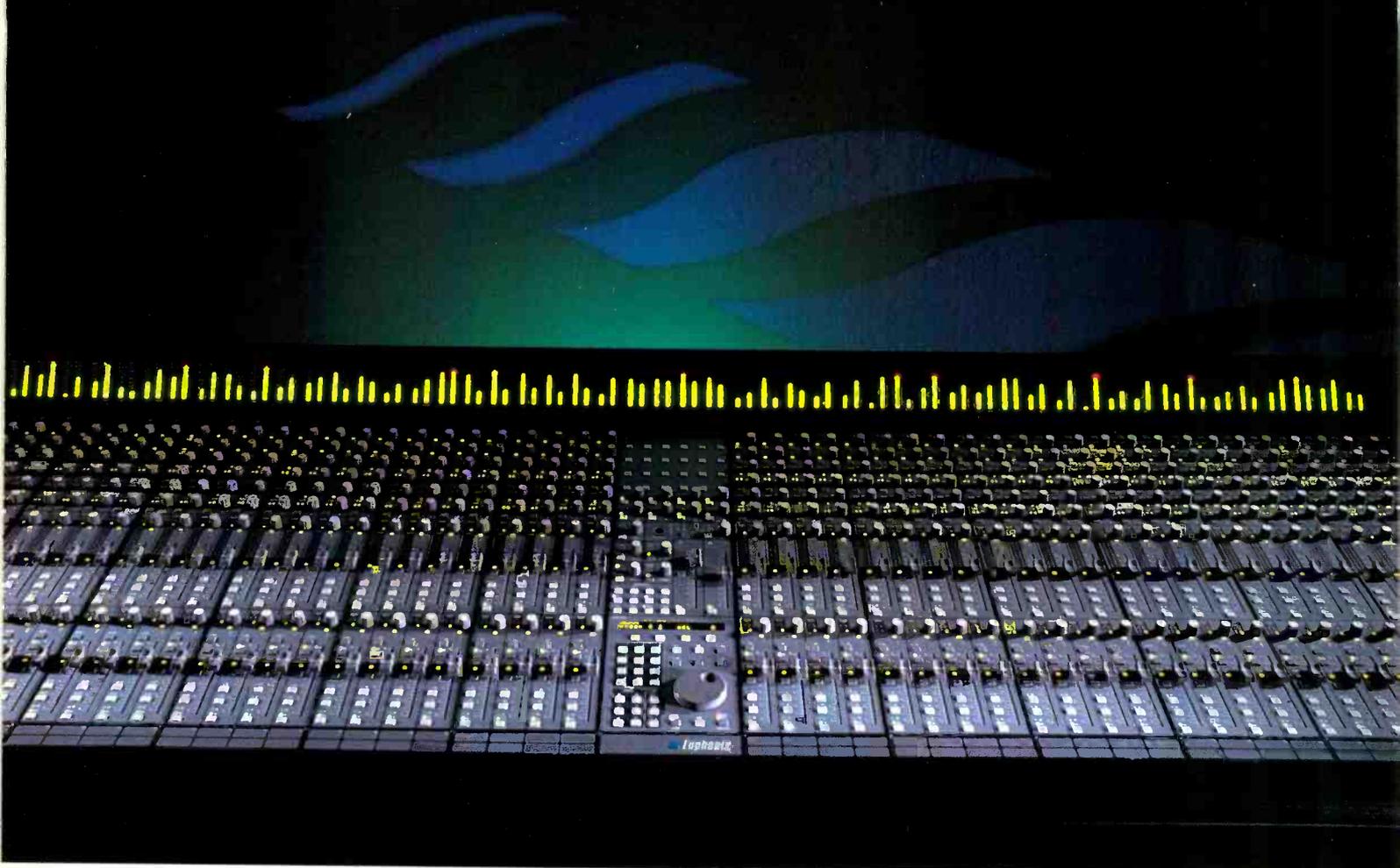
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Recording the soundtrack for *A Kiss Before Dying* in Studio 1

21 YEARS OF CTS

Patrick Stapley celebrates the coming of age of CTS

CTS Studios, Wembley is 21 this year. Over the course of its comparatively long life, the North London complex has become highly respected for a broad cross section of work, but in particular for film and TV soundtracks. The studios have been responsible for an impressive array of international films, and have played host to most of the major soundtrack composers in the world — names like John Barry (*James Bond*), Michael Kamen (*Robin Hood*), Danny Elfman (*Batman*), Maurice Jarre (*Witness*), Alan Silvestor (*Roger Rabbit*) and Hans Zimmer (*Rain Man*) have all been regular clients.

The history of the studios is an intriguing one with fair share of ups and downs, and begins in 1969 with De Lane Lea's decision to expand its operations. The company already owned a film post-production studio and a music recording studio, both of which had proved to be very successful. The recording studio, based in Kingsway, central London, was at the height of its success recording artists such as The Animals, The Stones, Jimi Hendrix, Fleetwood Mac and Deep Purple. The man in charge at the time was 29-year-old Dave Siddle, and he was given *carte blanche* to design and equip the new studios which took two years to complete.

De Lane Lea's parent company, the huge BET Group, owned land in Wembley that had originally been the site of the 1924 British Empire Exhibition, and it was there between the Stadium and the Arena, and over the top of an ornamental boating lake, that the studio was built.

The 25,000 ft², two storey complex became the first purpose built commercial studio in the UK, and contained 3 studios, 2 remix rooms, 2 disc cutting rooms, a film editing room, a large lounge and bar, various offices, a conference room and car parking space for over 100 cars. Studio 1 was the biggest of the three accommodating up to 130 musicians and was designed primarily for large orchestral film-work, having full projection and telecine facilities. Studio 2 had room for 40 and catered for a mixture of rock and middle of the road recording, and Studio 3 was devoted to recording rock and could accommodate 20.

Siddle was somewhat unconventional in his approach, and apart from his unusual choice of equipment and his use of a stethoscope to aid acoustic design, his choice of colour scheme was bizarre to say the least — an early member of staff described it as 'such unbelievable bad taste that it gave you a headache.'

Before opening the facility Siddle decided to test out the studios by bringing a band into play in the different rooms. The deal was that the group would get a demo tape in return for their time; as it turned out the demos not only helped them secure a record deal but some of the recordings were also used on their debut album — the band was Queen.

In 1971 the De Lane Lea Music Centre was formally opened by Princess Margaret flanked by the top brass of BET — an article in *Melody Maker* stated 'her eyes must have dropped out as she saw the amazing £3 to 4 million complex sitting in the middle of a rather ordinary factory estate in Wembley.' Whether ►



Top: Adrian Kerridge (standing) speaks with Chief Engineer, Dick Lewzey, at the Neve VPR console in the Studio 1 control room.

Middle: Hans Zimmer

Bottom: Maurice Jarre

the royal eyes stayed in place we don't know, but what unfortunately did happen was that soon after the studios opened, clients started 'dropping-out' after experiencing all kinds of horrendous technical problems.

The reputation of the studio quickly became tarnished and confidence dwindled among the staff, resulting in engineers Louis Austin and Martin Birch leaving after six months to reopen the old De Lane Lea Studios as Kingsway Recorders. The remaining staff bravely soldiered on, trying to put things right where they could as engineer Dick Plant explains.

'Apart from all the technical problems, the acoustics were very odd — you had completely dead studios and bathroom — like control rooms. We made gradual changes by sticking absorbent material on the walls of the control rooms, but it was a bit makeshift. There was also bad separation between the studios, and problems with air conditioning noise.'

Around this time CTS (Cine Tele Sound) were looking for new premises for their film scoring operation. CTS had been based at a converted concert hall in Kensington Garden Square, since 1960 and had established an excellent reputation, but with property values increasing, the premises were sold to a developer (ironically, due to subsequent planning restrictions, the property became Marcus Studios a few years later). Peter Harris, then in charge of the technical department, and engineer John Richards decided CTS was 'too good a thing to let die' and set about finding a new home for the operation. This resulted in CTS merging with De Lane Lea Music, and moving to the year-old Wembley complex. Harris describes the technical state of play that confronted him there in 1972.

'There was this attitude of shying away from anything standard, so for instance instead of installing Neve consoles and Studer machines, which we did later, there were Sound Techniques consoles and a mixture of Unitrack and Skully decks with modified electronics — in fact most of the equipment that had been altered in some respect, there was virtually nothing left in its original state — even the Lockwood speakers and Dolby units had been messed about with. We were pretty appalled by this especially as a lot of our equipment from the Kensington Square studio had already been sold off because we'd been told not to bring anything with us.'

The merger between the two companies was not initially a great success.

'It was very much a feeling of us and them,' recalls Dick Plant, 'which lasted for about a year before things smoothed out. They hated the place at first, and couldn't understand how a brand new studio could be in such a terrible technical mess. Of course we already knew about all the problems and had been trying terribly hard to do something about them — so we resented the fact that they were moaning about everything. Eventually though relations improved, and because Peter Harris was such a motivated character, things began to get done, he was great and I think it was really his efforts that saved the place.'

The first thing Harris did was to put in emergency orders for equipment and managed to buy back some of the CTS tape machines; as quickly as possible he and his inherited maintenance team set about improving standards, but not without 'severely straining relationships with loyal clients'. Studio One was the prime target, and a Neve console which had been specified for Pye Studios was diverted to Wembley. Harris tried to do his best with the remaining Sound Techniques desks but it was a losing battle as he describes.

'My original approach was that they're only consoles and they can be redesigned, rebuilt and generally improved, but there

was so much that needed doing that in the end it was much easier just to replace them. They were really grotty, badly designed desks.'

Engineer Dick Lewzey who came with Harris to CTS, remembers the problems with the consoles only too well.

'The desk in Studio 1 had this peculiar switching system built into it, which would reconfigure the console, unfortunately it had a nasty habit of switching over by itself, especially when there was a mains surge as the project started up — you ended up having to hold three of four switches down before each take to try and prevent this from happening. There were also occasions where the desk would suddenly switch itself in mid take resulting in colossal feedback. It was a nightmare.'

Shortly after CTS arrived at Wembley, Dave Siddle left the company saying that the task he had set himself had been 'bloody impossible' and joined Studio 70 in Germany. Peter Harris then became technical director and Louis Elman, who was on the board of De Lane Lea took over Siddle's position as Chief Executive.

As CTS became firmly established in their new surroundings, booking for Studio One, which had previously been very poor, steadily increased and the studio soon became a major source of revenue. Harris and his team continued to work hard at raising standards in the other studios, and combined the two adjacent remix rooms to form Studio 4 — one acting as control room the other as studio. The mono cutting room was turned into an editing and copying room and over the next few years Studios 2 and 3 both had their control rooms rebuilt by acoustician Ken Shearer who was known at the time for his work at Air London, Britannia Row and The Royal Albert Hall.

As budgets allowed, each studio was upgraded — a second Neve desk was bought for Studio 1, the former being installed in Studio 2. The Neve console from the old CTS Studio found its way back onto the market and was quickly snapped up by Harris, refurbished and put into Studio 4 along with one of the first *Necam* systems.

'Ourselves and Air were the initial victims of *Necam*', says Harris, 'It was very problematic during those early days, and we caught a bit of a cold with it, although it was improved later on.'

Once all the studios had been re-equipped the gear was very similar in each control room — the following Studio 1 equipment list from 1975, with a few variations, gives a good idea of what each contained: Neve 30 into 16 console; Studer 16-Track A80, plus 8-track headblock; Studer B62 two-track; Dolby NR; Universal Audio and Neve compressor; Eventide Instant Phaser; EMT stereo plates; Autostart (for film sync); Full 35 and 16 mm film dub.

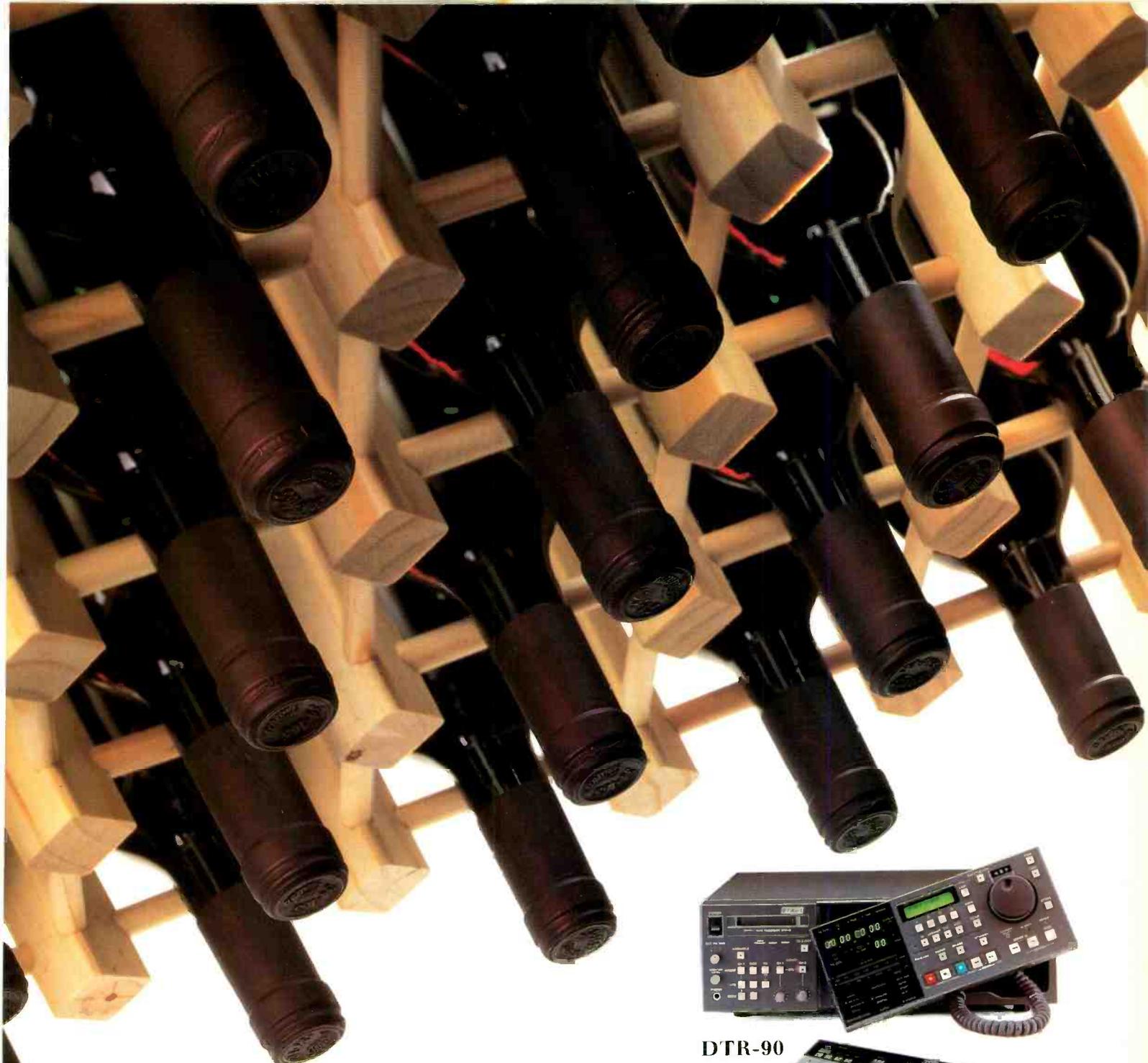
The reputation of the studios by now had improved enormously and apart from attracting an impressive number of big budget films, artists like The Electric Light Orchestra, Andy Williams, Showaddywaddy, Roy Wood, Shirley Bassey, The Shadows, and The Three Degrees became familiar faces through the remaining 70s. The two companies continued to co-exist side by side, but to prevent confusion the studios simply became known as the Music Centre. However, with the departure of Louis Elman in 1982, and the appointment of Harris as MD, the name changed once and for all to CTS Studio Ltd.

'There were still bad vibes associated with the name De Lane Lea in certain people's minds', says Harris, 'so to kill any confusion I decided to call it CTS — plus most people referred to it as CTS by then anyway.'

Just before this in 1981, Studio One's control room was redesigned and enlarged by Eastlake Audio making it one of the biggest control rooms available at the time. This pre-empted the installation of a new console and a few months later Harris was invited to see Neve's prototype digital console the P3 being demonstrated at the BBC.

'There was a very mixed reaction to it,' recalls Harris, 'only myself and Roger Cameron from Advision showed any real interest, but to cut a long story short CTS eventually became the first studio to put an order in for the DSP console in March 1982.'

To complement this order, the studios made another pioneering move and purchased one of the first Sony 3324 digital multitracks along with a 1610 Umatic. The digital desk was expected to be delivered within a year, and to coincide with this, the second phase of Studio One's refurbishment, the rebuild of the recording area, was scheduled with Eastlake. ►



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**Ryuichi Sakamoto
conducts the
soundtrack on
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The Eastlake design for Studio 1, was the most ambitious and costly improvement made at the complex so far. It included stripping out all existing finishes except the ceiling, extensive acoustic treatment to lengthen and control the reverberation time, the construction of two new isolation rooms beneath the first floor control room (one with a capacity for 30 musicians), fitting of new air conditioning and the installation of over seven tonnes of French chestnut to cover the floor and end walls. The whole job took six weeks to complete and was enthusiastically received by both staff and clients alike.

But the Neve console was very late, and it wasn't until the Spring of 1984 that the console finally arrived at CTS, two years after the order. Harris explains what happened next.

'After installing the console we ran some initial tests which turned up a few bugs, but these were minor things and we believed the console would perform perfectly well. Sadly this was not the case and ten minutes into its first session the desk completely seized up. As you can imagine this caused a number of red faces, especially among the Neve representatives who had been invited to witness the historic event. To finish the session, we had to quickly repatch through to Studio Two's console; afterwards we decided we couldn't risk a recurrence of this, so the DSP was ripped out and the original analogue desk replaced — while this was going on the Advision mobile was hired to act as Studio One's control room. The DSP was then moved to a side room where it was run in parallel with heavily buffered splits from Studio One's mic lines. Several members of Neve's development team then 'lived' with us for a number of months, and did sterling work not only sorting out the problems but making further improvements to the console.

'In retrospect this period was quite good in that it allowed us time to become fully conversant with the console and customise it our own requirements — the console that was eventually reinstalled just after Christmas '84, was very different to the one Neve had delivered in the Spring. Thereafter it worked quite well, although we still had the odd tantrum.'

The combination of DSP and Sony recorders made CTS Studio 1 the world's first all digital studio, gaining it both admirers who thought the sound and flexibility it offered were fantastic, and critics who were suspicious of the new technology and sceptical of its future.

'With hindsight maybe we were daft to stick our necks out,' says Harris, 'but we strongly believed in digital processing and that it would become the standard within the industry. All in all though I think it was a plus operation rather than a minus one.'

In 1985 Eastlake were once again called upon, and this time it was the turn of Studio 4. With the increasing proliferation of synthesisers and samplers, it was decided to turn the studio into

a dedicated 'electronic music suite' with full AV facilities. Room was left for clients to bring in their own equipment, but a deal was also struck with composer Brian Gascoyne to permanently install his gear including a *Fairlight* for the next couple of years.

After fifteen years of ownership, BET decided to sell CTS along with other entertainment interests to Lee International. Lee showed little enthusiasm for the studios and after just 18 months put it back up for sale. In February '87, CTS was bought by Adrian Kerridge for a sum in excess of £3 to 4 million, making it part of the Lansdowne Group of Companies. Kerridge was no stranger to CTS, having engineered a number of sessions there during the 70s, but his impression of the studio just before the take over was one of gloom.

'The studio was actually in a very depressed state. The Lee brothers hadn't spent any money on the place and it was actually making a loss — Peter Harris really did a fantastic job to hold his staff together over this period. I'd always been an admirer of CTS and its track record, but it did have this negative reputation with a lot of people of being "that rather institutionalized studio in Wembley which does a good job but it is a bit impersonal". So it was a real challenge for us when we took over to try and change things. We arrived and said to everybody that we intended to turn the thing round, inject capital back into it, provide long term funding and put CTS back on the map where it belonged.'

The first thing that Kerridge did was to refurbish the common parts of the building in particular the reception area. His philosophy being that as soon as people walked into the building they should be aware of an atmosphere of 'friendly efficiency.'

Another early decision was to replace the digital console.

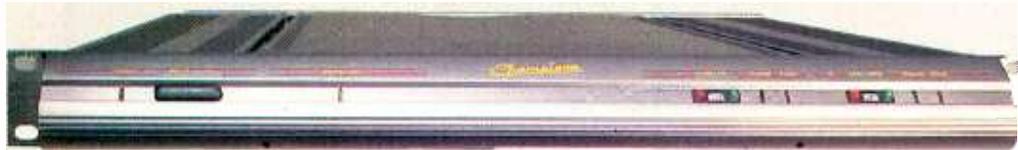
'The feeling was that the console had perhaps had its day and it was time for a change — I must say that I'd been amazed that CTS had taken this major step to install DSP. We replaced it with a Neve V Series which remained in service up until September last year when it was replaced with a VRP with *Flying Faders* and *Recall* — exactly the same console that is in Lansdowne Studios. We also made a few acoustic changes to the control room although we've kept the original Eastlake design.'

At the end of 1987 and after 26 years with CTS, Peter Harris, feeling that there was only room for one MD, bowed out to Kerridge and took early retirement. However, he retained a consultancy post and keeps an interest in the studios.

Once again Studios 2 and 3 had their control rooms rebuilt, but this time the designer was Roger D'Arcy from Recording Architecture, who used his 'Black Box' system in both areas, turning each around in under two weeks. It was decided to keep the original, and now vintage, Neve console in Studio 2, but to ►

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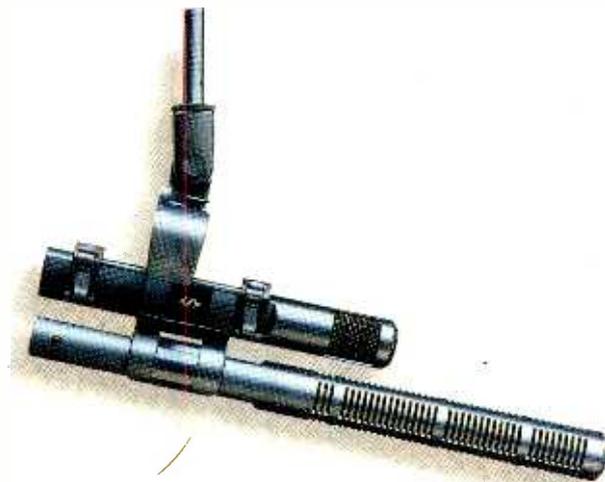
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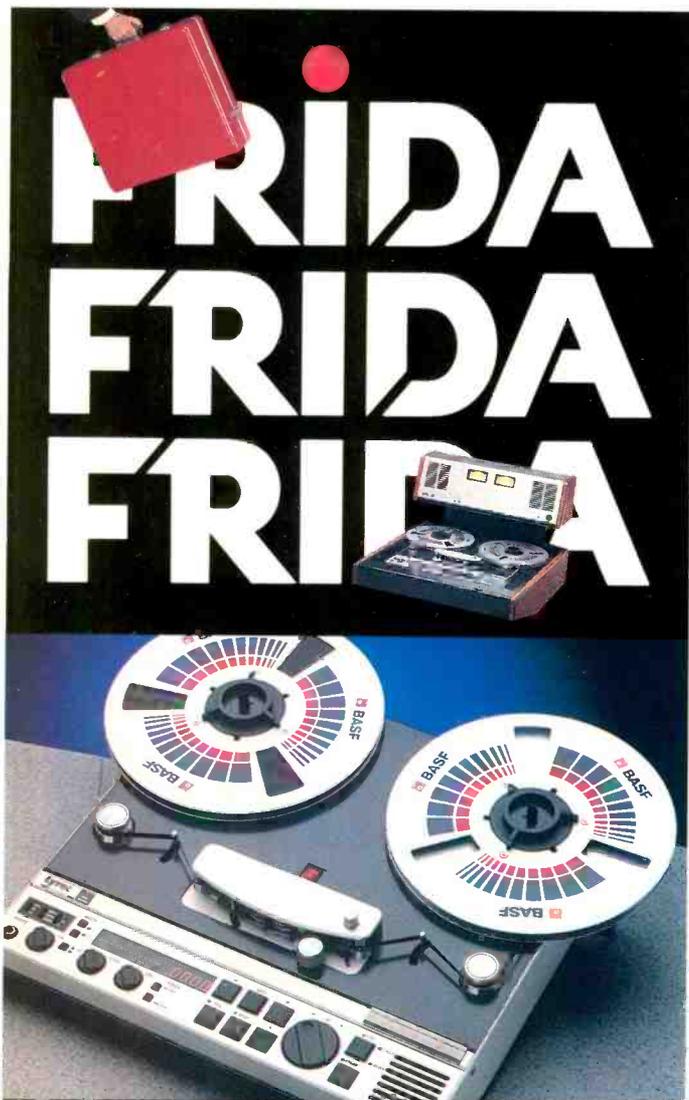
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replace the one in Studio 3 with a DDA AMR24 with Optifile automation, so breaking Neve's long monopoly at CTS.'

'The DDA decision was partly a financial one and partly because I felt we needed to have a change of console,' says Kerridge. 'It gave us the ability to market the room rather differently and provide a broader choice to our clients both in terms of equipment and rates.'

Another new name to be introduced to the studio was Sonic Solutions, which was installed into the fully redesigned and refurbished digital editing suite in 1991.

Kerridge is very optimistic for the future and sees enormous potential in the CTS/Lansdowne marriage, both in terms of facilities and staff. Changes continue to be made, and Kerridge forecasts that digital technology will play an increasingly significant roll in the studio's future, although he's not prepared to commit himself any further at this stage.

So congratulations CTS on a memorable and, in many ways, pioneering 21 years, and I look forward to drinking their health, once again, in four years time to celebrate their quarter century. ■

CTS CHRONOLOGY

1971: The Wembley studio complex is formally opened by HRH Princess Margaret as the De Lane Lea Music Centre. First artists to record there include Deep Purple, Thin Lizzy, and Peter Green. Studios are dogged with technical problems, badly affecting the facility's reputation.

1972: CTS agrees a 'cohabitation' deal with De Lane Lea and moved into the Wembley facility. Much is done to improve the poor state of the equipment, and Peter Harris orders Neve consoles to replace Sound Techniques desks. MD Dave Siddle leaves and is replaced by Louis Elman.

1973-76: Improvement continues raising the studios' reputation, and artists such as Showaddywaddy, Slade, ELO and Roy Wood become regular clients. Studio 1 becomes very popular attracting big film projects such as *The Man With The Golden Gun*, *Murder On The Orient Express*, *Return Of The Pink Panther*, *The Eagle Has Landed*, and *The Omen*. Fred Astaire and Bing Crosby record a musical together.

1977: Paul McCartney and Wings spend four months at the studios working on the film and record of *Wings Over America*. Other films include *A Bridge Too Far* and *The Spy Who Loved Me*.

1978: *Revenge Of The Pink Panther*, *The 39 Steps*, *Death On The Nile*

1979: *The Long Good Friday*, *Quadrophenia*.

1980: *The Elephant Man*, *Flash Gordon*, *Superman II*.

1981: Studio One's control room is redesigned and enlarged by Eastlake. *The French Lieutenant's Woman*, *For Your Eyes Only*.

1982: DSP console ordered for Studio One. *Ghandi*, *Heat And Dust*.

1983: Eastlake rebuilt recording area of Studio 1. CTS becomes one of the first facilities to take delivery of Sony 3324 and 1610. Flying Pickets record number 1 album. *Octopussy*, *The Meaning of Life*, *Superman III*.

1984: Neve DSP installed in Studio 1, but removed due to major breakdown and reinstalled just after Christmas. *Passage To India*.

1985: Studio 4 redesigned by Eastlake. *A View To Kill*, *Mad Max III*.

1986: BET sells CTS to Lee International. Placido Domingo records million seller Christmas album, and Ennio Morricone records score for *The Mission* which wins BAFTA award for best soundtrack.

1987: Lee International sell CTS to The Lansdowne Group. The DSP console is replaced with a Neve V Series. Michael Jackson nips in to do some recording during his dates at Wembley Stadium. Peter Harris takes early retirement after 26 years with CTS. *The Living Daylights*, *Superman IV*.

1988-89: Lansdowne Group purchase the freehold to CTS Studios. *Batman*, *Full Metal Jacket*, *A Fish Called Wanda*.

1990: Studio 2 control room redesigned by Recording Architecture. *The Fisher King*, *Who Framed Roger Rabbit*.

1991: Sonic Solutions room opened. Studio 3 control room redesigned by Recording Architecture, and a DDA console installed, ending the all-Neve domination. *Robin Hood*, *K2*.

1992: Long-time client Barrington Pheloung awarded platinum album for the music from the TV series *Inspector Morse*, all six series were recorded at CTS. *Wuthering Heights*, *Naked Lunch*.

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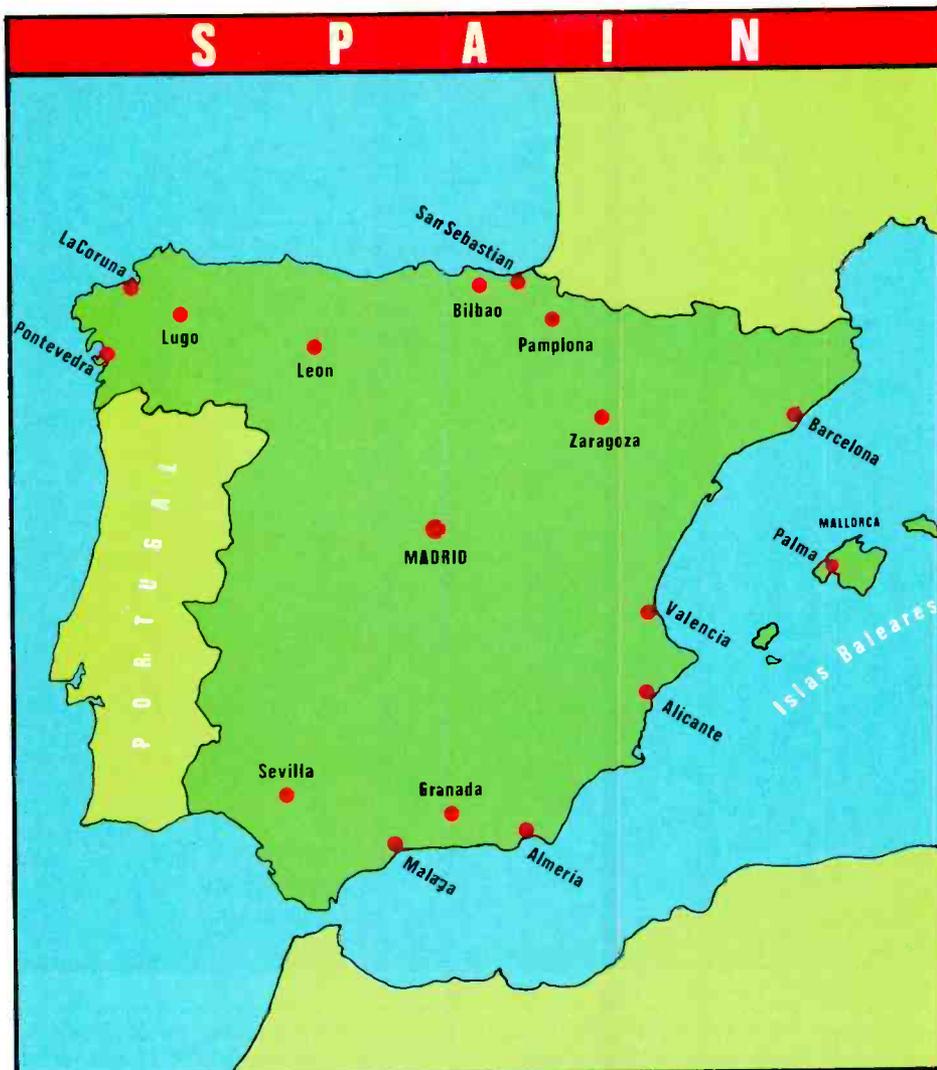
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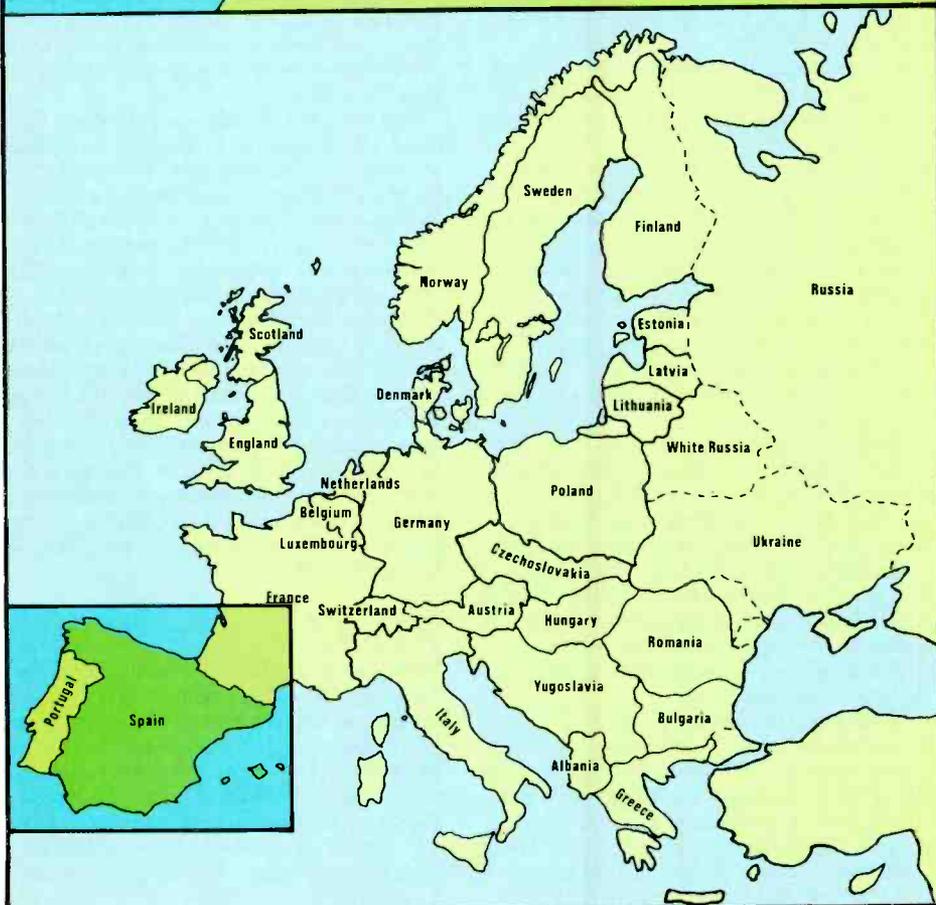
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THE REIGN OF SPAIN

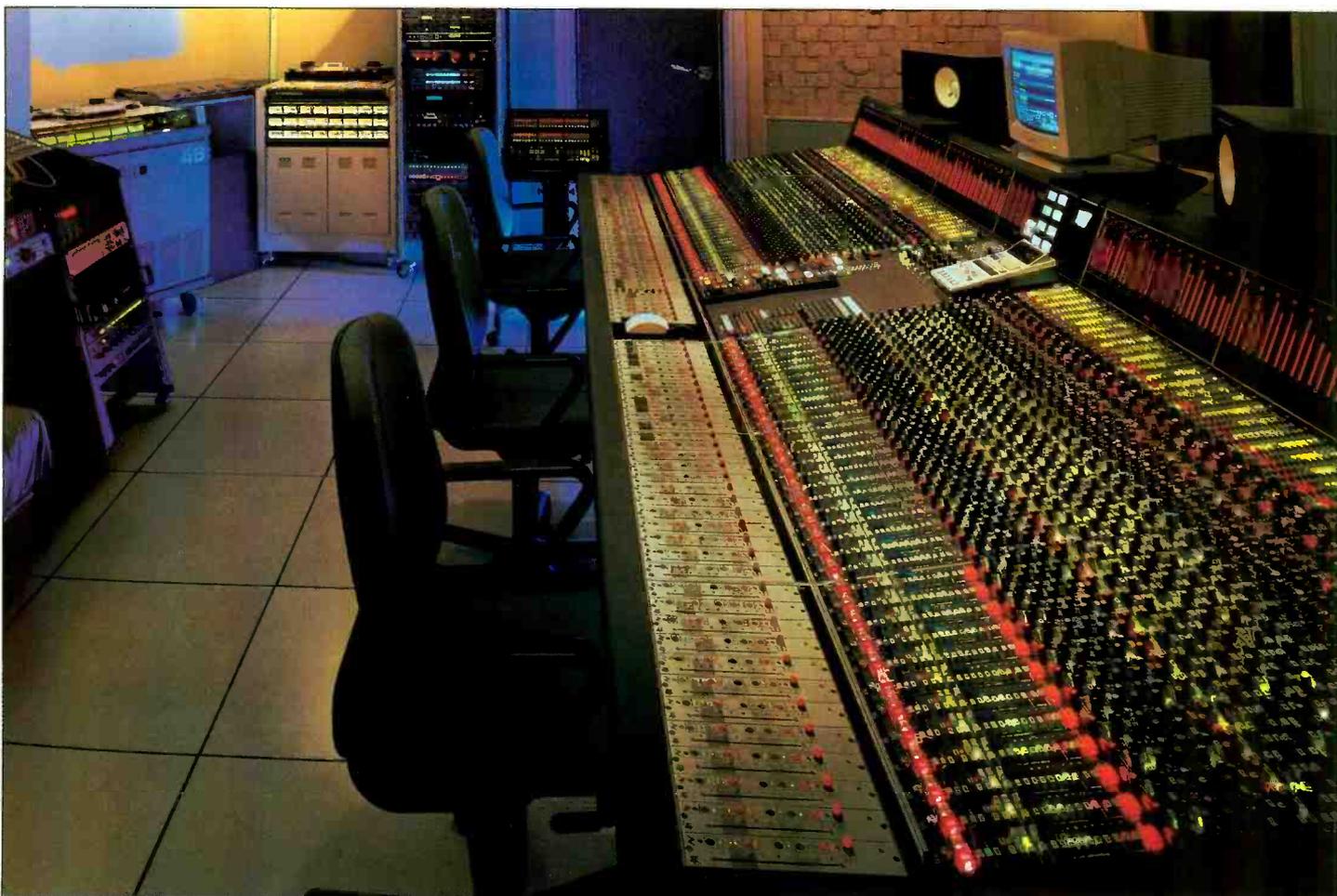
Post-dictatorship Spain has emerged as the creative centre of Europe, spending millions on the way. Sergio Castro heralds his country's recording world



Spain, among the biggest countries in Europe, is living a unique experience in the new upgraded EEC. The Spanish state is being driven into a group of diverse autonomic regions, some of them assuming quite independent roles culturally and politically, while still attached economically to the central government in Madrid.

Right now, and in spite of being worn-out by 10 years in power, the socialists, or if you like, the Social-Democrats of PSOE seem likely to be re-elected. I don't know if this is going to submerge Spain into recession, the British and Americans should know what I mean, but for the time being the audio and especially the video industries are doing quite well.

Historic difficulties in importing American and British music, drove local musicians to search for a ▶



The newly refurbished Control Room of Red Led Studios in Madrid

quality of writing, performing, and sound, to fulfil their audiences' needs. Of course to achieve this they needed good equipment, which most of the time was prohibitively expensive or simply not available. As a result indigenous mixer, loudspeaker, amplifier and even drum kit manufacturers started to grow. With the advent of autonomous television stations, each of the TV regions demanded different language overdubbing of the films, even if originally spoken in Casterllano, the official Spanish language.

This is one of the reasons why there are about 200 studios spread around Spain, most of them being concentrated in Madrid and Barcelona, with Sevilla and Valencia following close behind.

Of course, the Spanish audio industry doesn't just live from the pop/rock or the audio-for-video market. The name of Sevilla reminds us that for years Spain has been consuming and exporting the music from this region (Andaluzia) treating it like a musical version of the Spanish national flag. In the year of the EXPO, Sevilla hopefully will show to the world that Spanish music is on the right path to succeed universally.

Studios

However, not everyone agrees. Jose Vinader, 39, sound engineer for 22 years, now at one of the most respected Madrid facilities **Sintonia**, thinks that Spain still doesn't manufacture first class equipment for audio, thanks to little or no help from governments past and present. If a few companies succeeded, especially in the PA market, then that was due to the enormous efforts of the companies themselves.

Vinader thinks that the recession has already started in Spain, and that there is no creativity like

in the '60s and '70s. He feels that the overall sound production quality developed a lot in those days, and that expensive productions now mask the lack of ideas and originality.

Of course, there are a handful of very good musicians and producers, but ironically Spanish engineers only realise how good they are when they work abroad, or when British or American engineers come to Spain. They usually experience difficulties in coping with the working practices and systems of local musicians and producers, and with the limits imposed by the time/money ratio of Spanish record company projects. Spanish artists are generally not given British or US sized budgets.

'Money is still a fundamental priority for decisions. This factor often dictates the use of samplers and machines instead of live musicians. Sequenced music unfortunately tends to sound much the same.'

Sintonia studio itself is a complex of five studios headed by Studio 10, an Eastlake design, with an Amek 2520 desk and two Sony 3324A digital machines. The control room features Dolby Surround capability and Eastlake monitoring.

Sintonia's main market is audio post and a DAR *SoundStation II* has been bought for that role. The studio also boasts something quite rare in Spanish studios, a permanent maintenance man, most studios usually rely on part-time telecommunication engineers fresh from school!

Doubletronics, another digital studio in the heart of Madrid, is run by Jesus Gomez, a producer/engineer, who became famous for his best selling Gabinete Caligari productions, among others. I had the opportunity, as a producer, of working with him engineering in 1986, and I must admit that his degree of credibility and knowledge, both functional and electronic, was quite

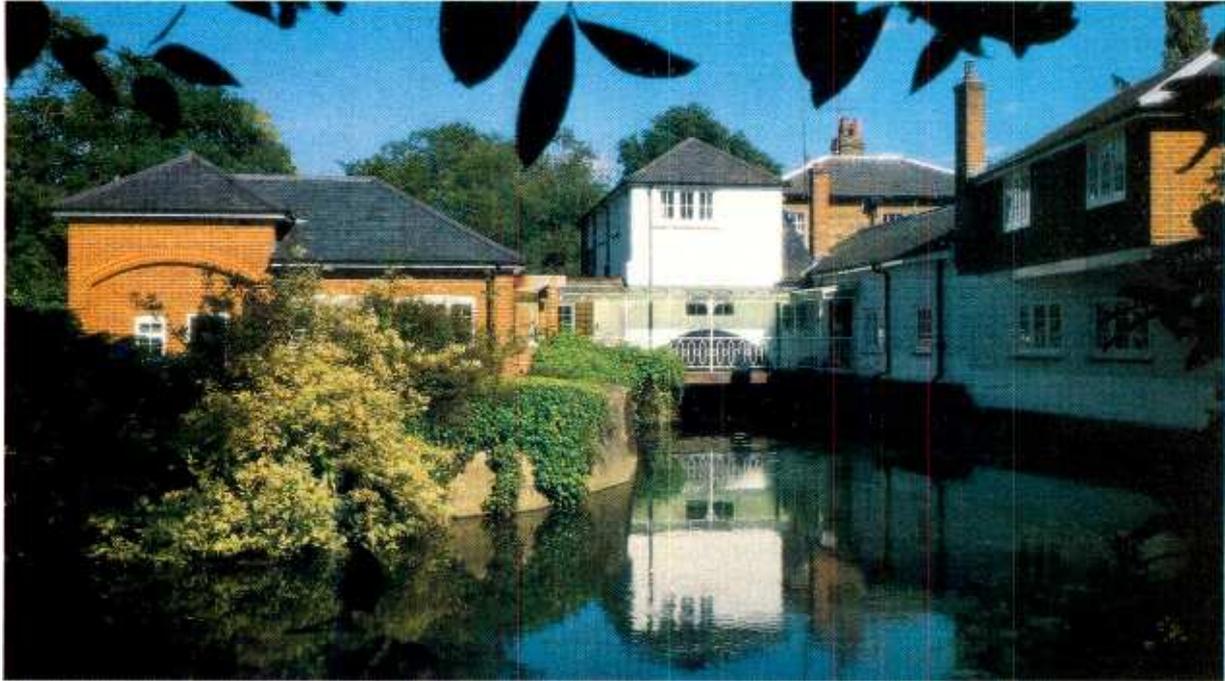
impressive. Still maintaining the old MCI *JH-24* and the previously modified JBL 4433s, he fitted in a 48-track digital Sony and an Amek 2520 desk with Audio Kinetics Automation. However, a new 500m² metre space is now waiting for an Eastlake design to start.

Trak is another digitally equipped studio. This complex of two studios, one being Eastlake design and the other a custom design, fills around 400m² in the main commercial and business area of Madrid, with underground, hotels and all the usual facilities of a capital city at the doorstep. Main monitors in both control rooms are Quedest 212s and while the smaller Eastlake room has a 36-channel Sound Workshop *Series 40* automated mixer, the bigger room (30m²) houses a 48-channel Neve VR with recall and *Flying Faders*. Machines are Sony 3324 digital, Otari *MTR 90 MK 11* and MCI *JH24* with Dolby A. Trak is one of the few facilities sending CD masters to their clients, from their Studer *D-740* CD Recorder. This studio also offers a full time maintenance and, interestingly, a guitar repair shop. Each studio area has its own Lounge with TV and games, microwave oven, coffee and refreshment machines.

AEGS

Trak, Sintonia or **Doubletronics** are all part of the group of 38 studios associated in an organisation that dates from 1976, originally called ANERS but now AEGS (Asociacion De Estudios De Grabacion De Sonido). This association, similar to the APRS and SPARS, operates from Madrid, and claims, in spite of representing mathematically only 25 to 30 percent of the number of Spanish studios, that they share 70 or 80 percent of the business. ►

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The Control Room of the Eastlake-designed KS Studios in Barcelona

Being in the AEGS means that you should respect decisions taken among all the members, dealing with standard and prices of the services, and technical performance.

Jose Luis Uget, the secretary, says that unfortunately the association still doesn't maintain relations with similar organisations in other countries, but they are looking forward to. He also confesses one of their main worries as being the lack of maintenance engineers in studios.

In Madrid, you can still find studios not affiliated to AEGS, like **Payton**, a mobile recording unit, property of Juan Vinader, legendary ex-recording engineer at **Eurosonic**, and **Fairlight** belonging to pop star Nacho Cano from Mecano and Quarzo. If you need to hire any kind of effect, **Kash** is the place to call. It belongs to Jim Kashishian, an

American musician who has lived in Spain for more than 25 years, and who also operates an AMS *AudioFile* for music editing.

Barcelona is a big flat town, a product of six other smaller cities, which have grown up and joined together. Its 3.5 million inhabitants will share all its facilities with everybody coming to the Olympics '92.

The town is in constant activity, with the last arrangements being made for the start of the games. According to Andreu Ugas, sound engineer of mega selling project Maquina, the studio scene in Barcelona, seems mainly inclined to the audio for video and disco markets. Right now and together with Max Music record label, he's involved in the project of building a major new studio in town. An old but beautiful house from the beginning of the

century, once owned by a Marquis, will house a Philip Newell designed control room and a recording area.

In another part of town, an old studio called **Aprilia** has been turned into the Laboratorio under the direction of Peter and Mark Eichenberg. The two Canadian brothers, with the help and design of Spanish acoustician Tasende, designed and built a 80m² control room. Equipment includes a 24-track Studio Magnetics recorder and a D&R *Marilon*. Monitors are from Court Acoustics. Space is available for electronic musicians with room enough for their synthesizers and samplers. Peter Eichenberg thinks that, 'The best decision was to invest in acoustics and decoration, because that really impresses the clientele, as much as a big mixing desk', and adds that digital multitracks and other stuff can be hired in, at request, coming directly from HHB Communications in the UK.

The only studio in Barcelona equipped with a Sony digital machine is **Gema**, a wide ranging facility comprising a CD plant, audio and video cassette duplication, magnetic tape manufacturing, vinyl record fabrication and plastic injection for audio and video products. In the studio they offer the alternative between 24-tracks, analogue and 24-track digital.

The other digital studio, which houses a DASH Tascam and a 3M 24-track analogue machine belongs to Albert Moraldea. **KS**, another Eastlake Design, is mainly dedicated to the record production. Juan Sorribas, its director, says that cinema and post-production work is also done at the Raindirk *Symphony* equipped studio. Studer A-827 with Dolby SR, Genelec 1033 a monitors, Studer A-807 2-track and Panasonic DAT are some of the equipment available. Again a Studer CD recorder allows clients to bring out the finished work in CD format.

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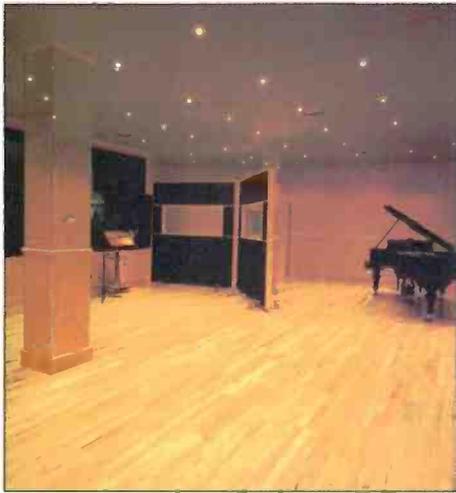
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The recording area of KS Studios

Another analogue studio, fitted with an automated Harrison *Mk4* and an Otari *MTR 90 MK11* with Dolby *SR* is *Aurha*, where Spanish made *DAS N 58* Biamp monitors have been installed. Maurizio Tonelli, the director, is proud of the best Catalan record of the year, attributed to the studio very recently. They have an extensive list of clients which ranges from rock/pop to Flamenco. Digital editing with the *SoundTools* system, is one of the offered services.

Like *Gema*, *El Camion* is a member of the AEGS. This is a company working with two mobile recording trucks designed by Eastlake which started operations in 1986. One of the trucks is fitted with a 48-channel Raindirk *Symphony*, two Sony *APR24* with Dolby *SR*, Studer *A810* with *SR* and Fostex *DAT*, everything locked by Audio

Kinetics *Q-Lock*. Meyer *MS833* are the monitor systems in both mobiles (apart from the omnipresent Yamaha *NS10s*).

The more recent truck houses a 96-channel custom built Raindirk, two digital Sony *3324A* and a Studer *810* with Dolby *SR* and *A*. This time Adams Smith *Zeta 111* is the sync device. An impressive list of clients, like Sting, Robert Palmer, Ramones, Grace Jones, Simple Minds, BBC TV, Manhattan Transfer, Monserrat Caballe, Terence Trent D'Arby, Mecano, etc. confirms that this company is now well established, in spite of the difficult start. Both units can be used either as mobile control rooms for live concerts, TV and Radio programme transmission or fixed location recording of artists who want to choose their own recording environment.

Other areas

Geographically Spain occupies 1/3 of the Peninsula and is divided for administrative purposes into areas. Out of Madrid and Barcelona, you still can find a big amount of facilities which range from publicity dedicated 8-track analogue or digital full professional 24-track.

In Sevilla, for example, you find *Alta Frecuencia*, a six studio complex, where studio *A*, digitally equipped with Sony *3324A*, houses an Amek *252* with *MasterMix* automation, while studio *8* is an analogue with Otari multitrack and Amek *Mozart* desk. ■

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El Camion (Mobile), Barcelona.

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Gema, Barcelona. Tel: + 34 9 3 4591201

KS Studios, Barcelona. Tel: + 34 9 3 2056511

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Eurosonic, Madrid. Tel: + 34 1 7258812

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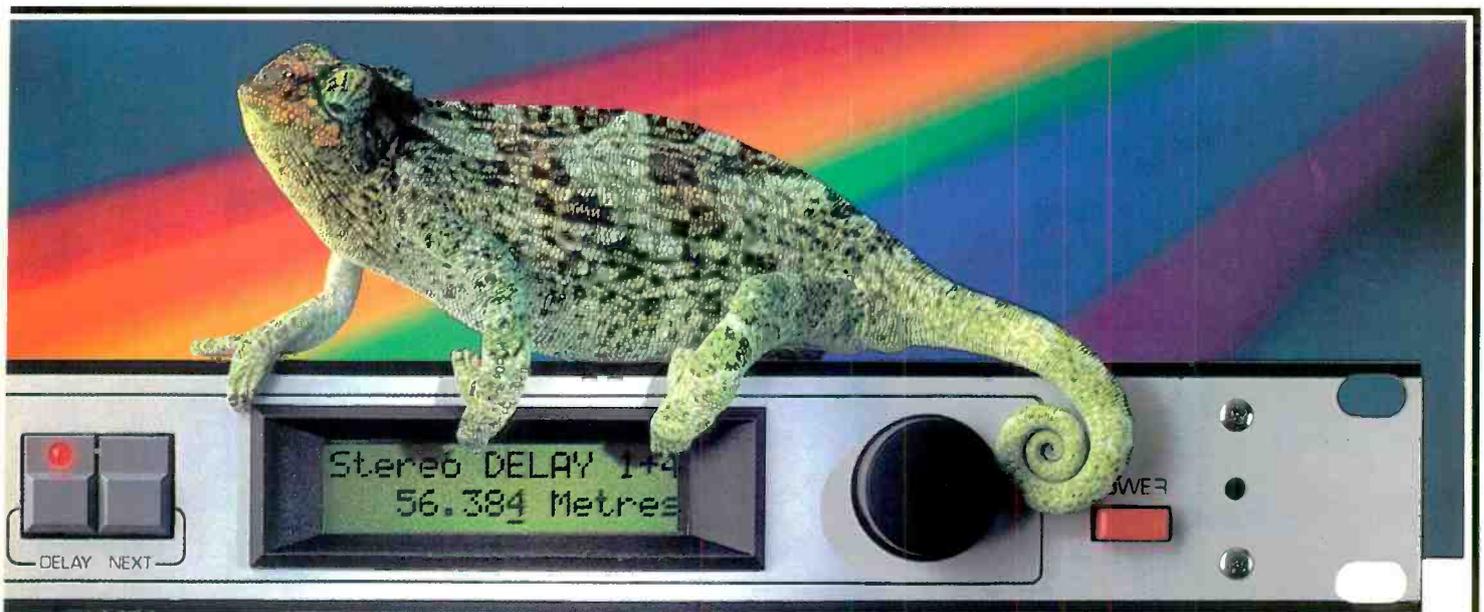
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Roland S750/770

Mike Collins reviews this sampler

Roland brought out their *S770* sampler back in 1990, featuring a built-in 40 Mb hard disk drive, digital output, and an output to a video display. This was priced significantly above the industry-standard Akai *S1000*, but aimed to offer various advantages, such as access to a large screen display, and a beefier sound quality. In the summer of 1991, Roland released the more competitively priced *S750* model (an *S770* without an internal hard disk drive or digital output). They also released version 2.0 system software for both models, which provides finer control over editing. For those of you with larger budgets for equipment, the more expensive *S770* is still available to special order.

I must say straight away that the *S750* manual is absolutely first-rate — and is a great improvement over the *S770* manual. It urges you to use a hard disk or optical disk of some sort, and all of the manual apart from the brief introductory tutorial assumes that you are using one. So although you can save money on your initial purchase if your budget is tight, in practice you will have to shell out for some sort of SCSI storage to make best use of the *S750*. Even with the 40 Mb hard disk on-board the *S770*, you are likely to want to connect a CD-ROM drive to let you access sample libraries, and for serious professional work you will probably want much more than 40 Mb of disk storage on-line. Roland provide a SCSI drive compatibility list, and you do have to check this out, because not every size of hard disk, nor every manufacturer's drive will work with the Roland samplers. The SCSI connector on the rear panel will only let you access external libraries of samples — however you cannot transfer samples to and from Macintosh personal computer software, such as *Sound Designer II* or *Alchemy*, or Steinberg's *Avalon Sample Editor* on the Atari ST, via SCSI — which you may wish to do if you already have a large library of samples which use these formats. The *S770/750* does support the Midi Sample Dump standard to transfer samples via Midi, but SCSI transfer is much faster in practice. On the positive side, the Roland samplers offer 24-note polyphony — which is eight more notes than most of their competitors — so these are much better instruments for sustained piano parts or complex musical orchestrations.

The standard machines come with just 2 Mb of RAM expandable to a maximum of 16 Mb (18 Mb for the *S750*) using standard Macintosh 4 Mb SIMMS — although you do need to have an RAS-750E memory expansion board installed to take the SIMMS. It is cheaper to add memory to these Roland machines than to the Akai *S1100/S1000*

models which need special (expensive) memory boards — although the *S1100/S1000* can be expanded to a maximum of 32 Mb. You may think that this gives the *S1100/S1000* a clear advantage in this respect, but it is not quite as simple as this. For a start, although you can record a 32 Mb sample into RAM on the Akai machines, you can only save a maximum of 16 Mb to disk at any one time, so anything this big would have to be split into two samples before saving. Also, when you upgrade the Akai machines to 8 Mb or more, you lose two of the sixteen available notes of polyphony, as two extra address lines are needed to access the additional RAM space. At this point the Akai's 14 notes of polyphony compares quite unfavourably with the Roland's 24 notes.

The main part of the *S750* manual also assumes that you have a video monitor in use, without which you can only see part of a screen at a time on the display, and you cannot see some screens at all. Roland no longer make any monitors suitable for use with the *S770/750*, so you have to buy your own. But where do you put it? The manual warns you to never put the monitor directly on top of, or even anywhere near the *S770/750* — to avoid hum and electromagnetic interference. I can assure you that you get plenty of this if you do put it on top. But where else could I put it in a well-equipped programming room with space at a premium? If Roland were to supply a monitor with very low emission, or very good shielding, or put extra shielding into these units, this would be much better. And how about offering a monitor stand, or a rackmount kit? And where are you supposed to put the mouse, especially if you have mounted the sampler in a rack? A rack tray for the mouse, immediately underneath a rackmounted sampler positioned at desktop height, with a properly shielded rackmounted monitor at a comfortable eye-level would be a more realistic suggestion — in my humble opinion!

The *S770/750* samplers both feature 16-bit data formats, and actually use 24-bit processing internally. They also feature 20-bit digital to analogue conversion on the outputs — so you might expect some audible improvement in the sonic performance of the *S770/750* compared with the Akai *S1100/S1000*. Subjectively, I felt that the factory samples supplied with the *S770/750* offered much fuller sounds with deeper bass and crisper treble than those supplied with the *S1100*.

The *S770* has both optical and coaxial inputs and outputs, but no AES/EBU output via XLR. The *S750* does not offer any provision for digital outputs. In comparison, the Akai *S1100* has an AES/EBU digital output via an XLR connector — although if you want both coaxial and optical digital inputs and outputs to allow direct digital sampling from CD players or other equipment, you need to buy a special interface board. The bonus with the Akai samplers is that their interface board also offers a back up to DAT capability.

Main features

You can record at 48 kHz or 44.1 kHz sampling rates, or at 22.05 kHz — which gives you more sampling time at half bandwidth. You can layer up to four samples and switch between these according to the velocity of the incoming Midi note number if you like. This trick is good for drum samples, where the timbres of real sounds can change quite drastically as you hit harder. It is also useful for bass guitar samples, where you might have a normal plucked note at lower velocities, with a 'popped' or 'snapped' sound at higher velocities. The *S770/750* offers two loop points, for the sustain and the release portions of the sample, and lets you tune the pitches of these looped portions. You can join samples together, with crossfades when appropriate, and the new software provides better control and more options in the 'Patchwork' page, as well as providing graphical tools for this purpose.

Many samplers offer some kind of processing of the audio output similar to that found on analogue synthesizers — such as an LFO to provide modulation effects, simulated analogue filtering, and envelope controls which can be applied either to the filter or to the amplifier to control their time behaviour. The *S770/750* has eight different LFO waveforms, and offers low-pass, band-pass, and high-pass filtering of samples with a Resonance ▶



control which will allow self-oscillation of the filter to occur (as on analogue synthesizer filters). It also has several Midi control options for the filters

— so you could control the cut-off frequency of the filter, for instance, according to Midi key numbers. The *S770/750* will also respond to Polyphonic Aftertouch messages — which are now available from several Midi Master keyboard controllers.

The Roland models also offer extremely flexible control over envelopes: you can set four time parameters and four level parameters to specify envelopes very precisely. In addition to parameter editing (where you alter numbers and watch a display of the envelope shape alter accordingly), the *S770/750* also offers graphical editing of envelopes, where you drag an outline of the envelope around the screen using the mouse — just as you can with computer-based synthesizer editors.

System software

The Version 2.0.4 software has more advanced looping features, compression/expansion, digital filtering, sample rate conversion, and time stretching (which lets you stretch or shorten the length of a sample without changing the pitch). Stereo resampling can now be performed while in Performance mode, enabling you to layer stereo samples or pan settings, for instance. Sounds coming from the analogue outputs can even be layered with sounds from other sound sources, or processed with an external effects unit and resampled in stereo. The original software would not allow you to use the analogue stereo left and right outputs as additional individual outputs. Version 2.0 software now puts this to rights, allowing a total of eight individual outs including the pair of stereo outs. A new Auto Sampling feature automatically designates the ideal sample start points and end points within the waveform. The sample can then be truncated based on these points. Also, the Start Point can now be set in the middle of a loop. Finally, various new Patch Edit features include Alternating Pan and Random Pan, Random Pitch and Analog Feel, new Copy/Sort functions, and Partial Mapping screens.

RC100

This is a portable control surface for the *S770/750*, designed to sit on a console or small table, or on your lap. It duplicates all the front panel controls, except for the input and output level knobs. When combined with a video monitor, it provides a complete remote editing and control interface for the unit. This could allow you to place the *S770/750* somewhere out of the way — which may be convenient for some applications such as live gigs. But if you want to use floppy disks, or to plug stuff in and out of the front-panel sockets, or adjust the level knobs, you do have to have the *S770/750* itself pretty close to hand.

User interface

Programming the *S770/750* using the mouse, remote controller, and a video monitor is much

better than programming without these aids. The *S770/750* really is intended to be used with all of these, and I would not advise anyone to figure on doing without them, especially if you are going to use it frequently. The screen displays on the monitor are a joy to use, and the on-screen sample editing facilities rival those of computer-based editors, such as *Alchemy* and *Sound Designer* on the *Macintosh*. There is a logic to the layout of the screens which is much better than the much more awkward system of tiny screens (about 35 in all) to be found on the Akai *S1100* — even if you use the small display on the *S770/750*. Unfortunately, you cannot access all the *S770/750* screen functions from this small display, and even the manual warns you that you will have to be very patient if you choose to use it.

The basic screen lists three main operating modes for the *S770/750*: Performance, Sound, and System. Clicking on any of these brings out a window to let you select within these categories. For instance, the System Menu lets you access various System Parameters, Disk Tools (Load, Save, Copy, Delete, etc), SCSI options, Midi options, and Miscellaneous Options. The Performance menu lets you play or edit a Performance set-up, map Midi Program Changes to your Performance, or Monitor incoming Midi data. The Sound Menu lets you edit a patch, edit a partial, resample, or edit samples. Edit Sample Menu 1 lets you record a sample, then loop it, truncate it, smooth it, or normalise it. Edit Sample Menu 2 gives you further looping options, lets you mix or splice samples together, apply digital filtering, apply audio compression or expansion, Time Stretch, convert sample rates, or edit the sample waveform onscreen using the WaveDraw function. You can also select these modes using dedicated buttons on the front-panel of the *S770/750*, or on the *RC-100*.

So how are sounds organised in the *S770/750*? Well obviously everything starts when you make a sample. The next step is to choose one or more samples which will be organised to form a Partial. A Partial can contain up to four samples which can be layered so that they all sound at once. Each sample here can have its own level and tuning, and you can arrange for them to respond to different ranges of incoming velocity messages. For instance, using velocity 'switching' like this you might have a lightly hit drum sample play at low velocities, and harder hit samples playing at higher velocities. You can also apply volume envelopes, analogue-style filters with envelopes, and low-frequency oscillator modulation to get pitch, volume, or filter vibrato effects — as on analogue synthesizers. This means that you can use the *S770/750* more like an analogue synthesizer, rather than just as a more basic sampler, which would just replay your samples more or less as they sounded when you recorded them.

Partials in turn are combined into Patches. This is where you assign a Partial containing one or more samples to be played across a range of keys (from 1 to 88 on the *S770/750*). Within a Patch, different Partials can be assigned to cover different key ranges. So for a drum kit, for instance, you make your samples, maybe put just

one sample into each Partial, then assign each Partial to play back from perhaps just one individual key.

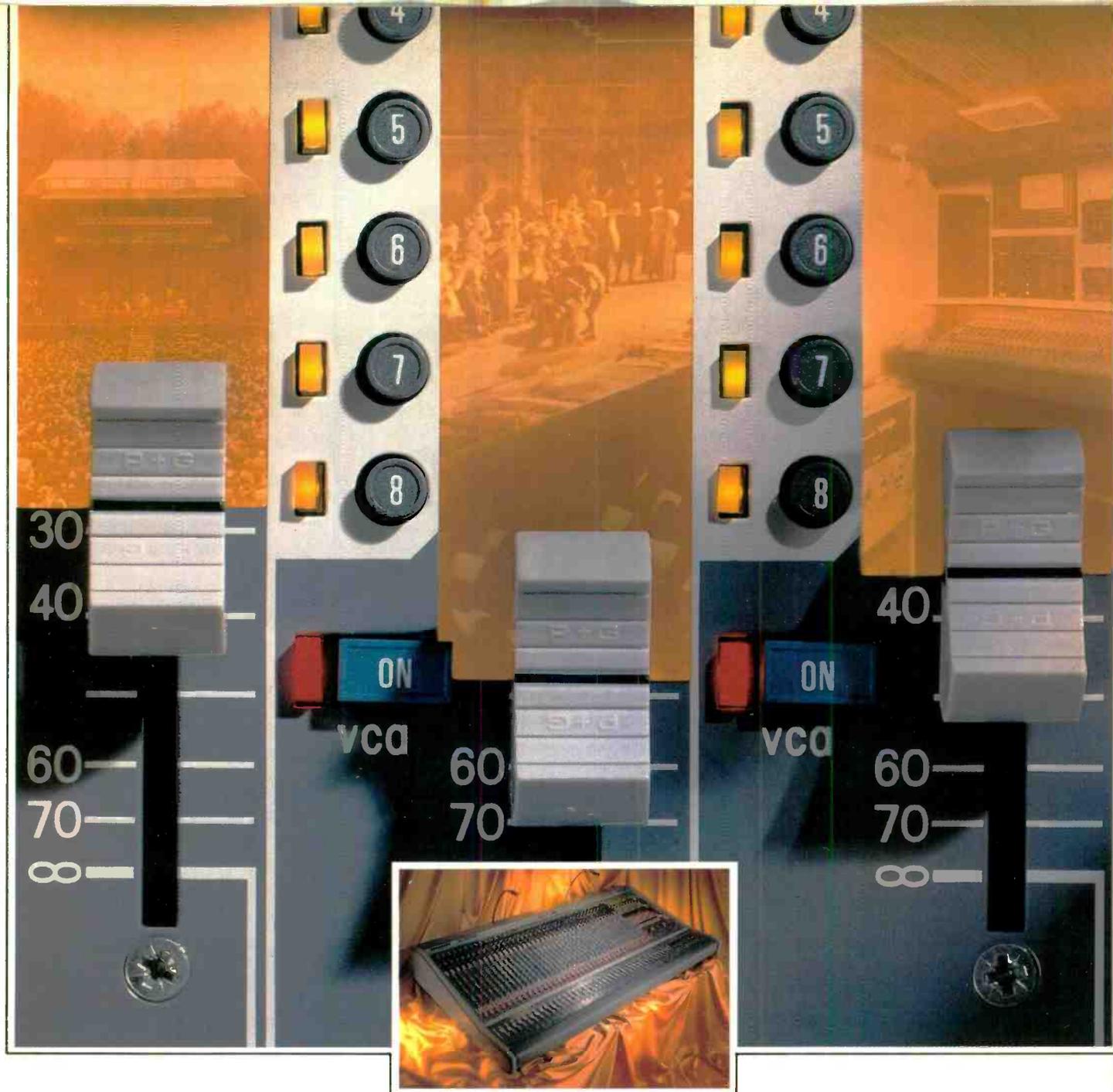
Performances are groups of Patches. Up to 32 Patches can be combined into a Performance, and these Patches may be played back on up to 16 different Midi channels for multi-timbral operation. Patches can be layered at this stage by assigning the same Midi channel, and can also be set to play across particular ranges of keys with the bonus that crossfades between patches based on Keyboard position can be set up here. Volume, output assignments, and Pan positions can be assigned here as well — to augment or override the settings made in Patches or Partials.

Performances may be further organised into Volumes on disk. A Performance, Patch, or Partial can draw its subsidiary files from different Volumes, and a particular Volume can be called up into RAM by Midi Program Change messages. The *S770/750* actually handles Midi Program Changes in a number of ways. If you are playing live, you might want to completely clear out the Volume in RAM containing the sounds for your first song, or set, and load in a new Volume with the sounds for your next song or set. This obviously takes a little time to do, and you can't play the *S770/750* while you do this. Alternatively, you can call up Performances which you have loaded into RAM. This is the most likely method to use within a song — whether on stage or in the studio. Both Volumes and Performances use the Midi Control Channel to accept Program Change messages. You can also call up individual Patches from RAM, using any of the 16 normal Midi channels. You would use this feature to change Patches within a Performance while playing or recording your music.

Factory libraries

The *S770* comes with a factory library of sounds on its internal 40 Mb hard disk. The *S770* Library Volumes, some of which contain several Performances include: Piano and Harp; Piano; Strings; Acoustic Guitar; Bases; Voices; Mallets; Drum Kits; Percussion; TR808 Kit. Of course, there is no hard disk with the *S750*, so what about a factory library of samples for this machine? Three floppy disks come with the *S750* when you buy it, but Roland will supply a box of 50 floppies on request. The *S750* floppy disk library contains the following Volumes: Best of Juno 106; Best of D-50; EM 2 strings; EM II Classical; EM II Voices; EM Noises; JD800 Sounds; Micro Comp 1; Micro Comp 2; 303/Dr Rhythm/MS10; Moog Bases; Acoustic Piano; Clarinet D6; Strings; Logan StringSyn; Mini/Korg 700 Synths; U20 Synth Set.

Roland also market an optical erasable disk drive, the *MO-7*, which uses a standard Sony 600 Mb mechanism. These Sony drives take cartridges which hold up to 300 Mb of data on each side. Obviously, these are an ideal medium for storing large sample libraries. The Roland *MO-7* is quite expensive compared with the prices being asked for similar drives using the same Sony mechanism, but marketed by different companies, such as DAC here in the UK. As a result, Roland UK no longer import this. Roland will supply both both the *S770* library, and the ►



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S770/750 library on an Optical cartridge if you like.

The optical disk which Roland supplied me with contained the following Volumes in addition to the complete *S770* and *S750* libraries: DPM Birdsong; DPM Mammoth; DPM Mello Brass; GAC Arabian; GAC Folk Harp; GLA Bang and Crash. Roland also have an additional sample library available on optical disk which users are invited to copy by appointment at Roland's premises.

CD-ROM

Roland also market their own *CD-5* CD-ROM player, which, again, Roland UK do not import. Unfortunately, the *S770/750* is not compatible with the latest Toshiba a CD-ROM drive, which is available in 19 in rack form from DAC. Roland UK do have three CD-ROM disks containing *S550* samples which, again, you are welcome to copy by appointment at Roland's premises. The *S770/750* has a useful 'Convert Load' feature which allows you to load *S550/W30* samples — so no problem with older libraries. I am told that Roland and various third-party suppliers are about to release CD-ROM disks containing 16-bit samples for use with the *S770/750* — so watch out for these also.

Caveats

You get just 22.5 s of memory with 2 Mb of RAM in the *S770/750*. But the Acoustic Guitar which comes on two floppy disks with the *S770/750* takes up 20 s of memory, and the stuff in the *S770* library takes even more RAM. For instance, the Percussion Volume occupies 108.9 s (10 Mb needed), and the Drum Kits Volume occupies 46.6 s (over 4 Mb). These larger Volumes contain several Performances, and you can load these individually if you have less memory. However, it quickly became apparent that 10 Mb of RAM would be a more workable minimum amount, and that 18 Mb would not be too much to make use of. Even 18 Mb of RAM could be on the low side in some situations!

Loading sounds is quite a time-consuming process. The *S770/750* was just a little faster loading from hard disk than the Akai *S1100/S1000*, although loading from floppy disks seemed a lot slower on the Roland machines. However, loading any sampler is tedious. This is yet another reason why you need lots of RAM, and a fast SCSI disk drive, of course. Saving files to disk is also more time-consuming than it ought to be — a lot slower than on the Akai machines. And you can only save one file of whatever type to floppy disk — which is quite a major limitation! Mostly you will choose to save a Volume containing Performances, Partial, Patches, and Samples. But if you want to save any combinations of these individually to floppy — you're in trouble!

The bottom line

The *S770/750* is a top-flight machine. It sounds great, and the sample libraries are good. And with a video monitor and remote controller it is much

more friendly to use than many other samplers. It has so much to offer that it will take you some time to find your way around and use it to the 'max', but you can go so much further in terms of creative sound sampling (compared with other samplers) that it is well worth the effort! To get properly set up will cost you the best part of £3000 for a *S750*, £270 for the remote, maybe £200-300 for a monitor, about £400 for an 8 Mb RAM upgrade, about £600 for a Syquest 45 Mb removable hard disk, and you could spend another £750 on a CD-ROM drive, £500 on CD-ROM disks full of sample libraries, £500-1000 on a fixed hard disk drive, and maybe even another £2500-3500 on an optical disk drive. Maybe as much as £10,000 in all! So it is not cheap! But neither is a fully configured *S1000/S1100* or *Emulator III* system.

The *S770/750* scores more highly than the Akai *S1100* in several areas other than the highly-important user interface — such as in having better analogue-style synthesizer controls, and in allowing Midi control of many parameters. Roland ought to market a suitable monitor, and some sort of stand or rackmount arrangement for this, and sort out the hum problems which you get when you have the monitor anywhere near the sampler. Or at least recommend third-party equipment which is suited to the job. Also, the limitations on the types of SCSI drive, and even the particular sizes of hard disk which will work with the *S770/750*, are not really acceptable. You can use just about any model of SCSI drives in any sizes up to 510 Mb with the *S1100/S1000* with no problems at all! Many people will already own SCSI drives which they may like to use with an *S770/750*, and will not buy these Roland samplers if they are forced to buy new SCSI drives just to suit. Roland UK told me that Version 3.0 of the operating system is under development, which should allow you to use a much wider range of SCSI devices when it becomes available.

Despite my various reservations, I can thoroughly recommend the *S770/750* models to anyone who needs a top-of-the-range sampler as the heart of their system, or as an alternative to the popular Akai models. ■

Free Upgrades

Roland UK Ltd announced that, wherever possible, software updates for their *S-770* and *S-750* samplers will be sent, free of charge, to registered owners.

There has been several upgrades, of varying significance, since the launch of the *S-750*. One benefit of the latest update, vers 2.1, is that loading from a SCSI device is 50%-70% faster than before. Roland feels it is important that every user receives this updated system and it will be sent, without charge, to all owners sending their name, model, serial number and date purchased to Chas Smith, AVB Division of Roland UK Ltd, Rye Close, Ancells Business Park, Fleet, Hants GU13 8UY, UK.



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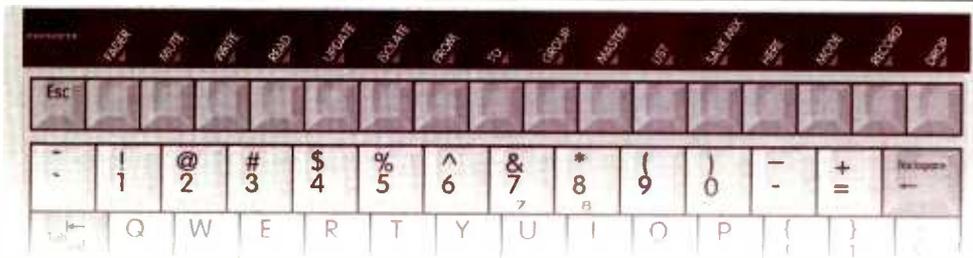
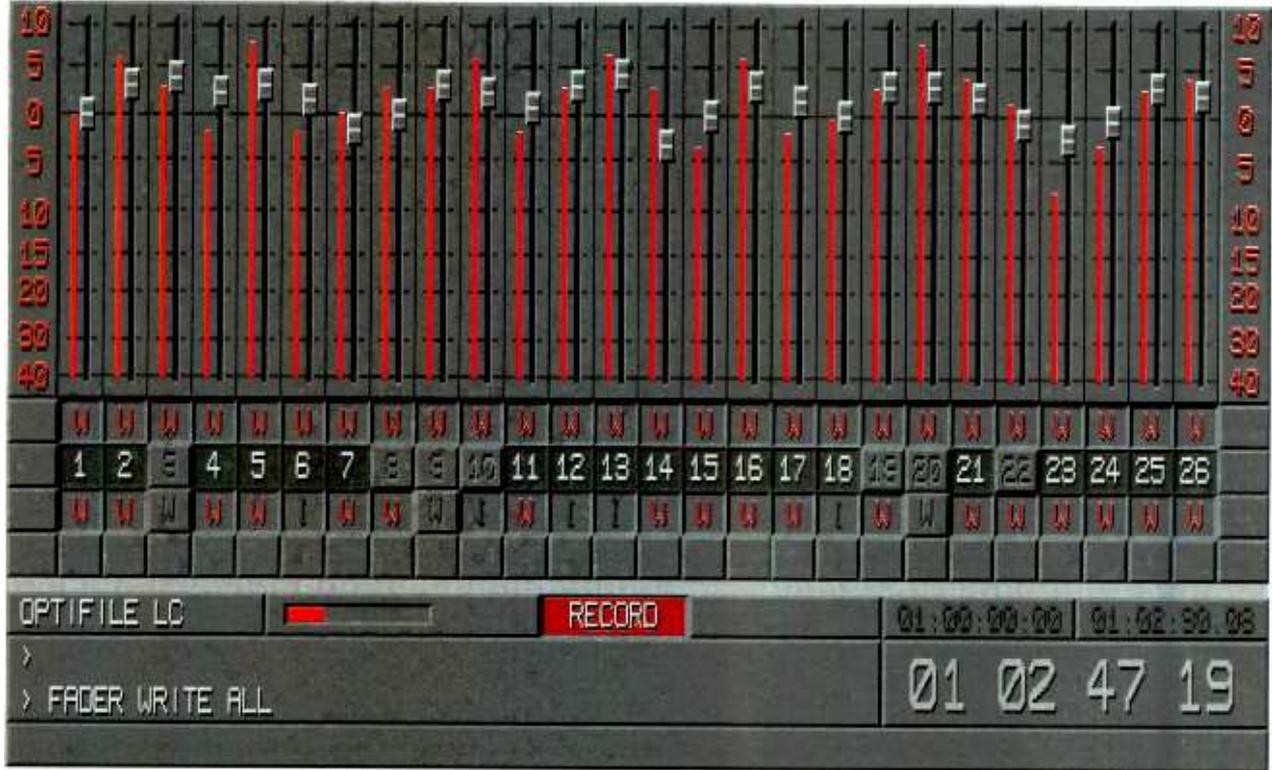
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THE RECORDABLE CD

The revolution of this year so far has been the accessibility of recordable CD. Francis Rumsey examines the technology and raises some questions for its future

Although CD-R (recordable CD) has now been available for over two years, it has been a relatively expensive game to get into. The revolution of 1992 is the launch of low-cost CD-R machines and media which have opened up the potential market for this technology. Until recently, most customers needing quick one-off CDs would use a CD-making service offered by a facilities house, at around £40 to £45 for the disc. For most people the purchase of a system could not be justified; but now, with CD-R machines retailing at just under £3000, and blank medium at around £16, a greater number of potential users will see the sense in owning an

in-house system or two. The price is comparable with that of a tape machine, and the discs cost about the same per minute as quarter-inch tape. Of course, you can't erase them, but this is not a problem in many applications, especially when the advantages are considered.

These low-cost CD-R machines, such as the Marantz *CDR-1* and Audio & Design's *Micromega* system, are manufactured by Philips as OEM products, which are made available to third parties in various states of finish, allowing the basic unit to be packaged in a number of forms. The transport is capable of recording onto a number of different CD-R blanks, since the laser

power is adjustable between 4 and 8 mW. This therefore frees the user from being tied to one particular source of blanks, and, by allowing a slacker tolerance in disc manufacture, results in lower cost medium.

Orange Book principles

Standard audio CDs (CD-DA) conform to the Red Book standard published by Philips, but to support CD-R Philips has now introduced the Orange Book standard. The Orange Book contains information on the additional features of CD-R, such as the area in the centre of the disc where data specific to CD-R recordings is stored. CDs recorded to the Orange Book standard can be 'fixed' to give them a standard Red Book table of contents (TOC), allowing them to be replayed on any conventional CD player. Once fixed into this form, the CD-R may not subsequently be added to, or changed, but prior to this there is a certain amount of flexibility, as discussed below. ▶

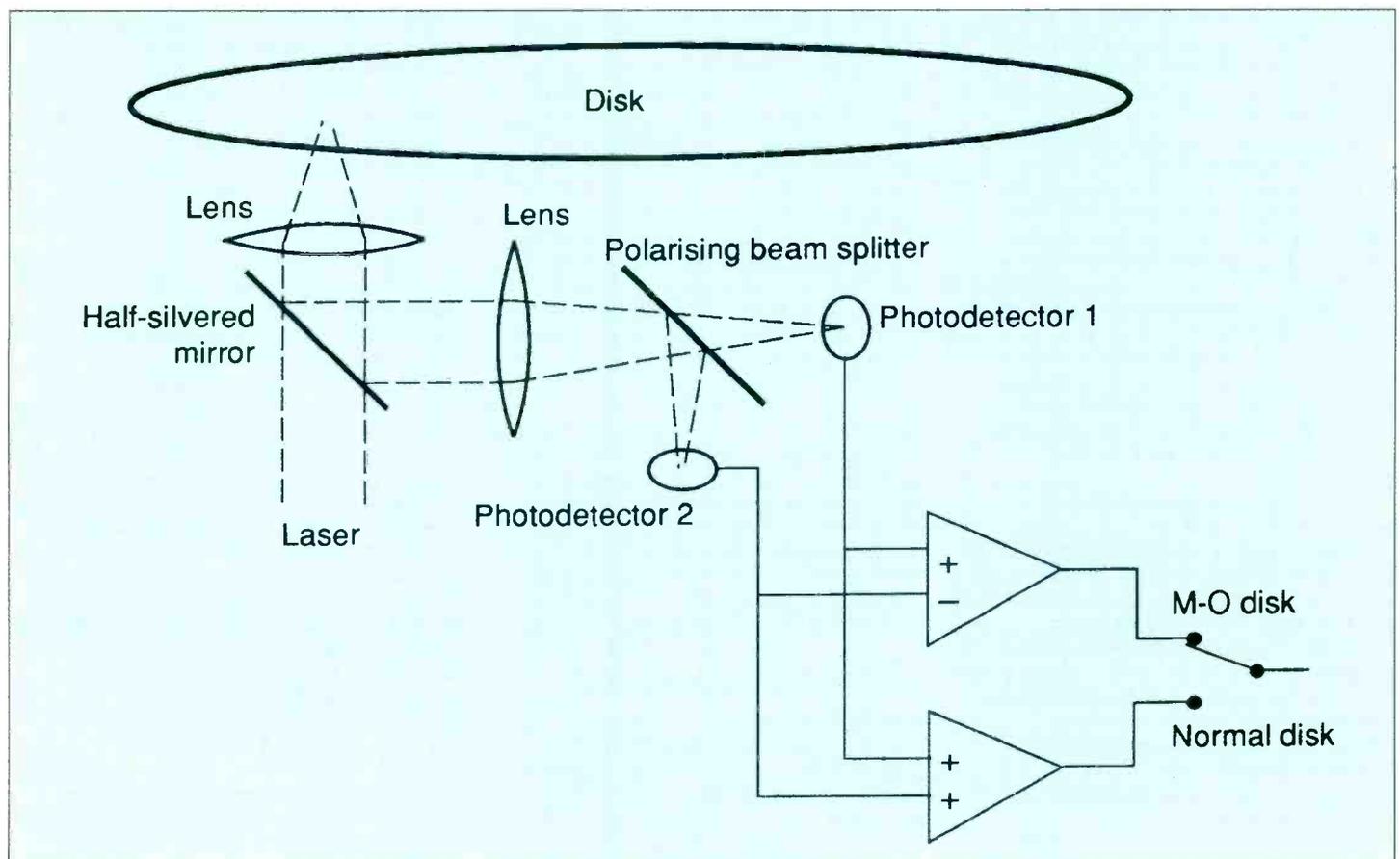


Figure 3: Method of replaying both erasable (M-O) and conventional optical disks

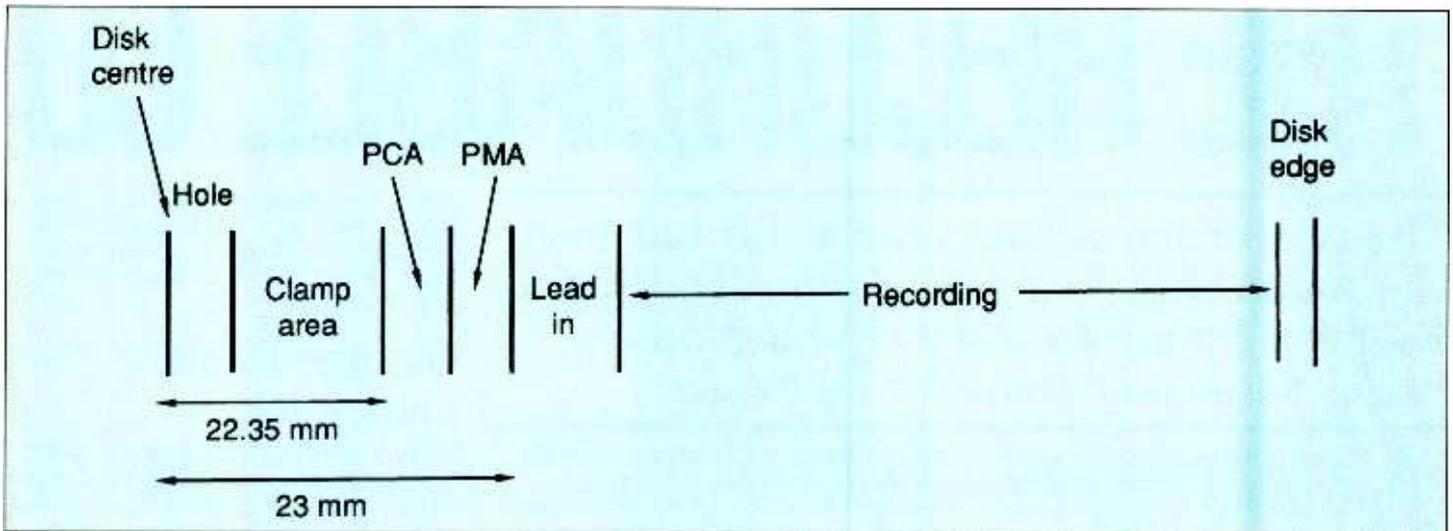


Figure 2: Position of Orange Book PCA and PMA

The Orange Book allows for two potential formats: one is basically a WORM format (for discs which can only be recorded once), and the other is an erasable format based on M-O (magneto-optical) discs. Only the WORM discs can currently be replayed on today's conventional CD players, since the principles of M-O replay are slightly different to those involved in a standard pick-up, but there is no reason why a dual-standard player should not be introduced in the future, replaying M-O and WORM discs, as proposed for Sony's MiniDisc system (see below). The current generation of low-cost CD-R machines, though, only work with WORM discs.

Fig. 1 shows the cross-section through a typical blank CD-R WORM disc, and it will be seen that the disc consists of a preformed 'groove' in the so-called recording layer. The recording layer consists of a green semitransparent material, behind which is a gold reflective layer. During recording, the laser heats the recording layer to around 250°C, a process which causes it to melt, forming a pit similar to that found on a conventional CD. On replay, the laser pick-up, operated at a lower power than for recording, experiences a lower level of reflected light in the presence of a pit than it does in the absence of a pit, in exactly the same manner as for a prerecorded CD.

Since the CD-R servo system must have some reference to lock to when recording a blank (information which is normally extracted from the data stream in prerecorded CDs), the pregrooved track is also modulated to a very slight extent by a sine wave at half the sampling frequency (22.05 kHz). The amount of sinusoidal deviation of the groove is only $\pm 0.03 \mu\text{m}$, while the track width remains at the standard $0.6 \mu\text{m}$ and the spacing between the tracks remains at $1.6 \mu\text{m}$. Superimposed on the pregroove modulation is information about the running time of the CD, in the form of a $\pm 1 \text{ kHz}$ frequency modulation of the 22.05 kHz sine wave.

An Orange Book CD-R does not have to be recorded all at once. It can be removed from the machine and added to at a later date, the new

track being appended to the end of the last recording, giving it the next numbered track ID. In order to make this possible the disc contains an additional recording area inside the starting point of a conventional CD (normal CD's begin with a TOC in the centre of the disc and play from the inside out), which is divided up into two parts (see Fig. 2). The Program Calibration Area (PCA) is used for optimising laser power by making a number of short test recordings when a new disc is first inserted. On subsequent occasions this calibration is not required since a message is stored on the disc to indicate the appropriate laser power. The Program Memory Area (PMA) is used to store a temporary TOC while the disc is yet 'unfixed', and this TOC is updated every time a new track is recorded. Here is also stored 'skip' information, which allows certain tracks to be skipped on replay if they have been messed up (although this may only work when the disc is replayed either on the CD-R machine itself, or on a very recent CD player which recognises skip IDs).

The lead-in area of the CD-R, where a normal CD would start to read its TOC, is left blank until such time as the user decides that the disc is completed. On 'fixing' the disc the machine records a Red Book TOC, after which no further recording is allowed. Thus a CD-R blank still has as much space for audio recording as a conventional CD. The first blanks for these machines run to 63 minutes, but 74-minute discs are soon to become available, running at the slightly slower linear velocity of 1.2 ms (which one company suggests might make it slightly more prone to replay errors than a 63-minute disc).

Current interest

Since the introduction of the above-mentioned machines a great deal of interest has been generated. By early April UK dealer HHB had sold over 50 of the Marantz *CDR-1* recorders in the first couple of months, alongside some £50,000 worth of blank medium. Although DAT recorders are now widespread in the music and broadcast industries, they are still mainly owned by

professional users and have not really permeated the consumer field, whereas nearly everyone has a CD player. For this reason the CD is seen as an ideal interchange medium for stereo programme material.

Radio broadcasters use the CD widely in the studio, and players are now available which allow for easy cueing of tracks. Broadcasters see the CD-R as an ideal medium for compiling sound effects, jingles, trails, music programmes, and any other material which might otherwise have been assembled onto carts or quarter-inch tape. In the cart machine vein, broadcast distributor ASC have recently introduced a product from Audiometrics called the *CD-10*, which has a very simple set of controls, rather like a broadcast cart machine, and a jog/shuttle wheel for cueing audio. CDs are contained within cartridges for easy handling, and start lag time has been cut to 200 ms.

Clearly the CD-R system is not a replacement for hard-disc editing (as discussed below), but for straightforward track assembly it is quite adequate. There is also a wide selection of available hardware for replay, the costs of which can be low. With CD blanks now at around £16, the cost is favourable compared with other media, and users are prepared to put up with the lack of erasability for increased flexibility, higher sound quality and convenience. CDs can also be stored in library systems or 'juke boxes', and accessed using a suitable database and remote control package.

Music studios see the CD as a convenient means of producing demo recordings, mainly because of the ease of replay, it being possible to give a copy to each of the members of a band and the producer at the end of a session. Budding talent could also use CD-R to produce one-off demos to hawk around the record companies.

Track ID

Recording audio information is one thing, but almost as important is the recording of track ID information on a CD-R. It is this information which allows tracks to be quickly and accurately accessed, and is encoded within the subcode on ▶

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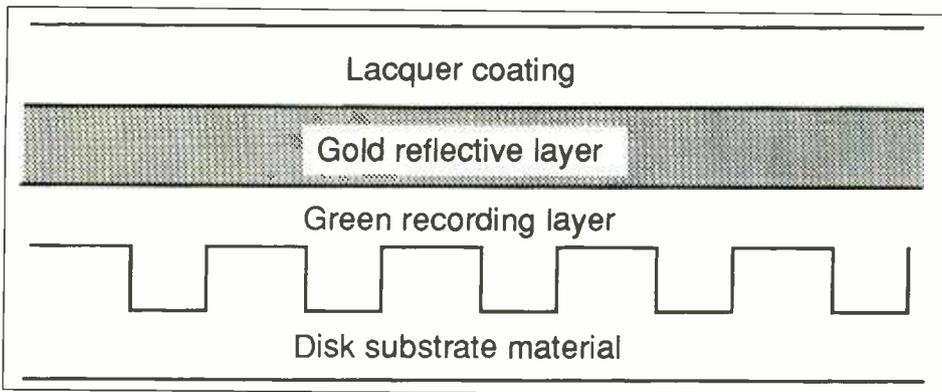


Figure 1: Cross-section through a CD-R blank

normal prerecorded CDs during the process known as PQ encoding. Information about the tracks contained on a CD is also contained within the TOC.

The Marantz and Micromega CD-R machines have a number of means of entering this information. Firstly, a start ID is written automatically whenever the machine is put into record at the start of a new track. There is also an automatic mode which writes a start ID when the audio level rises above -60 dB after a gap longer than 3 s (rather like the technique used in some DAT machines), but this is unlikely to be accurate enough for some applications. In the manual mode, after the first drop into record the user can enter ID points by pressing the appropriate button 'on the fly'.

A further possibility offered by these machines is that of entering skip start and end IDs which will cause recent players to 'jump over' the marked part of the disc. The skip data is stored in the temporary Orange Book TOC while the disc is only partially recorded, allowing the user to reinsert the skipped section up to 20 times. Skip data is also included in the fixed Red Book TOC when the disc is finished, and will be acted upon by the CD-R machine but may not be noticed on older CD players. This could perhaps be used for avoiding the replay of duff recorded tracks, but perhaps is dangerous for skipping sections which the user never wants anybody ever to hear! Audio and Design suggests that two CD-R machines could be used in this case, with the second machine being used to copy the disc once skipped sections had been programmed, but there would often be cheaper ways of avoiding this scenario, such as by

assembling the program onto DAT before copying onto CD-R.

When copying digitally onto CD-R from CDs or from DAT tapes, great advantages would exist if the copy could also contain exactly the same track IDs as the original. The route to this solution has not been easy in the case of DAT, but is straightforward in the case of CDs. When copying a CD digitally using the consumer SPDIF interface (optical or coax), the important subcode data is actually transferred between machines in the user (U) data bit of the audio subframe, rather than in the channel status (C) data. When the SPDIF category code signalled in channel status is 'CD', the user channel contains the QRSTUVW subcodes from the CD, but not the P flag. The format for this data seems consistent among manufacturers of CD players but information about it is not easily obtainable. Neither is it part of the AES/EBU standard which is concerned with professional equipment, and for which a standard packet system has just been defined for the U channel. (This is a further complication in the minefield of digital interface implementations.) Thus when a CD is copied using one of these CD-R machines, the Q data containing track information and the TOC is also transferred, thereby virtually cloning the disc. Very early or very simple players which rely principally on the P flag to locate tracks might experience difficulties if only Q data is transferred, but the P flag seems to be increasingly redundant in modern players.

When copying DAT tapes to CD the channel status category code over SPDIF is 'DAT', and the user bit stream carries start IDs and various other elements of DAT subcode. Again the format of this

data is not easily obtainable, and this has led companies dealing with these machines to attempt their own solutions to converting this data into something which will create CD track ID information. The problem with locating start ID subcode data from DAT tapes in the user bits is that the information never stays in the same place in the block format. Depending on whether the start ID has been renumbered or erased and rerecorded it may appear in a variety of locations, making the job of extracting the relevant data rather like chasing butterflies! Audio & Design, a UK company which has worked on this problem, has devised a SmartBox which will convert these DAT IDs so that they look like CD IDs, enabling easy cloning of DAT tapes to CD-Rs, and this process also works in reverse so that a CDs track information can be converted into DAT format.

Since subcode data from consumer formats such as DAT and CD should only properly be contained within the consumer interface (SPDIF) data, users should be encouraged to use this interface for copying between machines if the subcode data is important, rather than attempting to use the professional AES/EBU ports which may have been added as retrofit features by the distributors. There is still some confusion in the industry over the use of these interfaces, since manufacturers have been known to simply balance the SPDIF output of a consumer player to give it AES/EBU electrical specifications while still transmitting consumer data!

Developments

As many will be aware, the CD is not only used for sound recording. The CD-ROM is an increasingly widespread format for storing computer data, having a capacity of up to around 550 Mb, and users of CD-ROMs are already excited by the possibility of a recording CD-ROM system. Since the process and the media exist, development is a matter of building the appropriate firmware and SCSI interface into a drive, a project on which Philips is currently engaged. This move would seem to be very important, since it would bring the world of removable and recordable optical media into a much lower price bracket. Currently, computer WORM cartridges, and M-O cartridges holding 650 Mb of data, cost perhaps ten times more than the price of a CD-R blank in many cases. A recordable CD-ROM would not have all the advantages of the computer WORM cartridge, principally because the CD's access time and transfer rate are considerably slower, but the typical CD-ROM drive can now boast access times of around 350 ms, which is adequate for many applications.

One can imagine many applications for a cheap write-once CD-ROM in computer systems. It would allow company databases to be produced for limited circulation, at lower prices than current CD-ROM mastering, and it would prove invaluable in educational and training applications where CD-ROMs are used widely for interactive teaching. In publishing the CD-ROM is increasingly used for libraries of picture material (Kodak's new PhotoCD standard, for example); and in musical applications, a SCSI-interfaced CD-ROM drive▶

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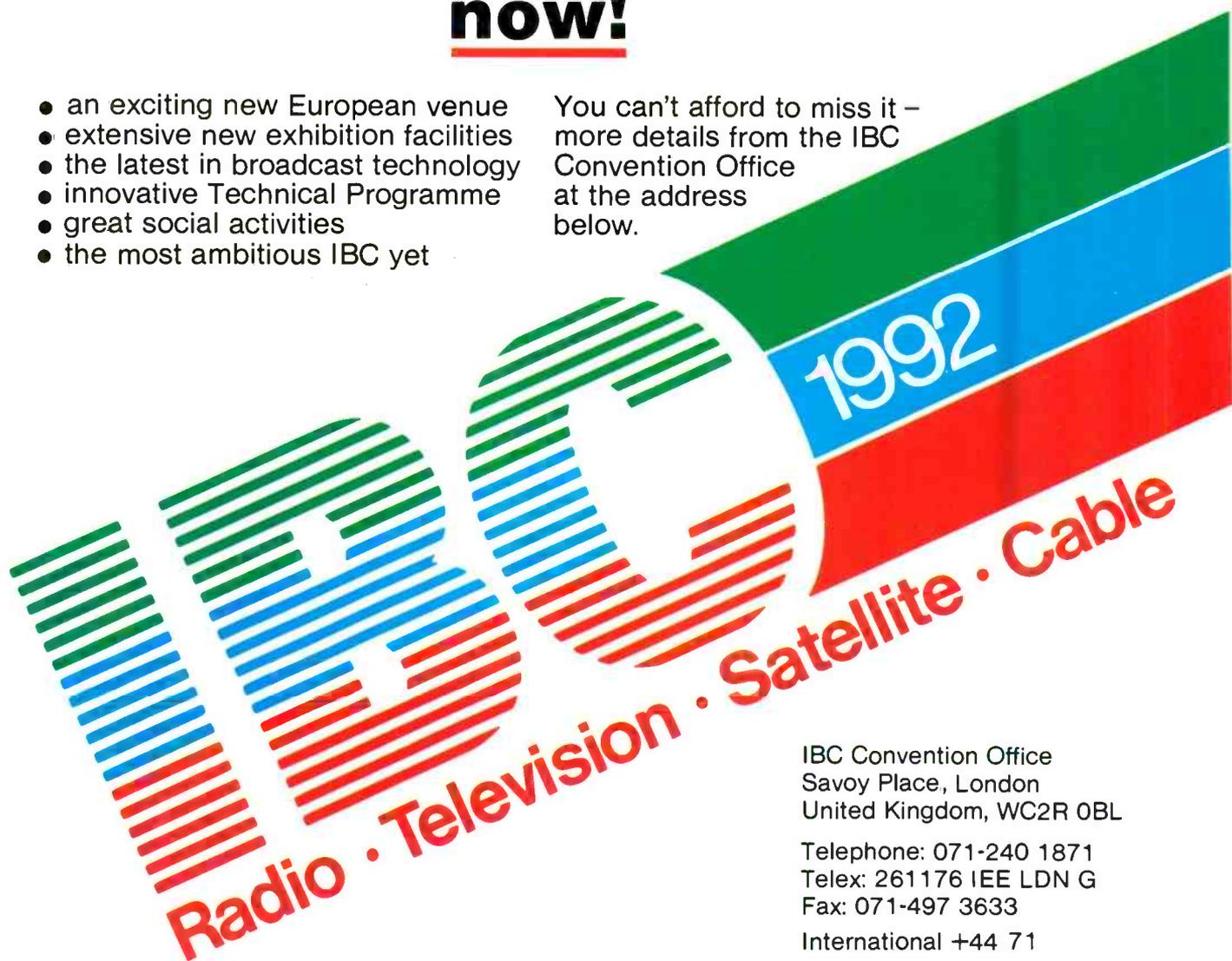
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could be used for storing sample data from MIDI samplers.

The potential of CD-R should not be confused with the potential of hard-disk editing systems, since CD drives will never match the access times and transfer rates of hard and optical disc drives. For one thing the rotational speed of CD is much slower (200-500 rpm), as compared to between 2000 and 3000 rpm, and it uses so-called CLV (constant linear velocity) recording as opposed to CAV (constant angular velocity) recording, which means that the rotational speed of the disc must be changed depending on the position of the pick-up, resulting in somewhat longer access times. Nonetheless, the CD-R will have applications when used in conjunction with hard disc editing systems, both in the CD-ROM form and the CD-DA form, since it will be used for offloading CD-DA masters from finished edit sessions, and perhaps as a means of transferring audio material between systems.

In the CD-ROM form it could be used as a cheap file store for a regularly used sound file database, with files being copied to the hard disk as required. The great thing about the CD-ROM format is that files can be addressed by name and accessed over a SCSI interface, whereas CD-DA lacks the block format and address structure, being dedicated specifically to sound recording.

Audio information can still be stored in the CD-ROM format, but it cannot be replayed in a conventional CD player. Some CD-ROM drives will also replay CD-DA discs.

Erasable CD-R?

So what about an erasable CD-R? As mentioned above, it is part of the Orange Book standard, but works on M-O principles rather than conventional CD pick-up principles. Discs and recorders are not currently available. As shown in Fig. 3 it is possible to design a pick-up which will read both types of disc, as Sony intends for its forthcoming MiniDisc. In fact it appears that a dual format pick-up could not be simpler! For conventional CDs or MiniDiscs using the 'pit-type' approach (pre-recorded discs and WORM discs) the outputs of the two photodetectors are added in phase, whereas for erasable discs using the Kerr Effect (whereby the plane of reflected polarisation is changed) the outputs of the photodetectors are added out of phase. This is because light reflected from a pit-type disc is simply a variation in brightness with no change of polarisation (giving identical outputs from the two photodetectors), whereas the light reflected from M-O discs does not change in brightness but in polarisation. The polarised beam splitter illuminates either one

photodetector or the other, depending on the plane of polarisation of reflected light, requiring the output to be the *difference* between the two, not the sum.

Using such pick-up technology, it would be quite feasible for a multiformat machine to replay and record both MiniDiscs and CDs, since the channel code is also the same (EFM) for the two formats. The audio data on MiniDiscs is encoded using a data reduction system based on psycho-acoustic masking (called ATRAC by Sony), and thus data from the two types of disc would go separate ways after EFM decoding, but only one set of D/A converters would be required.

Optical disc technology is clearly an area to be watched carefully in the years ahead, and distinctions between professional and consumer formats will become ever more difficult to make. Perhaps it will not be necessary to make the distinction, since the customer will pay his money and make his choice. If consumer equipment with adequate specifications exists at the right price, then who is to say that it is not suitable for professional purposes, especially when the format may be out of date in two years? ■

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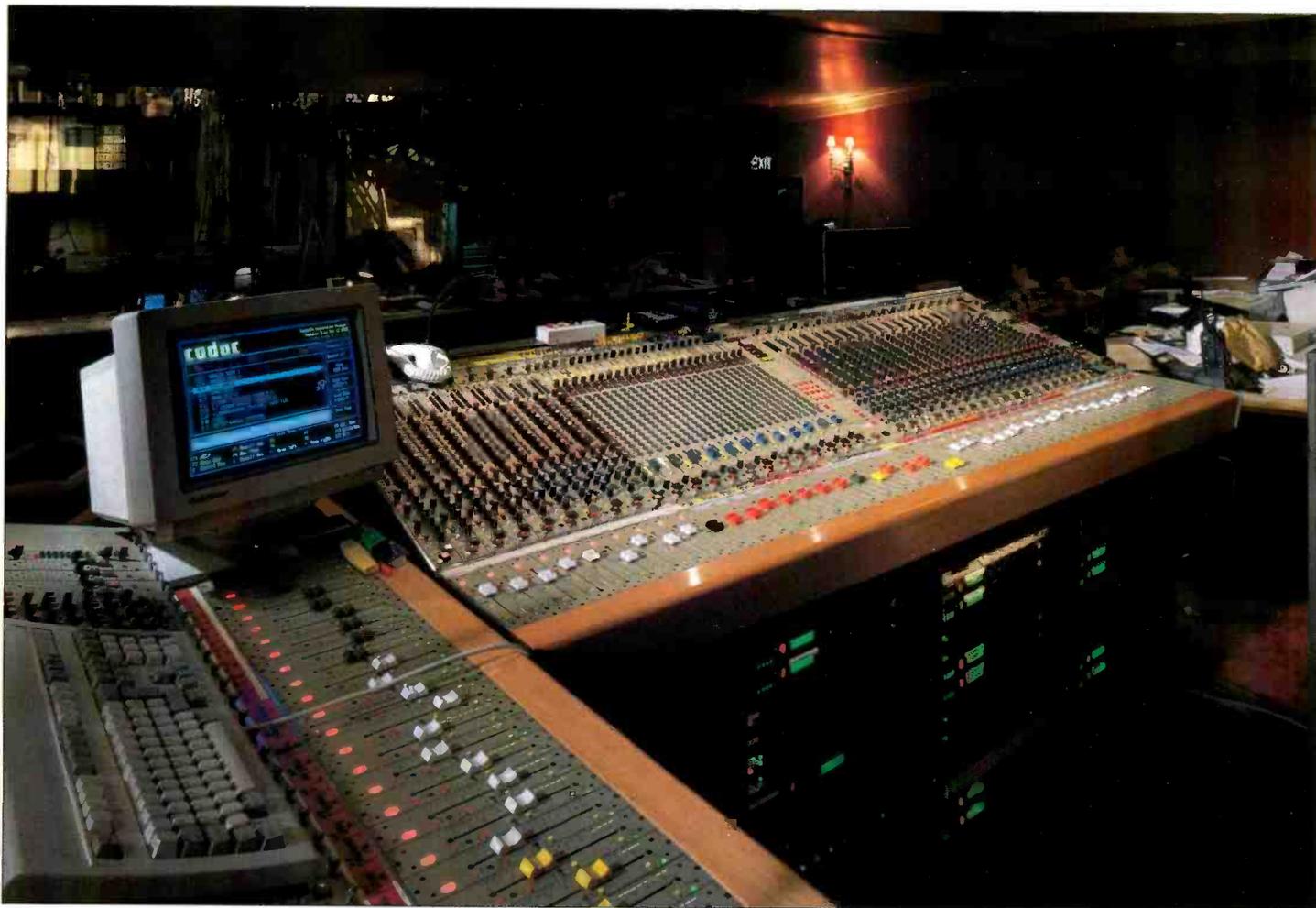
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SOUNDS OFF

The last ten years have seen a considerable change in attitude towards theatre sound; in rather the same way that film sound is now treated very much more seriously, stage sound has grown to become an extremely important production component. To a large extent the big 'blockbuster' musicals have played a significant part in raising standards, and as expectations and resulting demands have increased, a new breed of expert has emerged called the Sound Designer. Martin Levan is an internationally respected Sound Designer who has done a great deal to professionalise theatre audio and, together with companies like Clive Green's Cadac, has pioneered new techniques bringing the newest technology into the theatre. An area which exemplifies this is automation, where Cadac have developed a unique system to aid and simplify the increasingly complex task of front of house mixing.

Automating a live show is a very different matter to automating a multitrack mix. For a start live shows do not run against time code, they rely on the human clock which can be unpredictable at the best of times. Consequently timing is mainly dictated by the performers, while the computer follows obediently, prompted by the house engineer.

The Cadac Automation System operates with a series of Cues that contain information on faders, mutes, routing, MIDI program changes, and relay events. Cues can be either static snapshots or

CADAC consoles predominate in the theatre. Patrick Stapley sneaks backstage to learn why

dynamic sequences in which case Cadac's 6740 series motorised faders may be utilised. The system runs on a standard IBM compatible PC, and the user interface is via a dedicated module in the console and the computer's QWERTY keyboard/VDU. As a safety measure the system is designed to operate with a second back up computer which tracks Cue position and can quickly be switched into circuit in the event of failure.

There are two modes of operation — Performance and Rehearsal. Performance only allows the previously recorded data to be played back — Cue data cannot be written or modified. Rehearsal permits the full use of the system's facilities and is used to program Cues.

VCA groups are used extensively in the theatre and, generally speaking, the majority of mixing will be controlled from VCA masters — Cadac's

new J Type console provides up to 15 DC masters. When a Cue is saved, the channel to group assignment for the whole desk is memorised, so on recalling a Cue, all the channels will reroute to their respective VCA groups. To clarify the situation, the console can be equipped with programmable ID windows above each group master fader describing what is currently being controlled — each channel fader also has a display giving the number of the assigned VCA. With the addition of moving faders, VCA groups can become dynamically automated — resetting levels between Cues as well as replaying moves made during a timed Cue. Without this option it will be necessary for the operator to adjust levels manually.

The operator can also decide whether a VCA Group Master should affect the level of the channel's post selected auxiliary sends. Each fader module includes a button that toggles control so that the post aux send either follows or ignores movement made from the VCA Master. This, for example, would allow a group of channels to be faded from a master while leaving all their effects sends unaffected. The status of this function is saved as part of a Cue.

Routing on the J Type is sectioned into Subgroup and Matrix selection. The output of the channel is routed to 16 audio subgroups from where it can be sent to 32 matrix groups which feed out to speakers. Alternatively the direct output of the channel can be patched to a Programmable

Routing Module where the pattern of the Subgroup and Matrix routing is set and stored to a Cue. This enables Cues to perform complex routing changes, and create interesting effects by changing the output configuration to the speakers. When one considers a show like *Phantom Of The Opera*, which has 160 speakers distributed around the theatre, the potential for spatial and panned effects becomes enormous.

Events are used to cue CD players, cart machines and so on. Their action can be selected to On, Off or Pulse, and a display on the *J* Type Central Control Module shows their status. The *J* Type provides eight events per Cue, while the *E* Type caters for twelve. Programmed Event and MIDI information for each cue can be displayed in detail on the VDU.

MIDI has become an important part of theatre sound, and Cadac are currently extending its use in the system. At present Cues contain just Program Change messages which are transmitted via two MIDI Banks providing 32 MIDI channels per Cue. Like the events channels, MIDI channels are listed and can be named with the corresponding pieces of equipment they're controlling. Typically Cues can be used to change programs on effects processors, set delay times on mics, to fire MIDI sequenced routines and so on.

Martin Levan recently used a Yamaha *DMP 11* digital mixer to mix certain sound effects for *Moby Dick*: the Cue fired two CD machines via Events, reset various effects processors through MIDI program change, fired a programmed mix sequence in the *DMP 11* also using MIDI, configured mutes and groups on the console, and set the Programmable Modules to output the sound around the theatre. All this from a single key press!

Rehearsals

During rehearsals Cues are built up, added, edited, named, copied and pasted until a complete running order is created. This is called a Show File, and depending on complexity, an average file for a musical might contain somewhere in the region of 80 Cues. A number of Shows can be stored onto one disk, making the system ideal for theatres where shows return on a regular basis.

Once the Show exists in the computer, it's then simply a matter for the operator to enable Cues at the relevant points throughout the performance. The Base Screen displays 10 Cues at a time with the current Cue highlighted. The operator just presses the NEXT button at the appropriate moment to load the next Cue down — it is of course possible to select any Cue in the file, but this won't normally be necessary as by this stage all the Cues *hopefully* will have been arranged in the correct consecutive sequence.

Cues can also be programmed to start automatically by entering a Step Time; so Cue 20, for example, could be timed to start 10 s after the beginning of Cue 19. This can be useful for running a sequence of effects, and in this situation the performers will have to follow the timing of the computer — although the system can be manually overridden at any time. A 'Step Time' display keeps the operator in touch with what's happening by counting down the seconds to the start of the next Cue.

Timed dynamic cues (motorized faders) and stepped cues are run against real-time to an accuracy of $\frac{1}{16}$ th second. To further complicate matters dynamic Cues can be run concurrently, and static Cues can be executed during dynamic Cues.

Fader modules and Programmable Routing

Modules may be removed from computer control by selecting individual ISOLATE buttons on each module. Similarly fader modules can be removed from both computer and VCA control with individual BYPASS buttons. Both Isolate and Bypass modes can also be selected and cleared down globally. Events and MIDI may be disabled from their respective menus.

In addition to the Cues stored on computer, the *J* Type console includes 12 local memory stores which could be used to automate a simple show or concert, or provide an extra emergency back up in the unlikely event of both main and back up

computers malfunctioning.

The Cadac Console Automation Manager software acts as a platform for the various Cadac consoles and the options available to them. The latest addition to the Cadac range is the *Concert*, which takes automation a stage further by incorporating complete status recall. This provides automatic reset of all centrally assigned switching, and manual reset of potentiometers using nulling LEDs. With this kind of direction, one wonders how far away Cadac are from total dynamic automation, and whether this may lead to a fully digitally controlled analogue console. ■



Clive Green (right) and sound designer Martin Levan at The Piccadilly Theatre

Clive Green began his career at London's Olympic Studios, and it was there in 1965 that he designed his first console for a demo studio at Dick James Music. Three years later, after joining Lansdowne, Green began work on a replacement for their old EMI desk. News soon got around and he was approached by Morgan Studios who offered to buy the plans. Rather than lose control, Green agreed to build a desk for them and with the help of Charlie Billet of Audix who supplied the manufacturing facilities, Adrian Kerridge at Lansdowne who provided the user input, and David Bott from Pye TVT who was involved in the electronics, Clive Green formed CADAC — C(Clive) A(Adrian) D(David) A(And) C(Charlie).

Morgan ended up ordering three consoles before the Lansdowne desk was finally installed in 1970, where it remained in service for twenty years. Interest started coming from abroad, and desks were sold to Madrid and RCA in Rome. Cadac's name quickly became established throughout Europe resulting in 75% of consoles being exported. The 70s proved to be a boom period for the company, but with the proliferation of manufacturers towards the end of the decade and the spreading SSL factor, Cadac (or Clive Green & Company as they were now called) began to feel the pinch and sales in studio consoles gradually declined. In 1983 an important transition took place — largely inspired by Martin Levan, who was then Studio Manager at Morgan, Clive Green built his first theatre console.

Levan had been persuaded by Andrew Lloyd Webber to get involved in theatre sound, and was putting together *Little Shop Of Horrors* which required a desk to fit into the depth of a single row of seats. At the time there was nothing suitable, so

Levan contacted Green, who agreed to help turning round a console in a matter of weeks. Following the success of the show, Levan commissioned a more elaborate desk for *Starlight Express*, which remains in operation today. The theatre market took off for CADAC, and consoles were supplied for *Cats*, *Phantom Of The Opera*, *Les Miserables*, *Miss Saigon*, *Aspects Of Love* and so on. As these shows became big hits and opened internationally, additional consoles were required in venues worldwide — for *Les Miserables* alone, 14 desks were built. Clive Green now specialises solely in theatre and live sound — the last CADAC studio console was built for London's Audio International in 1986. The company do, however, produce a mic amp and equaliser, the *RME 100*, for the studio market.

The theatre desks have evolved from the original *A* Type through to the new *J* Type, which has recently been installed at *Moby Dick* in London, as well as *Five Guys Named Moe*, and *Guys and Dolls* in New York. The brief for the *J* Type was to keep the price below that of the popular *E* Type, and to allow any module to be plugged into any position of the desk, thus offering maximum flexibility. Cadac's other new console, the *Concert*, which features centrally assigned switching, and a full status recall facility, is scheduled to be installed at a major London venue towards the end of the year.

Cadac's theatre automation system first appeared in a very basic form on the *Starlight Express* console, but it wasn't until *Phantom Of The Opera*, two years later, that the system was further developed. Since then the system has been continually enhanced to offer the kind of sophisticated control now deemed essential for today's big musical shows. ■

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OPTIFILE 3D



Main control screen shows levels, fader status, mute on/off, mute status and group status

The latest version of AD-Système's *Optifile* has superb graphics and functions. Patrick Stapley reviews the improvements

AD-Système's *Optifile* automation is now in its third generation; since its 1985 introduction, the system has been greatly improved and streamlined, and the latest mark, *Optifile 3D*, has itself recently undergone a major software revision in which 60% of the software has been rewritten in line with user suggestions and requests. The French system, designed by Pierre Antonini, has been favoured by manufacturers such as DDA, Trident, Lafont and Soundcraft who have all built the system into various consoles — in fact Soundcraft's *Fame* automation was actually an early *Optifile* system.

3D is pitched firmly at the professional end of the market, although price-wise it equates more with the budget end. Familiarity and ease of use are fundamental to the design philosophy, and AD-Système make no apologies for the obvious similarities between *3D* and *SSL*. To date, 110 units have been sold of which about a third have been installed into DDA *AMR 24* consoles.

The system will retrofit to any desk with or without VCAs, and has an average installation time (40 channels) of approximately six hours. The

system is comprised of four main components — the *2U AD 900* computer rack with 3.5 in floppy drive and integral PSU; dedicated keyboard with full size keys; high resolution RGB monitor; and VCA boards utilising dbx 2150A VCAs (1 board per 8 channels), or linear interface boards for consoles already equipped with VCAs.

The system currently supports just faders and mutes, but there are plans to extend this to switches — the maximum number of channels supported is 64. Fader resolution is 0.19 dB which is achieved using 9-bit floating point logarithmic conversion, and both faders and mutes are accurate to one frame. Muting is controlled by the console's existing cut switches. All VCAs are bypassed when the system is switched out, alternatively optional switches can be fitted to provide a local VCA bypass facility.

User interface

Optifile 3D is a keyboard controlled system, there is no mouse or trackball. The compact keyboard is sectioned into Qwerty, Numeric, Dedicated

Function, and Cursor Keys, the Machine Control option includes additional keys fitted at the base of the unit. Each channel can also have an optional STATUS button and associated LEDs fitted next to the fader allowing various functions to be controlled locally — this option either requires a replacement fader plate, which AD-Système will supply, or requires holes to be drilled in the existing panel which may not be suitable for every installation.

The main control screen, rather appropriately, has a 3D appearance which not only makes the graphics more interesting but also helps to clarify the display. The screen shows levels, fader status, mute on/off, mute status and group status.

26 channels are displayed at one time, making the screen easily discernable at a distance — the original *3D* screen displayed 32. Also incorporated into the main screen is a large time code window showing the current position; additional time code displays indicating In/Out registers for programmable functions, and the captured 'Here' time; a horizontal bargraph indicating used memory; a window displaying the operating mode and another showing the name of the studio; a command and prompt area; and a Menu Line which changes in relation to the current function.

Optifile is now based more around a 'command line' structure than previous versions that were largely menu driven. Commands are entered either by using a sequence of dedicated keys, or by typing a line in full from the Qwerty keys. In the latter case, the CMD (Command) Key must ▶

be selected first to switch mode, this is because the Qwerty keys primarily act as function Keys — for example I = Keep, Z = Undo, X = Execute and so on. They also provide access to the various menus displayed in the Menu Line, mentioned above.

Status

There are four status modes — Read, Write, Update and Isolate. Faders and mutes can be selected independently to different status modes, with the exception of Update Mute which is to be implemented in the near future. Status can either be set from the keyboard allowing global or individual channel selection, or locally using the optional STATUS Key, the two status LEDs will confirm local status in addition to the main screen display.

Cues

Cues operate in a similar fashion to SSL's system in that named cues can be entered on or off-line to compile a Cue List which contains number, time code and name. The Cue List displays 16 cues at a time with a scrolling cursor marking the present position. Cues are selected either by number or name (abbreviations accepted) and can be used in commands rather than entering time code values. Names (max 21 characters) and time code can be edited — time code editing will cause the list to automatically reorganise and renumber cue positions.

The Machine Control option is designed to interface with various popular makes of synchroniser. The control keys and general operation is very familiar — keys include: GO TO, PLAY, FROM, CUE, TO, CYCLE, HERE, and so on.

Operation

The system is first set up and configured using a separate Set Up disk, which replaces the original Utilities Menu, and deals with various functions such as disc formatting, time code standard, date and time, fader calibration and so on. The program itself is stored on an EPROM. Before mixing can begin the computer must be initialised by entering the start and end times of the mix. This is done either by entering the times from the keyboard or capturing them on the fly as the tape plays through. The points act as finite boundaries outside of which the computer will not respond and the Time Code Box will be outlined in red when time code is within these limits. *Optifile* reads (but does not generate) all common time code standards, and will ignore drop-outs within a five frame window.

Depending on taste the mix can be started by writing mutes first, faders first or both together. The system operates with two buffers — a Base Buffer and a Temporary Buffer. During the first pass the information is written to the Temporary Buffer, modifications made in the second pass are also stored in the Temporary Buffer which simultaneously transfers the previous information to the Base Buffer. This procedure results in a current and previous mix being stored in RAM. However, during Update the computer calculates



Track List



Named cues can be entered on or off-line to compile a Cue List

moves relative to the Base Buffer and stores them in the Temporary Buffer — obviously to operate correctly the Base Buffer must contain the current rather than the previous mix. To address this, the Base Buffer must be made current prior to an Update by either Keeping or Saving the mix. The Keep command simply copies the Temporary Buffer to the Base Buffer, and Saving the mix to disc has the same affect. When data in both buffers is identical, the bargraph display (showing the percentage of used memory) will be blue, as soon as a change is made the display turns red. Information stored in the Temporary Buffer can be deleted with the Undo function — thus allowing the last pass to be erased.

This double buffer arrangement has the advantage of allowing mistakes to be simply overwritten by running the tape back and dropping-in; this is not possible on some of the other low price automation systems, where a single buffer design restricts the user's choice to either keeping or aborting the entire pass. The system also permits instant comparison of the two mixes held in each buffer with a single key press.

The various status modes, as mentioned, are set either from the keyboard or the STATUS keys — but

the STATUS key option does provide a quicker and more intuitive way to control status locally. There are two other keys that affect the way status operate — RECORD and DROP. The RECORD key toggles the system between Record and Rehearse modes thus allowing moves to be auditioned before writing them; there is also an Auto-Record mode providing a means of accurately programming Record In and Record Out points which will follow Record/Rehearse selection.

The DROP key toggles all channels set to either Write or Update to Read thus allowing selected channels to be dropped into record and out from a single switch. It can also be useful for playing back moves without first having to reset each channel status to Read — in this respect it provides a safe 'Status Lock' facility. The function is taken a stage further with the Auto-Drop function that automatically switches write status modes to Read when the tape is stopped and rewound to replay a pass — the DROP key is then used at the appropriate moment to reinstate status, or alternatively the original status will be automatically returned to the point the tape was rewound from. The Drop function can also be performed locally by using the STATUS keys. ▶

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92-018

Both Auto-Record and Auto-Drop have their start and end times displayed in a shared area of the main screen.

At present there is no means of nulling a fader other than visually matching levels on the screen — the bargraphs display mix levels while the fader heads represent the actual fader position. However, software is currently being written which will provide a null facility using the local status LEDs and also offer a 'Autotakeover' function incorporating the STATUS keys.

Mixes are saved to disk under a Title which is entered during the initialisation process — at the moment just one Title is permitted per disk, but this also is about to change. New software will extend the hierarchy by adding Project under which Titles and Mixes may be stored. Mixes can be optionally named (21 characters), otherwise they are entered into the Mix List by number along with a time and data entry. Mixes can be renamed, and deleted in groups (that is, delete 1-8). Group data is stored along with the mix, Cue, Track Sheet (64 tracks each with 31 characters), and Initialisation Registers are stored with the Title. Other features to be introduced soon include Note Pages which will be stored with each mix. The ability to save status with individual mixes has already been implemented.

Groups

Nine VCA groups are provided with permanent display on the main screen showing masters and slaves. Rather like status selection, group assignment is either implemented directly from the keyboard or with the aid of the STATUS keys. Groups cannot be nested — this is to say groups cannot exist within groups or overlap; however, because group information is written to the computer rather than being a monitor based function, it's quite feasible to disband a group and create another based around it. Grouping affects both faders and mutes together but, by setting up faders to read and mutes to write for example, the two can be treated independently.

Off-line functions

Off-line functions include Merging sections of one mix to another; Copying sections of fader and/or mute information from one channel to another or group of channels; and Trimming fader levels or a group of faders by up to ± 29 dB in 1 dB increments between two time code points. Also, by using the Execute function, a snapshot of the current desk configuration can be written between two time code points; obviously this can be specific to channel, fader and mute depending on status

selection — for example a typical Execute command using the dedicated keys might be: Mute Write 10 to 15 Execute from Cue 1 to Cue 3 Enter — in which case the current setting of mutes 10 through to 15 would be copied between the two cue points. Another function soon to be implemented is Title Offset, where the start of the mix can be offset against time code.

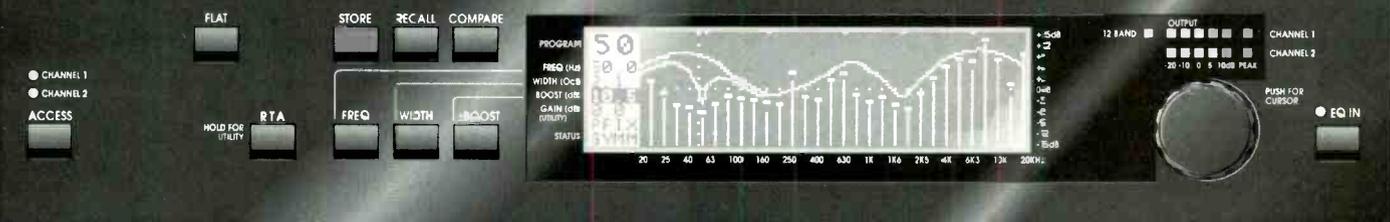
Conclusion

AD Systems have produced an automation system that will satisfy both the demands of the professional, and the bank manager. The system has been designed to be simple to use, and to retain familiarity with top end systems, in particular SSL. It has the great advantage of operating with a dedicated keyboard and local controls, rather than relying on a mouse-type user interface, which can often prove less than intuitive. The optional STATUS keys are an important addition to the system which potential purchasers should include if possible — ideally this should be a standard feature rather than an option.

With the new software and outlined future additions, *Optifile 3D* represents an affordable, professional and mature product that I am sure will continue to be both popular and successful. ■

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The mixing console is the centrepiece of every multitrack music studio. Choose the wrong one and the opportunities for self-abuse over the subsequent year or two will be manifold.

There are, of course, many levels on which this choice must be made. There is the operational level — can it do the job? And then there is the cosmetic level — will it *look* like it can do the job? As one famous Boston bartender once commented, 'A good mind can open doors, but a good haircut will blow 'em off their hinges'. Unconsciously shallow, perhaps, but image is an undeniably powerful force in any market place.

However, putting the cosmetic aside for a moment, my first consideration in the selection process was, as usual, financial. To make sense on paper the console had to come in at around the £25,000 (approx. \$41,250) mark. A few years ago this would have meant uncomfortable compromises, but today the quality of facilities offered at this price are extremely professional.

I was setting up a new 24-track studio aimed at serving the television and video post-production market, while also having a strong music production facility. So with 24 tape returns, a potentially unreasonable number of virtual tracks via MIDI, a range of stereo sources and a pile of signal processors, I needed lots of inputs. Space, however, was at a premium.

After a sustained period of obsessive brochure reading, discussion, trundling around exhibitions and test flying, I plumped for the Soundtracs Quartz from UK distributors, Larking Audio. The Quartz has a lot of excellent operational features, a decent patchbay (not to be assumed in this price range) and from the image point of view it has the solid, substantial feel of a more expensive board. Its technical specification in terms of noise, distortion and crosstalk is also excellent, in fact equal to, or better than, other consoles costing several times as much.

I do a lot of voice recording, much of it totally exposed, and so a noisy console, especially a noisy mic amp, would be untenable. It seems, though, that there is little to choose between most console mic amps these days. As a high quality reference I used a G383 rackmount unit from SSL and tried a simple A/B for noise and subjective quality, coming out of the desk directly from the mic amp (the insert send with EQ switched out). They sounded very similar, and neither could be said to be the superior in its basic function, although, of course, the SSL unit is more than just an amplifier and has a number of extra facilities.

While on the subject of noise, it is the nightmare of anyone building a new studio that, having spent all that time and money on 'getting things right', you turn on for the first time to a symphony of hums, buzzes and local radio stations. Good commonsense theories on grounding and screening are in no short supply. But if you're setting up in the centre of a busy city the air can be filled with all sorts of unpleasant emissions, and sometimes, especially if you're relying on existing earths, that same good old commonsense seems to fall short of a straightforward solution. With this in mind another feature of the Quartz that made sense was its use of balanced internal bussing. This is



JOURNEYMAN

The tale of one man's journey towards choosing a mixing console and automation system, and then living with his choice. Jim Betteridge confesses

relatively uncommon even on much more expensive consoles and almost unheard of in the price bracket. As with any balanced line the idea is that any induced hums or buzzes should be cancelled out. I was concerned that the unbalanced connections to my multitrack would render this balancing pointless, but in fact the internal bussing is completely buffered and the benefit is reaped irrespective of what you're connected to. I am delighted to say that we turned on to an almost religious silence — well, to a very low level of hiss, anyway, if you cranked everything up.

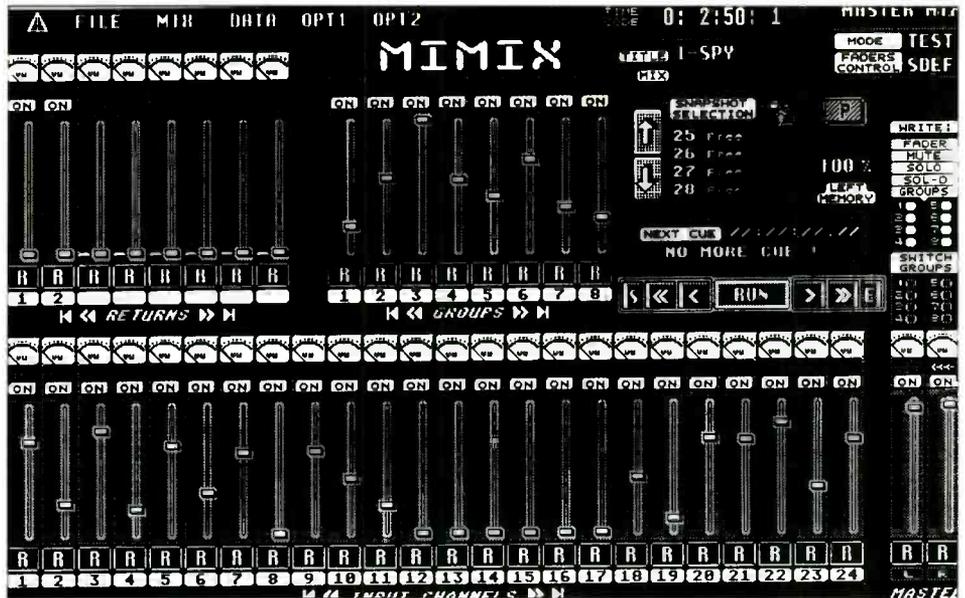
I bought a 48-channel frame fitted with 32 channels, leaving the empty space as a work area for remotes and notes, etc., and for possible future expansion. Of course, the whole point about an in-line console is that each strip contains two audio channels. Generally speaking, though, the

monitor channel offers a somewhat diminished set of controls. What I like about the Quartz is that both channels can have a full set of facilities: the EQ has four sweepable bands arranged to overlap in such a way that the top two dual concentric knobs can act as one 2-band EQ, with the lower pair acting as another. Either section can be independently assigned to the main or monitor path, allowing a 4-band facility in one or the other, or a 2-band in each.

Similarly, the six auxiliary sends are switchable in pairs between the two paths. Here we have three sets of dual concentric pots, the top set of which is a level and pan arrangement for sends one and two. These are switchable pre or post-fade and are intended for foldback (when you're not simply sending the control room monitor mix to the cans, which is another option) or for use as ▶



Soundtracs' Quartz console details. Right: the Master module. Left: the Stereo Input module.



Steinberg Mimix Master Mix screen

effects sends. Sends three and four are on the next dual concentric pair and can also be switched pre or post; then there are sends five and six which are fixed post-fade. The only limitation I have found here for my operation is that, when I am running a high number of tape tracks with a bunch of virtual tracks, I can't send an independent mix of the whole lot to the cans; sends one and two can be in either main or monitor channels, but clearly not both. My solution is to have a small line mixer built to combine the outputs of aux sends one and two with aux sends three and four, and to drive the foldback amp with that. More expensive Soundtracs models have this type of facility as standard.

One small niggle, on the knob front, is that there are no lines on the top of the upper controls of the dual concentric pots to indicate their positions. Thus you have to stand up each time you want to check what's going on. This has apparently been remedied on newer models shipped over the last few months and new caps with lines are available if you're in the same position.

Operationally, the console is very immediate. As you'd expect, each module has a fader reverse button which swaps the functions of the main and monitor level controls. One slight compromise is that the pan and mute controls don't swap with them. This is no big deal, but again on more expensive Soundtracs consoles the entire section is swapped — clearly preferable.

An unusual feature on each module is the button marked GROUP. When pressed this allows the monitor level control for that channel to act as a group output level control for the group of the same number. For example, with the GROUP button pressed on module 10, the monitor level control would act as an overall level control for a group of inputs routed to track 10. A handy alternative if you don't have VCAs.

I thought that the MIDI mute facilities on the desk would only be of interest to me in as much as I could integrate them into the Mimix automation system. However, they are useful in their own right as long as your sequencer has a Chase Events function, or similar, that allows the correct mute status to be established from wherever you start the track (actually within a given time zone limit, but that's another story). One way to use the system is to set up a mute snapshot, and store it in one of the console's internal hundred internal memories. As you switch between snapshots the changes can be recorded to a MIDI sequencer as

patch changes and subsequently replayed. Alternatively, you can record a real-time mute 'performance' into your sequencer, with each mute corresponding to a note-on MIDI command. These include the mutes on the main and monitor channels together with the auxiliary send master mutes. You have to turn your MIDI THRU off to avoid inadvertent triggering of notes, although I don't find that a problem in practice. Using Cubase with the Show Events display up, it's great to be able to see the mutes coming up, and some people actually use it in preference to the Mimix muting.

Mimix Automation

I chose Steinberg's Mimix automation system for a number of reasons. Of course, once again, it was within my budget, but there are a number of less expensive retrofit systems available also with proven track records. The facilities on Mimix seemed unusually extensive and particularly well suited to audio post. Also I was committed, if not addicted, to Steinberg's Cubase MIDI sequencer package which can be run simultaneously with Mimix, under the M-ROS switcher program (a version that operates alongside Cubase 3 should be complete by the time you read this). Again, space was at a premium and the idea of avoiding having another VDU in front of the console was appealing. Switching between the two displays could not be easier. You simply hold down CONTROL and SHIFT and press F1 for Cubase, F2 for Mimix. I wondered if it would be a problem not being able to view the two screens at the same time, but in practice I find that I'm concerned in detail with one or the other, and no difficulty arises. Another factor in my decision making process was the installation and excellent general user-support offered in England by Dave Newson of Audio Arcana, for which I am most grateful.

Interfacing the mute system with Mimix requires a mapping box to convert what the Quartz puts out to what Mimix understands as mutes. This is not a complicated job for a MIDI-convertant electronics engineer, and just such a box is available in England from Audio Arcana at around £130 (approx. \$214.50).

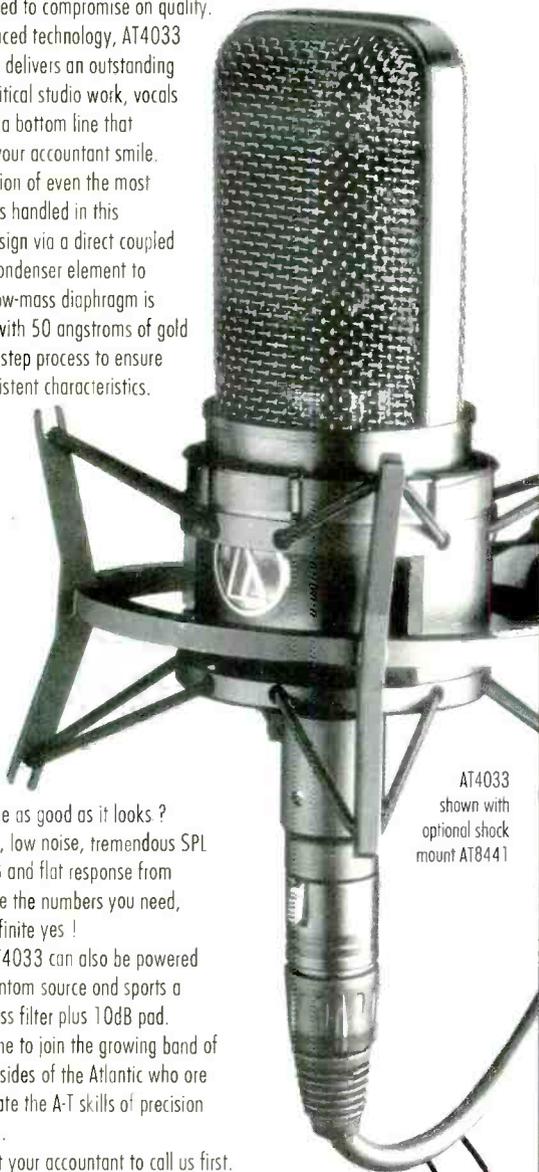
I run the Cubase and Mimix from a single Atari Mega 4 ST computer fitted with Steinberg's Midex key combiner and tape sync unit and an internal 108 Mb hard drive. I started running it with a 44 Mb SyQuest removable, but had seemingly insoluble problems with data ▶

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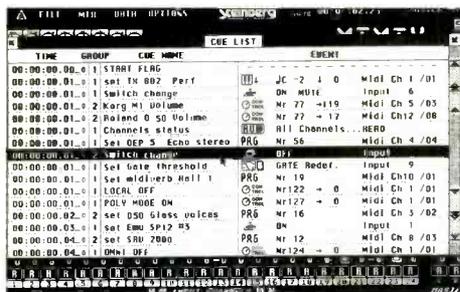
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corruption. Though theoretically quite possible, I tried two different Ataris, two different drives and DMA/SCSI interfaces and several expert minds, all to no avail. Take care, then, if you're following a similar path. Since having the internal fitted and set up by Dave, the whole system has performed very smoothly. The ICD disk utilities that came as part of the drive's ICD host adaptor package also allow me to make regular check-ups and, should they be needed, repairs.

The use of stereo 1/4 in (Type A) jacks for the send and return audio interconnections on *Mimix* is clearly not ideal for a professional installation. We all know what happens if too much cable is carelessly crammed into a stereo jack plug. So care has to be taken to ensure that they are really soldered and that the cables are loomed properly to prevent uninvited disconnection. This said, the system works very well. In fact it is quite astounding how much flexible processing power you get as compared to other systems costing many times as much. The VCA Associates' VCAs fitted as standard are of a better quality than the commonly used dbx alternatives, and so losses through having them in line are minimal.

Basic fader automation is very straightforward. It revolves around the normal Write, Read and Update modes, where Update basically adds a positive or negative offset to what is already written without the need to find a null point. In this way you could, for instance, raise the overall level of a vocal for a section of a song while still preserving the level changes within that section.

There are a number of ways in which to achieve most of the functions using just the mouse, a combination of mouse and keyboard or, in many cases, just the keyboard. I actually use a Marcus tracker ball rather than a mouse, which I find vastly preferable. You drop in and out of Write



Mimix displaying the Cue List

almost as you would record on a tape recorder, and there are a number of options as to what happens when you stop the tape. Most eventualities are catered for.

Grouping channels is extremely easy, and again, there are several ways to do it. Having selected the channels you want to a given group, you can then grab that group channel on screen, move it across and drop on to any one of the other channel icons. Henceforth, that channel fader on your mixer becomes the group master, but the automated VCA function of that channel is not effected.

Each channel has a 10-parameter gate instantly accessible. There seems to be a misconception that these are 'MIDI gates' and therefore incapable of rapid operation. This is not true. Each rack unit of eight VCAs has its own separate gate processor which allows a speed of more than eight times that of MIDI. What's more, because the audio trigger times can be logged by the computer, it is possible to advance them very slightly in order to catch any really fast transients that an ordinary gate might miss. They work very well.

Off line editing facilities are extensive, and include a range of options for merging and extracting all of parts of mixes. Fader movements

can be looked at graphically in minute detail. You can nudge through the curve of a fader movement, frame by frame, to see exactly how it progressed, and then redraw it to achieve the desired end. Again, there's more than one way to achieve this — you can select a preset curve towards which you would like to nudge your existing curve. Or you can leave the start and finish points of the curve fixed and move two other mid-way points using the mouse or you can simply draw a curve freehand. It's great for getting that tricky fade or cross fade just right.

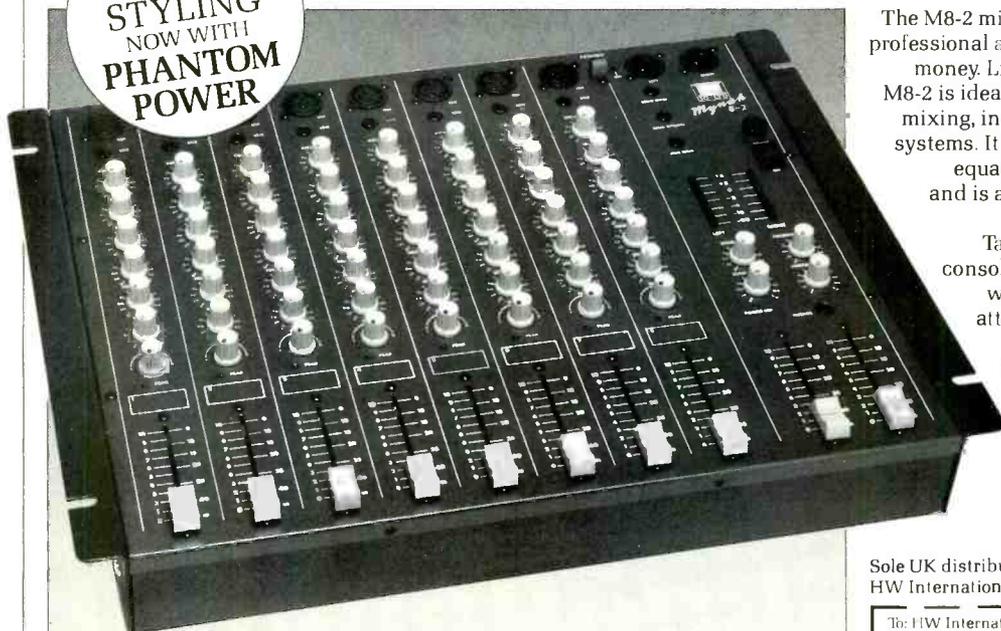
The Cue List facility has a practical potential that I have not yet fully realised. A list of events can be drawn up with quarter-frame accuracy to trigger a range of MIDI events, program change requests, preset fades, gets redefinition and more, I tend to use *Cubase* for MIDI events and so far I haven't needed to change a gate setting within a mix. But clearly a wide range of options is available.

There's a sense with both *Mimix* and *Cubase* that their full depths will never quite be plumbed. They are extremely well written and offer new delights at every turn. While *Cubase* has just gone through a major revision, things are strangely quiet on the *Mimix* front. Steinberg are resolutely silent on the matter, and will only say that significant changes will be made some time this year. Assuming they're true to form, it's very likely to be good news, and an affordable upgrade path will be offered to existing *Mimix* owners. Such is my hope, anyway. ■

Jim Betteridge is the owner of Copper Blue Studios, 43 Queens Gardens, London W2 3AA. Tel: 071 706 1544.

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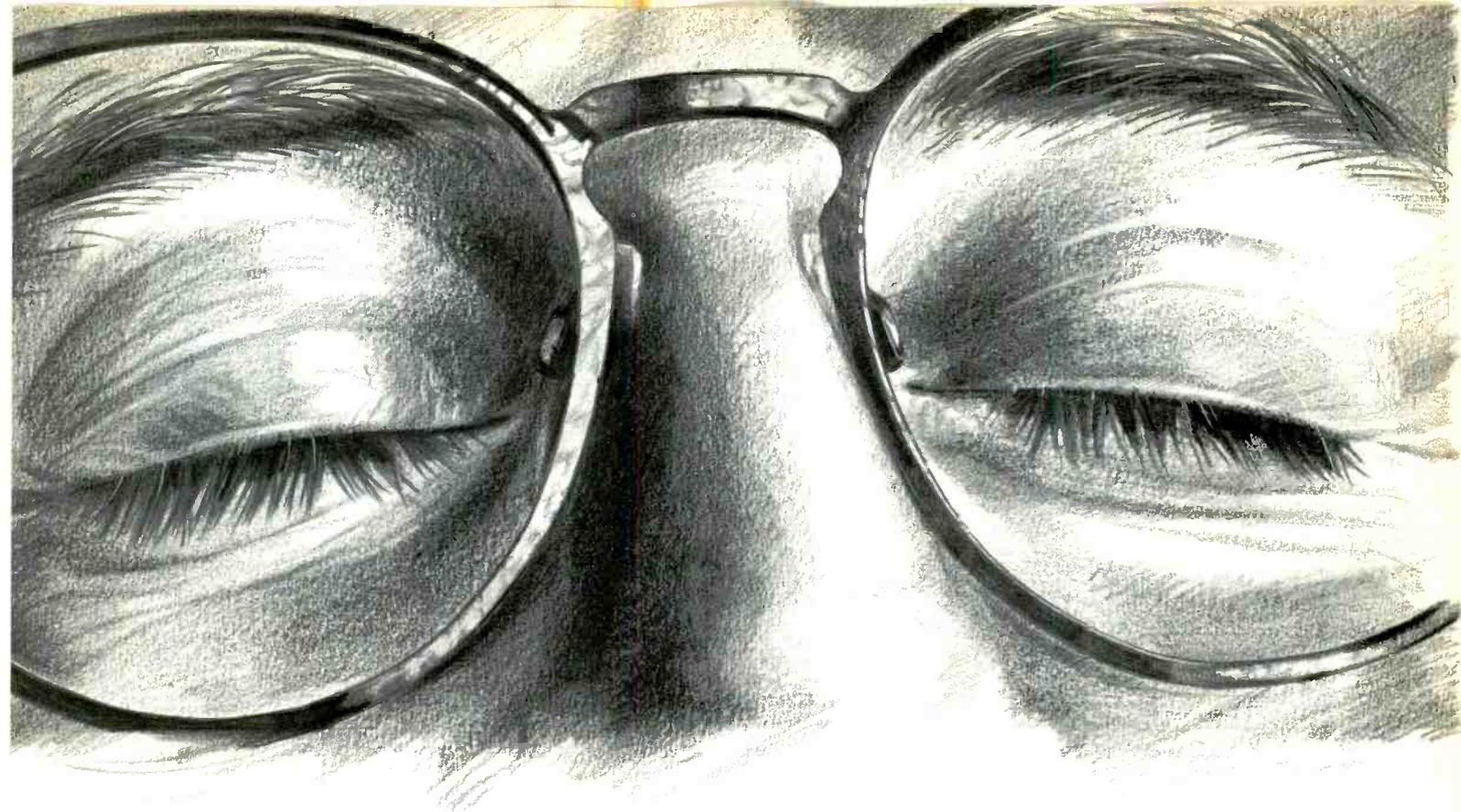
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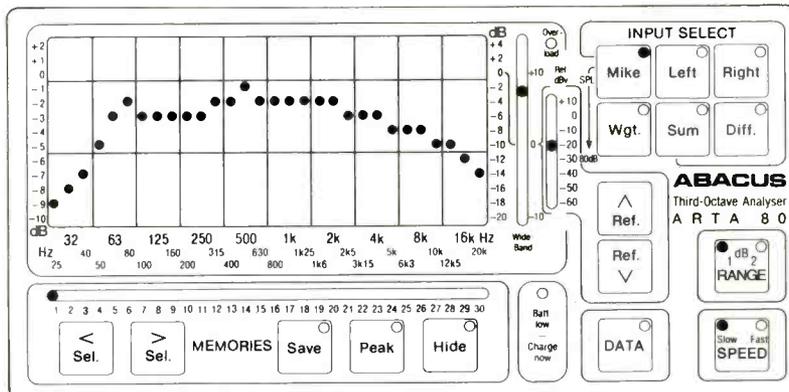
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Want to hear a horror story? A year or so ago, Alan Little leased a derelict arch under the railway line in Camberwell from British Rail. He borrowed money to convert it into a two-level mix of recording and rehearsal studios. The total cost was pushing towards £50,000.

I have been there, and seen the studios, and the derelict arches next door. Little's studio, Sound Advice, was a labour of love. I am not surprised that, up until last November, it was popular with up-and-coming bands needing somewhere to rehearse and record.

Then, one fateful Saturday morning, with three bands booked for the morning and three for the afternoon, disaster struck. All the studio equipment, and the bands' amplifiers, started warbling. Alan Little describes the sound as 'like something from the *Twilight Zone*'. I have heard it and I reckon that description cannot be bettered.

The bands and studio crew thought at first that they had an equipment fault. Then other studios in other railway arches in the area began phoning each other. They all had the same problem. The bands all went home. Alan Little phoned British Rail and on the Monday morning a BR engineer came round, listened and said the cause was a new signalling system installed by BR. BR then put the matter in the hands of its solicitors. So Alan Little put the matter in the hands of his solicitors. When nothing, apart from some 'goodwill payments', happened, Little asked his local MP Harriet Harman, to push BR. Some of the musicians asked the Musicians' Union to get involved. BR then asked its accountants to go through Alan Little's books.

By March the men in suits were still talking, the *Twilight Zone* sounds were still warbling, the studio rehearsal rooms were laying idle and Alan Little was on the dole and in court for nonpayment of bills.

In the meantime Little had employed independent consultant, John Woodgate, who measured the magnetic field strength and pinpointed the source as the railway lines. Woodgate was able to explain how BR's new signalling system had wiped out Little's business.

British Rail controls its track signal lights by feeding electric current through the rails. When a train runs over the rails, it provides a short circuit between them. Current flows through the short circuit and triggers a red light behind the train. Until recently BR used a direct current system but is now changing to the use of an alternating current. With AC, electronic filters along the track can divide continuous welded track into safety sections. But whereas in the DC system current only flows in the track when a train is present and causing a short circuit, in the AC system the current flows continuously in a loop through the long rails. These act as a highly efficient aerial, radiating a powerful AC magnetic field. The AC is at audio frequency, tones of between 1 kHz and 4 kHz. This roughly matches the frequency band used by telephones. The tones are complex warbles, to safeguard the system from outside interference.

The entire railway line thus becomes the

Barry Fox

British Rail signals disaster; forgettable and unforgettable masters

equivalent of an audio frequency induction loop system, AFILS, as used to provide sound for hearing aid users in public buildings, theatres and conference halls. The loop induces warble tones in nearby audio equipment.

The effect is heard through a mixing desk, with pick-up from mains and connecting leads. It is even heard through unpowered loudspeakers. It is worst when an electric guitar is plugged into an amplifier. Guitar pick-ups are designed to convert modulated magnetic field into sound. They cannot distinguish between radiation from a signalling system and vibrating strings.

In March Little had been offered £17,000, less the 'goodwill' payments previously made. If he took the money he had to surrender his lease and restore the arch to its original derelict state. BR had not apologised for ruining the business. When I phoned British Rail a spokesman for Network South East denied all knowledge of any change in the signalling system in the Camberwell area.

This is very worrying. Quite apart from destroying any studio business near a railway line, BR could well be causing bewildering problems for all manner of other audio equipment. Microphones and gramophone pick-up cartridges, like electric guitar pick-ups, work on induction principles. So, of course, do hearing aids and the heads of tape players.

How many people on railway stations have wondered what was wrong with their personal stereo, or hearing aid? How many people living near railway lines have hunted for a fault in their home hi-fi?

As my experience shows, they will be none the wiser if they phone British Rail for advice on mysterious warbling sounds.

In the case of Alan Little's studio, it looks as if there will be a half-happy ending. British Rail should by now have settled a deal which, as Little puts it, 'puts me back to square one'. He will get what he spent and not have to spend time and money on putting the arch back to its original derelict state. Doubtless BR will be able to lease out the studios to a theatre or dance group which will not be bothered by electrical interference. Alan Little now has to build another studio.

Meanwhile, has any other studio by railway lines had similar problems?

All the studio equipment started warbling

Understandably, 3M were proud to announce that the Grammy Award-winning single *Unforgettable*, which has Natalie Cole duetting with her late father Nat King Cole, was all made on 3M tape.

Nat King Cole's single was recorded, three-track, in the early 60s on Scotch 111 tape. Thirty years later Al Schmitt, of Ocean Way Studios in Los Angeles, spent a week filtering as much of the original orchestral backing out of the original recording. The filtered vocal was transferred to 3M 996 tape with a click track added by a drummer.

Film arranger, Johnny Mandel, wrote a new score and Natalie Cole sang live with the orchestra. The real achievement is in blending the voices without a chalk and cheese difference between the recording qualities. In many respects, the Cole duet builds on the work done for Clint Eastwood's film *Bird*, where Charlie Parker's old mono recordings were filtered to remove the original rhythm backing, and blended into a new backing in stereo.

Two points come to mind. The Cole duet was possible because the original thirty-year-old tape was in good condition. Those were the days before urethane base and binder materials came into favour. The story could be different in the future when engineers try to play the Cole trick with tapes which were made in the ten year window around the 70s when manufacturers were using the dubious urethane formulations which we now know can turn sticky in humid air.

Seeing Natalie Cole win her Grammy prompts another of those recommendations I sometimes give for books worth reading on a long haul flight.

Try *Singers and the Song* by Gene Lees, himself a singer and songwriter. There are some nice anecdotes about the music and recording industry. Like how Johnny Mercer founded and built Capitol Records on a policy of only releasing music he knew and liked. Nat King Cole's record sales helped build the company to immense success.

Later Mercer and his partners sold Capitol to EMI. When Cole phoned the record company the receptionist chanted 'Capitol Records, home of the Beatles' at him. And she had never heard of Nat King Cole.

Lees also tells the inside story of the crippling dispute between the US record and broadcast industries in the 1940s. ASCAP, the American Society of Composers, Authors and Publishers, wanted more money for music played on the radio. The radio stations said no and ASCAP pulled all its music off the air. Broadcast Music Incorporated, BMI, signed up composers and did a deal with the radio stations while ASCAP lost \$300,000 a month. When ASCAP settled, it was for a reduction in fees from 5% to 2.5%.

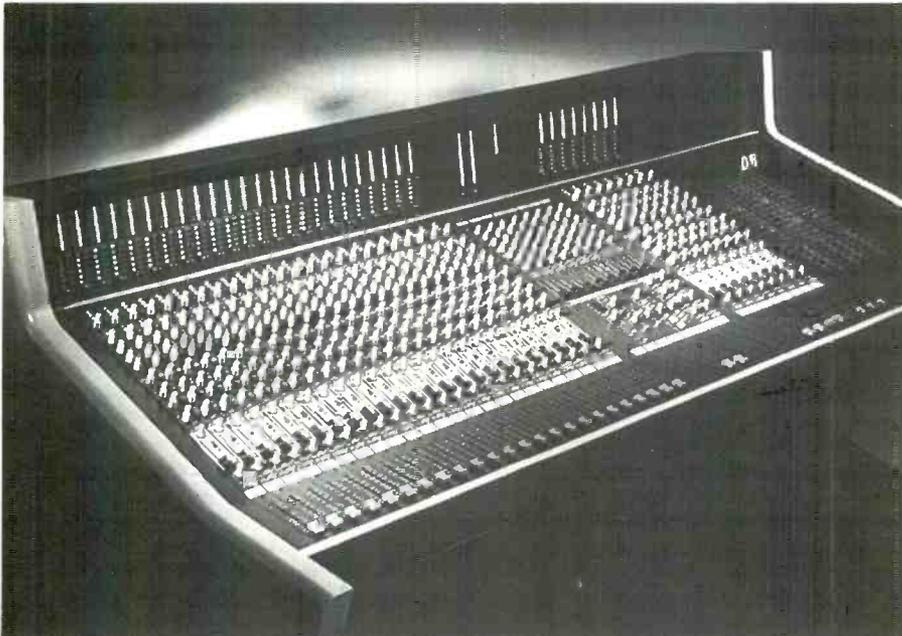
James Caesar Petrillo, President of the American Federation of Musicians, then got in on the act. Petrillo said that radio was costing musicians jobs and called all union members to stop making records. The only exceptions were singers, with choral group backings. Later, of course, the music industry became so anxious to get its records played on the radio that the idea of payola was born.

Funny old world, isn't it. ■

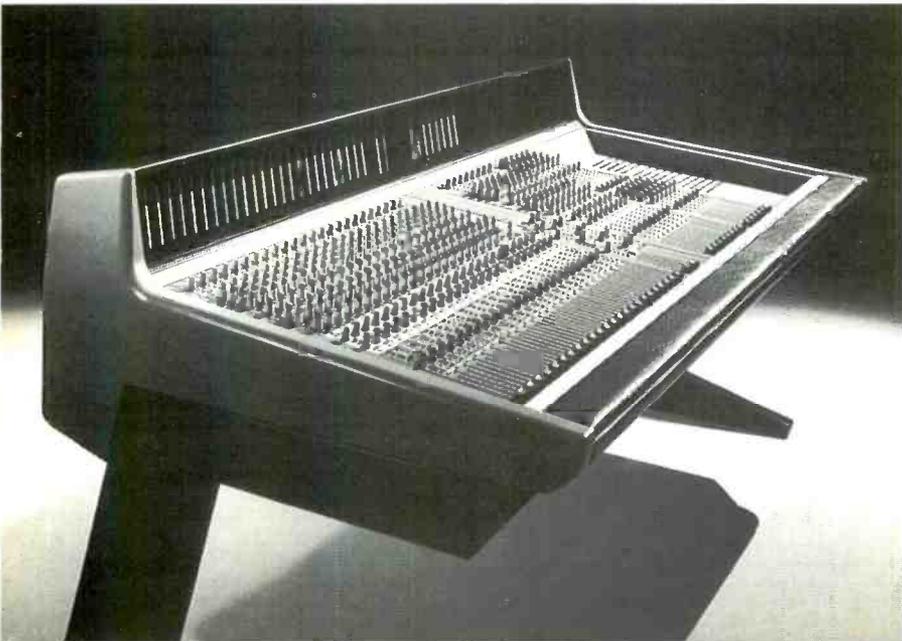
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EVERY SOUND UNDER CONTROL.

Jack Banyon was never impressed during his sallies into the so-called professional audio shops in London. The experience always made him feel rather cheap — like a tart shopping tricks, he thought. This time he really needed to buy a DAT recorder. His studio was a smallish 24-track garden variety kind of place, just barely staying ahead of the home studio cut-throats who he had to compete with. But, he had just installed an all-digital Japanese console with digital equalisation and reverb outboard in Studio B. All of the equipment was interfaced through a Macintosh computer and fed to a Japanese digital multitrack recorder — the kind that used 8 mm videotape. He was really proud of the setup and knew that it would bring back the bands he used to record for.

He knew that he had missed the boat on recording, however. He had really believed that he would be able to mix back down to two-track analogue or lay the digital pair onto 1/4 inch U-Matic. It had become painfully apparent that he needed two DAT machines and so he stood at the threshold of 'Audio World — Your Gateway To The Record Profession.' Passing under the sign, he felt like a cut rate digital Dante, 'abandoning hope, or at least your pocketbook, all ye who enter here!'

'Well, g'day to you mate,' cooed Cyril, the sportily dressed salesperson.

'God, I'm sunk,' thought Jack to himself. 'It's Crocodile Dundee in sharkskins so dazzling they must sample at 48 kilohertz.'

'What can I do for you,' queried Cyril.

'I was interested in two DAT recorders — balanced input, ready with remote controls,' answered Jack.

'Well, I would like to show you our top-of-the-line special this month,' interjected Alan — Cyril's running mate.

'My God, they travel in two's — just like sharks,' thought Jack to himself. 'I was actually interested in another brand,' Jack volunteered.

'Oh, you wouldn't want that, old son,' stated Cyril as though for the record.

'No, not at all,' Alan chimed in. 'The warranty plan is just awful and there is virtually no technical support from the maker.'

'Now look, mate, I have taken kindly to you and I am going to give you a special discount on the machine we are featuring. And I will throw in the operating manuals and all of the accessories absolutely free.' Cyril took a deep breath to refresh his lungs after the discourse.

'They're doing this a *cappella* — from one to the other,' Jack conceded to himself. 'Isn't this an older model,' he queried.

'Proven technology — no system bugs here,' replied Alan as though playing team tennis with his sales mate.

'I think I'd rather go back to my studio and think about it,' stated Jack.

Cyril interposed his rather elaborate bulk between Jack and the doorway. 'Now look here mate. We're about to throw a couple of shrimps on the barbie and open a couple of brews out back. Why not take a nice break with us and make your decision.'

Jack winced, 'I wish you a good day, gentlemen and I use that term loosely.'

Martin Polon

Our US columnist introduces a rogues' gallery of sales people

As a public service of this column, we bring you a guide to the sales personnel you might encounter in the process of buying professional audio equipment for home or studio. The above encounter is, unfortunately, a condensation of several experiences that I had in accompanying a studio owner on a shopping spree. Unbelievable, you say? It clearly is behaviour that one assumed when out with door-to-door vacuum cleaner sales. But a careful examination of any kind of retail today is enough to develop a cold sweat.

The professional audio marketplace has fused permanently with the consumer audio arena. Many companies both make and market audio equipment for the professional and for the consumer. Many dealers professional in both their product line and their sales demeanor have perished during the latest recession. In their place has come the 'pro audio stores from hell,' often owned by consumer audio interests and staffed with consumer audio sales types. It would be unfair, however, to suggest that the problems of unskilled, unethical and unmotivated sales help are confined to the wonderful world of electronic entertainment. A recent syndicated newspaper cartoon published in most of the major US papers had the comic strip's regular character trying to buy a car. The character's soul searching had the words 'honourable' and 'integrity' in play. The point of the cartoon was that the salesman depicted had to refer to a dictionary to understand those two words.

At any rate, it might be interesting to examine the various strategies used by audio salesmen and saleswomen to sell professional audio products to audio practioners:

The Futurist

Waiting for Godot could be the best description for this hardy existentialist, who will launch into a lengthy discussion of how the product you want to buy is already obsolete. The appearance of a much better product is promised to be 'just around the corner.' The only thing this self-destructive individual cannot identify is just which corner, when and where! Many potential customers

express amazement to see these folks employed because it would seem that they cannot possibly sell anything. But these 'audio philosophers' are either living in another time zone or will combine their pitch with a segue to another product.

The Bait and Switch Artist

This good fellow will find any excuse to move you away from the product you want to the one he wants to sell! There usually is an advertised special to get you in the store in the first place. The advertised special is usually out-of-stock. It is truly amazing how often the last of the specials 'was sold just before you came in.' The sales 'engineer' may be getting a premium from store management to move older stock or the store might have received a carload shipment from the manufacturer with a defective spray job on the bottom of the chassis. At any rate, your pal and mine will just happen to find 'just the thing for you.'

The SPIFF Specialist

Whether a guy or a gal, this salesperson knows that a particular manufacturer has set an identifiable quota of specific products. If they sell the right number of those units, they will win an all-expense-paid trip to Acapulco or to Honolulu or to Kingston-town. Wander into a store specialising in the personal and project studio marketplace and try to buy something competing with the product with the SPIFF 'attached,' wouldn't you or I do the same thing? It is, after all, reasonably predictable behaviour. Incidentally, SPIFF is supposed to mean Sales Personnel Incentive Follow-up Form — referring to the travel points accruing via paperwork accompanying each sale.

Mr Audio

This guy, or his female soul mate, know everything there is to know about audio and what they don't know — they will invent! It is virtually impossible to ask a question that cannot be answered by these experts to gain a sale. Accuracy is another question altogether. A frequent observation is if these self-proclaimed audio geniuses know so much, why are they still working in pro audio retail?

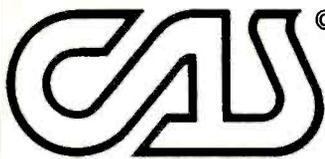
The Hi-Fi Salesperson

This is someone who has clearly died and gone to the pro-audio heaven! Ever grateful for leaving the land of K-Mart and the clarion call of 'Attention Shoppers,' these sales people may be among the nicest retail personnel you will ever encounter. They may not have all the answers but they are generally not afraid of asking questions. If you find one, hang on to them. They will do anything to avoid going back to the world of 'say mister, what's a stereo?'

The Sound Guru

This fellow dresses as if Bob Dylan and Arlo Guthrie concerts were taking place this weekend. There are several variations on a theme here. Some actually lived the renaissance era of audio in the sixties and others only pretend to. He frequently mumbles a lot when asked a technical question. ▶

This is someone who has clearly died and gone to pro-audio heaven



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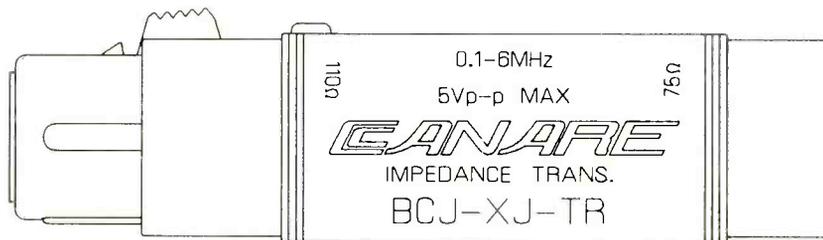
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The Historian

The diametrical opposite of the 'Futurist.' This prophet of the audio past is constantly comparing current products with those of audio antiquity. Worse, there is frequently an uncontrollable compulsion to sell used and ageing products to his or her customers.

The Friend

This sales person wants to 'bond' with you on contact. 'An instant "friend" for life,' is how one studio owner describes her favourite salesperson. Sometimes the relationship can be helpful. Certainly first name recognition is pleasing to the ego upon entering an audio retail establishment. But, beware that the 'friendship' works both ways!

Mr or Ms Suede Shoe

Clearly a former used car salesperson, with the whole bag of tricks accorded therein. High pressure sales behaviour of the most obnoxious kind. It is a miracle that one of them has not killed a customer who responds to their plaintive query with 'just looking.'

The Guilt Tripper

Clearly of Eastern European ethnic extraction. This sales specialist will make you feel really terrible about the unit you are trying to buy. The idea is to make you feel just how much you are missing by not buying the higher price spread! And curiously, these folks usually succeed.

The Exorcist

A specialist whose only mission in life is to protect you from the obvious dangers of buying a product that his store does not carry. You will be mercifully spared from having to deal with crazed customer support staff, inferior construction and second-rate chips, minimal warranty support and virtually non-existent service after sale. What he doesn't add is that the product he is pushing is about the same — more or less!

The Funeral Director

This calm and sober individual will give you a sense of peace and tranquility you have not felt since you laid dear old Uncle Henry at Forest Rest Gardens. If you buy the products that he or she endorses, you will never feel pain again.

The Financial Analyst

This salesperson is easily identified by the financial calculator that is forever with them. When they exit to use the restroom, you can hear the calculator keys clicking from behind the door. Every fiscal aspect of your proposed buy will be analysed from amortisation to zero interest credit. Minor points like frequency response and distortion specifications are simply too arcane to be discussed by this individual.

The Bargain Specialist

'I Can Get It For You Wholesale,' should be the credo of this class of salesperson. When they volunteer to get you something the store does not stock and at a substantial discount to boot. It is time for you to become nervous. Either this wizard is ordering unofficially and juggling the inventory or else has a direct line to the felons at Midnight Audio Supply Inc. Be especially suspicious when you are asked to pick up your purchase at a location other than the store. Bail out then and there or bear the risk of being arrested for receiving stolen property!

The Good Samaritan

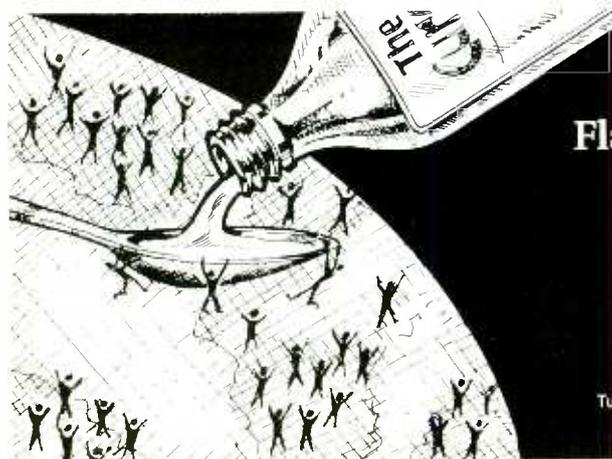
This helpful soul will promise almost anything to get a sale. You need an extra set of manuals — no problem. You have to have delivery by Monday evening at six — no problem. You need an extra set of line repeating transformers for the input — again, no problem. You really need someone to come into your studio and teach the staff how to use the new frammer jammer — you guessed it, no problem. Once the deal is consummated and you need to have these various promises made good on — now that's a problem!

It is important to recognise two things. First, this handy guide to professional audio sales personnel is somewhat tongue-in-cheek or hoof-in-mouth — whichever comes first. There are some really excellent people out there selling audio equipment. There are also some really dismal examples of human beings trying to make a living at the expense of their fellow man and woman! It is important to remember that all salespersons are earning their livelihood by selling professional audio equipment. Generally speaking, the more they sell the more they earn. Most are on

commission and many of those who are not must have been recently released from 'Shady Rest', since it is precious difficult to earn a decent wage without commission. And, it is vital to remember that no matter what — sales people are not your 'friend.' They are not your enemy either but are simply doing their job. One former pro sales 'artist' put it down succinctly. 'We are paid to sell equipment. We go out of our way to create a good relationship with our customer clientele. But we are not your buddy! If you really want to make friends, to a bar and buy a round of drinks for the house!'

Needless to say, there are some very good people in the business of vending professional audio equipment. Most, if not all, of the 'bad actors' are found in the walk-in retail sector rather than in the servicing of regular customers. A long-time pro audio salesman opted thusly: 'for the audio sales professional who works out of his or her car and calls on a regular list of customers, there are three rules that must be followed. 1. Client Relationship! 2. See 1. 3. See rule 2. In other words, the regular outside salesperson calling on a list of established customers has only two choices. Be straight with your customers or be unemployed. Honesty is preferable to living in a cardboard box.'

Nevertheless, a recent study of professional audio consumers identified audio salespeople as being the source of the least desirable interpersonal business relationships, with the possible exception of lawyers and US columnists for international audio publications (present company excepted, of course). The major component of the retail problem is that retail sales staff in all walks of life frequently assume that there is a virtually unlimited pool of new customers and that old customers will shop price and other factors before returning for repeat business — if at all! There is also a burnout factor with sales people spending significant amounts of time on product explanation with a new customer, only to find that said customer decided to buy the product via mail order. The bottom line — be professional in all your business dealings with vendors and demand that same level of professionalism from the individuals who sell you studio audio equipment! ■



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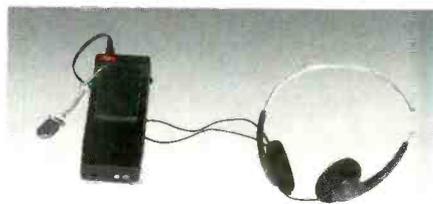
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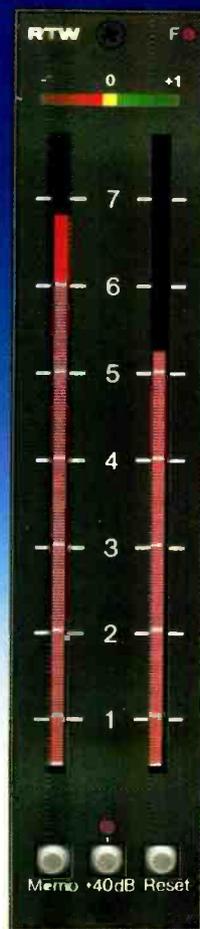
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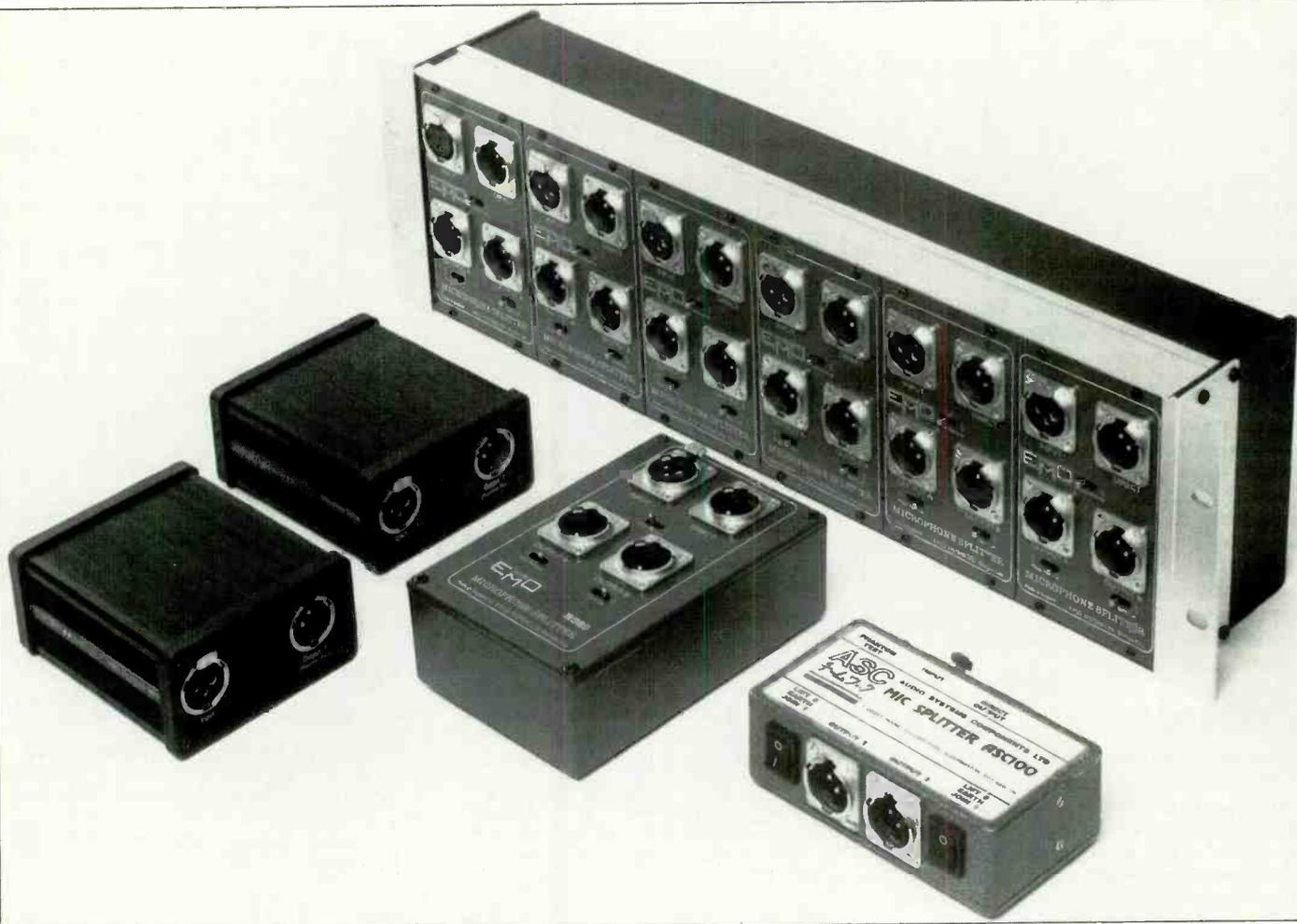
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SPLIT DECISION

A technical comparison of three passive microphone splitters by Sam Wise

On many occasions, the output of one microphone must be split to feed a number of different sound mixing consoles. At the simplest level, this is to provide feeds for both front-of-house and on-stage monitor consoles. Frequently, either a recording console, or outside broadcast console, or both, are added to the system. And in extreme situations, for example major sports events, tens or even hundred of feeds may be required. Obviously, this last example falls out of the scope of simple microphone splitting — which is usually limited to a three or four-way split.

Y-cord

It has been the practice at the low and middle end of the sound hire business to split the microphone with a simple parallel or Y-cord. This is the least expensive method, but has several practical disadvantages — firstly, the failure of any piece of cable or electronics within the mixer input systems will cause a total failure everywhere; secondly, the inputs on consoles which can be at widely varying

locations will be paralleled, introducing possible earthing problems; and thirdly, the microphone may be loaded in a way which will not only alters its level, but also frequently balance.

To examine the difference between a theoretical microphone (a 200 Ω resistor) and a real one, we measured the theoretical variety, and compared it to a real Shure SM58 microphone loaded with three cables of about 20 m length, short in comparison to many real situations.

Initially, we measured amplitude versus frequency of a single theoretical microphone (Tmic) into one mixer channel, and the same Tmic into three channels in parallel. As expected the level dropped by about 2 dB as the number of channels connected increased from one to three, but the frequency response remained flat. The

level change will directly result in a reduced signal-to-noise ratio of the same amount. The Tmic did not exhibit any change in frequency response, but what will happen if a real microphone is connected? This we will see later in Fig. 5, which compares the Y-cord result with the passive splitters.

What about common mode rejection — the ability of a balanced microphone, cable and mixer input to reject interfering signals? Our measurements showed that when a well designed input circuit is used, the CMRR of the inputs connected do not interact, therefore, paralleling microphone inputs does not usually reduce the interference performance of other inputs.

ASC100

The ASC 100 is a three-way passive microphone splitter housed in a grey hammertone paint finished die-cast box. It is the least expensive of the units tested. The Switchcraft XLR compatible connectors (which look a lot like badged Neutriks) are mounted on the two long sides. Side one contains the Input and Direct Output connections. This output is directly in parallel with the input and provides phantom pass-through. An adjacent PHANTOM TEST push button and led indicator allows the presence of a phantom voltage to be verified. This is the only unit we know of with this feature. ▶

MANUFACTURER'S SPECIFICATION

These were only provided by EMO
Frequency Response 20 Hz to 20 kHz ±0.25 dB
Input Level Maximum of +4 dBu at 30 Hz
Output Isolation Shorting Output A or B to ground reduces the level on the other by 1.5 dB

Stick-on feet keep the unit from scratching the surface.

On the opposite side of the box are the two additional independent transformer isolated Output 1 and Output 2 connections. These have adjacent EARTH LIFT rocker switches, which do not have gold-plated contacts.

Internal construction is hand-wired. Series resistors on the Output 1 and 2 connectors are soldered directly to the connector pins at one end, and to wires at the other, with an overall sleeve. Soldering quality is reasonable. On arrival two of the connector inserts were loose and pushed into the unit when connectors were inserted — this can be a feature of Neutrik PCB connectors when used without a PCB, and partly depends upon vigorous twisting of lock mechanism. The unit's construction provides no protection for the locking lever on the female XLR, nor for any of the switches.

Canford

The Canford microphone splitter is housed in an extruded aluminium box finished in black anodising, identical to that used for the successful TecPro intercom system. Tough glass-filled nylon bezels at the box ends protect the connectors and switches from damage under most circumstances. PCB mounted Neutrik connectors are used on this unit. They are retained not only by their locks, but are also sandwiched in by the internal PCB running from front to rear. The connectors are properly retained to the PCB by self-tapping screws.

One end of the box houses the Input and Output 1 connectors, which will pass phantom power. The opposite end contains the Output 2 connector with a further Output 3 in the three-way model.

Internally these units are identical. The Output 2 and 3 connections were found to be wired in parallel, with no isolation between them, while the Input and Output 1 connection are on the same transformer winding, but different taps. Outputs 2 and 3 are fully isolated from Input and Output 1.

Internally, all connections are on the PCB, which contains a Lundahl transformer. This transformer is enclosed in a metal case, but there are no tabs securing this case to the PCB, therefore all mechanical retention depends on the connection pins. In the past, larger versions of these transformers have been known to pull themselves free from the PCB if dropped from a height, but

this is lighter and therefore less likely to happen. Even so, a retaining bracket on top would reduce the risk.

The EARTH LIFT switches provided on Output 2 and Output 3 are miniature C & K slide switches with gold-flashed contacts. These completely isolate the pin 1 connection on the box from the case and the Input and Output 1 earth systems. The box itself has no AC or DC connection to earth, so will not form an electrostatic shield around the internal circuitry.

EMO

The EMO unit comes in either a stand-alone version, enclosed within a die-cast box, slightly larger than the ASC unit; or in a 6-channel, 3 unit high rackmount. The finish is black epoxy powder coat with attractive yellow labels. This is the most visually attractive of the three units.

Again Neutrik PCB mount connectors are used, this time with a back-mounted PCB linking all switches and connectors. The connector PCB mounting screws are also fitted on these units. The transformer is a cylindrical can construction, fixed to the PCB with two screws and having fully sleeved flying leads soldered to PCB pins.

All of the connectors are on the top surface of the unit, along with several miniature toggle switches, all with gold-flashed contacts for reliability. Unlike the other units, the EMO provides PHASE REVERSE switches. Circuitry is shown in Fig. 1. Direct is connected in parallel with the Input, while Output A and B are individually transformer-isolated from the Input. Both Direct and Output A can pass phantom power, with internal links to disable the power through Output A.

The units were well constructed. The input connector lock is subject to potential damage in the single channel version, while all switches are well protected by adjacent connector bodies.

The EMO is the only unit to provide any circuit or performance specification information.

Performance

All units were measured for amplitude versus frequency (frequency response) at various levels, THD+N versus frequency at various levels, common mode rejection ration, loading or gain reduction and the effect of shorts on other outputs. These are summarised in graphs which display the worst cast performances of each unit on the same

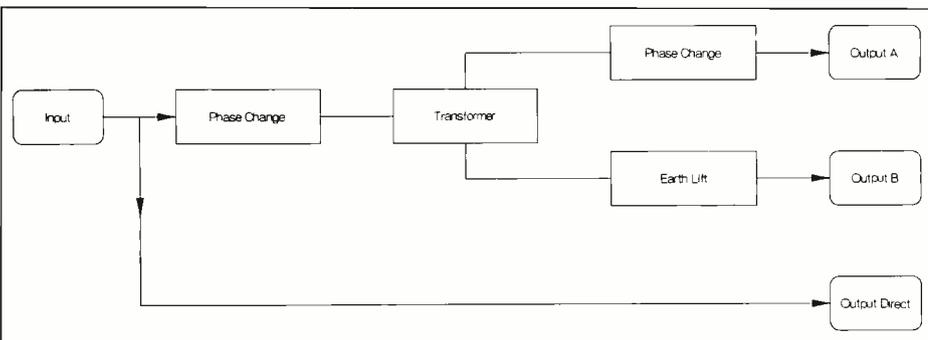


Fig. 1: EMO E325 block schematic

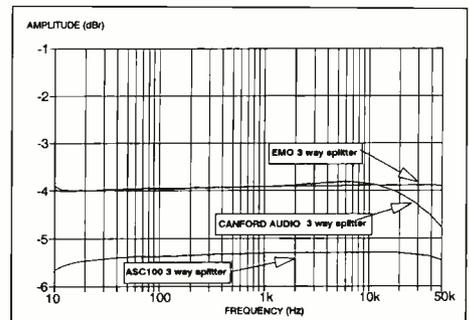


Fig. 2: Amplitude vs Frequency response of splitter outputs, each loaded with 1K2 Ω. Input level -40 dBu. Worst output of each splitter shown

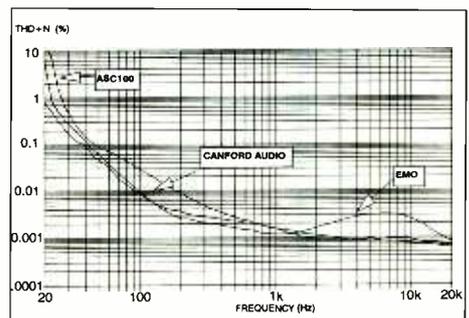


Fig. 3: THD + Noise, level + 10 dBu, all outputs loaded

graph for comparison.

Initial amplitude tests were performed using a 200 Ω resistor to simulate a microphone and 1.2k Ω resistors to terminate the splitter outputs. For these tests short cables were used, displaying only the errors caused directly by the splitter units. A further test was then performed using a Shure SM58 microphone — first parallel split (not splitter box), then split three ways by each splitter box in turn.

Amplitude and Phase vs Frequency: on initial tests the EMO unit has the best performance, being within -0.05/+0.07 dB under all loading conditions. ASC100 is next with -0.12/+0.15 dB on each output. Canford is worst at -0.08/+0.5 dB when measured on Output 1. The EMO phase response is also best, rising only 5° at low frequencies, with no phase error above 500 Hz. These results are shown in Fig. 2, and none of them are likely to be audibly obvious, all deviations being minor.

THD + N: here again, the units are similar, with EMO unit coming off marginally worse when driven at +10 dBu, well above normal limits. Fig. 3 shows the THD+N of all units when operating at this high level.

At lower levels distortion remain below 0.1% at the lowest frequencies, typically dropping to 0.002 % at 300 Hz. The ASC is worst here, not reaching the lowest distortion level until 600 Hz. Again, all deviations are small and not audibly important.

Common Mode Rejection Ratio: this was measured at -30 dBu. Here also units are similar, ▶

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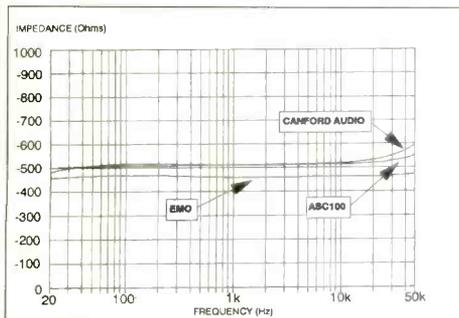


Fig. 4: Input Impedance of each splitter. All outputs loaded with 1K2 Ω. Level at -20 dBu

with the ASC unit marginally worse off, by 2 dB, than the *Canford* and *EMO* units. In general, the CMRR of the main output is virtually unaffected by the mixer microphone inputs connected to the other splitter outputs.

Input Impedance: the effective input impedance of the splitter under full load conditions was tested. The *Canford* and *ASC* units were similar, creating 500 Ω loads on the microphone, while the *EMO* reflected a load of 460 Ω. See Fig. 4.

Load Isolation and Insertion Loss: all measurements were made with all outputs loaded on the three-way splitters and are measured with respect to the 200 Ω generator output connected to a single mixer input.

The results are shown in Table 1, 2 and 3. It can be seen that *EMO* and *ASC* favour the direct output over the others, giving a higher performance to a selected main console; while *Canford* has chosen to balance the losses across all outputs evenly.

TABLE1: CANFORD 3-WAY SPLITTER OUTPUT ISOLATION AND INSERTION LOSS

Canford 3-way Output Measured	Output Shorted			Insertion Loss - All o/p loaded
	Output 1	Output 2	Output 3	
Output 1	X	-10.21 dB	-10.21 dB	-3.10 dB
Output 2	-12.57	X	No output	-3.93 dB
Output 3	-12.57	No output	X	-3.93 dB

TABLE2: EMO E325 3-WAY SPLITTER OUTPUT ISOLATION AND INSERTION LOSS

EMO E325 Output Measured	Output Shorted			Insertion Loss - All o/p loaded
	Direct Output	Output A	Output B	
Direct Output	X	-4.35 dB	-4.33 dB	-1.76 dB
Output A	No output	X	-7.37 dB	-3.91 dB
Output B	No output	-7.42 dB	X	-3.94 dB

TABLE3: ASC 100 3-WAY SPLITTER OUTPUT ISOLATION AND INSERTION LOSS

ASC 100 Output Measured	Output Shorted			Insertion Loss - All o/p loaded
	Direct Output	Output 1	Output 2	
Direct Output	X	-2.64 dB	-2.62 dB	-1.48 dB
Output 1	No output	X	-6.82 dB	-5.30 dB
Output 2	No output	-6.83 dB	X	-5.33 dB

The *EMO* and *ASC* units do not provide any isolation when the Direct Output is shorted, but give acceptable losses in other conditions. The *Canford* design produces some isolation when the Direct Output is shorted, but increased losses in other fault conditions.

Comparison

The Shure *SM58* microphone was connected to the splitter by a short jumper, followed by cables of about 30 m on each of the splitter outputs. These are, of course, shorter than in a typical real application. Each of these was in turn connected to a nominally identical mixer channel.

Measurements were made on each output in turn, using the same reference mixer channel to remove the possibility of differences resulting from causes outside the boxes.

The results are shown in Fig. 5. Each of these curves is a difference curve, where the reference is the frequency response output of this microphone connected to only one mixer channel by 30 m of cable. Therefore the microphone frequency response is taken out of the curves. All of these curves reveal a frequency response dip of about 200 Hz. This is caused by an interaction between a resonance within the microphone itself and the reduced load impedance of 500 Ω appearing on the microphone. This compares to the designed load of

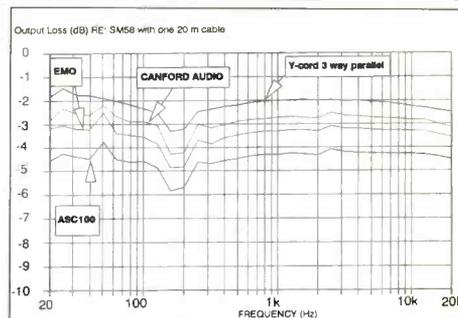


Fig. 5: Signal Loss vs Frequency of each type of split, using an *SM58*, referred to the same microphone connected to single mixer input channel. Note loss at about 200 Hz

about 1.2k Ω from a standard microphone input. This dip of 1.5 dB could be clearly audible. Note also the high frequency roll-off, which is mainly caused by the reactance of the microphone cable. All of these effects are typical of dynamic microphones. Otherwise the curves more-or-less parallel, indicating that the difference is mainly one of insertion loss, with the Y-cord winning, and the *ASC100* worst.

Conclusion

Any of these microphone splitters will give the user the benefit of reduced risk of earth interference, and less impact on the system if one outlying cable portion is damaged. For this, there is a small price to pay in terms of insertion loss, and therefore noise, compared to a Y-cord type of splitting arrangement.

Overall, the best unit seems to be the *EMO*. Its good performance combined with independent Outputs A and B, plus phase switching make it most versatile. Shorting pins 2 and 3 of the Direct Output does, however, totally shut down all outputs. As specified, shorting either Output A or B signal to earth results in only 1.5 dB signal loss on the other output.

Close behind are the *Canford* and *ASC*. The *Canford* box has better performance and is more robustly made, but the *ASC* is marginally less expensive and is the only box to provide any isolation when pins 2 and 3 of the direct output are shorted. Otherwise, given a good mains supply, quality earthing, not cable faults, and well designed mixer microphone inputs, the Y-cord gives a surprisingly good result.

In a recent article in *S&VC*, Ben Duncan examined the theoretical benefits of an active splitter compared to passive splitting. When active splitters are used, the system can be constructed so that the microphone sees the effect of a single input (as designed), while the outputs are buffered from each other. This removes the frequency response error which is evident in the above passive splitting arrangements, while having only a minor cost in signal-to-noise performance. This is more costly, but gives best technical performance. Unfortunately we were not able to obtain one for this review to confirm the theory. ■

ASC, 1 Comet House, Calleva Park, Aldermaston, Berkshire, UK. Tel: 0734 679565

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Apogee	38		
Ampex	39	LA Distribution	14, 15, 68, 69
AD System	70	Lexicon	28, 29
Audio & Design	46	Lyrec	56
Audio Technica	89	Larking Professional Sales	101
Avalon Design	84		
Abacus	92	Malcolm Hill	54
APRS	92		
		Neve	23
Bruel & Kjaer	84	Nagra	86
BSS	85		
		Otari	53
Calrec	80, 89		
Carlsbro	49	Phil Drake	80
		Penny & Giles	42
Digigram	13	Plasmec	64
D.A.T.	32	Peavey	73
Dolby	61		
Drawmer	77	Quested	40, 41
DACS	84		
D&R Electronica	94	Roland	43, 45, 47
		RTW	98
Euphonix	50		
		Soudercraft	IFC
Focusrite	OBC	Solid State Logic	4
Future Film Developments	96	Schoeps	31
		Studer	18, 19, 35
Genelec	91	Saje	44
Goutam	36	SPL	48
		Sennheiser	55
HHB	11, 30	Soundtracs	57
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A few weeks ago I was helping out an old musician friend at a studio I had never worked in before. I had been cajoled into joining in with 'backing vocals' among a small cast of thousands. It was the first time that I had been 'working' on this side of the glass for several years and it was great fun.

But it could have been a lot better and, more importantly, easier to achieve the same result. The problem came solely from communications or the lack of them.

Talking back

Communication is the very essence of recording. Musicians have to do it among themselves and in a slightly less frequent way the production staff have to join in as well. In many cases the role of the producer has become too sedentary, stuck behind the console rather than directly speaking to the musicians.

There is also the operational point that you can't keep running into the studio area every time you want to say something — it is just too disruptive. So communication happens through the talkback, but what shape is it in. It is not a selling point on a console — 'This one's got a great talkback sound sir!'

It is just too far fetched. The selection of talkback destinations may have become very sophisticated with the possibility of addressing each of eight foldback buses separately but what happens the moment the talkback key is hit?

The mic used in most consoles is now both smaller and more sensitive while hidden away so that you really have to look for it. The minute the key is hit, the whole room and its contents are squirted into talkback circuit. The musicians, possibly receptive to comment, are left straining to hear the words clipped by the switching noise of the key and the blast of control room ambience while the engineer tries to second guess the producer who seems to automatically when he speaks.

Although decidedly unfashionable these days, the old style of gooseneck mounting for the mic at least led to a relatively clean signal leaving the control room. Although I make these comments I would be interested to hear from anyone with mere positive experiences of flush mount talkback mics than I have.



Good manners

One of the problems of the session that we came in on was this failure of communication across the glass. It takes nothing less than real wisdom to know how to talk to an artist from the control room over the talkback. Even the most experienced vocalist needs comment, encouragement and guidance. There is something about talkback that is simple in concept but great care has to be taken with choice of words because they always sound different to the recipient.

The emphasis is somehow frequently misunderstood even if the producer is on top of the situation and available to talk the artist through the difficult bits. Too often I have seen a singer's delicate energies lost because they were left waiting, uncertain, while the engineer/producer conversed before commenting to them. It is bad talkback manners but unless you are on the receiving end it may not be realised.

Before writing this column I spent some time looking through several of the normally recommended books to find anything about the importance of attentive

communications and the talkback but found very little. Producer Phil Waiman's chapter on the role of the producer in *Sound Recording Practice* (third edition, Oxford University Press, edited by John Borwick) at least gave a good feel for the importance of interstudio communication as part of the producer's principal functions. The only other reference that I could find was a chapter in Sherman Keene's *Practical Techniques For The Recording Engineer* entitled 'Audio Psychology' (SKE Publishing, ISBN 0-942080-08-4, 1981) where I think he manages to express some of the problems found at the interface between art, technology and the ego.

Is there any way that sensitivity to the talkback communication can be taught and does anybody attempt it? I guess the only real answer is for every engineer to spend some time on the receiving end of the talkback preferably with his own artistic creativity under scrutiny and then you learn really fast what the artist goes through. It is quicker than waiting for the experience of the years to embrace the engineer by which time he will have had the

opportunity to be less than constructive on hundreds of occasions.

Alternatives

Well there are some but are they realistic? I have often felt that nothing beats the producer actually being out there with the artist(s) during those key times in the session. I know that it may mean he will not hear the performance in context but this may not matter quite so much.

Some studios have tackled the problem in a rather more serious style by removing the studio window and wall, and it works! The Soundstage in Nashville tried that and I was told that the extra communication and end result far outweighed the inconvenience to standard operating procedure. I have recorded vocals and most other instruments in the control room at various times, as I expect many have, almost always with good end results.

Other possibilities that might be considered are electronic message boards for cueing and comment without stopping the tape machine; the use of a graphics tablet and monitor for written notes; a speaker that automatically relays control room mic output to the cans or speaker as soon as the tape stops; and something I have always done — install mics from the studio floor to a small speaker in the control room that is under manual mute control to allow the producer to get a real feel for what is actually taking place on the studio floor by listening in without losing half the conversation due to the talkback key being in the ON position half the time.

Distance

The role of the talkback communications system should be to help overcome the distance and the glass between the control room and the artist not to reinforce it. That, together with the foldback/cue circuits, are the important outputs of your console that you never hear. It is only a casual suggestion with no real answer but is there anything that any of the newly introduced digital consoles could do with some of that digital processing capacity that is largely under used in the overdund mode? How about a little noise cancelling for starters and then maybe voice recognition? ■

Some of the outputs of your
console, you never get to hear.
Keith Spencer-Allen talks back

HENDRIX

FROM THE MAKERS OF MOZART

LEVELS

One Meter per input channel with Stereo VUs give comprehensive, at-a-glance indication of the state of your mix.

CLASSIC SOUND

AMEK's 4-band fully-parametric equalizer with swept pass filters. This is the equalizer which established AMEK's envied reputation for audio performance through hundreds of hit records over the last decade. Why settle for anything less?



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OPTION

Computer-controlled SUPERTRUE Digital Dynamics on every channel. Compressors, Gates, Limiters, and other Dynamics devices controlled from the computer and stored with the mix. A new first in automation.

PRICE

All of this comes for a ridiculously reasonable price. Buy your ticket to audio perfection and bring reality a little bit closer.

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Balanced inputs, outputs and busses are all carefully designed to give HENDRIX clean, quiet, crosstalk-free interconnections.

AUXILIARIES

12 balanced auxiliary busses give you the flexibility to address a wide range of Effects devices. All the control you need in today's complex, heavily-processed mixing environment.

VERSATILITY

Two panning and monitoring modes allow HENDRIX to be used for Recording (two channel stereo) and Film (3-channel stereo with Surround).

INPUTS

Each channel has two discrete paths; Eq can be split between them, giving 80 Equalized inputs. In addition we give you 4 complete stereo inputs with 4-band Eq and sends, and 4 stereo Effects Returns. Enough inputs to cover most recording and mixing situations, in a console under 2 metres wide - including the jackfield



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