

JUNE 1993

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# STUDIO SOUND

AND BROADCAST ENGINEERING

THE INTERNATIONAL PRO AUDIO MAGAZINE

## APRS PREVIEW

Showtime in London

# LOGIC 3

Exclusive in-depth report on  
AMS-Neve's new console

# VariCurve

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AND BROADCAST ENGINEERING

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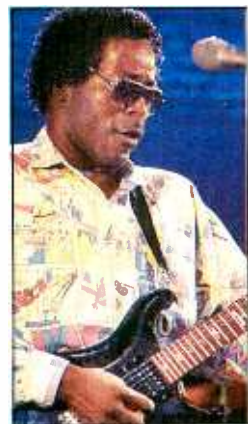
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# STUDIO SOUND

AND BROADCAST ENGINEERING

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## The Main Event

Although it could be regarded as presenting a contradiction in terms, it would be accurate to describe the original purpose of music recording as being to capture a live acoustic event. That the recording was an accurate representation of that event was an inescapable consequence of the simplicity of the available equipment. The contradiction obviously arises when one considers that, once captured on some recording medium, the event can no longer be described as 'live'. Quite apart from the fact that performers are no longer involved in the 'performance' of the musical event, the control offered by the replay system over the recording effectively makes the replay a unique event in its own right—not simply because you can alter such parameters as the volume and tone colour but because you can control your listening in a way beyond the practical considerations of using human performers.

A significant departure from this original purpose of recording arrived with the development of editing—suddenly the constraints traditionally placed on a performer had been radically altered. An even more significant departure accompanied the invention of overdubbing. Ever since the first overdub was made, we have been progressively working away from the principles of genuine performance and towards some idea of a 'perfect' performance.

The next step in the 'evolution' of recording came with all the practices and equipment that made possible events not possible in a live performance of any sort—take the now everyday practice of spinning in a chorus, for example; how could a traditional performance really be identical on every pass? The advent of sample-based music sits alongside so-called modern classical music in celebrating a considerable distance from more conventional musical methodology.

Now we have reached a stage where the technology is sufficiently advanced that we are making certain recordings in a way specifically intended to imitate the sound of a live performance, even though in many cases neither the instruments nor their players are what the listener is intended to believe they are.

Without necessarily invalidating any preceding recording ethic, the possibilities opened up by the arrival of new technology have actively influenced the development of the music itself. At the same time, in classical recording particularly, there has been a growing movement back towards that original purpose—the preservation of a genuine acoustic musical event, acoustic included.

Various observations can be made: on a musical level it can be seen that the time spent refining the 'musical performance' of the equipment is now being substituted for human musical performance itself, for example. On a technical level, and more controversially, it can be argued that skill in managing the equipment itself is substituted for the skills traditionally employed to make music.

While this latter accusation can more readily be addressed to artists' activities in their own studios—years ago Johnny Dankworth used to use a *Mellotron* to audition his orchestrations and today Barrington Pheloung uses electronic keyboards to check his—many professional commercial facilities regularly employ the same techniques, if to a lesser extent.

We could choose to argue the relative merits of playing skills, compositional skills and technical skills but any such discussion would have to be conducted in the knowledge that the majority of the public are genuinely unaware of the origins of much of the music they hear—whether it be pop music, music for television programmes or commercials, or many other forms of music. With this in mind, the only rational conclusion to be drawn is that the purpose of the majority of recording sessions is now to deceive the listener rather than present them with a genuine record of a musical event. ■


Tim Goodyer

Cover: AMS-Neve Logic 3

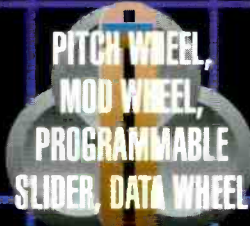
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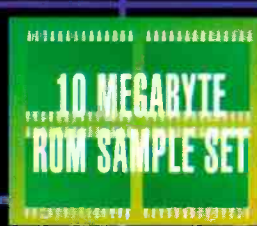
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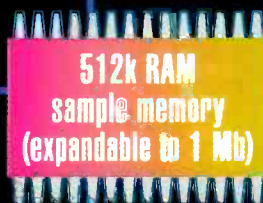
10 MEGABYTE  
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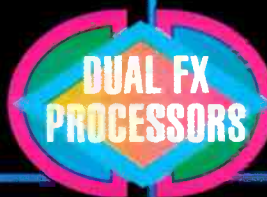
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# International News

## In-brief

● **DATs down at Raper & Wayman**  
Raper & Wayman have negotiated a UK price of £449 including VAT for a Sony DTC-670 DAT recorder.

**Raper & Wayman.**  
Tel: 081 800 8288

● **Altogether now at the Boundary**  
Boundary Row Studios, Node Recording Services, Studio 101a, Beatfarm Recordings, David Ferguson music and Hooj Studios have formed to launch a new audio production facility known as **The Boundary Recording Complex.**

Tel: 071 633 9629

● **FREE! freelance directory**

The Broadcast Freelance Professional Publication provides immediate and direct access to the skills and experience of freelance professionals throughout the UK, and its free!

**BFPF Freelance Directory**  
Tel: 0635 34869

● **Nexo's space goes up a third**

Nexo have announced further expansion to increase its manufacturing facility. The Paris-based company has recently added a third more space to its woodworking factory where CNC technology produces cabinets for their speaker system range.

Nexo Tel: + 33 1 48 63 23 01

● **Exchange makes Europe smaller**

The Audio Exchange, a subsidiary of postproduction company Magmasters are helping Dolby develop their AC-2 coding system for use with the BT digital network ISDN. Magmasters are looking for partners in Europe to develop the digital network. MD Steve Cook commented, 'British and European talent will now be much more accessible, and as we progress we can use the system for both video post and music, the quality is so good'.  
**Magmasters.**

Tel: 071 437 8273

● **Spectral get UK rep and v2.0**

US company Spectral Synthesis now have a UK base for their *AudioEngne* hard disk recording system. Also announced is v2.0 of the *StudioTracks* software with over 100 new features including digital mixing, support for multitrack recording and playback to M-O disks

**Spectral Synthesis**

Tel: 081 964 2365.

Fax: 081 964 3022.

● **Paper expands on compression**

DIGIGRAM and German company CAR have published their proposal for a standard file format for the recording of compressed audio data

## Synclavier owners finalise NED buyout

The *Synclavier's* Owners Consortium, a group of prominent studio owners formed by New York producer Mike Thorne and LA-based composer, Bruce Nazarian, have completed the acquisition of the assets of New England Digital from BayBank of Boston.

BayBank foreclosed on NED's assets on June 19th last year when the company defaulted on its outstanding loan of \$3 million.

According to the terms of the deal, the new concern, known as The Synclavier Company, acquires exclusive ownership of NED's patents, trademarks and software and hardware technologies, free of the debts and liabilities of the previous company.

The Synclavier Company has already resumed sales, service and support of *Synclavier* and *PostPro* workstations from service depots in New York and Los Angeles, and will support independent service representatives in the central US, Canada, England and continental Europe.

The new company, which will have its headquarters at the former premises of New England Digital in Lebanon, New Hampshire, will be led by Griffith W McRee who has been named as President and Chief Executive Officer. Both Thorne and Nazarian will serve as Directors. McRee commented on the company's plans. 'We will immediately begin building new *Synclavier* and *PostPro* systems to meet the growing number of orders we have for new



Madame Tussaud's have opened a spectacular £10m dark ride finale to their London exhibition featuring extensive audio and video trickery, here The Mayor of London is seen escaping down the Thames with his gold after the Great Fire in 1666. *The Spirit of London* ride recreates the sights, sounds and smells in 400 years of London history as you ride through the years in a black taxi. Speakers are cited in the back of the taxis playing a CD-based commentary and soundtrack and cabinets are arranged throughout the ride for other sound effects. Highlight of production was mixing live on the ride to *AMS AudioFile* using Roland's *RSS Sound Space 3-D* system for the numerous ambient effects. Design for *The Spirit of London* was by Tussaud's in-house team, installation was by Shuttlesound and the music was composed by Richard Hartley

systems. For example, I am pleased to announce that we will be shipping two *PostPro SD* workstations to Turkish Broadcasting.'

McRee also announced that the company's R&D team, led by NED veteran Paul Forstman, is working on a variety of new upgrade options for existing systems including removeable disk drives for the *PostPro*. In addition, another upgrade, the MegaRAM 64Mb random access memory cards for the *Synclavier* are now available.  
**The Synclavier Company.**  
Tel: +1 603 448 8887.  
**Europe: 0732 866555.**

## Light across Atlanta

Audio Production Center (APC) and Dixieland Productions (DPI) have become partners in one of the first interfacility projects in Atlanta. The project connects the two independent studios via fibre-optic technology.

The link provides four channels of bidirectional AES-EBU audio, bidirectional SMPTE time code, 2-way cue channel, RS-422 machine control and full duplex intercom over a distance of a quarter of a mile. Video exchange is possible via an additional fibre terminated with ST connectors using standard video modules.

The main equipment involved is the *NVision 2000*, a one-rack unit that can be configured by choice of cards to transmit up to eight digital audio channels over coaxial or fibre. Other modules carry time code, communication and machine control.

The link eliminates tape transport costs and downtime associated with linear facility posting.



A decade of *Synclavier*—NED products in 1983



## A First for Yakutsk

First Broadcast are to build a prewired studio complex for Yakutsk Radio & Television in the newly formed Republic of Saha.

The contract was negotiated through Denis Tyler Limited in the UK, who have been trading with the former Soviet Union for some thirty years.

The studio has to be shipped and assembled during the summer because of the hostile weather conditions experienced there. Yakutsk is between Siberia and Alaska and a mild winter hovers around -30°C!

Based on the *MBI Series 20*, the studio comes complete with all outboard equipment like carts, CDs and cassettes.

Mel Bowden of First Broadcast commented, 'This installation posed one or two problems in view of the possible language barrier and the nine-hour time difference between the UK and Yakutsk. Luckily the chief engineer of the station had a good command of the English language, or we faxed each other during the night.'

The contract is reportedly only the first in a series of new contracts recently negotiated in newly opened CIS markets.

**First Broadcast. Tel: 0273 324928.**

## Gabriel's extravaganza

Peter Gabriel's ambitious 'Secret World Tour' production, which came to London's Earls Court on May 31st and June 1st, blends music with visual theatre on the grand scale.

Two stages are connected by an 80ft 'spline' with a conveyor-belt walkway; performers and props enter and exit via substage lifts and stairs. The set (designed by Robert Lepage and built by Brilliant Stages), plus the 20-tonne sound and lighting rig, is touring back-to-back across Europe—a logistical feat in itself.

The tour also marks the debut for Funktion One's new wide dispersion PA technology. Compatible with the Tony-Andrews-John-Newsham-designed *Flashlight* system, the new cabinets provide much-enhanced



DTS gives you time code and analogue so lost CD-ROMs do not mean silent movies

## Jurassic Park opens on CD-ROM

The latest Steven Spielberg 'blockbuster' *Jurassic Park* has opened in the US with the latest in digital soundtracks.

Digital Theater Systems have developed their *DTS* Sound Processor based around CD-ROM technology. Of the more than 2,000 US theatres that will be showing the film, approximately 1,000 will be equipped with *DTS*.

The digital soundtrack is not contained on the film itself, but on a separate CD-ROM disc. A digital time code printed on the motion picture film controls the operation of a separate CD player wired into the cinema's existing speakers, up to six tracks of digital sound can be cued to the action of the film. The film still contains the analogue soundtrack for

cinemas not yet *DTS* equipped.

Digital Theater Systems claim that systems which place the digital soundtrack directly on to the film strip provide lower quality digital sound, require greater data compression and are more vulnerable to damage than the *DTS* system.

The other two competitive systems (developed by Sony Digital Sound and Dolby Labs) require extra equipment to read data and correct incomplete data. *DTS* cite this as the reason for their system costing much less than the competitors (\$3,950-\$5,950 for the *DTS* system as opposed to around \$15,000 for the other systems). **DTS Incorporated, 31336 Via Colinas 4, Westlake Village, CA 91362, USA. Tel: +1 818 706 3525. Fax: +1 818 706 1868.**



PHOTOGRAPH: MIKE LETHBY

Peter Gabriel waits for a call from the music critics as he delves into the world of *MultiMedia* for the first time since *The Lamb Lies Down On Broadway*.

flexibility in array configurations. The new technology is currently the subject of negotiations between Funktion One and Turbosound.

Since Gabriel and his band use the set as one large stage, the show is mixed as a single entity but divided into six interrelated sound zones. Britannia Row Productions used 70

Flashlight mid-high packs and 78 Flashlight bass cabinets, with 17 pairs of Funktion One's new 'Underslung' cabinets below the arrays and *TMS-4* delay hangs. Responsible for the sound are BRP's system engineers Chris Hey and Huw Richards, FOH engineer Pete Walsh and monitor mixer Bryan Olson.

### Contracts

● **Fibre hastens The Eternal Word**  
A BEC Technologies *ProLine* series fibre-optic audio system has been installed to link production studios to the satellite uplink at the Birmingham, Alabama headquarters facility of the Eternal Word Radio Network

● **NOB Audio prick mobile market**  
Netherlands-based NCB Audio, new owners of the first independent SSL-equipped mobile in Europe, Audio 1, have bookings including a Golden Oldies festival, Veronica Magazine Megaparty and the Metropole Orchestra



Terry Brown and Andrew Bruce with *J-Type*

### ▲ Miss Saigon opens in Canada

Producer Terry Brown (left) and sound designer Andrew Bruce with a CADAC *J-Type* at Canada's *Miss Saigon* production which opened in mid-May.

● **Photo finish at Horseferry Road**  
Studio design and construction company IAC beat three well-known UK specialist acoustic contractors to win the £460,000 contract to provide studios and acoustic components for Channel Four's new HQ at Horseferry Road, London.

● **Controlled room for Mad Hatter**  
Lakeside Associates are to design a new Remix control room and overdub booth for Mad Hatter studios in Los Angeles

● **Capricorn stars at BBC studio**  
The Music Studio at BBC Television Centre have ordered an AMS-Neve *Capricorn* digital desk for recording and mixing music for TV

● **My kinda interface SSL is...**  
Chicago-based production facility Avenue Edit recently installed the area's first SSL *Scenaria* digital audio-video postproduction system and are expecting their second soon

● **Mario Brothers in negative dash**  
Digital masters for *Super Mario Brothers* film were recently flown to the UK for production of the *SR.D* negative on the camera at Dolby HQ

# CHOOSING THE RIGHT COMPUTER BASED AUDIO EDITOR CAN BE A

# NIGHTMARE



Photo: Ewing Pearson Photography

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Here at Studio Audio, we had many sleepless nights when our customers began asking us for an off the shelf solution to professional audio editing. Then we woke up with SADiE™, a dream of a Disk Editor. For a start SADiE™ runs on a PC, so you get much more computer for far less money. It has a fully functional Windows 3.1\* user interface with all features mouse selectable. Our hardware platform is already found in many current audio and video products available from some well-known manufacturers. That means it's been tried and tested out in the field. Studio Audio believes in giving each customer personal service - you'll always get rapid customer support on our helpline. And because we're committed to SADiE™ and our customers, we'll give you the first 12 months software updates free of charge. Put an end to the nightmare now!



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bedtime reading  
matter.



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## Crest rising

At the recent inaugural Live! Show in London, Crest Audio launched four new products; *NexSys* for Windows, Professional Series 10001 and 10004 amplifiers and the *Century Series* from Crest Audio's Crest Consoles division.

The 10001 produces over 3,500 WRMS per channel into a 2Ω load (Crest claim the 10001 is the most powerful dual-channel professional audio amplifier currently available measured in to a 2Ω load). The 4-channel 10004 drives four individual channels rated at 1400W RMS at 2Ω.

*NexSys* for Windows allows the installer or operator to monitor and control up to 1200 Crest amps and MIDI-controllable devices.

The *Century Series* comprises four models; *GT*, *TC* and *SP* for F-O-H and *LM* for monitoring  
**Crest Audio Inc, 100 Eisenhower Dr. Paramus, NJ 07652, USA.**  
**Tel: +1 201 909 8700.**  
**Fax: +1 201 090 8667.**

**Europe:** Crest Audio Europe, 5a Wilbury Grove, Hove, East Sussex, BN3 3JQ, UK.  
**Tel: 0273 325 840. Fax: 0273 775462.**  
**UK:** Audio Projects Tel: 081 740 0057.

## Its MILES from Sonosax

Sonosax have introduced a digitally controlled mixing console called *MILES*. Preliminary information suggests the console is bound for the mobile, theatre and live sound markets and offers 48-channels in a single frame with computer-based automation and up to 99 different configuration storable and



Fairlight's *Tower*—if you want the editing but not 24 tracks



Crest's 10001—over 3,500W per channel into 2Ω

recallable. The chassis is made of composite material used in high tech sailing boat construction and aviation.

**Sonosax SA, Au Glapin, CH-1162 St-Prex, Switzerland.**  
**Tel: +41 21 806 0202.**  
**Fax: +41 21 806 0299**

## SSL's surround motion

At the recent NAB show in Las Vegas (see 'Nabbed' page 20) SSL launched a larger version of their *Scenario* digital postproduction system, called *OmniMix*. The new system adds SSL's own advances in surround sound technology called MotionTracking and Spatial Processing. Also a larger control surface and additional hard controls.  
**Solid State Logic, Begbroke, UK.**  
**Tel: 0865 842 300.**  
**US:** SSL. Tel: +1 201 659 0038

## Fender PX series

Fender Electronics have introduced the *PX Series* powered mixers. Frame sizes from 8 to 16 input channels. Features include a built-in reverb, a dual nine-band graphic EQ and two power amplifiers. The *PX-2208* and *PX-2208D* include a 2-channel 150W into 4Ω amp and the *PX-2212D* and *PX-2216D* include a 2-channel 250W into 4Ω amplifier.

**Fender Musical Instruments, 7975 N. Hayden road, Suite C-100, Scottsdale, AZ 85258, USA.**  
**Tel: +1 602 596 9690.**

## Tower of power!

Fairlight are to show their new *MFX Tower* system at the London APRS. The *Tower* is designed for those who want the editing of the *MFX-2* but not the full 24-track system. The new design includes all the software features of its bigger brother.

The *Tower* comes as standard with eight-channels of playback and 12 physical outputs, over 1.5 hours of hard disk storage and a *Tahiti II* M-O disk. Fairlight's Turbo SCSI interface and buffering system is able to achieve playback of up to 8-channels from a single disk. Use of M-O disks provides plug-and-play transfer between rooms and systems and enables the *Tower* to be used as a 'satellite' to the larger *MFX-2* system.

Fairlight have released new software for their *MFX-2* which includes 24-track level meters, up to 24dB digital input gain and automatic sample rate conversion.  
**Europe: Fairlight Europe.**  
**Tel: 0763 849090. Fax: 0763 849090.**

### In-brief

● **Time code from CD-R players**  
 Dimension Audio and Artistic License have developed a 1U device that generates time code from most CD and CD-R digital outputs. In addition to reading absolute time information found on CD and CD-R formats from the IEC958 and SPDIF digital output, the system outputs in film, EBU, SMPTE and DF standards.  
**Dimension Audio**  
**Tel: 081 877 3414.**

● **Upgrade error status for DATs**  
 Audio Design have released an error status card modification for the Sony *PCM 2300/2700* and *7000 Series* Dat players. A 15-way output port can interface to LEDs or a *DTA2000* analyser to report errors to four levels. CRC 1: one green LED. CRC 2: two green LEDs. Interpolation: an orange LED. Mute: one red LED. The errors are reported in both record and playback.  
**Audio Design**  
**Tel: 0734 844545.**

● **Surround Sound gets cheaper**  
*Circle Sound* from RSP Technologies claims the ability to position voices, instruments or sfx anywhere in the audio 'circle' by using a four or five-speaker surround system without encoding or adding information that is not already part of the source material. No artificial processes, phase correction or harmonic regeneration is used and the system is compatible with existing surround systems like Dolby *Surround* and Dolby *Stereo*. On top of that RSP claim a price 'a fraction of the cost of previous surround sound systems.'  
**RSP Technologies**  
**Tel: +1 313 853 3055.**

● **Desktop audio for under \$1,000**  
 A playback-only card for compressed audio files on the PC is available from Antex Electronics. Aimed at FM Broadcasters and Multimedia developers the *SX-7* card will decode Dolby AC-2; ADPCM; PCM; DVI; and CD-ROM XA/CDI formats.  
**Antex Electronics.**  
**Tel: +1 310 532 3092.**



**In-brief**

● **MS tools reflect market trend**

Two new accessories from Wes Dooley Audio have been designed to simplify the monitoring and manipulation of discrete M and S signals. The *MS38 Lite* is a battery powered stereo headphone amp-decoder for field use with portable DAT recorders and VCRs.

The unit offers flexible stereo monitoring, even when recording component MS direct to a DAT machine. Inputs can be mono or MS stereo sources. The *MS38 Mark II* is a MS stereo decoder with sum and difference insert points allowing additional reverb to be added to a stereo mix without affecting mono capability. **Wes Dooley Audio**

**Applications. Tel: +1 818 798 9128**  
**Fax: +1 818 798 2378**

● **Insurance policy for a blaster**

Australian Monitor now offer a five-year parts and labour warranty on every new *AM* and *K* amplifier.

**Australian Monitor.**  
**Tel: +61 2 816 35 44.**

## CHORD strikes

UK company Chord Electronics have launched the *SPA-1200* power amplifier already in use at EMI Abbey Road, the BBC, Sony Hit Factory and Metropolis Studios. Chord have used the technique of 'dynamic coupling' of the power supply rails. Whatever transient demand is presented to the amplifier stages, the positive and negative rails remain in perfect equilibrium, with each compensating for the demands made on the other. So delivery is always balanced and free from ground loop modulation distortion.

The amplifier sections are also sophisticated designs with a sliding bias class A-B design with all drive circuitry operating in class A. At usual listening levels, most of the music will be reproduced in class A. 250W RMS into 8Ω, 380W into 4Ω and 400W into 2Ω.

**Worldwide sales:** Michael Stevens & Partners Ltd, Invicta Works, Elliot Road, Bromley, Kent BR2 9NT, UK.  
**Tel: 081 460 7299. Fax: 081 460 0499.**

## Mic Shaggies

UK company Audio Marketing responded to our 'Craft' column (*Studio Sound*, May 1993, page 74) in which Keith Spencer-Allen talked about the problems of protecting mics from wind sources. They have launched a range of wind covers called *Shaggies*.

The range goes from the *SUI Universal Shaggy*, for use over foam windscreens through use with Rycote baskets to the *SF816 On Foam Shaggy* for large gun mics, *MKH816* or similar.

**Audio Marketing, Fourways, Morris Lane, Ormskirk, Lancashire L39 8SX.**  
**Tel: 0704 840328.**

## Hard for ProDisk

Otari have released the *CB-158* Hardware Control Panel for their *ProDisk* line of digital audio workstations. Higher operational speeds are claimed and reduction of

the system learning curve by placing all recording and editing functions on dedicated keys. The *CB-158* has been designed to control the *ProDisk's* GUIDE editing screen so the panel theoretically offers more performance than a generic controller designed to work with a number of systems.

In addition to controlling the *ProDisk* the control panel will provide machine control of up to four external video or audio desks.

**US: Otari Corporation, 378 Vintage Park Drive, Foster City, CA 94404.**  
**Tel: +1 415 341 5900.**

## ATC Crossover

The new electronic crossover from ATC the *EC23 Mk3* and is a two or three-way (by switches under the lid) stereo model with fourth order improved Linkwitz-Riley-type filters, active phase correction and presettable 'momentary gain reduction'. The unit is primarily intended for ATC's own monitors but the cross over frequencies can be

The Dolby Spectral Processor lets you bring out low-level detail without affecting louder sounds.

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altered by changing plug-in headers so that it can be used as an upgrade to any monitor system.

Claimed THD and IMD is better than -0.015% and signal-to-noise ratio better than 100dB. All the controls can be covered by a smoked perspex cover once they are set to prevent accidental readjustment and all audio inputs and outputs are fully balanced.

Because the distortion in ATC drive units is low and there is a minimal rise with increased power input, there is little warning of overdriving, the first thing you hear is a clipping amplifier followed by drive unit damage. In order to protect against this damage ATC have evolved their protection circuits. If required, these can be preset so that at the instant the clipping would otherwise occur, the gain is momentarily reduced and the waveform rounded off. This happens extremely quickly and is undetectable in use.

**ATC Loudspeakers.**  
Tel: 0285 760561. Fax: 0285 760683.



ATC's third version of their electronic crossover **EC23 Mk3**

## Q2 rocks the Front-of-House

DDA's new audio console for live performance **Q2**, is aimed at theatres, music performance and concerts.

Essentially an 8-bus console the **Q2** can be expanded to include eight stereo subgroups, 16 mono subgroups, or four complete LCR subgroups, with a master LCR bus arrangement (seen by DDA as a previously compromised area, especially in theatre work).

The input module offers all the standard features including eight full-time aux sends, with DDA's Direct output facility. For the eight mono and eight stereo subgroup versions, routing is individual to each group bus, with a pan between odd and even groups. The LCR version has routing to the four LCR groups.  
**DDA, Inwood Business Park, Whitton Road, Hounslow, Middlx, TW3 2EB, UK.**  
Tel: 081 570 7161.  
Fax: 081 577 3677.  
US: DDA. Tel: +1 516 249 3660.

### In-brief

● **Heavy era for nonlinear video**  
From the people who brought you *Lightworks* comes *Heavyworks*. Manufacturers OLE Ltd say that the new system has been designed to break through the remaining limitations of random-access editing machines. *Heavyworks* will play and edit up to four sources at once, at full speed on individual full-screen outputs. The system's new algorithms also provides near-broadcast quality with around 250 hours of storage access instantly. 16 separate sound outputs are also provided. **OLE Limited.**

Tel: 071 494 3084.  
Fax: 071 436 8934.

● **ADAT interface boxes**  
Jiri Donovsky has introduced a data transfer interface and format converter for use with the *ADAT* 8-track recorder for transfer to Sony *PCM 3324*; Mitsubishi *X850* or *X880*; and Yamaha *DMC1000* and *DMP7D*  
Jiri Donovsky Tel: +1 818 240 7668

ambience, lift harmonies, and bring out otherwise inaccessible subtleties - all without squashing transients, increasing overall track level, or disturbing the overall sense of dynamics.

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adjust the threshold below which processing occurs, the amount of boost in each band, and the crossover between bands. With noisy material, you can also switch in a gentle sliding-band noise reduction circuit. From adding that extra

touch of presence on a vocal track to sweetening a final stereo mix, the Dolby Spectral Processor provides the kind of EQ you've always wanted. Contact your Dolby Professional Products dealer soon for a demonstration.



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## Yamaha FX 550

Yamaha's latest guitar effect processor occupies the increasingly popular half-rack format which while convenient and compact needs to be bolted to something substantial if its not to be dragged around behind a player in the throes of performance. It handles 50 factory presets and 50 user presets, and can produce a total of seven effects simultaneously with only three of these equating to what are traditionally referred to as real effects-like modulation, delay and reverb. The remainder are concerned with the generation of a basic guitar sound via a compressor, distortion circuitry, EQ and an amp simulator. This immediately tells you that the FX550's priorities lie in giving its best shot at a tone before getting involved in all the weird and wonderful stuff.

Connections are surprisingly comprehensive with a front panel INSTRUMENT INPUT, rear panel two-jack STEREO OUTPUT, a TUNER OUT, PHONES OUT with volume pot and two footswitch sockets which handle the tasks of bypassing, incrementing and decrementing memories and the useful setting of tempo values for delay and modulation effects. There is also a single MIDI IN for patch selection, tempo setting via MIDI clock, external control of pitch change intervals, and two parameter real-time MIDI control.

The way the unit operates is extremely well reflected in the front panel. Each patch displays which of the five effects blocks are in circuit by the illumination of individual LEDs and the 15 x 2 line LCD shows which effect types are selected from the Modulation and Reverb blocks and whether they are in parallel or series plus the amp simulation type. Two keys control cursor movement and two larger ones patch selection and parameter value. Dedicated keys control the unit's PLAY (for performance), EDIT, STORE, UTILITY (MIDI and setup menus) and BYPASS modes. The best way of looking at the FX550 is as a very flexible guitar preamp with two effects units patched on the end—it is not a 'put everything through everything else and see how odd we can get it'-type of device, it is better for being more functional than that.

Patches are edited by the individual tweaking of effects blocks each of which is selected by pressing the COMPRESSOR, DISTORTION, EQ,



Yamaha FX550—concentrates its efforts on creating a good guitar tone

MODULATION or REVERB buttons while in Edit mode. In all cases parameters are adjusted through a modest number of pages using cursor and increment-decrement buttons in a process that will ring a bell with anyone who has toyed with an SPX.

The presets are varied with a tendency towards the more heavily processed stuff. It is always interesting to imagine the sort of player a manufacturer hopes to attract through a device's presets and with the FX550 I would hazard that Yamaha expect them to not be averse to wearing the odd leather-studded appliqué. However, in among the host of fizz and thrash there are some very sympathetic acoustic guitar approximations and some neat all-rounder tones.

The compressor is remarkably smooth with variable attack and sustain and the amp simulators all offer subtle-to-marked tonal differences in the four types available. The S simulation, which we are told approximates to a stack, is suitably wide and the M setting, which we are led to believe represents a stack of three 'M' heads, is convincingly forceful. Five distortion types are presented as two overdrives, two distortions and a crunch with variable drive and tone on all plus an adjustable noise gate bolted on the back for good measure. Strangely, just like the presets, all are fundamentally too bright for my ear and all benefit immediately from winding the tone down by half. While it is desirable to have a little more bite available for humbuckers, the total brightness on tap is enough to dislodge the fillings in a Strat owner.

That being said the overdrive 1

timbre is very good and the crunch is authentic and controllable. The five tones vary in their responsiveness to the range of drive settings which incidentally seem excessive with values from 0 to 100. Halving this range would not make any difference to the perceived control and it is a general observation that value ranges throughout the unit are impracticably wide especially when coupled to the sluggish increment button access.

However, back to the matter in hand, the two distortions seem to be the most flexible tones while the crunch circuit quite simply makes a wonderful noise. Combining these with the amp simulations gives an enormous variety of sounds from singing sustains to good working clean timbres.

The three bands of widely overlapping sweepable EQ are excellent, giving 15dBs each way on the low and highs and going down to -30dB in the mid. This means that if you want to push harmonics or rip out some middle then you really can and I cannot remember a guitar box EQ being quite as useful as this one.

Once you have got your basic tone right you can then dig into the modulation effects which give all the popular stuff like choruses, tremos, delay and flanging plus the ability to tie-in tempo into mod speeds. Yamaha have also got their act together with the pitch shifter which at last is as good as anything you would find on a Zoom unit.

The reverb block features good guitar reverbs and delays which can be in parallel or series and also tied into tempo if required. Notably the reverb can be adjusted for stereo width and has variable high and low

pass filters providing basic but useful control. Because the modulation and reverb effects blocks can similarly be put in parallel or series this simple adjustment makes for great flexibility at the end of the processing editing chain which has independent level control within each constituent part.

The FX550 is a very well balanced unit that is incredibly easy to use by virtue of the large amount of information fed back to the player. To its credit it concentrates its energies more on creating a good guitar tone than on approximating the sound of a guitar amp falling down a mine shaft. The straight through guitar signal is of high quality and the reverbs and delays are ideal for guitar processing. On the downside the only criticism is that some of the parameter value ranges are too wide to be manageable and meaningful, and data entry can be sluggish and imprecise.

The best thing about the FX550 is that it really is a guitar effect processor and does not dilute its appeal by pretending to perform the functions of a general multi-effects unit. There is something in the FX550 for everyone and while it may not be as slick as the Zoom units that it is pitched against, it is every bit as able. ■

UK: Yamaha-Kemble, Sherbourne Drive, Tilbrook, Milton Keynes MK7 8BL. Tel: 0908 366700.

US: Yamaha Corporation of America, 6600 Orangethorpe Avenue, Buena Park, CA 90620.

Tel: +1 714 522 9011.

Fax: +1 714 739 2680.

Music News is compiled  
by Zenon Schoepe

# STUDER Systems

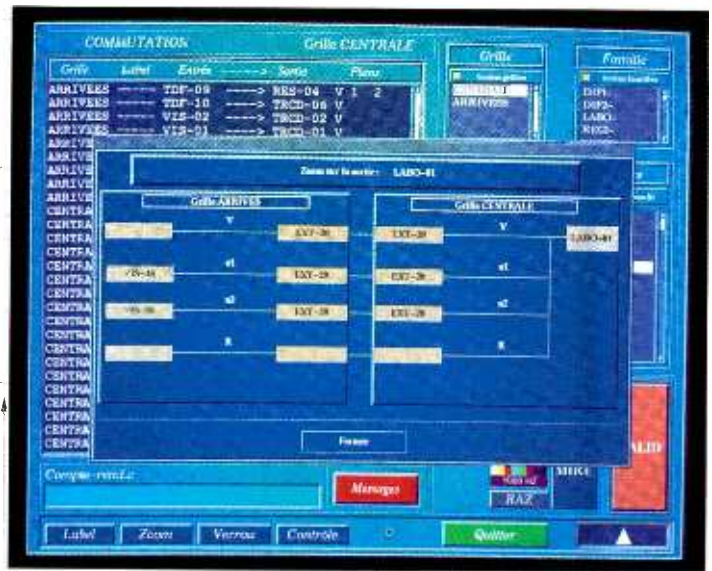
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## THE STUDIO CONDENSER FOR ENGINEERS *and* ACCOUNTANTS

# Compelling listening

The Aphex catalogue is full of products whose deliberately misspelt names give an impression of power and purpose without specifically telling you what that purpose is. Almost any of their processors could be said to make a sound dominate, express, excite or compel, and a little more guidance as to the particular functions of each model would be a definite help. On the other hand, it could be said that few Aphex products perform mundane tasks in mundane ways and that mundane names would therefore not do the things justice, but our business generally likes to call a spade a spade, not an *Excavator*.

To put things simply then, 'the *Compellor* is a multipurpose audio processor designed to give inaudible control of short and long-term average program dynamic range'. Wake up at the back, you broadcasters, PA engineers, film & TV mixers and anybody else who wants the quiet bits louder and the loud bits quieter without anyone noticing that you have actually done anything. For that matter, the unit could just as easily have been called the *Leveller*.

The *Compellor* comprises two quite separate main dynamic control processes working alongside each other, with the weighting of one against the other being just about the only thing the user has any control over. Thresholds, ratios, gain make-up and time constants are all either fixed or automatically varied by the *Compellor*'s detectors, with apparently a good deal of interaction.

The first process is long-term levelling, with a 20:1 compression ratio and automatic attack and release times centred on 2.5 and 5 seconds respectively. This is intended 'to simulate the way the ear perceives loudness over long periods'. Alongside it is a straightforward soft-knee compressor, with a maximum ratio of 3:1 and similarly variable time constants although this time much shorter.

There are only two controls allowing the user to determine how this lot will operate. An input level

control (labelled *DRIVE* presumably because it sounds more important) effectively decides how much gain reduction will take place by adjusting the overall signal level relative to the fixed thresholds, an interesting reversal of the usual variable threshold approach. The other control, *PROCESS BALANCE*, gives levelling alone at one end, compression alone at the other, and equal contributions from both in the middle; this centre position is the basic starting point and indeed the most generally-used setting.

Claims that an audio processor will produce a desired result without any unwanted side effects and completely automatically are always hard to swallow. It is difficult to believe that one catch-all box can possibly handle the wide variety of programme material it is likely to encounter, or even that the designer's idea of what should be happening is necessarily the same as yours. It therefore comes as a welcome surprise when the device in question stands up under test and delivers the goods, and this is undoubtedly the case with the *Compellor*. It is as happy working on overall programme as on elements of a mix, and never did I feel the need for any other controls or disagree with the way it decided to handle something.

Complete mixes passed through it acquire added drive and urgency without a trace of the pumping, breathing and other artifacts you might expect from what is, after all, a glorified Automatic Gain Control. Parts of mixes can be helped to do their jobs better; for instance, horn sections can be submixed via the *Compellor* to cut through without obtruding but without sounding squeezed, and backing vocals can be made to sit comfortably in a mix and still sound natural. At no time is the processing audibly apparent. I also used it on multiple stereo (real) string tracks, and the result was a smooth, uniform string pad without any obvious signs of treatment.

One additional control could cause confusion as it is labelled *THRESHOLD* but it is actually controlling the unit's

Silence Gate circuit. This is not a gate at all, but a means of setting a threshold below which the *Compellor* will not attempt to adjust the gain, thereby eliminating the possibility of cranking up silent passages to produce noise and pumping.

There is a fixed Peak Limiter in addition to the main gain control functions, which does no more or less than expected and can be switched out if not required. The two channels can be linked for stereo operation, either just for the levelling or for the whole process.

There is, ominously, a switch marked *STEREO ENHANCE*, which feeds a small amount of each channel, phase-inverted, to the opposite channel. I try to avoid such functions in principle, so was relieved to find that it actually does very little—to the extent that it hardly seems worth having provided it.

Aphex are obviously keen to make the *Compellor* accessible to as wide a range of users as possible; a rear-mounted *OPERATING LEVEL* switch offers not only +4 and -10 but also +8dBm as well, and a recessed push-button provides 600Ω termination on each input. Metering is comprehensive and its function user-selectable; clever bi-colour LED strips can show peak and average input or output levels or the instantaneous gain reduction, with compression and levelling shown simultaneously using the two colours.

The *Compellor* appears to genuinely deliver what it promises: transparent overall level control. As such it is ideal for those jobs which your favourite bells-and-whistles compressor would be (a) wasted on and (b) probably unable to do properly anyway. This is specialised dynamic control, functional rather than creative, and it works. ■

Dave Foister

**Aphex Systems, 11068 Randall Street, Sun Valley, CA 91352, USA. Tel: +1 818 767 2929.**

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



AT4033 shown with optional shock mount AT8441

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

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

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

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February 1992



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**Compulsion—the only way to treat audio?**

# Hum to the Unsung Hero

With the ever-increasing number of hi-tech products, it is hardly surprising that one or two have fallen by the wayside.

Two recollections of the 1991 Frankfurt Music Messe remain indelibly printed in my memory, both concerning Roland. The first is the Roland *Sound Space* 'surround-sound' creator, an interesting technological approach that has somewhat disappeared from the public eye. The second item never even made it that far! The *SN-550* Digital Noise Eliminator has had the odd review but would certainly not be at the top of anyone's list of essential signal processors. It probably would not make the list at all.

The reason I recall it from Frankfurt is the way that George Thorn, the demonstrator, played a tape of earth hum and simply hit a single button on the *SN-550* to remove it totally. The fact that I had just heard RSS perhaps dulled the significance of such a process, but I recalled this situation a few weeks ago when an old pal of mine asked me to help him. He had written the music for *Warrior Marks*, a Channel 4 programme about Alice Walker (the writer of *The Colour Purple*) but the editing suite had thrown the DAT tape back at him due to the high level of background hum. A poor plug-based mains transformer had caused this, and the nature of the recording made it almost impossible

to recreate, hence the sound of total resignation in his voice.

The *SN-550* is one of Roland's digital products that uses the DSP technology developed for their *E-660* parametric equaliser and *GS-6* guitar preamp, each of which offer a similar noise-cancelling facility. Called a *Hum Canceller*, this is effectively a comb filter whereby a frequency for removal, this then being extracted along with its harmonics in decreasing amounts. Such a process can lead to audible side effects if carried out in the analogue domain, but the *SN-550* uses a 48kHz sampling rate to convert incoming signals to digital data before processing it. The use of 18-bit D-A converters then retains the integrity of this result as the quoted dynamic range of greater than 94dB bears out.

A *Noise Canceller* is also included, a feature not offered by the other products previously mentioned. This downward expander also acts in the digital domain and functions on five frequency bands: 350; 700; 1400; 2800 and 5600Hz. By splitting the audio input into these bands, the *SN-550* independently rolls off signal in each range so effectively masking any inherent background noise. The display clearly shows when each of these functions is in operation.

Controls on the front panel are minimal. Each of the functions has a pair of buttons to turn them on or off

and dual-ganged threshold controls for the two channels. Additionally, the *Hum Cancel* part allows you to select the frequency, the current value being shown in the display. If removal of hum from the current mains supply is all that is required, the *LINE FREQUENCY* button automates the procedure.

Intended for professional use, the rear panel sports balanced connectors in both XLR and stereo 1/4-inch jack formats.

## The result

The original leaflet on the *SN-550* quotes that 'hum is cancelled without affecting the original sound's tonality', an impressive claim. The innate noise of the unit is low, a good starting point, and the use of balanced inputs and outputs ensures that no line noise is picked up as long as decent quality cable is used.

A quick listen to my friend's DAT tape confirmed my fears; mains hum at a level usually associated with an earth loop. Even worse, there were many quiet periods when the hum was practically louder than the subject material.

Setting up the *SN-550* is very simple. The dual-ganged Internal Level controls set the input level according to the bar meters and the two processes are switched in and out at will. A hardware bypass switch

ensures that comparison with the actual input can be made, not with a digitally-converted version.

Selecting 50Hz for the *Hum Canceller* immediately reduced the hum to a very quiet buzz that was completely inaudible if any other sound was present. Using the *Noise Canceller* at its minimum threshold setting then removed any final semblance of noise during the silent passages when moving from one piece to the next on tape.

The downward expander is almost invisible in use at this minimum setting; you know it is working purely from the flashing figures in the display. Moreover, switching the bypass in and out certainly brings the hum back but has very little audible effect on the audio programme. Listening back to the final DAT tape confirmed the vast improvement. At a cost of around £1,000, the results are impressive—other equipment from Sonic Solutions or CEDAR capable of acting in the digital domain would cost at least 20 times this amount.

Perhaps the only fly in the ointment for the *SN-550* is that it should not be necessary at all in a studio environment! Live, yes, but not in the studio as the knowledge that a noise-based problem can easily be rectified could certainly lead to sloppy working procedures. That said, it is nice to have a safety net. ■

Vic Lennard

**UK:** Roland (UK) Ltd, Rye Close, Ancells Business Park, Fleet, Hampshire GU13 8HY.  
Tel: 0252 816181. Fax: 0252 812692.  
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**The Roland SN-550—a solution to many mains hum problems**

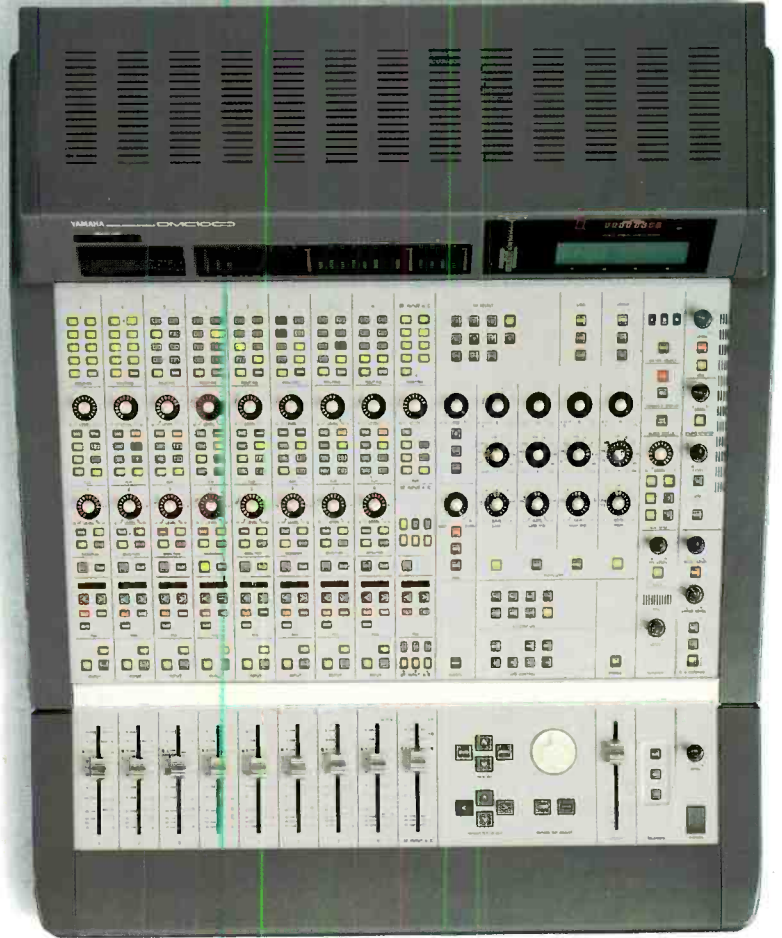
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1993	1993 24 tracks from one disk 24 Simultaneous Record Emulation Digital Video Playback
1992	MFX2 16 tracks from one disk Scrolling waveforms Frequency Domain time compression Gated Recording
1991	MFX Hard Disk editing 8/16 track playback Audio Freeze frame 16 Zoom scales
1990	Series III Rev 8 Dynamic Voice Allocation 8 track disk recorder
1988	Series III Rev 7 Fast disk transfer card Caching of software display 32-bit processor added
1987	Series III Rev 6 Cue List timecode sequencer CAPS music sequencer Integrated mono disk recorder
1985	CMI Series III First 16 bit sampler 16 Voices Shared Memory Architecture
1982/3	CMI Series IIX HiFi sampling MIDI implemented Page R sequencer
1980	CMI Series II First Real Time Graphics based Music Sequencer
1978	CMI Series I First Sampling Digital Workstation Waveform Editing
1976	QASAR 8 channel Fourier synthesis Light pen interactive graphics Dual CPU architecture

# GREAT SCOTT!

**I** never tell a band which nights I'm going to record them, because as soon as they know they'll invariably play differently and often badly.' So says Chris Lewis—Engineer, Producer, Maintenance Man, Mastering Engineer, Studio Manager (you name it he does it) at the legendary Ronnie Scott's jazz club in London.

Since its 1959 opening, Ronnie's has played host to some of the finest names in jazz: Dizzy Gillespie, Art Blakey, Oscar Peterson, Roland Kirk, Dexter Gordon, Elvin Jones, Sonny Rollins, Stan Getz, Buddy Rich, Miles Davis. The list is endless, and one has only to glance around the portrait covered walls to get a feel for the club's extraordinary history. George Melly, a regular performer at the club, puts it rather well: 'Ronnie Scott's is the greatest jazz club in the world. Walking on stage, in response to Ronnie's laconic introduction, it is impossible not to experience a certain awe at the thought of living legends and lively ghosts who have preceded us, of all those historic nights when the marvellous music ascended the smoky air'.

Not surprisingly the club has been a popular venue for many live recordings and broadcasts over the years, with mobiles jamming up the narrow Soho streets; but three years ago this all changed thanks to a Danish brewer, as Chris Lewis explains.

'Carlsberg approached us and said they'd like to do something for the club as we had been such good clients for so many years. I think they were thinking along the lines of a new bar of something like that, because they were very surprised when we suggested a studio. Anyway after a bit of convincing they agreed to put up the money and we put the 24-track studio together.'

Lewis, who started at the club 11 years ago as a PA mixer, was responsible for choosing the equipment—32-input Raindirk *Symphony*, ATC *SCM100A* active monitors, Tascam *ATR80* 24-track with Dolby SR, Otari *MTR12* 1/2-inch, Panasonic *SV3700* and Technics *SV360* DAT recorders, plus various outboard gear. The studio was originally installed at the front of the building but later moved to a small backstage room above the club office. In this relatively cramped space, with little to speak of in the way of acoustic treatment, Lewis spends most of his waking hours mixing during the day and recording late into the night.



## Can white men play the blues? Ask Eric Clapton

'Recording live jazz is about capturing the moment. You get this magic spontaneity that suddenly happens when the band comes together and the audience responds—there is real energy and excitement and it is my job to convey that atmosphere to the listener. I've never been keen on those one-mic jazz club recordings where you hear all the background noise, they're okay for the hardcore fan but not for the general public who expect high quality sound these days. I'm also keen on providing value for money; CDs are so expensive that I try to put on as much good stuff as I can and I'm always pestering CD manufacturers to produce longer CDs—some of our releases are now running to 79 1/2 minutes.'

The recordings made at the club are issued on the Ronnie Scott's Jazz House label. A club record label had also existing during the 1970s and some of those recordings have been remastered to join the 25 new titles recorded by Lewis. The material ranges from intimate trios to wild Latin American combos to slick jazz-funk bands, with this kind of diversity a variety of recording techniques are called for.

'You have to approach each project differently—for example close miking the drums with a band playing contemporary straight ahead jazz sounds all wrong, but with a jazz-funk band you need to come in close and multi-mic the kit to get the sound. One week I might be using just a handful of mics, the next I'll fill all 32 inputs on the console.'

'Generally for straight-ahead acoustic bands the miking will be very minimal: a typical setup would be three mics on the drums—XY overheads plus a bass drum mic—and single mics for bass, piano and sax. I always try to pick mics that will work without EQ, and I'm also very conscious of level handling. Trumpet players, for instance, have this habit of using the mic as a mute!

'Acoustic bass is the hardest ▶



## Chet Baker offered a 'cool' alternative to Miles Davis before falling victim to drug addiction

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Ronnie Scott's world-famous jazz venue also houses its own studio. Patrick Stapley breezes in to talk to Chris Lewis about recording the greats

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**Taking a break between sets: Art Blakey's *Jazz Messengers* offered an apprenticeship for many young jazz musicians**

thing to record because it's a quiet instrument and is normally right next to the drums—you can stick a pickup on it but they always produce an unnatural, electronic sound. What I quite often do is use two mics on the bass, for example a Neumann U89 and a Countryman clip-on—I use the clip-on when all the band are playing, to provide a brighter sound with more definition, and then bring in the U89 for solos to add richness and warmth.

'Most recording is to multitrack, but certain things are

recorded direct to stereo including the Tuesday night sets which are broadcast by London's Jazz FM. These are recorded straight to DAT and later edited down to a one hour program. However, if it weren't for the extra cost of analogue tape, Lewis would prefer to use 1/2-inch rather than DAT.

'There's a lot of life left in analogue, and 15ips half-inch with Dolby SR is very hard to beat especially when combined with a high output tape like 3M 996.

'I think 1992 was a crunch year for digital and a lot of people began to realise that they had to be quite careful how they worked with it. For example you transfer one DAT to another and the sound alters—it's not a perfect clone as we've been led to believe. I've been experimenting with different converters (Wadia and Prism) which have made so much difference to the sound. The A/B comparisons between recordings made on internal and outboard processors are quite staggering—it's as though a curtain has been lifted from the speakers, you're suddenly aware of all this openness and space.

'A wide dynamic range is really important for jazz recording and the Prism includes an extended dynamic range function that gives pseudo 20-bit performance on a 16-bit medium. We actually recorded a signal at -120dB which was perfectly audible using this facility—without it all you could hear was a mush of noise.'

Normally Lewis uses the first night to sort out sounds and balances, but there are two nights that he finds especially good to record. 'Thursdays because there are a lot of club members in, and the second Monday in a two-week booking because the band's refreshed after a day off, and the audience is often very good—lets face it, anyone who's going to stay up until 3am on a Monday must be into the music! English audiences are still very stiff though, and it takes them time to warm up. More often than not, the best material comes from the second set.

'We did an interesting thing with Roy Ayers' band last time he was here. The guitarist, Zachary Breaux, asked if he could do some recording separately; we told him that we couldn't do that because the whole point of the label is that it's live at Ronnie Scott's. So instead, Roy let him do one tune in each set, and over five nights we recorded enough material for an album. The album is currently doing extremely well in New York; stations like CD 101 are playing tracks on rotation four or five times a day and we've just licensed it to a new jazz-fusion label called NYC. Nobody can believe that it's a collection of one-off live takes that weren't even recorded during his own gig.'

Although jazz appears to have enjoyed a resurgence in recent years, Lewis remains sceptical about the commitment from major record companies.

'There's been a resurgence in hype certainly; the bigger record companies don't really know how to deal with jazz, they treat it with this rock and roll mentality, which means they have a front man who they can make a star. They also tend to think in terms of fast sales whereas most jazz albums sell steadily over a long period of time. I think a lot of labels have been disappointed with the returns on their jazz artists and many have been dropped recently. It's a shame because there are some great players around at the moment but only a few getting a look-in. We can do something a bit different here because recording costs are obviously much lower than going into a studio for weeks on end, and, of course, from the jazz point of view live is best.'

I couldn't leave the club without a final word on the man himself and in particular his infamous jokes.

'People can get quite offended by Ronnie's jokes. I remember on one occasion he used the gag: "Why do seagulls fly upside down over Scunthorpe? Because there's nothing worth shitting on." A woman in the audience jumped up and hurled a glass at him shouting I come from Scunthorpe you \*α\*!\*ρδ, Ronnie turned to her and very calmly said, "Madam you've just proved my point, you're banned". We haven't used any of his jokes on an album yet, but it's probably only a matter of time.' ■

**Ronnie Scott's Jazz Club,  
47 Frith Street, London  
W1. Tel: 071 439 0747**

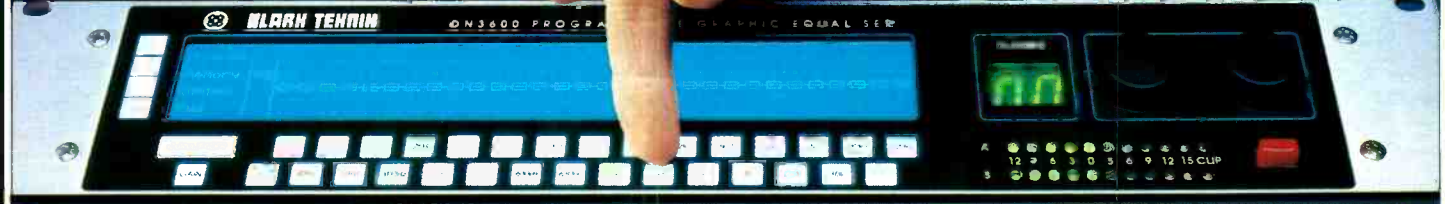
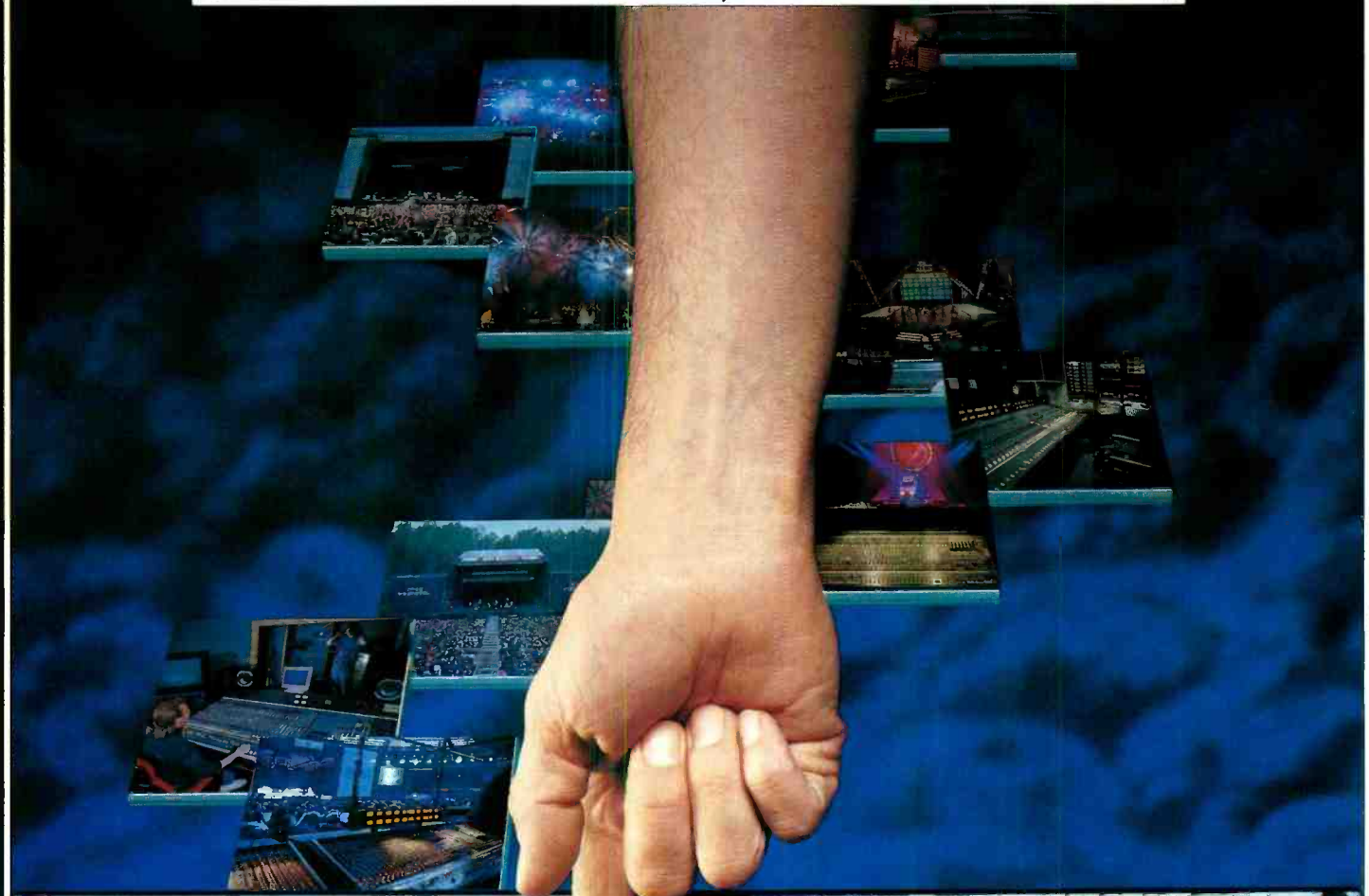


**A Symphony in Ronnie Scott's—the recording studio**



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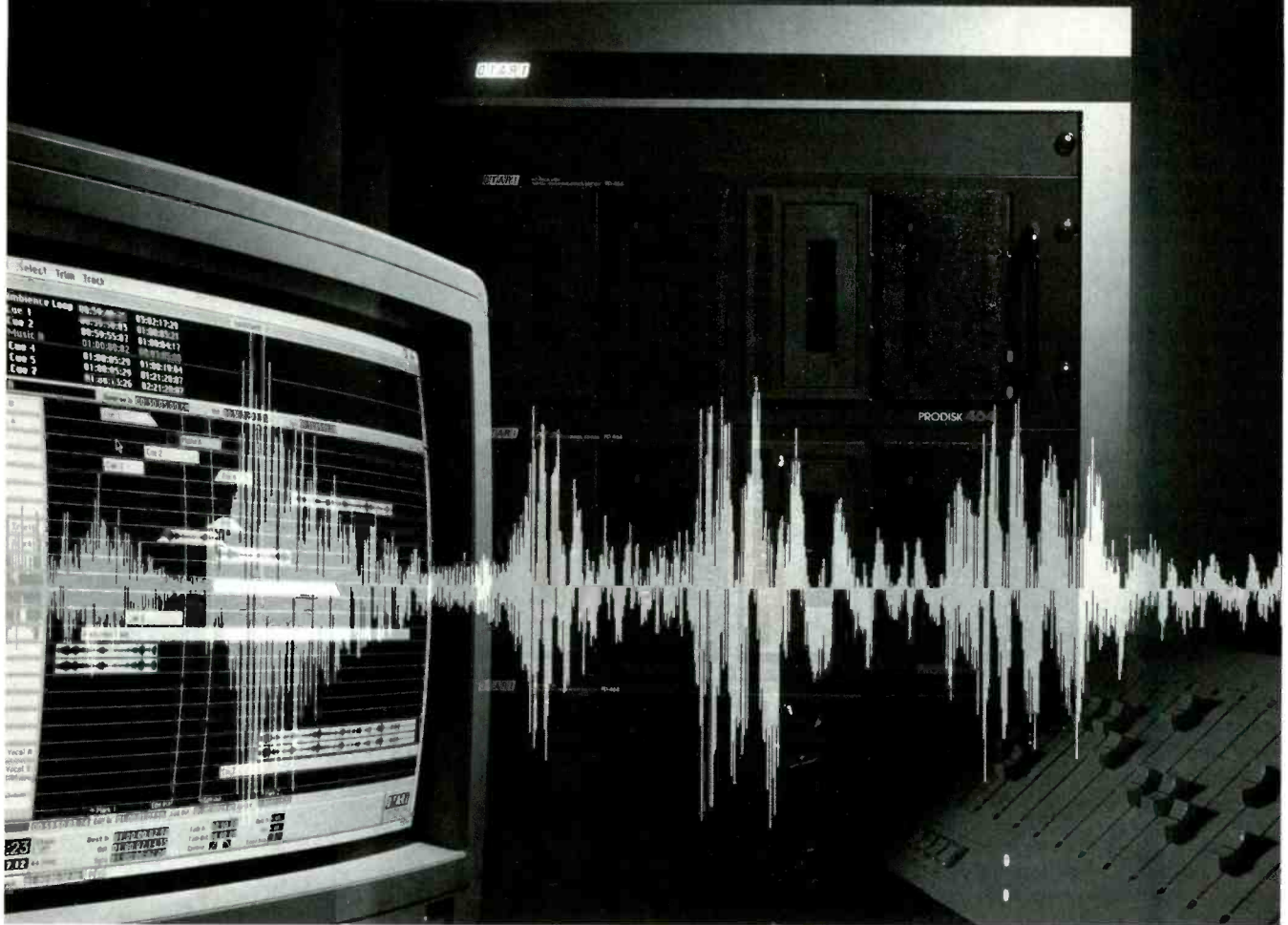
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## Affordable but well specified, the new *Logic 3* is already finding favour in postpro circles. Patrick Stapley tests the logic

---

**T**here are currently 450 *AudioFiles* in use worldwide, but only 11% of these are interfaced with a *Logic* console. From the user feedback AMS-Neve were receiving, it became clear that an increasing number of clients were keen to upgrade their *AudioFile*, by adding a digital mixer. However, for one reason or another (mainly budgetary), few had taken the option any further and some had chosen a more affordable alternative such as the Yamaha *DMC 1000* console.

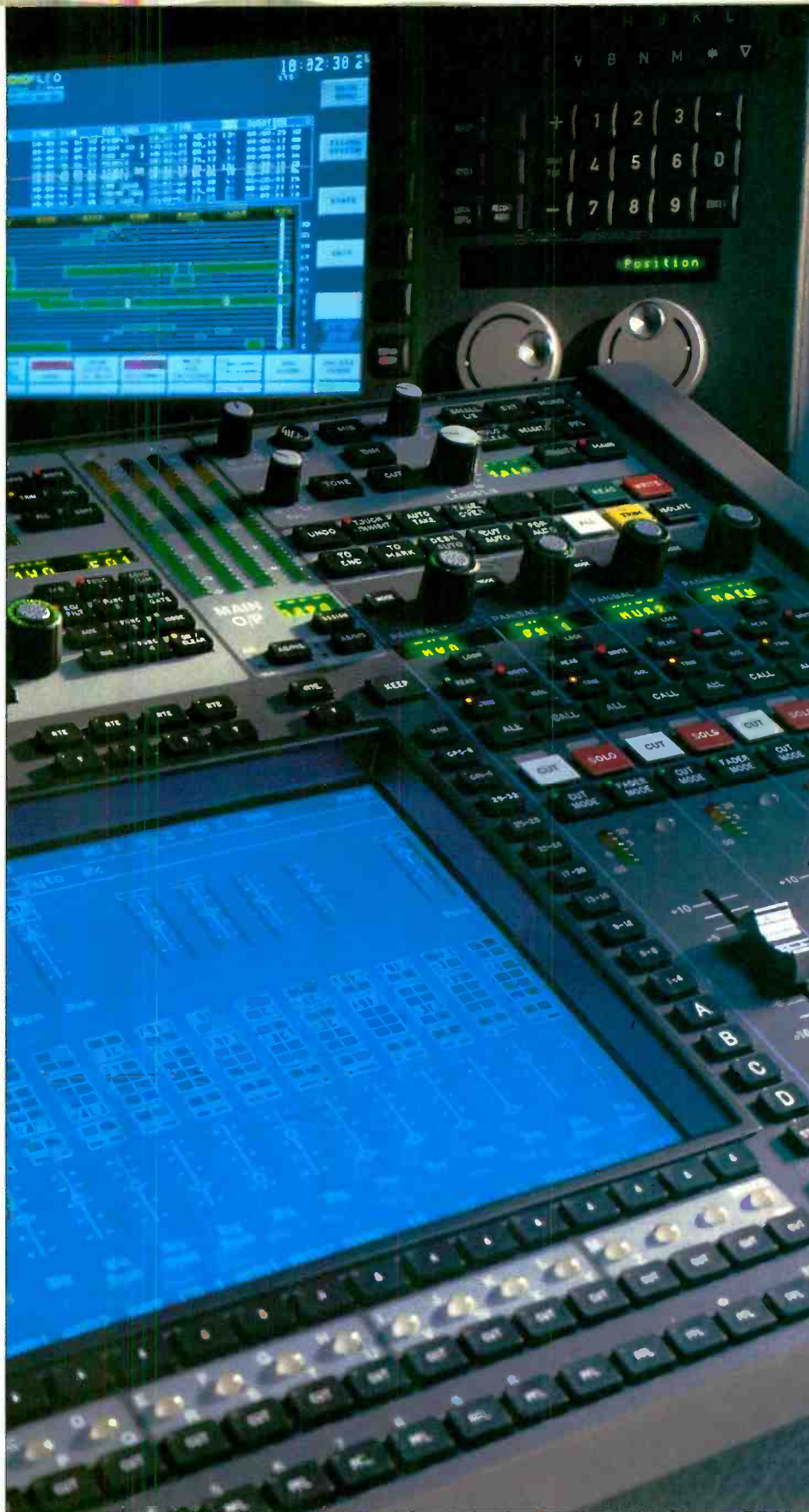
It was obvious that a lower cost product was required, but one that fitted conceptually with existing *Logic* consoles.

'We had to make a price reduction,' states AMS-Neve Product Manager Doug Ford, 'and the only way to go about that was to produce a radically new control surface. The sophisticated hardware that comprises a *Logic 1* surface adds considerable cost to the product, so we had to find a way of significantly reducing that. At the same time it was important that the product retained a close identity with previous designs both operationally and in terms of audio quality—we were adamant that it should incorporate hardware faders and rotary controls, for instance, rather than being a screen operated system, even though a number of people had suggested that we integrate mix-type functions within *AudioFile* itself. We also felt it was very important for the operator to be able to access more than just one control at a time, which is obviously a limitation with screen-based systems.'

So a critical consideration was how far to reduce the size of the control surface, and the number of controls that should be included.

The idea of the minimalist console with one assignable fader and rotary control, was absolutely not acceptable in our view point. But we had to look very carefully at exactly how many controls were necessary—bearing in mind that *Logic 3* was to be designed primarily for postproduction applications and as a partner to *AudioFile Plus*, the need to be able to reach out and grab something live was not such an important factor—so a dedicated fader per channel layout was unnecessary.

'Something that gave us a clue about what was operationally acceptable and what was not, was knowing the situations people had been through with *AudioFile*. The first *AudioFiles* were ►



# LOGIC 3

8-track systems, and people's initial response was that 8 tracks would be very limiting compared to the 16 or 24-track machines they were used to. We had to explain that a hard disk 8-track was far more powerful than the traditional multitracks they were working with, but required a different operating philosophy. We felt that the people who had taken this on board, would be able to make the same kind of adjustment with the assignable concept we were proposing for *Logic 3*.

"The surface we eventually ended-up with, incorporates what we consider to be an acceptable degree of assignability for the type of applications we see the console being used for."

The standard *Logic 3* offers four motorised faders (P&G cord driven rather than the linear faders used on *Logics 1* and *2*) with associated Cut, Pan and Solo switches; a bank of 12 logicators (assignable rotary shaft encoding controls); a colour TFT (Thin Film Transistor) screen which is identical to the type used in *AudioFile*; and a selection of other controls including automation buttons, talkback controls, oscillator, monitor source buttons, large-small speaker selector, and so on. The function, layout and terminology of the controls remains very similar to previous *Logic* designs, and where new controls have been added (mainly connected with screen functions, metering, and assignment), they have been intelligently and intuitively laid out. The whole control surface has been packaged into a 19 inches by 8U sloping unit with removable wrist pad.

The system controls up to 32 mono channels or 16 stereo channels (or an equivalent mixture), eight mono or four stereo subgroups or a mixture with dedicated outputs, a maximum of four stereo aux sends, and a stereo main output. The screen displays the larger part of the console providing a view of 16 channels at a time plus the group, aux, and main outputs all represented as faders. The screen also shows individual pan-balance positions, routing selection (to stereo main, groups, and auxs), channel source (that is *AudioFile* track, line input, etc), attached processing (EQ, Dynamics, etc), and metering (for groups, auxs, and main outputs). The signal paths currently selected to the four hardware faders are identified as is the path currently assigned to the Logicator panel (this does not have to be a path already under fader control).

Paths are selected to faders either in consecutive blocks of four, or the operator can save personalised assignments under four store keys positioned to the right of the screen. Surrounding the screen, in a similar way to the *AudioFile* arrangement, are various function buttons. These include routing keys for both assignment and interrogation (that is pressing the ROUTING button directly above Group 1, lights LEDs on all channels or auxs routed to it). Dedicated CUT and PFL buttons are also included, and each channel has a tricolour input level LED.

A PAGE button will switch the display to view any remaining channels, but 32 is the maximum the system will accommodate.

"We've restricted the maximum expansion of the console—the philosophy being that if you're mixing more than 32 channels, you'll probably need more faders and controls, and *Logic 1* picks up at that point. This is the exciting thing about the *Logic* series as it stands now: in the same way that we can offer a range of editors to suit various applications and budgets, we can now offer a choice of mixing consoles. We haven't gone to people and said, we make this one box that does absolutely everything and you'd be bonkers not to



buy it. We've become very aware of the wide range of applications that exist and the need to supply different elements to cater for them. Even within the same application, people work differently so this degree of choice is essential."

AMS-Neve were also keen that *Logic 3* should not appear under configured in terms of I-Os, converters and processing power. The company having received comment over this in the past, as Doug Ford explains.

"We came in for a bit of criticism regarding configuration and pricing with *Logic 1*—we'd quote a price for the console and people would say, OK, but what exactly do I get for that? When we told them, they'd often add on extra ADCs, AES cards and so on to configure the console to what they considered to be a real working product. What we've done now with *Logic 1* is produce a more fully-loaded console while keeping the price static effectively offering a considerable price reduction. With *Logic 3*, we looked at it from the view point that it had to be a product that could be taken out of the box, plugged-in and used straight away

... where new controls have been added (mainly connected with screen functions, metering, and assignment), they have been intelligently and intuitively laid out

without the need for add-ons. We believe the base specification both in terms of signal processing and I-O will be more than sufficient for the type of applications it's designed for. Having said that it is, of course, still possible to add extra cards if the client requires them."

The console comes with eight A-D converters (16-bit standards 20-bit optional), 12 D-A converters, four AES I-Os, and direct two-way digital connection to *AudioFile Plus*. Processing is handled by two SSP cards which can provide the following mix setup: 32 mono channels with individual 3-band EQ, four stereo sub-groups with a compressor in each, stereo main output with compressor, and four mono aux sends. The processing hardware is identical to *Logic 1* and *2*, and the same assignable 'pool of processing' philosophy is incorporated: thus, if instead of 32 channels, I configure just 24, additional processing will become available to fuel facilities like 4-band EQ, filters, insert points, and extra dynamics. Processing and I-O hardware are built into a remote 9U chassis which links to the console via TranLink communication and analogue monitor cables (for talkback and monitor feeds).

Things that *Logic 3* does not offer, that *Logics 1* and *2* do, include true multitrack routing, surround panning, and film format monitoring. *Logic* consoles are compatible and a setup complete with automation data can be ported from *Logic 3* to a larger console, spreading out over a wider control surface—the same applies in reverse providing, of course, that the capabilities of *Logic 3* are not exceeded.

*Logic 3* supports EBA (Event-Based Automation). This means that any automation data that has been written for an Event (a piece of audio within *AudioFile*) will remain intact despite the Event being moved in time or between tracks. Additionally, static settings can be attached to individual or multiple Events off-line—this provides a useful facility for treating a string of Events with identical processing, for example to 'spot-in' a telephone voice.

Options (other than expanded processing, extra I-Os, and 20-bit converters) are digitally controlled mic-amps with control coming directly from the console, and a four-fader bolt-on 'side-car' for users who prefer to work with more than four faders.

At the moment *Logic 3* is being regarded very definitely as a partner to *AudioFile Plus* providing an all-digital editing and automated mixing system for radio and TV post applications. Stand-alone operation is not something that is being immediately envisaged; however, provision has been made for the EŞAM (Edit Suite Audio Mixer) protocol.

It is obviously very early days for *Logic 3*, but according to Doug Ford, the console appears to have got off to a very good start.

"Response so far has been tremendous. We actually took eight orders for the system directly from the stand at NAB which was the first time it's been seen publicly. All were American clients, seven being existing *AudioFile* owners and one being new to hard disk who bought both the console and *AudioFile Plus*."

"I think it's fair to say that *Logic 3* really was a logical step for us!" ■

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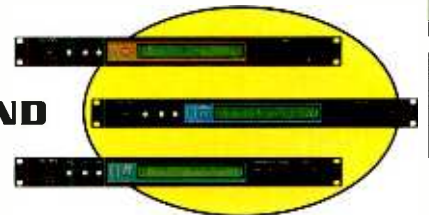
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# APRS LONDON PREVIEW

The Association of Professional Recording Services host the show this year from 23rd–25th June 1993. As usual we have compiled from exhibitors information this preview of equipment and demonstrations to be seen at Olympia 2, London

**A** ● **Acoustic Design Group:** Stand X19. Now have representation in two European and two South-East Asian locations, as well as Seoul, Los Angeles, UK and Tokyo. Current UK projects: dubbing facilities at Metropolis, new control room for Abbey Road Studio 2 and modular system for Jack Bruce. ● **AES:** Stand X19.

● **AKG Acoustics:** Stand 001A. *CK68-ULS* with two shotgun capsules in one divisible interference tube, providing medium range and close-up operation. *C414 B-TLII* transformerless microphone with the classic *CK12* capsule. *C522 MS* format stereo condenser mic for ENG applications. The *Blue Line Series* now includes the *CK94* designed for mono bidirectional and MS Stereo miking. New *dbx 172* expander-gate. Adjacent stand has *BSS FPC Varicurve* controller for up to 32 channels of multiband parametric equalisation using *FCS-926* and *FCS-920* dual *Varicurve* equaliser-analyser units.

● **Alice Soundtech:** Stand 101. Featuring *Air 2000* broadcast mixing desk used by stations including Virgin Radio. Features carbon plastic faders; all-LED illumination and switches designed for five million operations. Soundtech *Series A* mixing console for production or on-air. *PAKS* interfacing units. ● **Allen & Heath:** Stand 024A. *GS3* series consoles: *GS3V* with fader automation; *GS3* with mute automation and *GL3* the sound reinforcement version. Frame sizes 16 and 24, plus expander option in blocks of eight. Possibly new models as well. ● **Amek:**

Stand 007A. Range of consoles under the Langley, Amek and TAC brands. *Recall* live sound and *Big* recording consoles by Langley with automation and recall with Voice Prompt facility. Amek *Mozart RN* with Rupert-Neve-designed input channels and *Supertrue* automation. Amek *Hendrix* multitrack console; *BCIII* broadcast production console; *Einstein Super E* console with two independent paths per channel. TAC *Bullet* and *B2* cost-effective consoles for SR and video post. ● **Ampex Recording Media**

**International:** Stand 010A. Newly extended range of 467 DAT cassettes from 15 to 120 minutes duration. New formulation 83-minute U-matic cassette for CD mastering. *499 Grand Master Gold* high energy analogue mastering tape. ● **AMS-Neve:** Stand 012A. *Logic 3*; latest addition to the *Logic* line of digital consoles, can have up to 32 mono/16 mono audio inputs, eight mono or four stereo subgroups and four auxiliary sends. When used with *AudioFile*, forms complete digital system with Event-based Automation.

*Capricorn* digital music recording console (18 slot) and *55 Series* broadcast console. ● **APRS:**

Offering general information about the association and benefits of membership; also copies of publications *The 1993 Handbook of UK Recording and Duplicating* and *The Master Tape Book*.

● **ASC:** Stand 112A. *DART* digital cart system with v2.0 software including chaining, cut-and-paste editing, variable length beds, RS232 logging-remote and other enhancements. New *WINFX SFX* database and CD multiplayer control software operating under *Windows* on PC. New Phase 3 audio products from Videoquip, 'problem solvers' including D-As, balancing boxes, splitters, routers and silence detector. New *AEQ* audio monitor unit and *ASC DC-AC* powered monitor.

● **AT&T:** Stand X03A. First APRS showing of *DISQ* Digital Mixer Core, a parallel digital audio processor that interfaces with analogue consoles. The console then becomes a controller for the digital audio system. Compatible with *SSL G* Series automation, *Neve Flying Faders* for the *Neve VR* and *GML 2000* Series. ● **Audio Design:** Stand X12. First of new Digital Reference Series, a 20-bit differential DAC, designed to provide best dynamic range for all input word lengths. Improved jitter attenuation; optional error concealment up to 24-bit and regenerated, relocked DC filtered output. ● **Audio**

**Development:** Standard CD testing module *CD CATS SA3 Basic* and *SA3* with advanced functions and new parameters. Plus *CD CATS ST2* stamper tester module. ● **Audio Developments:** Stand 010. Latest version of the *AD261* mixer for ENG applications: has four inputs and MS matrices, running for as many as three days on one set of batteries. Latest version of *AD146* mixer; four output battery powered modular system in a variety of frame sizes. *ADO81* audio distribution system and the *Flexi-EQ* family of parametric equalisers.

● **Audio Kinetics UK:** Stand 006. Emulation of Adams Smith *Zeta III* and *26000* series machine controllers on *ES Lock* system, allowing communications with *AMS-Neve Capricorn* console and *Flying Fader* automation. Addition of mixed code ability to *ES Lock* and development of stand-alone code converter for restriping.

● **Audio Processing Technology:** Stand 003. New *Pro-Link* combining ISDN terminal adaptor with an intelligent six-channel inverse multiplexer. *DSM100* digital audio transceiver with new inverse multiplex option. 16-bit versions of the *ACE100* PC digital audio expansion card and new *Windows* compatible editing package.

● **Audio Projects:** Stand 103. Crest products including *10001* power amplifier producing 7,000W from 4U of rack. Crest *7301* Professional Monitor Amplifier designed for biamped stage monitors and including crossover and limiters. *10004* Pro Series amplifier with four channels producing 1,400W each into 2Ω.

● **Audio Technica:** Stand 102. Latest condenser microphones including large capsule studio models and boundary-principle units. *FBT* compact mixers. ● **Autograph Sales:** Stand X01A. Meyer Sound *HD-1* compact self-powered monitors, plus *MSL-2*, *UPL-2* and the complete *MPS-3* series.

Also: Meyer Sound *SIM System II* analyser; *ATM Fly-Ware*; *Matrix-Plus* digital intercom system from Clear-Com. New fibre-optic communication equipment from Opto-Digital. Milab mics; Micron radio-mics; processors; amplifiers and stands. ● **Avcom Systems:** Stand 012.

● **Avid Technology:** Stand 118A. *AudioVision* digital audio editor with integral random access video. Compatible with *Avid Media Composer* off-line nonlinear video editor. Four or eight audio tracks; integral level control for each track. ▶



AKG CK94 mic—Stand 001A

**B** ● **BASF Magnetics:** Stand 004A. Digital Master 931 master tape for DASH and ProDigi multitrack; MOD Master M-O disc and CD-R Master write-once CD; Studio Master 911 analogue studio products. ● **BBC Wood Norton:** Stand 189. Fifty years as BBC technical training centre, now available to outside organisations and freelancers. Purpose-built training and residential areas. Subjects covered include audio tape machine maintenance; multitrack recording and mixing; stereo mic technique; MIDI; hard disk editing; audio postproduction and measuring digital system performance. ● **Beyerdynamic:** Stand 020A. New studio condenser mic MC834, based on the MC740 but reduced cost. MV100 high performance stereo preamp for field use. MCE87VS camera-mount shotgun mic, based on MCE86. Top-of-range pro headphones, DT150 and new Sports Headset DT190. Two headset miniature condenser mics, HEM190 cardioid and HEM191 omni. IRS790 headphones. Soundtracs Solo Logic console.

**C** ● **Cadac-Clive Green & Co:** Stand 107. J-Type console with new group modules with programmable mutes and inserts on sub and matrix outputs. RME100 four-band parametric equaliser with separate PSU and remotely controlled mic amp RCM-3. Cadac consoles now in 25th year. ● **Calrec Audio:** Stand 155. First UK showing of T Series console with digital control of analogue audio path. Designed for production, postproduction and recording, has snapshot reset of all controls, event-driven recall or dynamic automation. ● **Canford Audio:** Stand 004. Established 15 years as manufacturer and

## The Mighty Disq

The European debut of the mighty Disq Digital Mixer Core is set for APRS. The showing will involve the first public demonstration of the Core's ability to interface with SSL E and G-series consoles running G-series computers following recent testing in Nashville.

Based on AT&T's Parallel Processor, the Core will handle 32-72 channels of digital audio adopting SSL, GML Series-2000 or Neve Flying Faders automation systems to allow control from the familiar environment of an SSL or Neve desk (without invalidating the audio facilities of the desk). The approach is described by AT&T's Russ Hamm as, 'evolution to fully digital mixing rather than a radical jump'. Studio demonstrations in Tokyo have been greeted with enthusiasm. Stand X03A ■

distributor. Illsonics tunnel allows visitors to 'listen to the silence'. BBC cables formerly available from BBC supplylink. Complete range of communications equipment; cables and connectors; studio furniture and accessories; processors; loudspeakers and test equipment. ● **Celestion International:** Stand 158. Latest processor-controlled live sound speaker systems. ● **Central Research Laboratories:** Stand 118. Systems for automated QC of cassette programme and identification of source material. CD manufacture, fully packed and wrapped. New range of speciality jewel boxes with custom printing. Free PQ coding and glass mastering for quantities of 500 up. ● **CP Cases:** Stand 140.

New EMS modular rack from Scandinavia; can be expanded by changing side panels. Starting units are 3U or 6U polycarbonate composite.

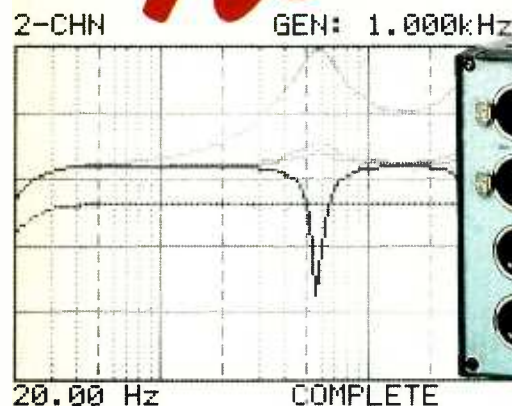
● **Crookwood:** Stand 187. First time exhibitor with the Paint Pot mic preamp, designed to be placed near microphone to avoid signal loss through long cable runs. Also 'console brick' system: digital building blocks that can be used to construct an audio mixer under the control of a variety of user interfaces. ● **Cunnings Recording Associates:** Stand 182.

**D** ● **Danish Pro Audio:** Stand 145-7. Team including Hilton Sound, Fairlight and GML representatives will show several product ranges. New Brüel & Kjær mic for single instrument applications; Acoustic Pressure Equalisation adaptor kits and established condenser mics. ● **Data Conversion Systems:** Stand 173. First showing of the dcs 902 high speed ADC—88.2 and 96 kHz compatible. ● **DDA:** Stand 025A. QMR compact 24-track project console in hands-on mix demonstrations. Profile studio console with added functions in Pro-File automation system: direct machine control via MIDI or Audio Kinetics Pacer synchroniser. New Q2 live sound console with three-channel (left, centre, right) panning and comprehensive solo system, choice of eight mono or eight stereo subgroups, or four LCR subgroups, plus on-board mix matrix. ● **Deltron Components:** Stand 014. Range of XLR-type audio connectors including the 7000 Series with precision die cast bodies and colour coding system for easy identification. ● **Digidesign:** Stand 130. Major software upgrade to Pro Tools 'world's best selling multichannel professional audio workstation'. Improved EQ; graphic editing of ▶

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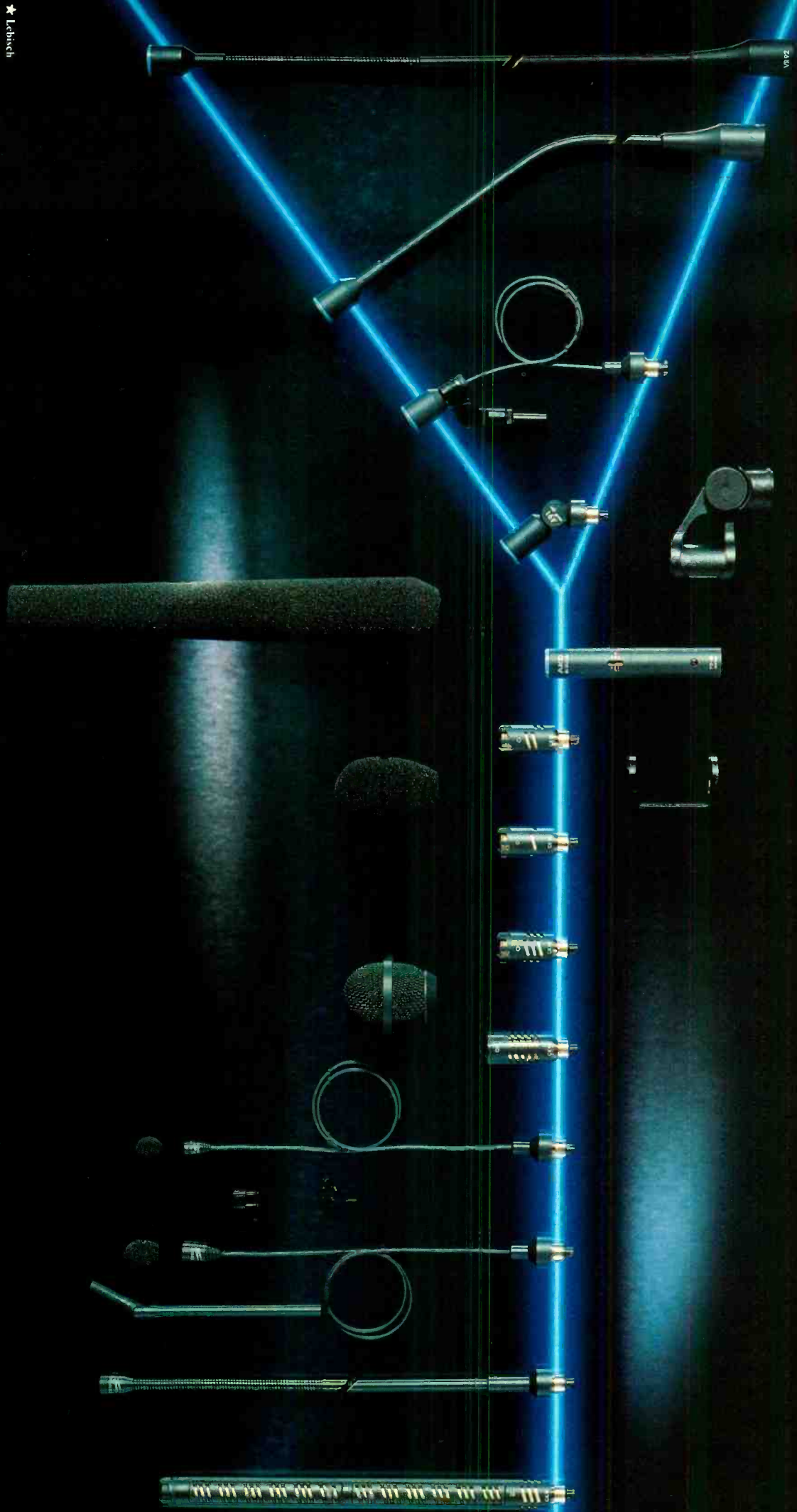
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automation; improves support for stereo and multichannel tracks; enhanced scrubbing; improved ease and speed of use. Demonstrating **8XL** low-cost eight-channel hard disk system with digital mixing with +4db audio levels and I-Os for other audio equipment. **SampleCell II**, new stereo 16-bit, 32Mb sample playback card for *Mac II*, *Centris* and *Quadra* computers. Integrates with *Pro Tools* and has dynamic digital filtering and eight polyphonic analogue outputs. ● **Digital Audio Research**: Stand 188. New *Sabre* affordable eight-track M-O based recorder and editor with single screen fast editing operation. Similar ergonomics to other DAR products but mouse operation. *SoundStation Delta* range of production systems in four, eight or 16 channels with options including *WordFit*, Segment-Based Processing and mixing. *SoundStation Sigma* with up to 16 channels of simultaneous play-record and on-board M-O storage. ● **Dolby Laboratories**: Stand 030A. Demonstrating *740* Spectral Processor for increasing low-level detail. Demonstrating *AC-2* digital bit-rate reduction technology for audio via ISDN loop back to stand using *DP501* digital encoder and *DP502* decoder. Full range of noise reduction systems and processors. ● **Drawmer Distribution**: Stand 018A. *DL441* Quad Auto Compressor-Limiter. Switchable hard-soft knee with ratio control in both modes; auto-attack and release to follow dynamics of signal and preserve transients without peaks; peak level control adjustable between 0dB and +16dB with 'zero response time' and 'zero overshoot' circuits. Also the *1960* Mic Preamp-Vacuum Tube Compressor with two low noise 48V phantom preamps, two soft knee compressors and enough gain for tube overload.

● **EMO Systems**: Stand 007. Complete range of ancillary equipment includes special version of *E520* single DI box 'for solving interface problems of monumental proportions'. Transformer-based mic splitters. ● **Energy Technology**: Stand 113A. *VKP-1* rackmounting two-channel valve preamp

for harmonic enhancement of Hammond-type keyboards, synthesisers, bass guitar and samples.

**F** ● **Fairlight**: Stand 147. Latest version of *MPX2* workstation with DSP option which provides time and frequency expansion and compression from 50% to 200%. New sample and hold function.

● **Filmtech**: New *LSP4* portable mixer for television and film location work. Four outputs; plus direct outs for all four inputs; MS matrix available on input, monitor and output section. Extended headroom for speech and effects recording. Aluminium case and carrying bag.

● **First Broadcast (MBI)**: Stand X09. ● **Formula Sound**: Range of mixing consoles for applications including hospital radio and disco. ● **Fostex UK**: Stand 108A. DAT and ADAT products, including UK launch of *D10* lower cost DAT machine. *PD2* location DAT recorder with time code; *D20B* studio time code DAT recorder. New *RD-8* ADAT standard 8-track digital recorder. Also *G* Series recorders and units from Fostex PA range. ● **Future Film Developments**: Stand 009.

**GH** ● **Graff Electronic Machines**: New specification *GEM Crystal 2* stereo or mono cassette copier, available as one-to-one, single or double slaves. Double or single-sided copying; record level and meter on all channels; one-button operation; short-jammed tape indicator on every slave; optional erase and rewind. ● **Harman Audio**: Stand 026A. Latest products from JBL, EAW, C-Audio and Steinberg. ● **Harris Allied Europe**: Stand 129. Latest version of *Arrakis* Digilink hard disk radio play automation system with *Tracstar* eight-track production editor. Also range of *Arrakis* products including *12000* series on-air console and *Modulux* studio furniture. Audio-metrics *CD-10* broadcast CD player with *AIRCorp* and Orban processing, AEQ telephone interface products and other units. ● **Hayden**

CONTINUED ON PAGE 35 ▶

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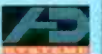
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## Soundcraft DC2000

The latest console from the Soundcraft stable is the *DC2000*, one of the highlights of which is proprietary automation system. Designed to deliver the goods on a modest budget, the automation still manages to offer a touchscreen interface system and motorised faders. The *DC2000* is an in-line 24 or 32-input console featuring stereo effects returns, 4-band EQ and nonmodular expansion—instead, additional channels come in 8-channel blocks.

'Console automation has come of age with the *DC2000*. The intuitive visual operation of moving faders is now available at an unbelievable price. The market has been waiting a long time for leading-edge electronics like this and we are really excited about the possibilities of applying *DC2000* technology in future consoles,' says Marketing and Business Planning Director Alison Brett. Stand 009A ■

Re-Pro newsletters and brochures will be available, along with a classified equipment sales service. ● **Roland:** Stand 154. Three *DM-80* eight-track systems locked together in 24-track configuration, with Roland Mac-based *Multitrack Manager* and new *DM-80L Locking Resolver*. Also detailed waveform editing on *DM-80* remote controller. New *SRV-330 Space Delay* and *SDE-330 Space Reverb*, both with *RSS 3D* processing. Cost less than £600. Sampler *S-750* and sample player *SP-700* combined to create nearly 10 minutes of sample time. New rack *JD-900 Super JD* synthesiser with eight-part multitimbrality and 24-voice polyphony. New *SRC-2* dual sample rate and format converter; converts, controls overall level and digitally mixes two stereo signals into one stereo digital signal. ● **Roxburg Electronics:** Now UK distributor for Alps faders, including new models on show. Also showing Roxburg range of switches.

● **Sellmark Electronic Services/Audiomation:** Stand 148/149. Extended range of motorised faders, now including 'budget' 60mm and 100mm units. Available with VCA or standard audio laws. New *MCU-1000* and *MCU-800* control systems for automation. Audiomation: new automation systems for Midas and SSL consoles. *2000 Series Uptown* moving fader automation system and *990 Series* low cost automation. ● **Sennheiser:** Stand 120A. New Neumann *TLM193* cardioid large diaphragm studio condenser mic for approximately £790.00. First UK showing of Neumann *Strategy 2002* digitally controlled recording, theatre postproduction and recording console. New Sennheiser *1051* budget hand-held radio mic system; four new budget musicians' dynamic mics; *MKH80* variable pattern condenser mic. New range of high power radio transmitters for OB links; VHS version of *EM1046* diversity system; *EK4015* miniature diversity receiver for film and TV; range of Anchor portable reinforcement products. ● **Shuttlesound:** New products from Behringer, Sabine, Dynacord and Rane. Behringer *EX 2200J* Multiflex and *EX3000* Ultraflex; compressors and gates including *MDX1000* and *MDX2000 Composer*, *MDX Combinator* and *XR2000 Intelligate*; Mic 502 preamp and *MX602* splitter. Sabine family of feedback exterminators including *FBX1200*. Demonstration of Shuttlesound CAD plus product from Samson, Amcron and Electro-Voice. ● **Sifam:** Stand 020. Details of expanded design and custom moulding service. Collet, push-on and slider control knobs. PPM and VU indicators. ● **Sonifex:** New Sound Screen *HDX2000*

CONTINUED ON PAGE 40 ►

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PC-based hard disk audio recorder and programme scheduler for on-air and newsroom use. Five hours of structured library storage with index facilities and rapid-find. Discart *DX10-R* add-on record unit for the *DX10* player. ● **Sony Broadcast International:** Stand 002A. New *PCM-9000* M-O mastering disc recorder. Radio system products; *DMX-B4008* eight-channel digital audio console for radio; *CDP-3100* broadcast CD player with remote; *CDK-3600* 360-disc CD changer; *PCM-E7700* 'new generation' DAT editing system *DATstation*; *PMD-C1* MiniDisc cart machine. Audio-for-video consoles; *MXP-290, 390, 2908, DMX-E3000*. DASH recorders; *24S* and *3348* with MADI interface. *C-800* series microphones. Complete *DPS0-X7* Series. *DMX-S6000* will be demonstrated off main stand. ● **Sound Design:** Stand X22. Acoustic consultancy offering conventional and prefabricated constructions. New prefabricated modular radio studio for £7,999 including air conditioning, plus details of TV centre for Yorkshire and Tyne Tees designed and built in ten weeks. ● **Sound Technology:** Stand 028A. Alesis *ADAT* digital multitrack recorders, outboard processors and other products. ● **Sound & Video Contractor:** Stand 105. ● **Soundcraft Electronics:** Stand 009A, also ● **Soundcraft Spirit** Stand 022. *DC2000* in-line console with motorised fader automation system. *LM1* location mixer and compact mixers *B100* and *BVE100* for recording and postproduction. New *Folio 4*, four-bus version of existing model and *Folio SI* for MIDI rigs. Live 4, 16-channel configuration. ● **Soundtracs:** Stand 021A. Existing range of *Megas* consoles including the *Megas Monitor, Megas Stage, Megas Studio* and

## Studer Dyaxis II

The appearance of Studer's *Dyaxis II* workstation at this year's APRS marks its first official appearance in the UK. The 8-48-track expandable *Dyaxis II* has been enhanced by the addition of new software for autoconforming called *Smartlog* which accepts EDLs from a variety of video editing systems.

Also new to *Dyaxis* are multitrack editing facilities, time compression-expansion (from 0.5 to 10 times real time) and scrub editing to picture, and a feature tagged *Plug & Play*. This latter improvement 'translates the power and performance of the fastest hard drives into simple plug and play operation on removable optical media' making unnecessary the usual backup and restoration tasks. Stand 140A. ■

*Megas Mix, Solo Live, Solo Midi* and *Solo Monitor*. Unannounced new consoles. ● **SSE Marketing:** Audio Precision test equipment; Genelec monitor speakers; Schoeps condenser mics; new v3.0 software for the Digital Audio Labs PC audio digitising card. ● **Stafford Knight O'Neill:** Details and advice on insurance packages for the music and sound recording industries. ● **Stirling/Syco:** Stand X23. *TimeLine Lynx 2* synchroniser module; Alesis *AL 2* made by *TimeLine* for Alesis to interface *ADAT* with synchronisers; *Lexicon NuVerb*—reverb on a card for the *Mac*; *MicroTech Geffel UM92S* valve mic. For *Syco DigiDesign ProTools v2.0*; *WaveFrame DCS*; and *DASH 6800 Apple Mac* workstations. ● **Studer Revox UK:** Stand 140A. New *Dyaxis II*

multichannel audio workstation with new autoconforming *Smartlog* software accepting EDLs from video editors. New *Numisys II* broadcast automation system. Studer CD range and CD-R machine. Aegan *408 OMX* optical multitrack recorder-editor. ● **Studio Audio & Video:** Version 2.0 of *Sadie* PC-based two/four-channel recording and editing system. Now with real-time mixdown with panning; digital compression and sample rate conversion. PQ editing and waveform editing included, as well as time compression. Up to 24-bit resolution and interface to wave files on PC. ● **Studio Sound:** Stand 179. Meet the staff of your favourite magazine in delightful surroundings. ● **Studiomaster:** Stand 161. Mixer and amplifier products.

**T** ● **Tannoy:** Stand 014A. New *System 6 NFMII* compact monitor with 6.5-inch dual concentric drive unit. New *Monitor Series II* with improved crossovers. ● **Tapematic/Tapetek:** New *5200 DupeCenter* loop-bin master and two slaves in integral cabinet for the high speed duplication of audio cassette tapes. Also 8mm *MiniLoader* and audio cassette *MiniLoader*. *2002CL* dual pancake cassette loader with stacker fitted. ● **TEAC UK:** Stand 108A. *DA-88* digital eight-track recorder; professional DAT recorders including the *DA-60* four-head machine with time code; *RA-4000* hard disk recorder, broadcast CD players and a range of multitrack consoles. ● **Thear Technology:** Details of equipment servicing including on-site visits and contract work for Akai, Audio Kinetics, Athan Corporation, Fairlight, Marantz, Otari, Studer and Revox, Teac. ● **Tony Larking Professional Sales:** Stand 018. KRK ▶

## Multitrack editing software XTrack version 3 makes production a pleasure

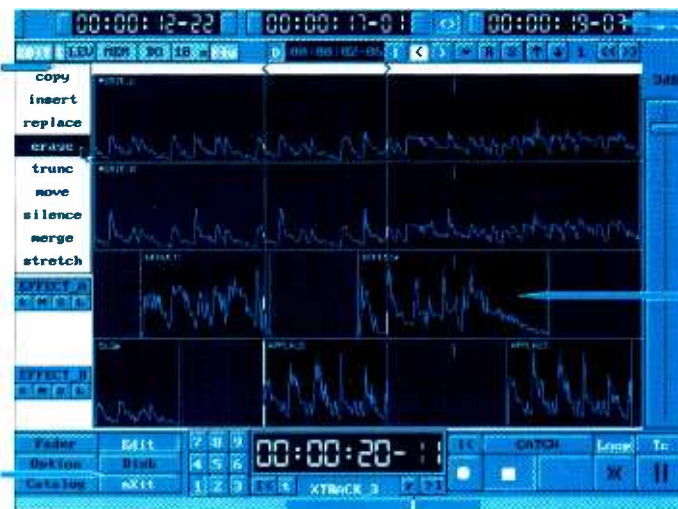
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### XTrack is fast

All the edit functions (crossfade, merge, time stretch...) are directly accessible via the drop down menus

### XTrack is comprehensive

Xtrack is also a post-production tool with LTC chase-lock and RS 422 capabilities. In addition, the catalogue supervises a veritable banquet of sound data to service your creativity.



### XTrack is simple

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### XTrack is enjoyable

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### XTrack is compatible

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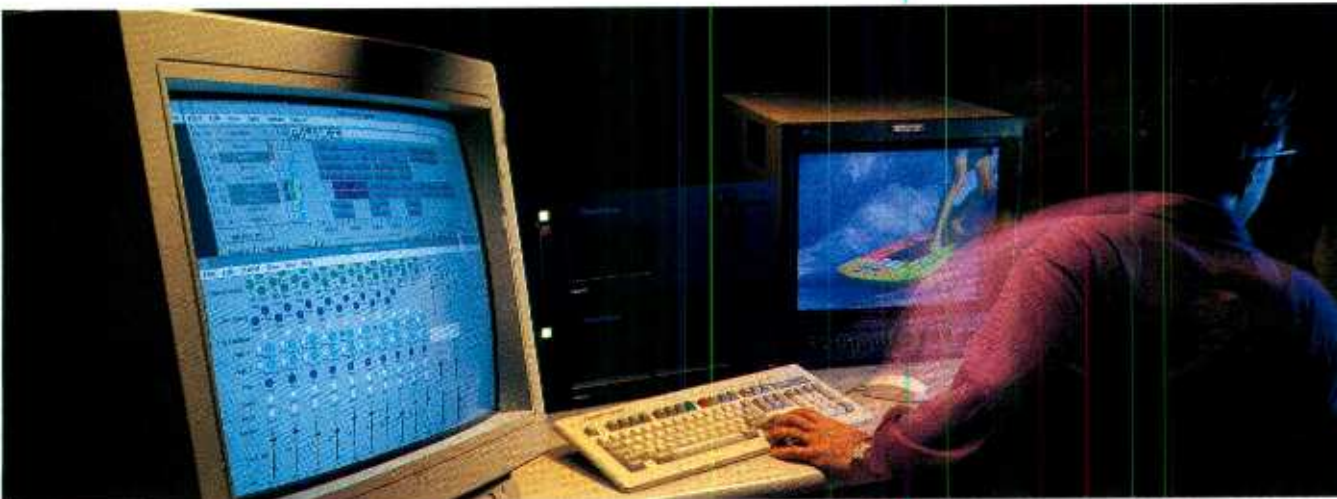


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● **Trident Audio Developments:** Stand 029A. Trident *Ninety* and *Vector 432* consoles. *Ninety* I-O module has five inputs and three signal paths, creating 128 inputs in a 40-way frame. All paths have equalisation, aux sends, multitrack routing and automated cuts available. Ten aux sends (two stereo) and aux feeds to multitrack included. Trident *Trimix* dual VCA automation and machine control system addresses 12 switches per module, 14 central facilities switches and 16 switch group masters. ● **TSC Studio Sales:** Euphonix consoles.

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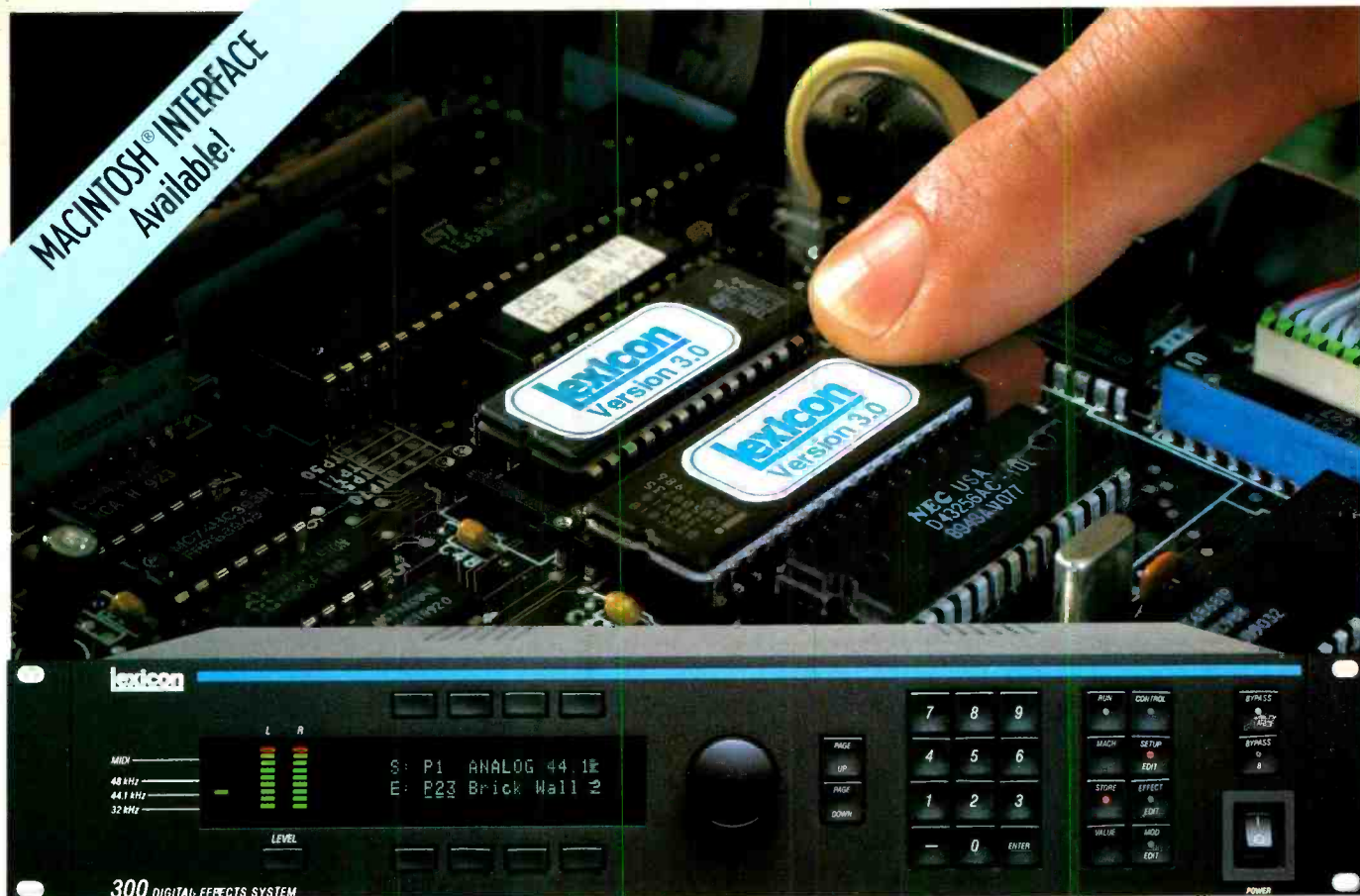
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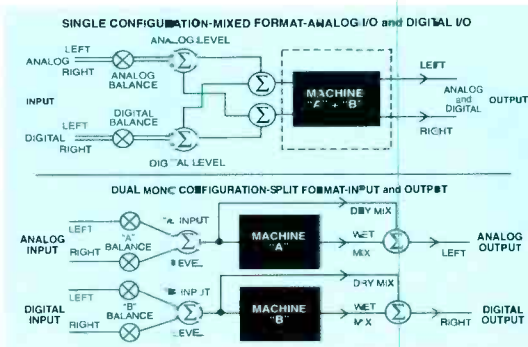
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\*1991 Mix Magazine TEC Award Winner

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*Exhibit A: To find evidence of our remorseless commitment to sonic integrity, look no further than the new D&R Triton. Its transparency, flexibility, and unparalleled support put it in the same league as our flagship, the D&R Avalon.*

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*Exhibit B: When Digidesign was judging new consoles to use with their own 20- and 16-bit digital recording & editing systems, they knew the board would have to be good. Very good. And quiet. Very quiet. Their verdict? The D&R Orion.*

D&R handcrafts consoles for recording, live sound, theatre, post-production and broadcast. Whether you own a world-class facility or a serious project studio, there's a D&R for your needs and budget.

**A**udio historians will readily point out that surround sound has not had an easy time. Although it has provided almost unlimited scope for academic research, surround sound has not borne a proportional quantity of commercial fruit. Its principal claim to fame has been in the cinema, owing to the success of the Dolby Stereo format for 35mm prints which encodes four channels (Left, Centre, Right and Surround) into a stereo variable area (SVA) optical soundtrack. Anyone who has been to a good cinema and seen an exciting film in this format will bear witness to the enhanced experience offered over conventional mono. (I, for one, find mono cinemas extremely dull now.) It is all the more remarkable, therefore, that there is still a large proportion of cinemas in the UK incapable of reproducing surround sound—although the situation in the USA is somewhat better.

Surround sound in the home is another matter altogether. Certainly as far as audio-only reproduction goes, the market has proven to be extremely small to date, with a limited number of listeners using such things as Ambisonic decoders to play back UHJ-encoded stereo recordings of classical music, and with quadraphonics having fizzled out in the 1970s. There is no doubt that well-set-up Ambisonics can sound impressive in the home, but the mass market impetus to install more than two loudspeakers in the living room has simply not been there. Acceptance of home surround sound is gradually taking place, though, due to the increased interest in home movie systems, involving consumer surround decoders, multiple channel A-V amplifiers and four or five loudspeakers, to provide enhanced enjoyment of transmitted, bought and rented movies.

Now that NICAM stereo broadcasts are available to a considerable proportion of the UK population (resulting in a corresponding purchase of NICAM TVs and VCRs), it is possible for consumers to decode surround information contained within stereo movies that are transmitted as part of the everyday programme schedule. Increases in rented video market and sales of VHS hi-fi recorders have also encouraged the installation of hi-fi sound reproduction equipment to go with home movie systems. Thus it is the that pictures can be seen to be the driving



Dinosaur junior — a scene from *Jurassic Park* made using APT-X100 data reduction

# CHANNEL CROSSING

force behind surround sound installations—and it is possible that audio-only applications will follow in their wake. Dolby Labs report sales of many hundreds of thousands of Dolby Surround decoders (the consumer equivalent of Dolby Stereo) in Europe and America, and there is the usual great enthusiasm for such things in Japan.

In workshops at the AES Convention in Berlin, delegates were given the opportunity to hear about a number of surround systems, some claiming to offer solutions for high definition television (HDTV), and demonstrations were arranged of each system so that it was possible to compare examples of audio both with and without pictures. It was a rare opportunity to find the systems in such close proximity. At the same time, technical developments were reported which have resulted in data reduction systems designed for the transmission and storage of surround information at a reduced bit rate—this being vital to the possibility for surround information to be carried in a digital form on optical film, on CD-I

with full motion video, and over the air in future DAB and HDTV transmissions.

A clear division in the systems presented in the Berlin workshops existed between the systems vying for the HDTV future, and systems designed either for experimental purposes or auditorium sound reinforcement. The main surround formats and digital coding systems discussed consisted of '3-2 Stereo with MUSICAM-Surround' (IRT presentation), Dolby Stereo and Dolby SR-D, Delta Stereofonie (Deutsche Bundespost Telekom), and Orthophonie (Berlin Technical University). Dealing with the latter two first, Delta Stereofonie is designed principally for large-area auditorium sound reinforcement, attempting to enhance ►



Digital Theater Systems' DTS-6 six-track CD-ROM

Recent developments in multichannel sound systems are discussed by Francis Rumsey

the spatial cues present in the original sound, and Orthophonie is an experimental system which seems much like a variation on Ambisonics. I shall spend the remainder of this article concentrating on the future of the 3-2 format and the data reduction systems used, but first it is important to outline the agreements regarding a standard surround format either to accompany pictures or not, which have been proposed by various bodies, since this has an important bearing on the following topics.

## A universal format?

Although it has been the goal for many years, a universal surround loudspeaker format has proved elusive to date. Now there may be some light at the end of the tunnel—and this time it may not be an approaching train! Working groups of the SMPTE<sup>1</sup>, the EBU<sup>2</sup> and the CCIR<sup>3</sup> have all made draft recommendations for a 3-2-channel surround reproduction system—that is a system with three front channels (L, C, R) and two rear channels (stereo surround). There is also the intention optionally to include a '0.2' channel carrying only low frequency non-directional information for the 'bass boom'.

The interesting thing about the wide agreement is the apparent reduction in emphasis on the goal of many previous surround systems, which was to attempt all-round localisation of phantom sources. In the 3-2 standard it is expected that the front channels will carry directional information, but that the rear channels will carry stereo ambience and effects signals which are not critically located, so that there could be considerable flexibility in the placement of the surround loudspeakers. Indeed, it is suggested that the surround loudspeakers might often be placed nearer the sides, rather than at the rear of domestic rooms. Theile<sup>4</sup> says that 'the addition of side-rear loudspeakers does not enlarge the listening angle (by delivering genuine surround localisation of phantom sources); rather it adds an acoustic environment to the frontal stereophonic presentation of directional sound'. This seems to me to be the key to success. The number of people who want or will appreciate the Holy Grail of 'correct' all-round sound field reconstruction is very small. Most people appreciate 2-channel stereo for its improvement in the spaciousness and excitement of listening, rather than for the accuracy of phantom source localisation, and most will appreciate surround for the same reason. Furthermore, the use of the rear channels in a manner more akin to the cinema will make production and postproduction more straightforward.

This channel configuration does not preclude the use of the 3-2 loudspeaker layout for attempts at 3-D spatial localisation, and the working groups have been clever in specifying principally the reproduction format, rather than saying how material should be produced for that format. That way they have left the way clear for audio-only applications of the 3-2 format which may wish to use the rear channels for all-round localisation. The CCIR has also produced a draft hierarchy of alternative lower level formats for smaller numbers of channels, allowing configurations such as 3-1, 3-0, 2-2, 2-0 (conventional stereo) and 1-0 (mono), with matrix equations to suit each. Although researchers have proposed many loudspeaker arrangements and required numbers of channels for HDTV surround sound, the 3-2 format is a pragmatic compromise which stands a good chance of being implementable, and which is

capable of convincing reproduction. It is suggested that it will also prove acceptable for audio-only applications, such as surround broadcasts of music in future DAB systems.

## Reproduction formats and coding

There is some confusion among those not directly involved in the development of surround systems as to the difference between the reproduction format and the digital audio systems used to handle the surround information. This is partly because at the same time as the reproduction format is being standardised, there is a frantic rush to develop coding algorithms which will allow 3-2 surround information to be stored and transmitted in a data-reduced form. The confusion is possibly intentional to some extent, since the developers would like you to use both their surround format and their coding system, but the two subjects are, in fact, somewhat independent.

One coding system (AC-3) is implemented by Dolby, which has straightforwardly commercial aims in seeing its systems adopted as widely as possible, and another (MUSICAM-Surround) has been developed by the group of European researchers which produced the MUSICAM data reduction system that has now been adopted by ISO (the International Standards Organisation). APT has also entered the fray, announcing that the APT-X100 data reduction system is to be used with Stephen Spielberg's *Jurassic Park* film at over 1000 cinemas in the US, using CD-ROM drives to carry the compressed multichannel audio, synchronised to the picture. One is therefore really dealing with a contrast between *de facto* standardisation through commercial predominance, and formal international standardisation by committee.

## 3-2 stereo with MUSICAM-Surround

MUSICAM-Surround is an extension of the coding method developed for digital audio broadcasting (DAB), which was based largely on the MUSICAM data reduction system. It is proposed as phase two of the ISO-MPEG-Audio standardisation of bit-rate reduction (ISO 11172-3), providing compatibility with mono, stereo or dual-language programmes. It extends psychoacoustic masking theory to a greater number of channels, and takes account of redundancy between five channels rather than just two. In this way it is possible to code 3-2 surround sound at a bit rate considerably lower than five times the single channel rate, and the proposal is for a total bit rate of 384Kbit/s, which is approximately ten times lower than the linear PCM bit rate for five channels.

A key aim of the MUSICAM-Surround development team was to ensure that 2-channel decoders would still decode compatible stereo information from multichannel signals, and thus they have introduced the surround information as a multichannel extension to the existing ISO-MPEG frame structure. The five transmitted channels are matrixed in such a way that the left and right main pair of the ISO-MPEG frame contains a proportion of Centre and Surround channels, whilst the remaining three channels carry Centre and stereo surround. A stereo decoder thus receives a compatible signal and a multichannel decoder subtracts the centre and surround information from the front left and right channels. There are also possibilities for using ►

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the five channels as two stereo programmes, or for second languages.

The strengths of the proposal are that the ISO-MPEG coding method is likely to be widely used in all areas of the audio and multimedia industries, including CD-I, DAB and HDTV sound, and this is its natural extension to a greater number of channels.

The programme material demonstrated by the MUSICAM group at Berlin was largely originated by broadcasters (ARD, BBC, IRT), in conjunction with the VDT (Verband Deutscher Tonmeister), and included both sound with pictures and audio-only material.

## Dolby surround sound, AC-3 and SR-D

Dolby's main surround format to date has used only mono surround information, and Carter<sup>5</sup> suggests that the improvement of five channels over four is debatable. In accordance with the SMPTE recommendations, though, Dolby's latest digital format does allow for stereo surround information as well as the low-frequency 'boom' channel, and thus is a 3-2 format in essence.

Dolby's equivalent of MUSICAM Surround is called AC-3, and is a development of its AC-2 transform coder, producing a bit rate for the five channels very similar to that of MUSICAM. Dolby has implemented AC-3 as the coding method for its SR-D digital film sound format, which incorporates the digital sound information optically in the gaps between the sprocket holes of the film, allowing the conventional SVA optical track to coexist, thus making possible a single 35mm release print for both analogue and digital systems.

In Berlin, Dolby showed a selection of surround film material, both with mono and stereo surround channels, and also played some audio-only material in five channel format, coded through AC-3. They were also keen to show examples of TV programmes mixed in Dolby Surround, and suggested that the popularity of this approach was growing in the television industry due to the increasing number of surround decoders in the home. ■

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**Dr FRANCIS RUMSEY is Chairman of the British Section of AES, and a lecturer on Surrey University's Tonmeister degree course in Music and Sound Recording. He is the author of numerous conference and convention papers for AES, the Institute of Acoustics and the Royal TV Society, and six books on audio technology including Digital Audio Operations and MIDI Systems and Control**

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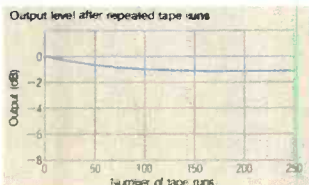
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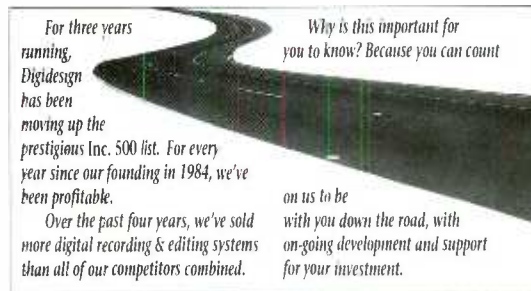
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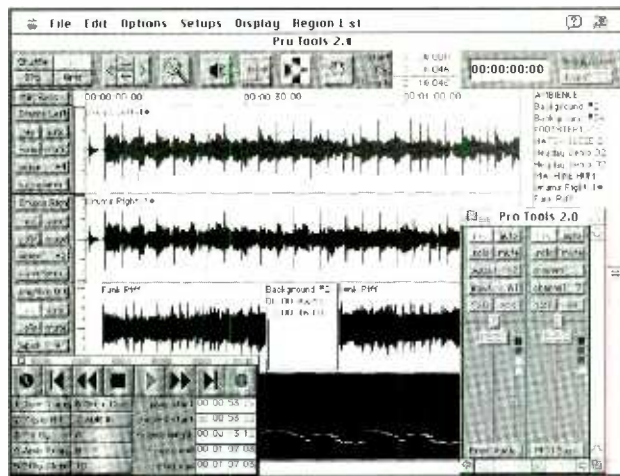
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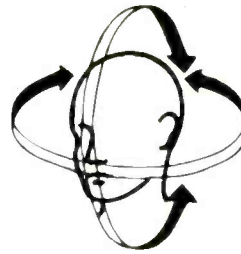
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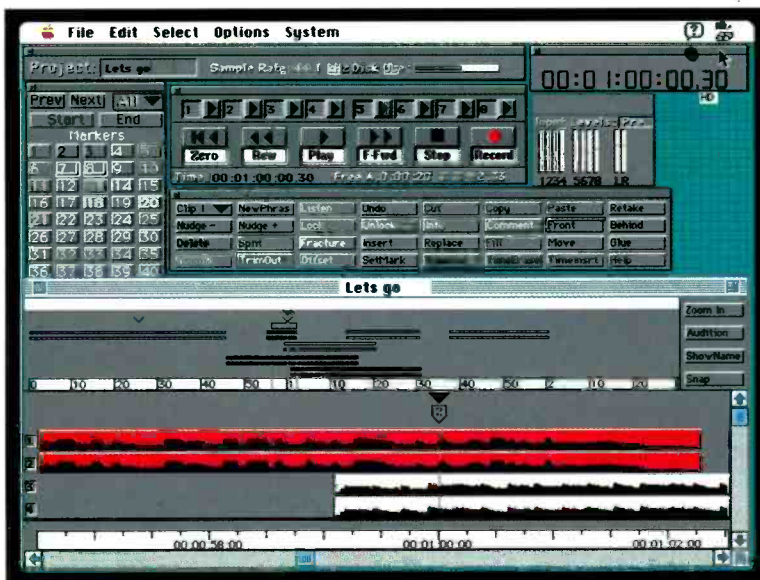
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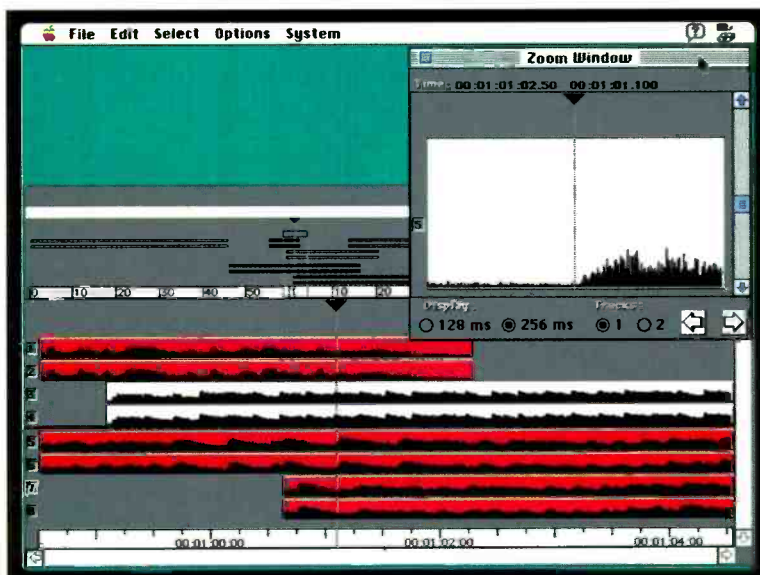
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# ECHOES IN THE GREEN ROOM

Last year saw the release of Henryk Górecki's Symphony No 3 Opus 36 on the Elektra Nonesuch label. The piece is a 20th Century classical composition, recorded by the London Sinfonietta with David Zinman conducting and featuring soprano Dawn Upshaw as the soloist. At a time when 'traditionally' popular and profitable musical styles are turning in sufficiently disappointing sales performances to have certain industry figures entertaining the possible 'death' of popular music, the runaway success of 'Górecki's 3rd' is both unexpected and encouraging.

Górecki studied with Messiaen in Paris in the 1950s and draws inspiration from sources as diverse as 14th Century Polish chants and Weberian serialism. Consequently, he has been recognised as an exponent of avant garde composition since his first work in 1956—facts that make the commercial success of the Górecki symphony even more unlikely. So what is behind the phenomenon: a blinding musical performance, a revolutionary approach to recording or a perfect recording location? Or is it simply the music itself?

The recording venue was CTS Studio 1 and the man behind the desk was one Tony Faulkner, whose Green Room Productions company was partly responsible for the recording. Here Faulkner attempts to help resolve some of the mysteries surrounding its success.

'If you took an average punter a year ago, put a CD in front of him and said "Górecki's Symphony No. 3, David Zinman, London Sinfonietta", he begins, illustrating the first obstacle to be overcome, his impression without listening to it would probably have been "I wonder what the hell that is. It sounds 20th Century which probably means it is going to hurt and need a PhD to listen to". It's the old squeaky gate syndrome.'



Conveniently, the situation was eased by the fact that Faulkner's assistant engineer on the project—Declan McGovern—has since become a producer at the Classic FM radio station.

'When the playlist came in,' Faulkner continues, 'he didn't think "Górecki's 3rd Symphony, that must be squeaky gate", he thought, "we'll see if anybody likes it". He put it out and they did, so a barrier was broken.'

Moving from the music to the means by which it was made, Faulkner's high regard for digital electronics quickly becomes evident.

'There's a lot of atmosphere on it that could only have been captured by digital technology,' he comments. 'With a digital system you can record down to DC if you're not worried about offsets, and you can certainly record down to half a hertz. If you're on an analogue system at 30ips what happens below 50Hz is best coughed over; the replay head needs to be the size of a dustbin to reproduce anything below 50Hz.'

The modern style of recording using directional microphones, transistor electronics and maybe an analogue tape machine does not do anything ►

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How do you take a piece of 20th Century classical music based on the Holocaust to the top of the charts? Tim Goodyer talks to Tony Faulkner about venues, desks and digital audio

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useful below 50Hz at all. With the microphones we use and the modifications that have been done to them, the electronics are still alive at a couple of hertz and the A-D converters we use are certainly pretty live down there. And I think that is an unusual sensation to have that warm quality to get at the bottom end. That is where a big studio like CTS comes in because you need a certain volume of air to reproduce low frequencies.'

When it comes to recording venues, classical music demands that the studio environment becomes a part of the recording in a way that most non-classical engineers find alarming. In classical circles a reverb unit is nothing, the room is everything.

'You need a room which is large enough to house the right number of musicians and you need a room with some colour to it,' Faulkner explains. 'Most modern studios are designed to be as colourless as possible so you can use a lot of microphones, you can stick a drum kit in there and you can add an acoustic in the control room with a Lexicon or whatever. With classics, traditionally, you try and use the room and there are not many places around the world you'd really want to use very much because they've been designed for different purposes.'

'The only real places that I know of are Abbey Road—Number One especially but Number Two also has a lot of life and colour. Then there's CTS, particularly Studio 1 because its got space and colour and it doesn't saturate if you put a big orchestra in there playing fairly loud—you don't feel you want to cover your ears if you're in there because there is a great enough volume of air. For the Górecki, there were 22 violins; eight violas; six cellos; eight double basses; double wind; some brass — about 65 or 70 in the orchestra. You wouldn't want anything much bigger, or you start to hear the walls.'

'Abbey Road is the liveliest room in London and the closest to a classical location—it's very good and they've made some wonderful records there. A studio as live as that requires engineers used to working in live acoustics. Most people who do general-purpose engineering, or film and TV recording, are used to working in a drier acoustic.'

'It's interesting seeing what they've been doing at Air—Lyndhurst Hall has a beautiful acoustic and they've already started wrecking it, putting in all sorts of flying saucers and acoustic tile dangling all over the place. Admittedly, it needs some work on it but compared to most of the locations I get to work in—like Tooting or Blackheath—that place is already very dead. I'm not saying it's ideal to have locations very live, but I would be very happy with Lyndhurst with just a small amount of treatment—maybe if they put some carpets up in the galleries.'

'You have to look at what their main client base is, and it's one thing to say you want to be a classical venue, it's another thing to provide certain things that those classical people would like that would be a nuisance to film people or whoever. Dire Straits doing a drum track wouldn't want to be in a room as live as that.'

Another option exists in the choice of recording venue, and that is to use a church or hall whose size and acoustic may be better suited to a project than any purpose-built room.

'If you actually want a 100-piece orchestra, 200-piece chorus and six soloists, I would not want to put that in Lyndhurst Hall or here or probably



**Tony Faulkner at the Neve desk in CTS' Studio 1**

not even Abbey Road. I would go on the road,' confirms Faulkner.

'The other advantage with a location is that it tends to be booked for all of the day so you go in and everybody arrives when they want to arrive and finishes when they want to finish. If you're working in Abbey Road you're definitely aware that, if you've got a 2.30–5.30 slot, and if you want to do a cadenza at the end you can't because they're doing Tom & Jerry, the Movie at 7 o'clock.'

'I have to have total control over the choice of the venue. It's an Achilles heel of my mic technique—it's very dependent on where I'm working. If I'm put in a bad location I'm likely to come out with something that isn't that fantastic; if I'm in a good location then I can get on with it. I always use a lot of the room, so I have to be somewhere decent and there are very few studios I would choose to be in.'

'The only other studio I use regularly is Lucas in San Francisco, which is spectacular and really designed for the same sort of purpose as CTS: its a sound stage for doing music and its big enough to have an acoustic and some nice colour. And they're friendly. I'm not trying to trivialise it, but if you're uncomfortable, it's not a nice situation to work in.'

Acoustics, however, are only part of a studio facility—there are also issues of equipment and sound isolation. Again the demands of the classical engineer do not readily match up to those of the rock or pop fraternities.

'If you record on location in a church, which was originally planned for the Górecki, because of the nature of the music where about the first 10 or 15

minutes is pianissimo double basses, the last thing you want to hear are Routemaster buses, Jumbo Jets and somebody reversing a Securicor van. We couldn't have had enough minutes of quiet to make that record without people getting grumpy.'

While the lack of extraneous noise at CTS pleases Faulkner, it seems none of the studios in question are able to offer the equipment required for making magical classical recordings.

'They're geared to multitrack work and nearly all classical work is straight to twin track,' he explains. 'The Górecki was straight to twin track using my own mics and my own mic preamps. We used the Neve V-series desk, an outboard A-D converter and their Sony 1610s.'

'I can't expect a multipurpose studio or a television studio to have the gear I specifically want to use,' he concedes. 'I want M50 valve microphones, I want B&W or Quad monitoring—those are things that none of the other clients or engineers would want and people like me don't come in often enough to make it worth the studio buying them.'

Owning much of his own equipment allows Faulkner to bring ensure that he is always suitably equipped for a recording session, whether it is on location or in a commercial facility. Perhaps the Górecki secret lies here.

'I've got a Neotek solid state desk which was built to our spec,' Faulkner reveals. 'The frame is about seven or eight years old but it has been modified twice in the last 12 months. In terms of modern desks, I've used the Neve in CTS and the Neve at Skywalker and, given the constraints of building a multipurpose desk, they are the most transparent.'

'I've used the SSL at BBC Manchester, and at BBC Glasgow and the one at Abbey Road Number One which they're just scrapping at the moment. I've always been happy with the recording when I've got the recording home and listened to it on my system but I've never been 100% comfortable at the time. I think they've had to make certain design compromises to give facilities more than absolute sound quality; Neve, traditionally, have been much more obsessive about sound quality. The big V-series desk has got so much headroom that it's similar to using a valve desk. ►

**the demands of the classical engineer do not readily match up to those of the rock or pop fraternities.**

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The Neve monitor path sounds okay to me but I'm suspicious of SSL monitoring because recordings always seem to sound better when you get them home. If I work at Abbey Road Number One, say, recordings always sound a bit cleaner at the top and warmer at the bottom at home. It's kind of front to back—it sounds nicer than you thought it did at the time.'

On A-D converters, Faulkner admits to using two dCS boxes but claims to have mixed experience of other units.

'We've got some Meridians which were made as one-offs by Bob Stuart. They make an A-D as part of their range for hi-fi systems; somebody lent us one and we tried it out and it knocked the spots off a lot of the other stuff around. We're doing quite a lot of work sticking the A-D in the hall and running long fibre optic cables which we like the sound of. It means you can float the A-D away from the control room and there are no grounding problems and you haven't got a long run for the analogue signal. We've also been playing with a Prism A-D which we think is very good.

'We've had a few run-ins with others; I wouldn't want to be destructive by saying the names of them. But some A-Ds really are bullshit jobs, particularly if you're trying to get a very big dynamic range out of them, you can be tempted not to dither them properly and then the low levels sound as if you're running around on Rice Krispies—horrible and scratchy and grainy.

'We've also got a very nice redithering box from Meridian which does different sorts of noise shaping. We've had a lot of success with that, redithering from 20-bit instead of truncating.'

Moving on to the topic of valve technology and its interaction with digital systems seems to take us closer to Górecki's secret. The session—like

there obviously isn't any kind of in-built reluctance to enjoy the qualities that digital and valve technologies make as a team

many others Faulkner has conducted— was miked using Neumann M50s (from Faulkner's 'large collection of ancient valve mics') as the main pair, with a second pair of Schoeps omnis on the soloist.

'Valve technology avoids the breaking glass quality you get from a lot of modern CDs,' the engineer explains. 'And valve power amps usually have so much more headroom; effectively that means you can drive them into clipping without covering your ears. Most of the distortion with valves tends to be low order—it's second or third order harmonics which can actually sound quite nice, a bit richer. It may be less honest, but it's rescued so many small speaker designs—if the bass unit has a lot of second harmonic in it, it often sounds as if there's a lot more bass than there actually is. The ear is quite easily fooled by low-order distortion. If you've got a choice of either a lot of high-order or intermod distortion, or else a bit of warming up at the bass end, my ears tell me one thing.

'I've only done one recording using transistor main mics in the last five years. None of the records come out saying that they were done using valve microphones and silver wire, and all the rest of it. It's mainstream labels putting mainstream records out, and the fact that we've got five in the Top 20 at the moment I think is interesting. I wouldn't draw any more conclusions than that, but there obviously isn't any kind of in-built reluctance to enjoy the qualities that digital and valve technologies make as a team.'

So, the formula for success appears to include a carefully chosen venue and a selection of equipment not readily available in any commercial recording facility. Add digital and valve electronics in concise measures, some seasoned performers and a discerning Recording Engineer and you've got a surefire hit. Or does it really all come down to the Assistant Engineer having secured an influential position at a radio station?

'Its success is not only due to Classic FM,' maintains Faulkner, 'because it's also sold very well in America. If it's sold 60,000 there, there has to be another reason—it might actually be that it's a good record.

'The fact is that it is good and the musical establishment feels a responsibility to encourage modern music. Beethoven wouldn't have successes if there hadn't been an interest in his music in his day, and it's still true now. It is very difficult to find 20th Century music that's approachable for ordinary mortals—most of it does require a PhD or a very big commitment to listen through the techniques of modern composition. But the Górecki falls on the ear; it doesn't sound traditionalist, it's got its own colour and it sell into a slot for people who want to promote modern music from serious artists.' ■



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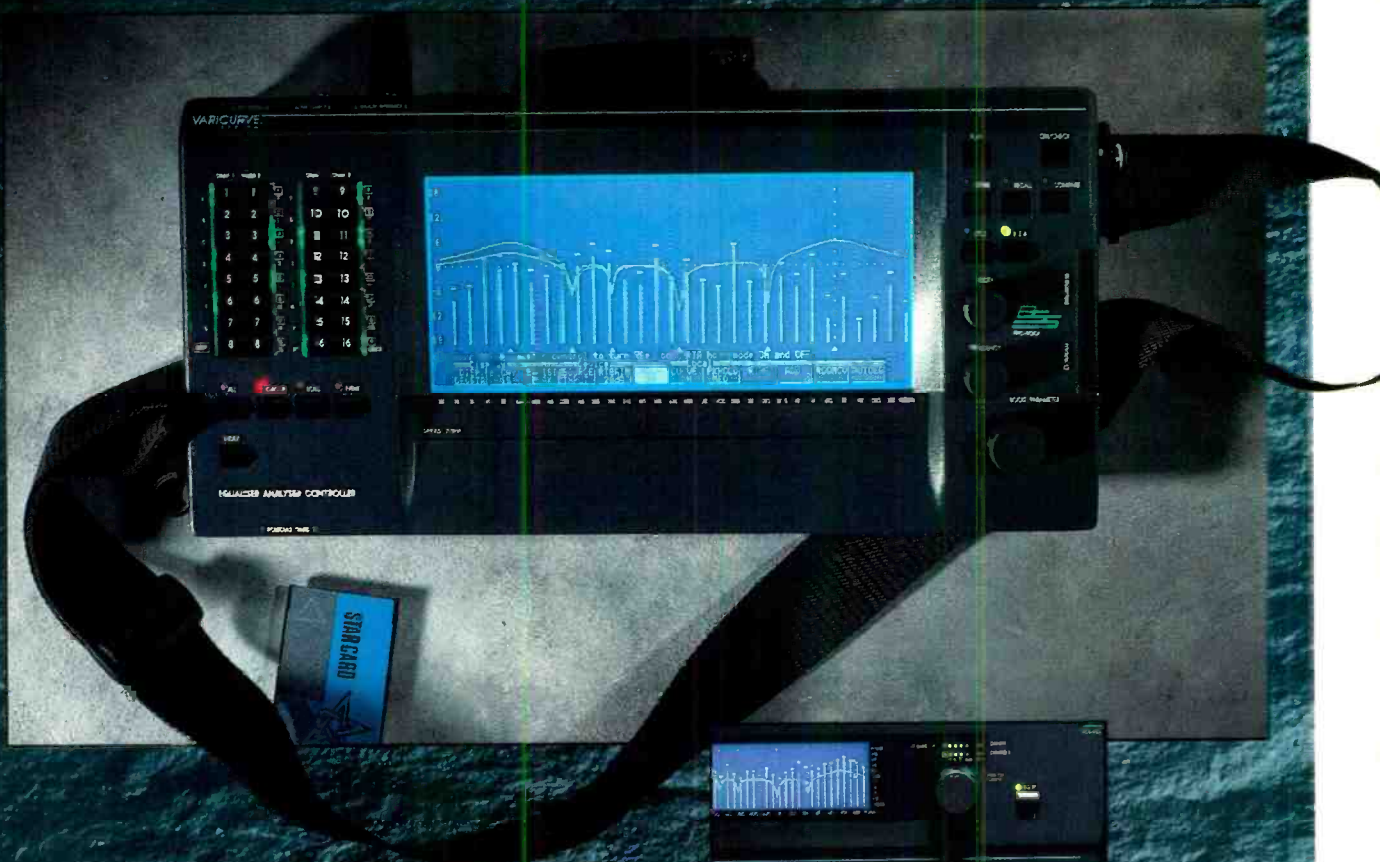
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# ALL TOOLED UP

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*Pro Tools* should not be viewed as a replacement for the other packages. Some of the processing power and editing detail they provide has been traded off for the multitrack configuration, a new graphic environment with faster access to basic editing functions, MIDI recording and playback, onboard digital mixing and time code capabilities. The systems should rather be seen as complementary; *Sound Designer-Sound Tools* data can be imported into *Pro Tools* for incorporation into a multitrack project, and *Pro Tools* files can be processed in *Sound Designer* where its additional facilities are required. The point is that the intended

applications are entirely different; the existing systems are mainly for detailed editing, while *Pro Tools* is geared to multitrack assembly work.

The basic *Pro Tools* package, running on a *Macintosh* like others in the stable, provides four channels of audio input and output, and additional hardware offers configurations up to 16 channels. This is not to say that *Pro Tools* is a 4-track recorder; as with most hard-disk systems, tracks do not equal audio outputs. Any number of tracks can be assigned to one common output, or voice, as long as only one needs to be heard at any one time. This system, in conjunction with the automated digital mixer and the MIDI tracks, provides far more flexibility than the 4-channel configuration might suggest.

All audio ins and outs, analogue and digital, are on one 1U-high box, unlike *Sound Designer* with its various I-O options on separate smaller boxes. The only other necessary hardware is, as usual, a card for the *Mac*. It is assumed that the available *Mac* is up to the job (I ran it on a *IIcx*) and the usual hard disk requirement of about 5Mb per (mono) track-minute applies.

Audio can be brought into *Pro Tools* in several ways. Four analogue +4dBm balanced inputs are

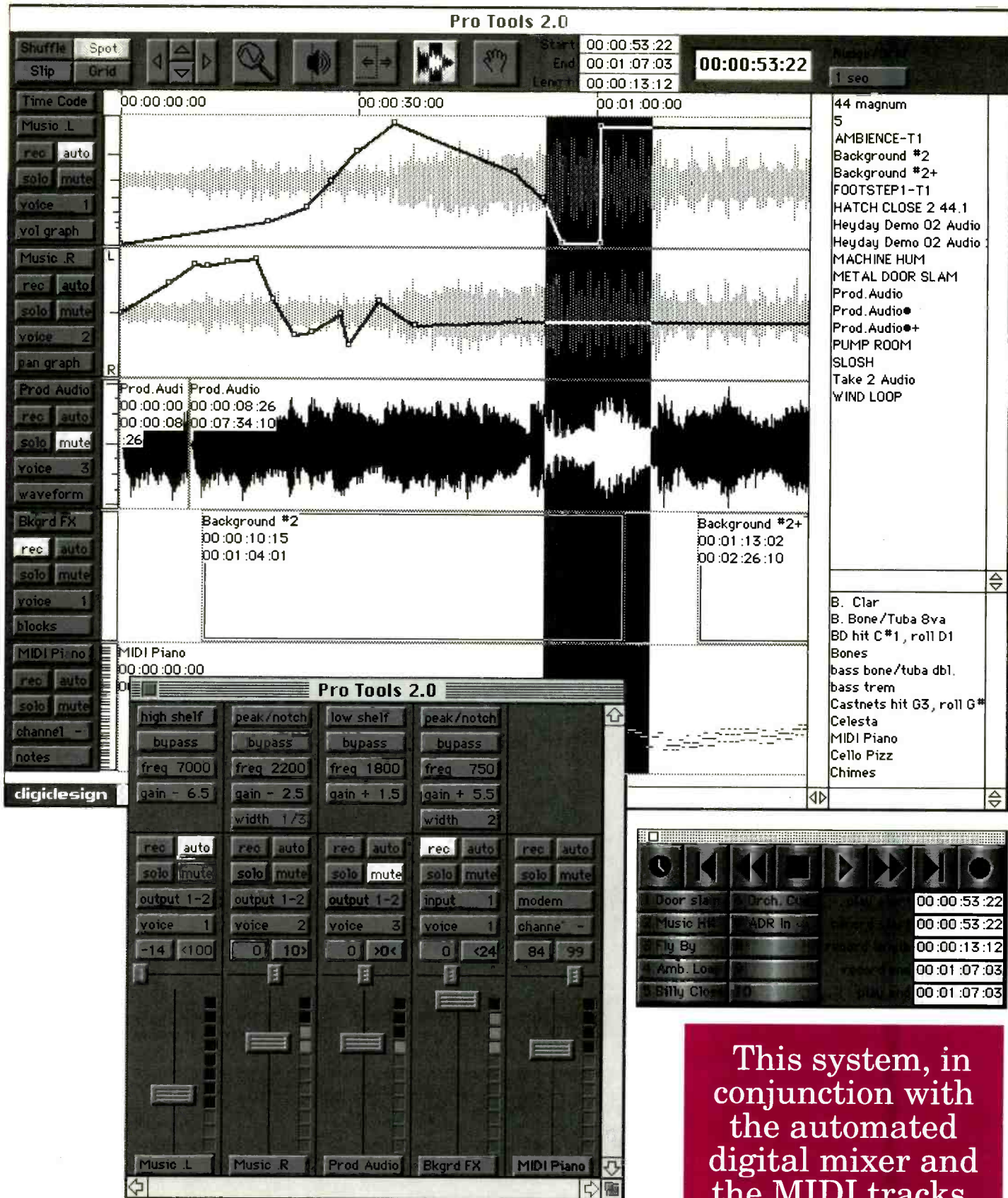
provided on the interface unit, which can all be recorded simultaneously if required. Alternatively, the first two channels can be fed from the digital input, which accepts both AES-EBU and SPDIF formats. In addition, sound files produced by Digidesign's other packages can be imported directly into *Pro Tools*, with stereo files being automatically split into two mono files since *Pro Tools* does not deal directly with stereo as such.

Once the audio is on the hard disk, most of the work takes place within the Edit window, most ►

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**Digidesign's importance in nonlinear audio is confirmed by *Pro Tools* v2.0. Dave Foister boots up and wades in**

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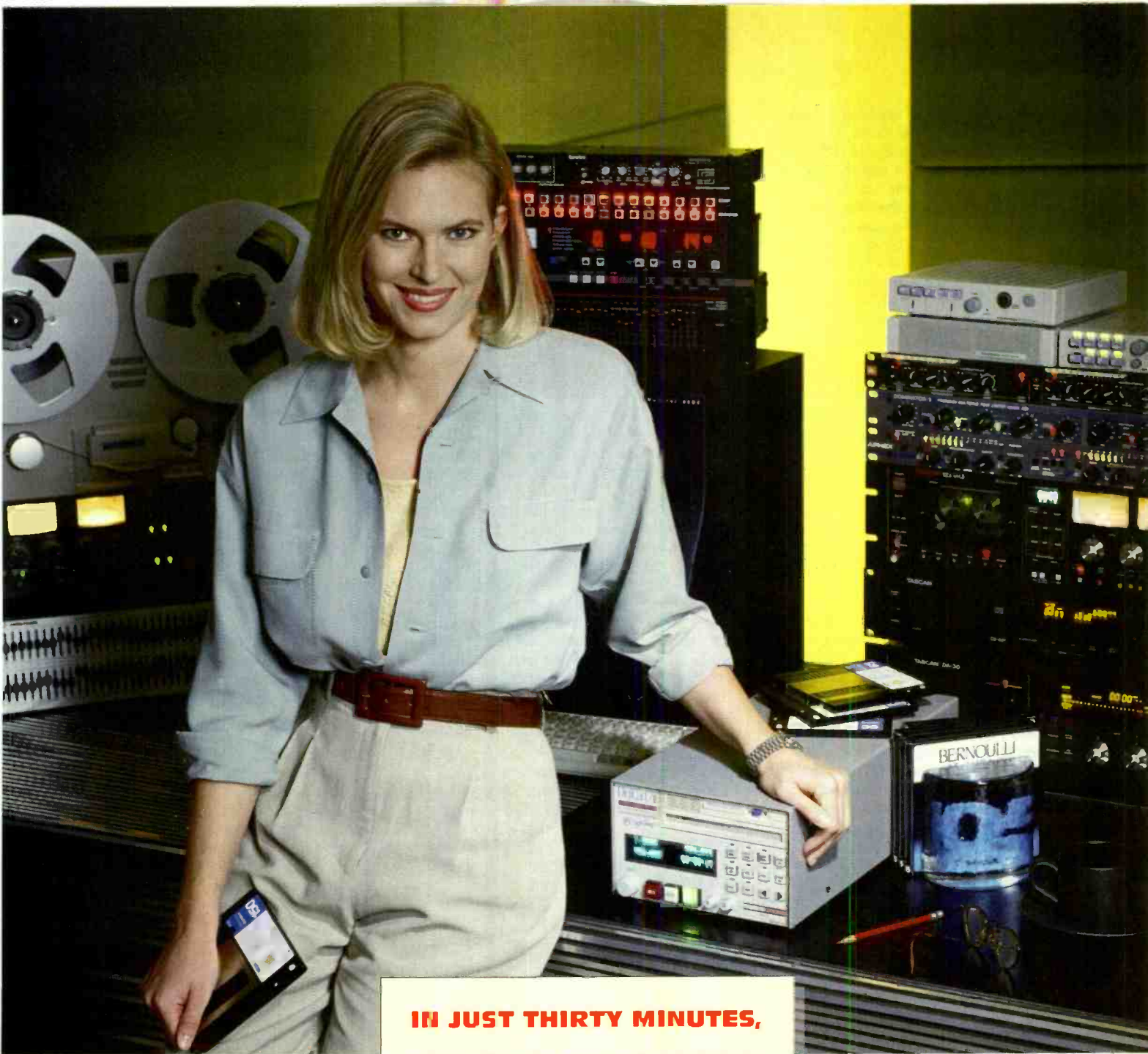


of whose area is devoted to the multitrack waveform display. This resembles a scaled-down multicoloured version of the familiar *Sound Tools* main window, with the improvement that *Pro Tools* takes almost no time to compute its display. Audio can be recorded directly into this window, appearing immediately on its selected tracks, or imported files can be dragged from a list at the side into any position on any track.

*Pro Tools* will provide as many virtual tracks as you need, normally displaying four at a time in the scrolling window, although a reduced-size mode doubles this up at the expense of display detail.

Some of Digidesign's usual terminology has been retained, particularly the concept of the Region. A Region is a selected section of a sound file or track, which can be named and treated as a separate entity, moved, copied, deleted, ▶

This system, in conjunction with the automated digital mixer and the MIDI tracks, provides far more flexibility than the 4-channel configuration might suggest



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lengthened or shortened as required, without, of course, affecting the original source. The selection, trimming and general manipulation of Regions is made faster in *Pro Tools* by a new set of tool icons at the top of the screen. These include a Selector cursor for highlighting stretches of audio to be defined as Regions, a Grabber paw for moving regions round the screen, a Scrubber tool for finding points accurately, and a Trimmer for moving the ends of regions in and out. The Scrubber is much improved; while digital scrubbing can be very crude and difficult to make much sense of, *Pro Tools* now compares with the best mechanical systems.

A new tool is the Magnifying Glass. Accurate editing often involves zooming in on the detail of the waveform at a particular point, and the usual zoom in-out nudge buttons for amplitude and time scale can be time-consuming to use. While these buttons are still provided, the new tool allows an area of the display to be rubber-banded; when the mouse is released, the banded area will expand in both directions to fill the display. This gives instant access to exactly the amount of detail required, and when the job in hand is finished, a double-click on the tool's icon restores the display to its original magnification.

Once Regions, or chunks of audio, have been defined and added to the Regions List at the side of the screen, there are four ways of placing them on to the tracks, all of which lend themselves to different applications. Conventional editing, where regions from different takes are to be assembled into a continuous whole, will use Shuffle mode, where a region dragged on to a track will automatically be butted on to the end of the existing audio. This mode also allows regions to be inserted between two existing regions,

A big feature of *Pro Tools* is the fact that MIDI tracks are handled in an almost identical way to audio tracks

sliding the following audio back to make room in true nonlinear editing fashion, and overall behaves most like *Sound Designer's* Playlist function although it all takes place on the main computer screen.

Slip mode allows regions to be placed anywhere on the screen. These can overlap (although only the last placed will be heard during the overlap) and gaps can be left. This is obviously what would be needed for, say, adding sound effects to a music bed. If the effects are to be spotted to pictures using time code (VITC is supported via another hardware box) then Spot mode will be the most useful. This allows time-code trigger points for specific regions to be typed in or captured from incoming code, and Auto Spot speeds things up by instantly spotting a region to the current time code value as soon as it is dragged on to the track. Of course, the start of a region is not necessarily the hit point of the effect (think of a skidding car hitting a tree—the final impact is the crucial moment) so *Pro Tools* allows a Sync point to be

defined for each region. This can be easily identified using the scrubber and the display, and once defined, it is this Sync point which is spotted to the required position.

The other option is Grid mode, which effectively quantises the placement of regions according to a chosen snap value, which can be expressed in terms of time, time code, feet and frames or bars and beats. This last relies on the existence of a tempo map, of which more anon.

Fades in and out of regions, and crossfades between them, are now handled on the main screen. The Selector tool is used to highlight the chosen track for the duration of the fade, and then a choice of fade curves is offered, with independent shapes for up and down. This is fast and easy for conventional, audible fades, but for those

short, 5ms–15ms crossfades which can disguise the occasional click at a join, the technique is fiddly and imprecise.

## MIDI tools

A big feature of *Pro Tools* is the fact that MIDI tracks are handled in an almost identical way to audio tracks. They appear on the same screen alongside each other with a similar layout, although sufficiently differentiated to tell them apart and with obviously different functions available. Where the audio tracks display the audio waveform, the MIDI tracks show a kind of staircase representing the notes and their musical durations.

Recording MIDI is also subject to the same kinds of options and limitations as recording audio. Basic MIDI data can be recorded directly on to a track as can audio, but the processing power (as opposed to the juggling capabilities) once it is there is likewise comparatively rudimentary. If you want to do anything fancy with the audio such as graphic EQ, compression or pitch shifting, it has to be done in another package (such as *Sound Designer*) and the finished processed file imported into *Pro Tools*. Similarly, the MIDI facilities within *Pro Tools* offer little more than basic quantisation and transposition. This is not a grown-up sequencer by any stretch of the imagination, but that is not its purpose; serious sequencing and manipulation must be done in another package and the resultant MIDI file imported into *Pro Tools'* regions list for subsequent placing on to tracks. Type 1 and Type 0 Standard MIDI Files are supported, with the 'multitrack' Type 1 files split out into separate regions for each original sequencer track, complete with the original names and MIDI channel assignments. Type 0 (single-track) files become one big region containing all the data lumped together but with original channel assignments retained intact.

Once the MIDI data is in *Pro Tools*, the same manipulative procedures are available as for audio, such as chopping it up into regions and cutting and pasting them into different places, all alongside the audio and even grouped in with it. Sets of tracks can be grouped together for selection and processing purposes; the obvious simple use of this is for stereo audio, which will always appear on two tracks, one for each channel. Any region definition, or any movement of regions, must take place identically on both these tracks, and configuring them as a group achieves this. In an extreme case, chunks of the whole session—all the audio and all the MIDI tracks—could be cut out, moved, repeated and so on *en bloc*. Once the data is on the tracks there is very little difference between them.

Normally an imported MIDI file will bring with it its own tempo map, which can then be used to control *Pro Tools* and to provide a bars and beats framework for the time scale and grid quantising. This is fine if the sequencing work is done first and audio added afterwards, which is perhaps the normal way round, but *Pro Tools* will also allow the reverse procedure, with the MIDI tracks conforming to a tempo map derived from pre-existing audio tracks. This is done by defining two precise points in the audio and telling *Pro Tools* how many bars apart they are, and what the time signature is. A basic tempo map is then extrapolated from this information. This will be easiest to do if the audio has been recorded to a click, preferably generated by *Pro Tools'* own MIDI metronome, but even if it has not, and even



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**Pro Tools v2.0—fitting into the big league with ease!**

if the timing alters (intentionally or otherwise) or the time signature changes, a workable tempo map can still be constructed by defining further reference points at the changes. This could be quite laborious in any but the simplest cases, but opens up some interesting possibilities nonetheless. It would be nice to see the kind of facility included in some sequencers, where tapping a key in time with the audio directly generates a tempo map, but this is not provided.

Having tempo data in place, however it was derived, adds substantially to the power of several of *Pro Tools'* features, effectively providing quantisation of most types of region manipulation, such as selection and trimming of regions so that the start and end points always occur exactly at a bar line. Regions can be nudged forwards or backwards by the chosen grid value simply by using the + and - keys on the *Mac*.

## Mixing tools

Once all the audio and MIDI tracks are complete, the next step is the Mixer window. Here each track, including the MIDI tracks, appears as a mixer channel, with a fader, a pan control and several other controls and buttons. The fader and pan control operate in real time, with the MIDI tracks controlling suitably equipped destination devices by means of MIDI volume and pan messages. Where audio tracks have voice assigns, MIDI tracks have channel assigns, and all tracks have MUTE, RECORD, SOLO and AUTO buttons. Recording can be performed directly from here, with signal to any track selectable from any of the inputs. The audio interface's ins and outs can be configured in the *Mac* to provide two auxiliary buses (with proper aux sends on each channel) and a stereo return in addition to a main stereo output pair, or the mixer may simply be used with two independent stereo output busses.

Although full graphic EQ is not provided (yet) each audio track has two bands of digital EQ available, either of which can be shelving, high or low-pass, or fully parametric complete with variable Q. These are adjusted in real time with pop-up sliders and they sound and feel like real

equalisers, with a good range of adjustment, a fast response and a clean versatile sound. These mixer facilities, and the EQ in particular, explain the logic of being able to assign multiple tracks to the same output voice even though only one can be heard at a time; different sections of a project can be given completely different treatments simply by assigning them to separate tracks, even though they end up using the same voice.

The AUTO button on the mixer channels enables the fader and pan automation. This can be recorded in real time, with mouse-controlled fader movements being recorded for later moving-fader-style recall. If more tactile control, or simultaneous control of multiple faders, is required, a hardware controller such as the Cooper CS-10 (or any MIDI controller) can be configured to remotely control the mixer. Resulting fader and pan movements can be displayed and edited in the main window.

Given enough disk space, nondestructive digital bouncing is available, allowing all audible tracks to be bounced on a what-you-hear-is-what-you-get basis to a new stereo pair, freeing up voices for further audio. The same approach is recommended for final

stereo mastering, with a DAT only being made when the disk master is finalised.

## Conclusion

Despite its evident power, *Pro Tools* is surprisingly quick to learn and easy to use. By and large, it is logically thought out and intuitive, with fewer hidden commands, submenus and forgettable key combinations than might be expected. Housekeeping, both in terms of a tidy screen and an economically used disk, is accommodated, which is just as well considering how cluttered both can get when using software like this.

It should be clear by now that for all its capabilities, *Pro Tools* is simply not the thing to use for many conventional hard-disk tasks; for straightforward stereo assemble editing I am still more comfortable with *Sound Designer*. It should also be clear that this is not in any way a criticism; for audio-for-picture work, A-V soundtracks, jingle and commercial production and any such job where the big hard-disk multitracks have made such an impact, *Pro Tools* seems to offer everything. ■

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# NABBED

The sparkling lights of Las Vegas provided the background for this year's NAB Show. Yasmin Hashmi & Stella Plumbridge sign up with Gamblers' Anonymous to file this report.

This year's NAB Convention demonstrated a new level of energy on the part of tapeless system manufacturers and suppliers. Many are now recognising that their potential markets may be broader than traditionally considered and in order to take advantage of these markets, some interesting developments have been announced. Of course, there were also plenty of enhancements and refinements to systems, the highlights of which are covered here, but of equal interest was manufacturers' willingness to explore different approaches to system control and development and transmission of material. A welcome development from the potential purchaser's point of view was the introduction of lower-cost systems, making tapeless technology accessible to a wider market.

## Enhancements

*Dyaxis II* from **Studer** contained enhanced edit-point location features and the ability to move cues in the waveform display which is interactive with the track display. The system also now supports machine control and data compression, which is performed at the output stage and therefore does not affect the edit resolution.

**Roland's DM-80** can now support 8-channel operation using two Alphatronix M-O drives, with the ability to internally bounce between drives. In addition, the remote now provides waveform displays (therefore eliminating the need for the *Mac* option for this purpose).

**AMS-Neve** were previewing event-based automation for their *Logic* consoles and showed various enhancements to *Spectra* including user-definable fades, scrub against picture and a 'turbo trim' function which allows the track display to be stepped through with an expanded display of passing cues at the top of the screen.

**Digidesign** were demonstrating *Pro Tools v2.0* software, with the system connected to a Lexicon *NuVerb* reverb card via AES-EBU. Once the system's TDM bus structure becomes available in June, third party effects-processing cards such as those from Lexicon and Apogee can be plugged straight in. Also on show was third party cart replacement software from **Softron Media Services**. This allows playlisting with live triggering using a mouse or touch screen.

New features for **Studio Audio & Video's SADI-E** include varispeed and full chase lock to time code. Operational enhancements include listing any digital input errors and the ability to print the events list in either a PQ format or video

EDL. The next version of software will include 20-bit and 24-bit linear editing and 8-track editing with stereo mixdown.

Enhancements to **Fairlight's MFX 2** include frequency-domain time compression-expansion between 25%–400%, stripping out silence after recording (with handles) and improved manipulation of stacked ADR retakes and library search functions. Fairlight plan to launch a new system by the end of the year which will support 24 simultaneous channels from one hard disk.

**Lexicon** were demonstrating their ADR software for the *Opus* as well as Autorecord autoconforming. For general overall operational enhancements, they are developing a talkback communications module.

**HHB** had **CEDAR's** new *CEDAR Production System* on show. This runs on the same platform as the company sound restoration system and allows total or selective restoration of marked regions within a project. Projects can be edited and compiled in any preferred order as well as being referenced to time code.

New from **SSL** was *Omnimix*—a version of *Scenaria* providing 32 additional mix buses which can be configured to present up to six channel stereo formats. This allows mixes in Dolby surround and should also cater for any new formats for film and TV such as HDTV stereo and Dolby *SR-D*. It also includes 24 channels of delay and reverb, motion tracking (it will record the path of panning) and includes distance and velocity effects. In addition, an on-screen display of speaker positions allows the user to plot a framework of panning in freeze-frame, assigning each point to a specific time code. The system will then automatically join the points with user-definable curves.

**Yamaha's CBX-D5** was shown working with

**MotU's Digital Performer** using a Dynatek 400Mb hard disk. **Tascam's RA4000** was on show (but without audio monitoring). Tascam plan to start shipping the unit by middle of the year.

**Digital F/X's DCS** (aka *WaveFrame 401*) now supports 16 channels, multitrack punch-in and combines both editorial software and the standard recording-editing system running interactively on the same platform.

**SunRize** were demonstrating their *Amiga-based Studio 16* system with two ins and outs and eight internal channels. The system supports LTC chase lock for the *Video Toaster*, provides track-based and waveform editing with effects such as reverb and plans include the development of EQ and compression modules.

**Micro Technology Unlimited** were previewing v2.13 software for their *MicroSound* system which will support four tracks, each with 50 simultaneous mix segments. They will also be introducing their *MicroTools* noise removal software which will operate under *Windows*.

## Reduced costs

**AMS-Neve** caused a stir by announcing price reductions on *AudioFile* systems of 40%–45%. This means that the cost of an 8-track *AudioFile* starts from around £30,000.

Also on show was the new *Logic 3* digital mixing console, which also has an emphasis on the lower end of the price scale. As an add on to *AudioFile Spectra* it will cost around \$60,000. *Logic 3* is compatible with other *Logic* consoles and uses just four faders with multilayering to control up to 32 channels.

**Roland US** announced a low-cost IBM AT-compatible card called the *RAP-10*. This ►



*Omnimix* is the latest system in SSL's *Scenaria* range

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**Digidesign's Session 8 XL** was also on show. This is the balanced professional version of their new PC-based 8-channel music-based system which retails at around \$6,000 for a complete system, (the Mac version expected to be available in June).

The **DD1000** range of optical-based systems were on show at the **Akai** stand as well as their new low cost multitrack replacement the **DR4d**. This supports 4-channel operation with front panel operation and up to four units can be controlled by the optional remote which emulates the **DR4d** front panel.

**Fairlight** introduced their new Fairlight **MFX Tower** system which has a compact hardware tower and is aimed at preparatory work and/or those with more modest needs than a full **MFX 2**. It supports eight channels using one optical disk, has 12 outputs, is operationally identical to the **MFX 2** (with the exception that it does not support the sampling-sequencing **CMI** software) and retails for just under \$50,000.

New from **Spectral Synthesis** is a card for the PC called **PRISMA**. It supports 12-channel operation with eight inputs and outputs, is supplied with software similar to that of the **Audio Engine** and costs around \$4,000.

## In control

**Otari's ProDisk PD464** has a new hardware control surface which sports two displays, a jog wheel, numerous keys (all of which are soft and can be user-configured) and will control up to four external machines. New features include EDL autoconform and the ability to digitally control their new **Concept 1** analogue console.

**Augan** were showing their new **RC2** remote which they claim is the first of various application-specific controllers planned for the **408 OMX**. The **RC2** is aimed at ADR for film editors, has specific function keys with a Steenbeck-style motion controller, supports biphase and can be operated with or without the electroluminescent display. Augan were also showing new cart replacement software which is now included as standard and is available free of charge to existing owners. This allows an unlimited number of cues to be arranged in four stereo playlists; a list can be edited while it is playing.

**Spectral Synthesis** have a new production-mixing control surface for the **Audio Engine** designed by **Desarollo de Sonido Professional**. The console is modular with a mixing section, pointing device, jog wheel, transport and edit keys and a VITC reader. Desarollo were also demonstrating their M-O-based random access video machine working in conjunction with the **Audio Engine**, whose v2.0 software includes punch-in, automix and recording to M-O storage devices.

## Random access video

There are those who argue that video editing and audio editing are separate disciplines and there is therefore no point in providing a system which does both. This may be true to a certain extent, however, since a number of nonlinear (or random access) video systems are already offering audio editing features, the pressure on both technologies to integrate is inevitable. Furthermore, offering random access picture almost certainly makes an audio system more attractive (since the instant access of the audio is somewhat lost if slaving a spooling VTR). The next likely stage of development is that for an audio system offering random access video, to offer simple cut-and-paste editing of the picture (to accommodate late changes to the picture, for example).

However, rather than reinventing the wheel, a number of manufacturers are incorporating third party developments and/or are looking at existing systems with which to work. One such example is the agreement announced between **AMS-Neve** and **OLE Ltd**, which will lead to a technology exchange between the **AudioFile** and **Lightworks**—the idea being that **AudioFile** will get **Lightworks** picture and **Lightworks** will get **AudioFile** sound.

**Avid** have been using **Digidesign Pro Tools** hardware for their **Media Composer** systems for some time and have recently launched a dedicated audio editing system (with random access picture) called **Audio Vision**. They were demonstrating v2.0 which includes enhanced editing, time compression-expansion, pitch shifting, looping of audio and picture for ADR (with the option of running a third monitor for full picture), cut-and-paste editing of the picture (without dissolves), the ability to import 14 different types of EDL and the ability to output an EDL. Avid are also now licensing **NoNoise** from Sonic Solutions and intend to be able to import **NED** files into Avid systems via OMF.

**Digidesign** were previewing integrated digital video for **Pro Tools** using Quicktime. Frame-accurate synchronisation was demonstrated and Digidesign claim that any Quicktime card can be used. The option should be available by the middle of the year.

**Doremi** were demonstrating a 16-channel **DAWN II**, digitally controlling and automating an analogue console from Pacific Recorders. They were also using Radius' **Video Vision** to display digital video on the Mac from a Pioneer laser disc and plan to launch their nonlinear video option at the AES in New York.

## Radio systems

As one would expect at a show organised for broadcasters, tapeless systems aimed at radio applications were well represented, from simple cart replacement systems to those aimed at full unattended automation.

A number of cart replacement systems designed to look and feel like the traditional cart ▶

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machine were on show. **Fidelipac's DCR 1000** was demonstrated operating with their new **MX** modular mixing console and now has software which allows bidirectional operation with a PC. It will generate a log which can be output to a printer and Fidelipac plan to introduce slave machines, up to three of which can be controlled by one master. **dB-CART** from **Digital Broadcast Associates** is now capable of using 3.5-inch M-O discs or alternatively, floppy or floptical (the latter supporting 21Mb of storage). Operation is via simple front panel control and a triple stack play unit is also available (DBA also distribute a convenient modular disk racking system from

Delta Plastics Inc which consists of individual disk holders which can be clipped together to form a wall-mount or a carousel and costs around \$30 per 10 holders).

**Sony** will be entering the cart replacement market by the beginning of next year with their **Mini Disc Cart**. Based on the mini disc, the system will be available in two versions—the **PMD-C1** recorder and the **PMD-C1P** player. Each single-sided mini disc supports 74 stereo-minutes of recording using 5:1 compression and can be accessed faster than CD.

**360 Systems' Digidart II** has an internal hard disk as standard and uses a new Bernoulli disk

with a storage capacity of 70 stereo-minutes. It also has two remotes, one which is for replay only and the other which provides the same controls as the front panel. Cues can be assigned to 16 'hot keys' (or to all keys on an alphanumeric) and up to four **Digidarts** can be controlled by one remote. The system also supports gain and fade control and can be controlled by a PC via a serial port.

**PACE** is a news editing system resulting from a collaboration with **CCS Audio Products** and **CBS Radio**. A prototype was on show which has a dedicated work surface with separate sections for editing and mixing and a **Windows**-based display. All tactile controllers are soft and keys will change their labelling according to the menu selected. The system uses Musicam compression, can be locally and wide area networked and is expected to be commercially available within 6-12 months.

**MediaDISK II** from **Media Touch Systems** is based on the Antex **SX20** card and provides semi-automated operation using a touch screen and-or keyboard with mouse. The system works with a file server, uses DOS-based graphics with playlisting and will also work with Antex **SX12** and **SX15** cards. Future development plans include the ability to control external replay machines such as analogue tape machines, CD players and DAT machines.

## Station automation

**Smartcaster** is a new system from **Smarts Broadcast Systems** which controls both hard disk and CD machines. The system is operated by keyboard and mouse or optional touch screen, editing uses **Wave** for **Windows** and the system can be networked and completely automated. A novel feature of the traffic software is the ability to automatically record, categorise and play classified adverts which are telephoned in by the listener.

**ENCO** were demonstrating a networked **DAD486x** with CD jukebox automation. The system is capable of multitasking, automatically recording network feeds in the background, simultaneous automated replay and manual triggering and-or production while replaying. It also provides full cut-and-paste editing and allows cues to contain pointers (or posts) which can be used to trigger countdowns. The system currently uses AC-2 data compression and will soon also support Musicam.

**ABC** were demonstrating their new range of controllers for **D-CART**. These have been developed with health and safety regulations in mind and include a flat surface with illuminated keys and scrub-shuttle control and a foot pedal with left and right keys. The latter is intended to provide journalists with easy replay and rewind purposes which do not interrupt typing-editing operations. **D-CART** was also shown connected to a **BASYS** news server and gives an audible beep should a news item come in while the user is working in the audio mode. **ABC's** plans for further developments to operational control include **Windows**-based displays with waveform editing facilities. ►



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The *PHANTOM* from **RDS** will accept feeds from up to 50 satellites and-or news services with background recording and uses real-time time compression-expansion to fill breaks accurately. Other useful features include the ability to play cues of mixed formats within the same list and a 'history' function which records all operations and can be used to create a log. The editing side of the system is somewhat basic—edited audio is rerecorded and in and out times can only be found by typing in times. **RDS** were also showing the *Digicorder* which is aimed at simple cart replacement with playlisting.

**AEV** were also an automation system and a

simple cart replacement system called *Aurad System 2* and *Digital Jingle* respectively. Both can be run on the same PC-based platform with keyboard-only operation, although they plan to provide a touch screen option in the near future.

*AudioVAULT 100* from **Broadcast Electronics** has the same operational capabilities as the original *AudioVAULT* but allows up to four cards to be used with one PC. Each card operates independently, displays are *Windows*-based and a simple keypad is available for remote control.

**Harris Allied** ensured a big tapeless presence, representing four systems from different manufacturers. These included **AKG's DSE 7000**,

Roland's *DM-80*, Gentner's *Audisk* (which is now networkable and provides specific playlisting for commercials and music respectively) and Arrakis' *Digilink* (which now supports an 8-track editor called *Trakstar*).

**DCS** from **Computer Concepts** has a new 'hot key' remote with 18 assignable keys and operational enhancements include on-screen metering and a programmable countdown timer. **Digicenter** from **International Tapetronics** now allows unattended operation by interfacing with a CD jukebox and **Ranson Audio** were demonstrating *Cartouche*, *Cartedit* and *Masterlog*.

For development purposes, **APT** now include *Windows*-based editing software with the *ACE 100* card and also have a *Windows Wave* driver, making the system compatible with other *Wave*-based packages.

## Networking

**EDnet** demonstrated the *Digital Patch System* and were playing sound live from Hollywood via Switched-56 ISDN. They were also replaying a video whose sound was being transmitted to the exhibition centre from Skywalker Ranch. Picture and sound were synchronised by sending time code via the ISDN line back to the Ranch. In addition, **EDnet** have not limited themselves to audio transmission, but can now also transmit the video (at VHS quality taking six to eight times longer than real time) to assist with approval. Alternatively, to help with remote ADR recording for example, they can transmit a reduced quality small black and white picture live to a *Mac* by using a miniature camera. They also have a 'wireless' suitcase for hire for location or remote work where line rents are not available.

**APT** were showing their new *Pro-Link* system which works with their transceiver. The transceiver performs live **APT** compression and *Pro-Link* will synchronise up to six channels of audio being transmitted via ISDN.

**Sonic Solutions** were not just talking about their *MediaNet* network, they were demonstrating it in action, with remote **Sonic Systems** networked via optical cable between the exhibition centre and a nearby hotel. They were also demonstrating file swapping between a remote *Sonic System* and **Avid's Audio Vision** via an FDDI network using OMF. This involved sending tracks to the *Sonic* from *Audio Vision* for sound restoration and then replaying up to eight channels live from the *Sonic* against *Audio Vision's* picture. ■

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Under the name **Sypha, YASMIN HASHMI & STELLA PLUMBRIDGE** operate a UK-based independent consultancy to manufacturers and users of disk-based audio-video editing and related systems. **Sypha** was established in 1988 and has published *The Tapeless Directory* and various market studies, as well as regularly contributing to *Studio Sound*.

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Tel: 071 439 0311

**PMD. Magnetics**  
P.O. Box 19  
Avenue Farm  
Stratford-Upon-Avon  
Warwickshire CV37 0QJ  
Tel: 0789 268579

**Sound & Video Services (UK) Ltd.**  
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Manchester M22 4RW  
Tel: 061 491 6660

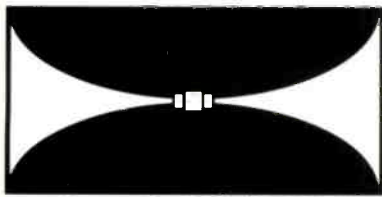
**Transco Mastering Services**  
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London W1V 5DD  
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**P. F. Magnetics**  
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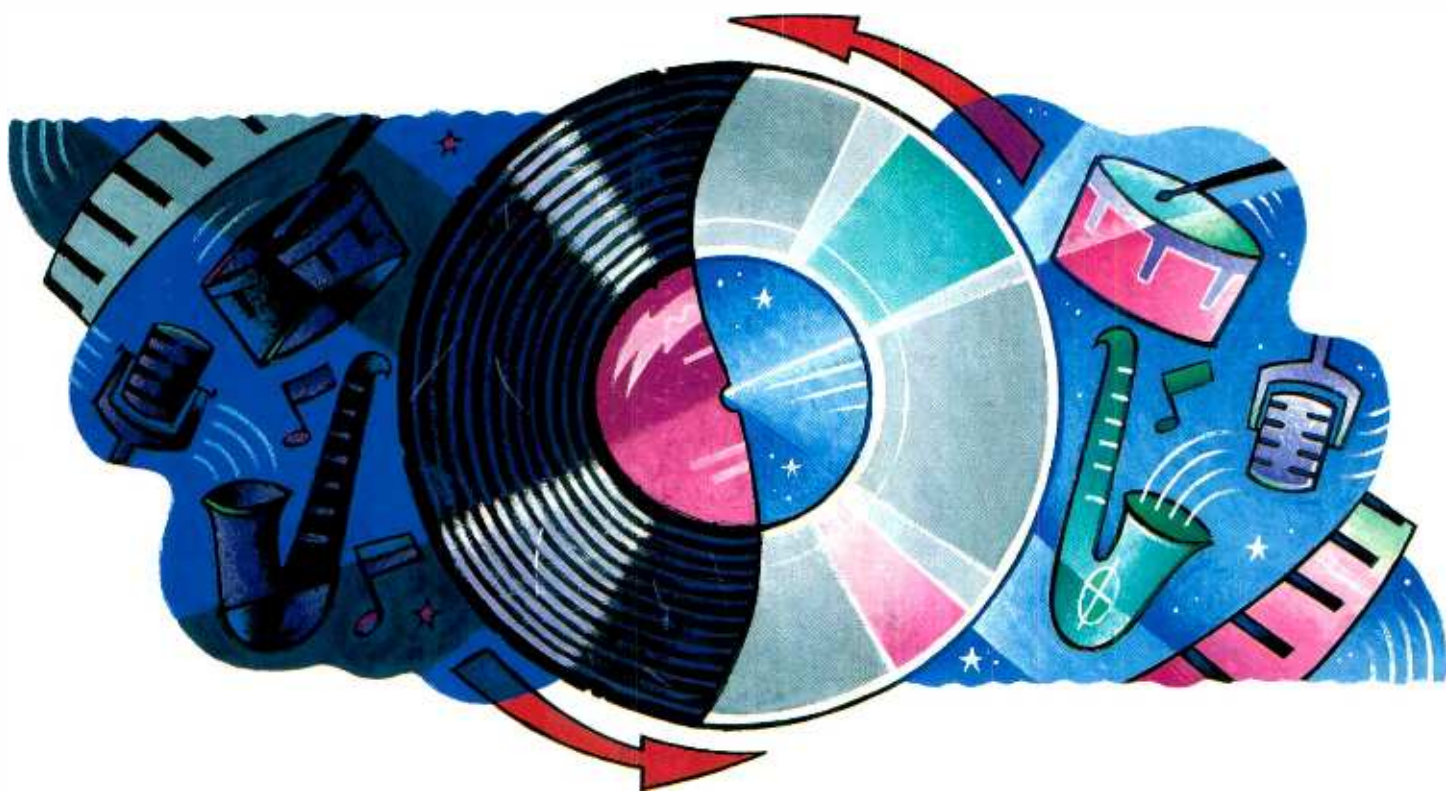
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# ALL IS NOT LOST!

**T**hankfully we seem to be becoming more conservation-minded nowadays. One result of this is that our old recordings are more frequently saved than consigned to a skip. Certain rereleases of archive material are even catching the ear (and eye) of the public in the records and tape stores.

Processing, and the techniques of 'cleaning up' old recordings are fairly well known and can achieve remarkable results today. But what about the really troublesome recordings—fragile or damaged discs and acutely dry and brittle tapes? This second problem is particularly acute in the video business, where line standards and recording formats have changed significantly, and is compounded by chemical changes in the tape itself which may render it unusable.

Conventional wisdom suggests that you consult an expert—and there are a number of people who specialise in rescuing unplayable recordings and achieving the apparently impossible. Most seem to be enthusiasts who are passionately interested in the technologies they deal with—which is fortunate, since the advanced techniques used and the specialised hardware needed are virtually impossible to find elsewhere.

On the audio side, one such specialist is Philip

Farlow who has been operating independently for two years under the title Audio Services.

'The business,' he explains, 'is basically an audio transfer bureau. We specialise in the study and practice of achieving the best results in the transfer of material from mainly redundant formats such as open reel tape of all sizes, speeds and track formats, and also acetate discs up to 17.25 inches in diameter at any speed and groove format. We use a studio of specialised tape and disc replay equipment to deal with the many and varied problems encountered in attempts to retrieve all that remains on the tape or in the groove.'

Farlow goes on to explain that the audio can be transferred to the format of the customer's choice, whether compact cassette, or recordable compact disc. If the recordings are particularly valuable, it may be worth considering using one of the digital audio restoration processes currently available via the DAT format.

'Only five or six people in the country have the technology to do this,' he continues, 'and the fascination of the business is that you never know what the next phone call will bring'.

Among his institutional customers are organisations such as the National Sound Archive,

the Imperial War Museum and the BBC Sound Library. In addition, there are also all manner of odd jobs such as removing unwanted background noises from a muffled dictation machine tape—this was for work connected with the legal profession. Making recordings more intelligible is a regular request, which may also involve compensating for variable tape speed caused by failing batteries. Remarkably, another regular type of commission is rescuing voices of deceased relatives for mementos; sometimes the source is an office dictation machine or an end-of-the-pier recording machine.

Farlow explains that each format requires ►

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**Andrew Emmerson talks to the companies who specialise in recovering 'lost' recordings**

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unique handling. Open-reel tape started to be used routinely around the early 1950s but only caught on domestically towards the end of that era, and continued well into the compact cassette revolution of the late 1960s to early 1970s. Many early tapes will by now be getting brittle (early types were acetate-backed) and even with careful storage will probably be going out of shape beyond their quarter-inch tolerance. Adding to the difficulties of playing them will be past breakages that may have been spliced with sticky tape which has, over years of storage, oozed out on to adjacent layers. Sometimes, too, the tape will refuse to grip the head of the playback machine due to curling.

Audio Services have the necessary experience required for dealing with these and other long-term storage problems, and can achieve good retrieval results due to the care and attention paid during the initial 'rescue' transfer. This includes the original recording head's azimuth, original speed (where identifiable), replay characteristic corresponding with the original machine (where known) and final overall sound conditions.

So-called acetate discs are another headache for most people. This type of directly-recorded disc was a popular means of sound preservation between 1934 to at least the early 1960s, when domestic open-reel tape recording took over.

Acetates—or to be more accurate, cellulose nitrate lacquer discs—can be distinguished from commercial pressings by their typed or handwritten labels (normally headed with the name of the company that originally arranged to cut the recordings). On closer inspection one realises that the discs are metal, or less commonly, glass-based; this is often noticeable on inspection of either the rim and/or centre hole. Also if the disc has been recorded on one side only, there may be evidence of an off-centre hole on the blank side if there is no label. Some directly-recorded discs are not actually acetate but the recording surface consists of a gelatin compound prone to dissolve before your very eyes upon attempts at washing.

Most acetate or gelatin-coated discs will now be showing signs of decay as the manufacturing compounds part from the metal or glass base. Some will have become warped through bad storage or others mouldy, even with careful storage, and probably worn through being played many times under far from ideal conditions. Acetate and gelatine discs were only intended for a certain number of plays before wear accelerated rapidly.

Farlow has the technical know-how and equipment to deal successfully with the majority



**The National Sound Archive 'have the means to play four different cylinder formats'**

of these problems. This technology includes variable-speed turntables together with various combinations of stylus and tracking conditions. In most cases the retrieval operation can be improved by careful washing of non-gelatin discs. Using the above technique he can achieve quite acceptable results from even the most apparently ravaged recordings.

These acetates can be a source of headaches for sound archives who have large collections. The National Sound Library's Alan Ward explains that eventually the lacquer shrivels up and peels off the core disc, but in earlier stages of deterioration the lacquer often shrinks and cracks while remaining flat and in contact with the core. Such discs cannot be played with a conventional stylus, but for several years researchers have attempted to develop a means of reading the information in the grooves using laser optics similar to those now commonplace in CD players. Working machines have been made, but unfortunately the laser, however well-focused, has been unable to distinguish between wanted and unwanted information in the grooves, and so playback has been overwhelmed by a loud roar.

However, a possible solution has been investigated; Professor Philippe Robert and colleagues at the Swiss Institute of Technology at Lugano have built a playback mechanism based on a 124 micron fibre-optic cable which tracks round the upper part of the groove but is only a fraction of the weight of a normal stylus. The cable

can be adjusted to pick up wanted information to the exclusion of unwanted, and light emitted from the end of it is then processed using conventional CD circuitry. It also makes a good job of replaying broken 78s stuck together with adhesive tape. The new machine relies largely on off-the-shelf components, so it should be affordable if its early promise is fulfilled and a manufacturer takes it up.

Most of the source recording formats mentioned so far will be familiar to audio people, even if they have not encountered them for some while. But what about wax cylinders, belt-driven dictation machines and wire recorders? The National Sound Archive's Peter Copeland can handle these.

'We have the means to play four different cylinder formats together with a number of wire recording formats,' he says. Obscure tape types do not discourage him either and he can process most kinds of dictation machine cassettes, NAB cartridges and the Sony Elcaset. If necessary, tapes in cartridges and cassette can be removed from these and replayed on an open-reel machine, he says. Copeland stresses that they are a sound archive, not a museum for audio equipment, however interesting, and their guiding remit is the storage and replay of sound recordings.

The transcription service, Copeland explains, is primarily for the Archive's own use but they are happy to do external work; their wide experience attracts many commercial jobs. Their charges are based on the amount of staff time used, with three scales depending whether the customer is commercial, educational or a private individual. In the last two cases transcriptions are made only to compact cassette.

Turning our attention to video recordings, the potential problems are just as great. People have joked that the best television recordings are telerecordings on 16mm film; film has proved to be a durable format, independent of international TV line and field standards. And even when the base material shrinks or distorts, which is uncommon, broadcast telecine projectors can compensate for the problem.

Early video tape suffered from manufacturing defects, both noticed and unnoticed. Oxide shedding leading to clogging of the tape heads with white powder was generally noticed during use (and led to much merriment on the BBC's internal 'Christmas Tapes' of the 1970s). Other problems took longer to be discovered and many industrial and domestic recordings of the same period are now unplayable due to chemical changes. A lubricant built into the tape can migrate, causing the tapes to bind and squeal when replayed. One manufacturer devised a ▶

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Recordings from wax cylinder can be recovered to DAT

special rescue transfer bay where a liquid lubricant was sprayed onto the tape as it passed the replay heads, enabling the recorded material to be copied to new tape, but this has long since been dismantled. The problem remains, though, and is a source of disappointment to many who thought their recordings would last forever. Surprisingly, newer and much older tape does not suffer from the same defects.

A more obvious bugbear is when the recordings have been made to an obsolete TV standard (generally 405 lines) or on an obsolete machine. The domestic video market has seen many formats come and go, but even in the industrial and broadcast sectors have used many formats no longer with us. Tape widths range from 1/4-inch, through half and 2/3-inch to 1-inch and 2-inch. Converting from 405 to 625 lines can be done optically or electronically, but the key task is to recover the pictures and sound. There are no universal playback devices here and the only solution is to find a machine of the original format. These can suffer from stretched drive belts and worn heads, and maintaining them can be problematic.

Nonetheless, a few of these dinosaurs are kept going (most machines are pretty large). Some are run as purely commercial enterprises but the job tends to be a labour of love, meaning that it appeals more to dedicated enthusiasts who carry across their professional skills to their spare time. As a result, say, when David Bowie's record company have found an old Akai 1/4-inch video tape sequence they want to include in a new pop video.

There are no set charges for any of these rescue operations, instead charges are determined by negotiation, generally on a no luck, no fee basis. Fees can be remarkably modest when all factors are considered; a selection of proponents is given in the accompanying side bar.

Most of the specialists listed can handle a variety of formats, the recovered audio being copied to compact cassette, DAT or CD-R. In some cases digital audio restoration and other enhancing processes can be applied. ■



Wrapped wax cylinders

## CONTACTS

### AUDIO

- **Audio Services** (Philip Farlow), 41 Glebe Gardens, New Malden, Surrey KT3 5RU, UK. Tel: 081 942 6788.
- **John Davies**, Bryn Coleu, Plas Gwyn Road, Pwllheli LL53 6UT, UK. Tel: 0758 612932.
- **Ted Kendall**, 27 Prospect Street, Farsley, Pudsey, York LS28 4ER, UK. Tel: 0532 578205.
- **National Sound Archive**, 29 Exhibition Road, London SW7 2AS, UK. Tel: 071 589 6603.
- **Parree Audio-Video**, 4 Glenfield Road, Ealing, London W13 9JZ, UK. (Written enquires only).
- **Adrian Tuddenham**, 88 Mount Road, Southdown, Bath BA2 1LH, UK. Tel: 0225 335974.
- **IDT Inc**, 8049 Monetary Drive, Suite C-7, Riviera Beach, FL33404, USA. Tel: +1 407 844 2111.

### VIDEO

- **Martin Loach** has the following VTR formats: 1-inch reel-to-reel: Ampex VR7003 (A format), Philips-Peto-Scott EL3400, IVC 826. 2/3-inch reel-to-reel: Ikegami TVR40. 1/2-inch reel-to-reel: Philips LDL, Rank-Nivico KU800, Sony CV-2000, Sony CV-2100, Shibaden, EIAJ-1 (high density Hitachi, National, Sony, Sanyo.) 1/4-inch reel-to-reel: Akai VT100. Cassette: Betamax, Grundig SVR, Philips N1500, Philips N1700, Sony U-Matic (low band), V2000, VHS. Contact: 82 Honey Botton Lane, Dry Sandford Abingdon OX13 6BX, UK. Tel: 0865 735821.
- **Ron Vansittart (RTV Video Distribution Ltd)** has a formidable array of formats at his disposal, including 2-inch Quad and helical, any line standard; 1-inch B and C formats, high and low-band U-Matic PAL, SECAM and NTSC; Betacam SP; S-VHS and VHS. Among the less common formats are National (Panasonic) cartridge (Omnivision), Philip VCR 1500 and 2000 and Panasonic 1/2-inch EIAJ. He also has 16 and 35mm telecine facilities. Tel: 0843 292802.
- **Parree Audio-Video** offer Quadruplex (625 lines high and low band, 525, 405 and 819 lines). They also deal in C format, low-band U-Matic and the following 1/2-inch variants (Sony CV-2000, Sony CV-2100, EIAJ (high and low density, monochrome and colour), Shibaden and 525 line EIAJ. Their cassette formats include Betamax (standard and super), VHS, S-VHS, Video 8, Philips (1500, 1700 and V2000), Grundig SVR and 4 x 4, and Akai 1/4-inch monochrome and colour formats. Finally, other open reel formats handled are Ampex 1-inch CCTV and Philips 1-inch. Contact: 4 Glenfield Road, Ealing, London W13 9JZ, UK.
- **Pat Hildred** has VHS, U-Matic, National cartridge and Technicolor-Funai Microvideo quarter-inch cassette. Contact: 18 Well House Avenue, Leeds, LS8 4BY, UK. Tel: 0532 402841 (evenings).
- **Flintdown Channel 5 Television** claim to have a collection of vintage VCRs so vast it confuses even the most ardent of format spotters. Contact Donald Blakely, Chief Engineer, Flintdown Channel 5 television, 339 Clifton Drive South, St. Annes on Sea, Lancs FY8 1LP, UK.
- Nobody seems to have listed BBC VERA—yet. That said, at least one piece of tape remains from this pioneering format. ■

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# WHEN THE REST SIMPLY AREN'T GOOD ENOUGH

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### FRONT PANEL FUNCTIONS

Being designed for the professional studio the DA-88 allows access to all its major functions from the front panel. Location, auto-punch in/out, tape monitor switching, and track/machine delays are

## DA-88 EIGHT TRACK DIGITAL RECORDER

all accessible from the front panel without the need for an external remote control. Digital/analogue source switching, remote/local control, varispeed and record frequency select also appear on the front panel, making the DA-88 instantly familiar in use. The shuttle wheel on the DA-88 makes location to a specific point instantly familiar to an engineer used to the "rock and roll" method of tape location.

### SYNCHRONISATION AND CONTROL

Multiple DA-88 units can be synchronised together (up to a maximum of sixteen units/128 tracks). The lock-up time of a multi-machine system is typically 2-4 seconds, making a multiple DA-88 appear as a single unit to the operator. Synchronisation of the DA-88 to video is achieved via the optional SY-88 sync card, which offers chase synchronisation, MMC and video editor control capability. Only one SY-88 is required per system. Control of up to six DA-88 recorders, one video recorder (via RS-422) and two analogue recorders (via TASCAM ACC1 & ACC2 ports) can be achieved from the optional RC-848 system controller which also offers comprehensive auto-locate, record function select, and track delay/machine offset control functions.

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In over thirty-five years at the forefront of analogue and digital recording technology TASCAM has become the world's largest manufacturer of recording equipment, deservedly gaining a unique reputation for innovation, quality and reliability.

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## The Master Tape Book

By Alan Parsons, Bill Foster & Chris Hollebone

Publisher: APRS and The British Record Producers Guild. ISBN: 09520018-02

'When is a master not a master?' begins the Master Tape Book—'When is a master.' Confused? Then read on to discover the general confusion caused to Engineers, Producers and A&R departments when receiving tapes labelled Master, Copy Master, Production Master, Final Master (sometimes dated earlier than yet another master) and so on. Phil Collins illustrates the problem in the book's foreword by describing how a basic lack of understanding and communication resulted in Genesis' first CD release, *ABACAB*, being produced from the wrong master, wasting everyone's time and money.

The purpose of this book is to clear up the confusion by simple but thorough explanation of studio and production practices involving tape, and also to recommend guide-lines that will hopefully help people to avoid embarrassing and expensive mistakes in the future.

The three authors, Alan Parsons, Bill Foster and Chris Hollebone are extremely well qualified to tackle the subject and must be congratulated on presenting a well conceived, clearly presented book that is as accessible to studio personnel as it is record company staff. Hopefully it may also encourage better liaison between the two parties.

The 80-page paperback is split into six chapters plus a glossary. It is generously illustrated and includes a series of cartoons by Stu Leathwood. The opening chapter highlights the importance of correct tape box labelling and the problems that can occur when details are omitted, vague or not updated. Track sheet upkeep is examined and the necessity of keeping an up-to-date hardcopy in the tape box is stressed (I know of one producer who removes track sheets after finishing a project, purely to make life difficult for subsequent producers-remixers).

The chapter also looks briefly at analogue and digital editing, explains what a slave is, and outlines the reasons for making safety copies, pointing out the difference between a digital copy and clone. The Tape Label System (TLS), introduced in

1986 by The British Record Producers Guild and the APRS, is not surprisingly endorsed by the book with the hope for its future popularisation.

The second chapter deals with tape formats and covers all those likely to be encountered, giving details on the various options that apply to each—tape speed, recording characteristics, type of noise reduction, and so on, for analogue; and sampling frequency, bit resolution, emphasis, and so on, for digital. A short account is also given on optical and hard disk recording systems.

The next two chapters are perhaps aimed more at operational personnel and look at tape machine alignment, tones and making copies-clones. The reasons for adding tones to both analogue and digital tapes and the correct way to go about it are thoroughly dealt with. Optimum record levels for both analogue and digital are examined, plus digital metering and the move by the AES towards its standardisation with reference to full scale (-x dB FS). Digital terminology such as sampling frequencies and word lengths as well as interface formats are explained.

The book goes on to explain another important aspect—tape handling and storage. 'Poor handling in a professional recording facility is more likely to contribute to any degradation than even the worst storage conditions.' The various ways that a tape can become damaged are discussed ranging from greasy finger marks to cinching (tape buckling due to faulty winding). A couple of myths are also dispelled; firstly that tapes can be erased by magnetic fields on electric trains, and secondly that security X-ray machines can have a damaging effect. Optimum storage conditions are looked at and the reasons given for storing tapes 'tail out'. Periodical rewind of stored tape is recommended to release pack stresses and provide advance warning of deterioration and sticking edits.

Also advised is the back-up of masters to both digital and analogue formats, as digital longevity is still a relatively unknown factor. The recent 'sticky tape' syndrome caused by unstable binder formulations is discussed, with guide-lines included from Ampex and a letter on the subject from the BRPG.

The last chapter deals with the role of the record producer and A&R department in ensuring the right tapes are used for the right job: 'The

need for good communications between the producer and A&R cannot be overstated. . . when a recording is to be reissued or used on a compilation, A&R staff should always contact the original producer. Fashions in sound change, and there may be artistic decisions to be made about possible changes'.

Finally, to help keep proper tabs on a project, the book includes a Production Checklist which charts the progress of a recording through 27 stages. The checklist is designed to be photocopied and used, or alternatively a printed version on A4 is available through the APRS free of charge.

This book should be read by anyone who is actively involved with tape either operationally or administratively, and should be as prevalent on record company bookshelves as it is studios. If enough people take the trouble to read it and practice what it preaches, everyone's jobs will be made that much easier. Highly recommended.

Patrick Stapley

## The Tapeless Directory

By Yasmin Hashmi & Stella Plumbridge

Publisher: Sypha  
ISBN: 0-951-7826-1-4

The business of choosing a digital audio workstation from the increasing number of competing systems can be a daunting task: collecting and collating all the relevant information for just a handful of systems is extremely time consuming, and one is more likely to end up with a salesman's viewpoint rather than an objective one.

These problems were recognised four years ago by UK-based technical and marketing consultants Sypha, who brought out *The Tapeless Directory* in response. Since then the number of systems has grown rapidly, and the third edition, published this month, contains over 140 products—three times the number that appeared in the first edition of the directory.

The directory lists all the currently available tapeless recording-editing systems, plus some that are no longer manufactured. The 108-page publication is divided into two parts. The first provides a background to tapeless technology, explaining the ►

### Literature received

- **Auditorium Acoustics and Architectural Design** by Michael Barron. Publisher: E & FN Spon. UK: ISBN 0-419-17710-8. US: ISBN 0-442-31623-2.
- **Broadcast Transmission Engineering Practice** by William Wharton, Shaun Metcalfe & Geoff C Platts. Publisher: Focal Press. ISBN 0-240-51335-5.
- **The Compact Disc Handbook** by Ken C Pohlmann. Publisher: Oxford University Press. ISBN 0-19-816327-4.
- **Electromagnetic Compatibility** by Jasper Goedbloed. Publisher: Prentice Hall. ISBN 0-13-249293-8
- **History of International Broadcasting** by James Wood. Publisher: Peter Peregrinus Ltd. ISBN 0-86341-281-5.
- **Masts, Antennas and Service Planning** by G W Wiskin, R G Manton & J H Causebrook. Publisher: Focal Press. ISBN 0-240-51336-3.
- **Microphone Manual** by David Miles Huber. Publisher: Focal Press. ISBN 0-240-80141-5.
- **MIDI Survival Guide** by Vic Lennard. Publisher: PC Publishing ISBN 1-870775-28-7.
- **Nonlinear—A Guide to Electronic Film and Video Editing** by Michael Rubin. Publisher: Triad Publishing Company. ISBN 0-937-404-83-7
- **Picture Book & Multimedia** by Peter Kruger and Brian Samuel. Publisher: Digithurst Ltd.



ISBN 0-9516631-2-7

- **Random Access Audio** by David Miles Huber. Publisher: SAMS Publishing. ISBN 0-672-30086-9.
- **The Real Facts about Desktop Video Editing** by Cliff Roth. FutureVideo Products Inc. ISBN: 0-9632586-0-5.
- **WRTH Equipment Buyers Guide 1993** by Willem Bos & Jonathan Marks. Publisher: Billboard Books ISBN: 0-8230-5949-9.

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terminology and giving a clear introduction to the subject as well as some useful pointers for those buying a system.

The second part contains the listings which are split into four sections: Stereo/4-Channel Systems; multichannel Systems; Cart Replacement Systems; and Miscellaneous Systems (systems not quite meeting with commercial recording-editing criteria but closely related, such as record-playback only systems). At the end of each section a few products are included where the information required was incomplete either because suppliers were unable to provide full details or confirm information which had already collected by the authors.

Each entry is described under a number of headings and the terminology used by manufacturers has been standardised to avoid confusion. These headings are: General Market (postproduction, music editing, mastering for radio and so on); Release Date; Recording media (hard disk, M-O disc, plus the number of channels supported); Hardware; User Interface; Salient Features (aspects considered of particular importance); Archiving (backup hardware, whether included or optional, and speed of backup relative to real time); Recording (number of analogue inputs, number of channels that can be recorded simultaneously, sampling rates, data compression, standard and maximum record times, and punch-in facilities); Playback (number of analogue outputs, number of channels that can be simultaneously replayed, varispeed, and looping facilities); Interfacing and Synchronisation; Editing (waveform, tape representation, cut and paste, number of tracks including virtual

tracks, timing displays, crossfade types and times, point location); Mixing-DSP (level control, EQ, internal mixing, time compansion, harmonising, sample rate conversion, and format conversion); future developments; customer support (including training and service) arrangements; cost of a typical system; and finally, Suppliers, giving details where possible of UK, European, US and Far Eastern agents.

The Directory is an invaluable source of information providing prospective purchasers with all the necessary information to narrow down the tapeless field by a process of direct comparisons and elimination. The remaining system or systems can then be examined in greater detail—as the authors suggest, the best way to judge a product is to try it for yourself, preferably at leisure at your own premises.

Apart from being an excellent buyers' guide, the directory also makes interesting reading and an invaluable reference book for anyone professionally involved with tapeless technology.

Patrick Stapley

## The Handbook of Audio Recording

by Mike Day

Publisher: Blue Moon Publications  
ISBN: 0-951891 8-0-4

Mike Day is a Recording Engineer and Musician of 20 years' experience. This, his first book, is aimed at leading the beginner gently through studio basics. The five chapters split the subject into: the console; monitoring; microphones; recorders

... an  
invaluable  
reference book  
for anyone  
professionally  
involved with  
tapeless  
technology  
The Tapeless Directory

and outboard equipment; plus a useful glossary and a foreword by George Martin. Sixty of the 146 pages are taken up with illustrations which not only give the book a practical feel, but help make the subject matter more accessible. Each chapter ends with a summary followed by a Q&A section—just to check you've been paying attention.

Starting with the mixing console, Day describes the layout and controls of a 'split console', using an A&H *Sabre* as his model. With the aid of channel strip diagrams and photographs a clear view is given of the various sections and their functions. A brief outline on automation is also included.

Monitoring covers main, midfield and nearfield speakers and their uses, plus the effect of room acoustics and the dangers of prolonged high-level listening. Alternative reference sources are discussed along with foldback monitoring. Metering is covered in this chapter with the differences between VU and PPM, and Mechanical and light meters being explained.

Microphones are split into dynamic, condenser, electret, boundary and ribbon types with a short introduction, diagram and photograph of each type. Nine examples of mic placement are shown, but little is said about technique. Polar patterns are

discussed and 3-dimensional diagrams are included, although to be understood by the beginner, further explanation would have been useful. Phase cancellation between mics is clearly explained and other transducers are mentioned along with DI boxes. Finally, cables and plugs are discussed.

Analogue and digital recorders (2-track and multitrack), hard disk recorders, samplers, sequencers and MIDI are all covered. Different formats and types of time code are dealt with, and an insight is given into recording music for picture. Editing techniques (both electronic and manual) are explained and the reader's attention is drawn to the importance of regular cleaning and maintenance of tape recorders.

The final chapter deals with outboard processing: ambience, delay, pitch changing, modulation, dynamics and EQ. Descriptions are given for each category with an outline of the type of processors available and their practical uses. Noise reduction considerations are also addressed.

Mike Day's book will provide a useful reference for the beginner, where it provides an insight into the increasingly complex nature of the modern recording studio. There were times when I felt the author could have risked going into greater detail but I quite understand the necessity for simplicity.

This is a good book for those considering embarking on a career in the recording industry. It also, sensibly, avoids painting an over-glamorous picture, as George Martin warns: 'Beware! It is a business not to be undertaken lightly. Notoriously underpaid except for the fortunate few, its toughness has broken many a heart.'

Patrick Stapley

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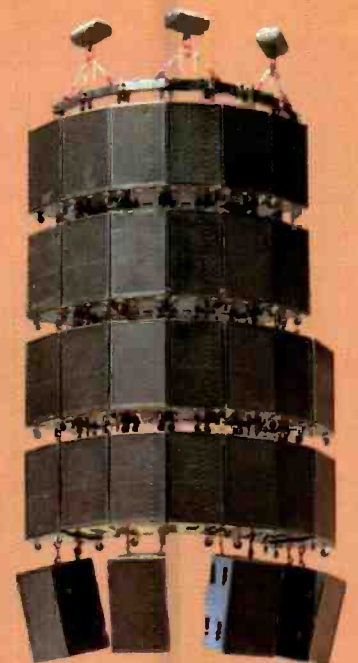
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**M**AC is dead, and with it the prospect of digital audio with satellite TV—at least until we get a new system like *PALplus* (with NICAM stereo) or all-digital TV, perhaps with Dolby *SR-D*. Until then we are stuck with the analogue Wegener *Panda* system of companded subcarriers.

There is nothing intrinsically wrong with Wegener stereo. It works well at a professional level, where the receiver decoders are well made and carefully set up. The problems lie with some domestic receivers. Although Wegener ask for a licence fee they do none of the policing work that Dolby have refined to preserve the system's reputation. So some Wegener stereo receivers are much better than others, and some models just use 'stereo' circuits which are a cheap, licence-free version of Wegener.

*MAC* had clearly been doomed for many months, but the final nails went into the coffin in February. EC Industry Commissioner Martin Bangemann, who took over responsibility for TV technology from Technology Commissioner Fillippo Pandolfi (who left at the end 1992 after failing to make the Europe's *MAC* and *HD-MAC* system fly), said that the EC will no longer try and force broadcasters to use this technology. Instead they can use any wide-screen or HDTV system they like. This leaves European broadcasters free to adopt an all-digital system, most likely they will follow whatever decision the US government comes to this year when it sets a standard.

Grabbing the golden opportunity presented by Bangemann's all-clear, Britain's DTI pulled the plug on EC-directed legislation that would have made it illegal, after the end of this year, for anyone to sell a wide-screen TV set without a circuitry to decode *MAC* broadcasts. With good grace the DTI now acknowledge that its plans to enact this legislation did not involve adequate public consultation and created the potentially absurd situation of the DTI forcing the public to pay for a technology in which the DTI had publicly voted no confidence.

In December 1992, Technology Minister Edward Leigh vetoed the EC's plans to subsidise simulcasting from satellite such that the same programmes would go out in *MAC* as well as *PAL*. Leigh said the future lay with digital TV. In January the *Eureka 625 Vadis* team working on digital TV announced that it would expand its brief to cover digital HDTV. Soon after, Philips halted production of *HD-MAC* HDTV sets.

The *Eureka HD-MAC* project was conceived in 1986 when the US delegation to a CCIR (International Radio Consultative Committee) conference in Dubrovnik proposed that the Japanese HDTV system, called *Hi Vision*, be adopted as a world standard. The target was a service launch in 1995. Now—recognising that there is no installed base of *MAC* sets, no upgrade path to *HD-MAC*, and that broadcasters have no firm plans to start an HDTV service—Philips will 'take account of market realities' and go with whatever system looks viable. Philips are already cooperating with Thomson on one of the all-digital systems now proposed for use in the US.

Philips expect digital TV technology to be ready for broadcasting pictures of today's quality by the mid-1990s, and for HDTV by the turn of the

Barry Fox

## The dish death of *MAC* and the life of live music

century. 'No-one should be surprised if things take much longer in practice', warn Philips.

Philips management had acted on internal briefing papers which admit 'the chances of a market success for *HD-MAC* are very limited'. Philips blame delays in producing the *MAC* microchips on which receiver production relied and on a flaring loophole in the EC's Directive of 1986. This Directive was supposed to make *MAC* the European standard for satellite TV and provide the elegant upgrade path to *HD-MAC*. Instead the loophole let broadcasters, led by Rupert Murdoch's Sky, use *PAL* from Luxembourg's hugely successful Astra satellite instead of waiting for *MAC*.

It is still not clear whether the 1986 loophole was a cock-up or a conspiracy. It centred on restricting broadcasting to one frequency band and Astra operates outside this band. Brussels eurocrats have tried to tell me that the EC was under pressure from Luxembourg and the UK to 'write in' the loophole. Luxembourg's interest is obvious—it owns the Astra satellite. So is the UK's interest—Rupert Murdoch, who wanted to beat Britain's official *MAC* service BSB, had the ear of the then Prime Minister Margaret Thatcher. Or is it just that the Brussels drafters goofed and are now trying to blame someone else for their mistake? We shall probably never know for sure.

Only one thing is certain: if Britain's BSB had succeeded, the UK would not have a wide-screen *MAC* service with digital sound, irrespective of whatever else happened on the Continent.

After BSB collapsed into a merger with Sky in November 1990, BSkyB continued to simulcast some of its *PAL* programmes in *MAC* from BSB's Marcopolo satellite. But BSkyB switched off the

For some tabloid background to the whole sorry tale, try the paperback version of *Dished!*, the book by Peter Chippendale & Suzanne Franks about 'the rise and fall of BSB'.

programme feed to the Marcopolo satellite at the end of 1992.

For some tabloid background to the whole sorry tale, try the paperback version of *Dished!*, the book by Peter Chippendale & Suzanne Franks about 'the rise and fall of BSB'. It is a good read and allows some of the central characters to justify their catastrophe by rewriting history.

Journalists, manufacturers and retail dealers who had to deal with BSB on a daily basis became frustrated beyond words by the company's refusal to talk hard facts and the apparent inability of the management either to see or acknowledge problems that so clearly lay ahead—such as late delivery of the *MAC* chips on which the whole project depended and nonappearance of the Squarial on which BSB had built an entire advertising campaign. BSB's management structure trapped facts and information in a tight pocket.

At the end of 1992, in the run-up to the Marcopolo shut-off, two industry engineers took me to task for saying that *HD-MAC* had offered an elegant upgrade path to wide-screen and HDTV. They reckoned that I had helped to kill *MAC* by being anti-BSB (in my writing for *Studio Sound*, for example).

'I was at several meetings at which your press articles were discussed, and I understood that you turned down at least one invitation to present your case in person to the BSB technical team', wrote one of the engineers.

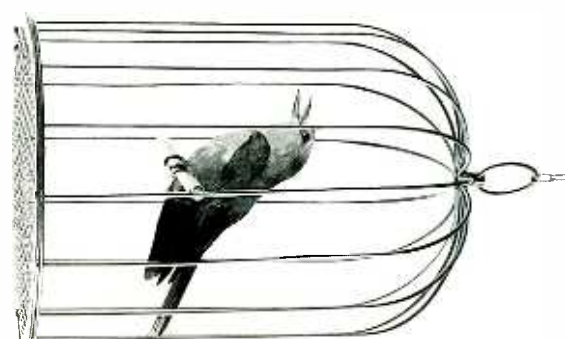
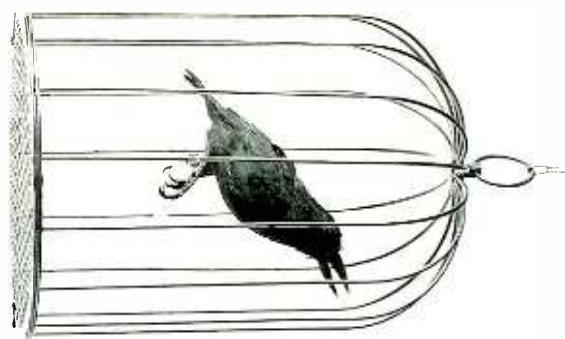
After the collapse of BSB, John Gau, BSB's Deputy Chief Executive and Director of Programmes, described me in print as 'that ardent Sky cheerleader'. Well, I still have a pile of letters written to BSB's Chief Executive, Anthony Simonds-Gooding, in the first half of 1989. I had repeatedly asked for the chance to talk with BSB's technical team. There were always excuses.

'For the fifth time', I wrote to ASG in June 1989, 'I suggest to you that the time is long overdue for... a factual briefing for the specialist press... what really worries me, and others in this field, is that if BSB fails, then Britain loses the upgrade path to *MAC*, and with it the chance of wide-screen, and later high definition, television'. There never was a briefing, and soon afterwards BSB set their high-powered solicitors onto me for predicting that BSB would end up on the Astra satellite.

**H**ow live is live? Dire Straits recently spent two months 'finishing' a live album at Air. The alternative is to rig the concert stage as a studio. This is what happened at one of last year's JVC *Jazz Parade* concerts.

Singer Dianne Reeves had a very tight four-piece backing group—but most of the audience never even saw the drummer, Billy Kilson. He and his drum kit were hidden between a big black screen. Some members of the audience thought he was shy. It was a full set of studio cubicle screens dressed up to look a little less like studio cubicle screening. So the group's live sound was close to a multitracked studio mix. If this practice were to be pursued to logical extremes, concert goers could find themselves expecting to see less and less of the people they are paying more and more to watch. ■

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**G**ood, bad or indifferent. And how do you know? These questions have plagued the audio industry since its inception. No task has been harder than that of deciding which piece of equipment to purchase.

One long-time veteran of West Coast 'studio wars' (now happily retired) commented that 'nothing has ever put more stress on my chief engineers than their role in making equipment decisions. The only time I ever fired a chief—and I fired a few—was over bad calls on studio gear. I could tolerate one case of poor judgment but after that I gave those guys enough rope to do the honourable thing and they usually did!' This attitude is not unusual in the recording industry. What it does is to make the act of equipment purchase so fraught with danger that a walk down the main street of Sarajevo seem tame by comparison. In an industry where a less-than-optimum piece of equipment can cost upwards of \$100,000 and a digital console can reach towards the seven-digit mark, there is not a lot of room for charity for those who make the wrong choice.

There are a number of sources of information that can contribute to the making of a correct decision, play a role in a poor choice or increase the difficulty of valid decision making. When it comes to buying a piece of equipment (or an entire system) there can frequently be too much information, as well as too little. Here are some information resources we all have had to considered at one time or another.

The first is word of mouth. The problem with word of mouth evaluations of equipment is that sometimes you do not get to the truth. Others in the business may not admit to you—their competitor—they may have bought a console that 'barks'. Simply, they may not own up to a mistake that could damage their reputation or the confidence of their customers. On the other hand, the owner of a less-than-satisfactory unit may claim it the greatest piece of equipment ever made—and that the unit is available for sale due to the forthcoming purchase of something more powerful. Is a competitor to tell you that the purchase of a *Whizbanger 7000* will increase your studio trade if it would jeopardise theirs?

The 'buzz', 'scuttlebutt' or 'skinny' is the kind of information that comes from people you do not know personally—someone sitting in the bar at the Olympia centre during APRS in London, say. It is not that the information exchanged is necessarily bad (some really useful tidbits do make it from 'pint to pint'), but there is no real way to weigh the information. The guy with his face in his lager *might* be a studio owner, but he could be a former sales manager of the console he is currently 'downing'. The pretty woman slipping white wine *may* have spent five years in postproduction or she may be a studio groupie who reads all the trade mags and spec sheets. Either way, the information is not validated, one way or another.

Vapourware is the electronics manufacturer's version of promises made by politicians running for office. Vapourware originated—according to computer industry folklore—with IBM. Big Blue would announce in some detail a product with specifications so advanced that potential customers

## Martin Polon

### Assessing costly equipment before you part with a lot of money is a tricky business. Who can you trust to advise you well?

of other systems would delay or postpone indefinitely their purchases in order to wait for this new equipment. In some cases, the vapourware in question would never appear from IBM. In other cases, the product would appear but in a time frame calculated to bring the Second Coming to mind. The purpose of the exercise, according to most observers (and especially IBM's competitors), was to distract customers. Now vapourware has permeated the audio industry to an extent that might be more readily attributed to car dealers. But it is not that equipment manufacturers don't mean well—their products do eventually meet the intended specs—it is just those time frames and product debugging stages.

Nothing is more difficult than winnowing the chaff from the grain in the information provided by audio equipment dealers. The relative merging of technologies involving consumer and pro audio over the last few years has been reflected by the migration of consumer audio sales personnel to the better-paying world of pro audio sales. Generally, whatever their background, sales people earn their living through earning commission. It is, therefore, logically not in their best interest to discourage a sale by discouraging a potential customer from buying any piece of equipment unless an alternative carries a higher commission. Add to this a relative lack of technical sophistication displayed by certain sales personnel (some studio owners would argue many), and you have a situation where identifying the truth requires the services of Diogenes.

Even the *de facto* protection once provided by expensive, low-volume, hand-built equipment whose manufacturers relied on repeat custom to remain in business has all but evaporated. In many

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**The bottom line for the potential purchaser of audio equipment. . . is the question 'who can you trust?'**

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cases, the rise of mass-market studio gear with lower prices that brings greater numbers of one-off customers has produced dealers who functionally do not care about return business. The bottom line here is that there are good dealers with bad sales people and bad dealers with good sales people! You figure it out.

Satisfied-user testimonials are a reasonably easy to value judge. If someone who owns or engineers a prominent studio, appears in a full-page, 4-colour advertisement that cost the equipment maker \$5,000 in a trade publication to lionise his product, it is a fair assumption that nothing derogatory will be discussed.

Nothing can make a potential recording studio customer feel more like a KGB operative than trying to separate fact from fiction in new product introductions at events like the AES Convention. The 'mystery product' is frequently introduced inside a plexiglass case—so that it remains unsullied by human hands and disguises the fact that the product is made of wood and contains only sawdust. Another ploy to hide the fact that a new product is either a prototype or a mock-up is to put it behind a barrier in the hands of a gorgeous female model. Few male engineers tend to notice that a new portable mixer has garden hose fittings where mike snake connectors should be when held in the hands of Miss December. When the manufacturer actually delivers such a product is another matter.

Magazines present a particular problem and, to be fair, it has been a tough call, in the financially trying 1990s, for magazines to remain accurate and objective. You should be most wary of 'sins of omission' rather than venal attempts to mislead.

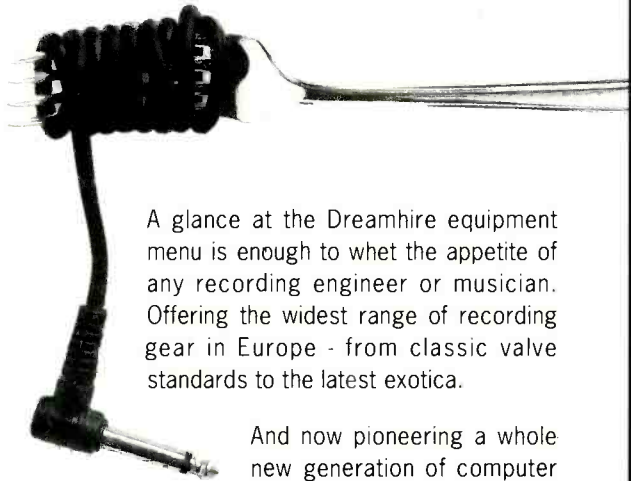
Reviews are, to some extent, necessarily based on subjective opinion; the question is whether or not those opinions are consistent with those held in the recording studio mainstream. Professional audio equipment reviews are generally of a higher standard than those in consumer audio circles. Yet consumer audio equipment reviews have become more important as most studios use some consumer DATs, CD players, cassette decks, and so on. This lack of negative reviews of consumer audio equipment imposes a further burden of judgment on the equipment purchaser rather than on the reviewer.

It is worth noting that this is much more an American publishing phenomenon than a British one, but, it makes the information gleaned from magazines as potentially ambiguous as that from other sources. The best general guide to the value of the information presented is the magazine's reputation.

The bottom line for the potential purchaser of audio equipment for the recording studio is the question 'who can you trust?' The answer is basically 'no-one'. The one reliable method of obtaining valuable product feedback is to request from the manufacturer a list of customers using the product you wish to acquire. Armed with new shoes and/or a telephone, the prospective buyer can contact these people personally for an opinion. Only by doing this kind of homework, can the information needed be gathered with relative accuracy. ■

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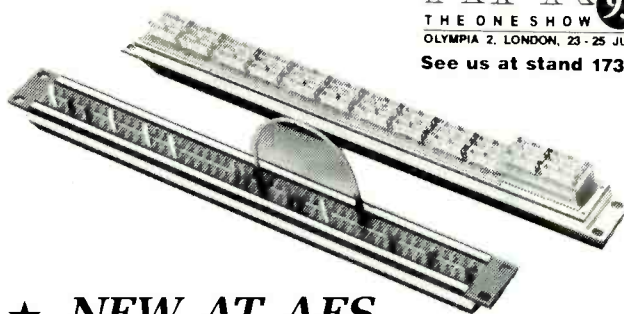
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## 4D hype?

Dear sir, I realise that your International News section has to be compiled mainly from press releases and manufacturers' propaganda. This means some marketing waffle is inevitable. The piece on Deutsche Grammophon's 4D promotion (in *Studio Sound*, April 1993 and elsewhere) has set an all-time low for absurd incredibility. How can a serious major international classical record company claim its recording techniques are 'anti-technology' and 'a revision of the complete audio chain'?

To deal with the first claim, multiple microphone (have you been to a DG session recently?) and multitrack recording can hardly be described as 'anti-technology'. It is tricky enough when multi-mic balancing goes on during a straight-to-stereo session, but at least the artists are around to make some personal observations and adjustments after hearing playbacks. With multitrack classical the options for meddling safely hundreds of miles away from the performers is a temptation too great for most 'Tonmeisters' I have encountered. I live in the same real world as DG and am well aware that too many commercial projects require the use of more than one or two microphones, but to describe what DG do as 'anti-technology' is quite hilarious.

To deal with the second claim, DG's 'revision of the complete audio chain' includes:

Microphones—theirs look pretty much the same as nearly everyone else's to me, Neumanns, Sennheisers, Schoeps.

Microphone preamplifiers—not everyone uses preamps in the studio itself rather than in the control room, but a good few do. It is a technique which was also used in olden valve days, and my company has made 300 plus commercial CDs using such a practice, including the *Gorecki 3* on Nonesuch which has sold over 300,000 copies so far. Remote gain control is offered by several commercial companies and although DG's distortion and noise figures are very good there are very fine comparable commercial products in regular use in many studios.

A-D converters—very many people have been using 'more than 16-bit' converters for a good few years. DG's claim of having 21-bit performance is a dangerous one to make since not

only does it constitute a description under the UK Trade Descriptions Act but it means a total system noise and distortion of at the very worst -120dB (dithered) below and in the presence of a tone modulated to peak-bits, presumably including their mic preamps which are integrated in the same box. I do not believe DG's claim myself and challenge them here and now to deliver a converter to Sam Wise for measurement to see if the performance tests meet their claims. Additionally, I have read elsewhere that DG employ a floating-bit conversion system which is unlikely to yield 21-bit noise floor in the presence of a peak-bit modulation—there are also transfer-characteristic glitches to consider in using multiple A-D converters.

Stagebox integrated mic preamps and A-D converters—I have one sitting here in case the marketing people at DG would like to see it. So have other studios, I'm sure.

All-digital mixdown—to read of all-digital mixdown as part of a revision of the complete audio chain in April 1993 is quite breathtaking when it has been around so long. Have DG's marketing team never been told of the Neve at CTS back in the 1980s or Decca's mixers which are manufactured within DG's own Polygram operation?

Authentic Bit Imaging—this appears to be similar to the noise-shaping redithering techniques being used already by just about everybody in the 'more-than-16-bit' business. Harmonia Mundi make a box, Gambit Audio make a box, Meridian make a box, Prism Systems make a box, Decca make a box, Sony make a box, Sonic Solutions include it in their latest software. DG's ABI has a unique name, but the concept is employed worldwide already.

Congratulations to DG for making such a huge and worthwhile commitment and investment in the upgrade of their equipment, it is a commendable achievement—no equivocation here, except that you still need to buy some 'more-than-16-bit' recorders before preaching to the rest of us. Please spare us the 4D waffle and get on with making some great recordings. With all the current media discussion of retail CD pricing I would rather have seen a pound or two knocked off CD prices than wade through endless expensive press propaganda about 4D and DCC.

**Tony Faulkner, Recording Engineer, Middlesex, England.**



Deutsche Grammophon's Klaus Hiemann lends an ear

## DG reply

Dear sir, the claims made for 4D Audio Recording at the Henry Wood Hall demonstration were made by myself, as Head of Deutsche Grammophon Recording Centre and therefore responsible for its development. Although I did in fact explain that the 4D affix did not relate to a 'fourth dimension', but to the four areas of the recording chain where improvement and revision have been effected within the development, these claims were much as stated in your report. In no way did they represent anything other than a true and proper statement of what Deutsche Grammophon has achieved with 4D Audio Recording.

What was clearly meant by my statement that 'The technique is anti-technology—the only judge is the human ear' (it is always more honest to take issue with a complete statement) is that, whatever the technical reasons for decisions throughout the development of the system, listening tests were always paramount.

4D Audio Recording is a complete revision of the recording audio chain, an extremely high-specification platform, able to deliver optimum system performance, in the light of current and likely future DSP technological development. This is as opposed to the adoption of new equipment within an existing audio chain, as and when it becomes available.

The achievement of 4D Audio Recording is, therefore, that it represents the development of a mobile recording system, able to deliver system performance anywhere in the world, previously only attainable with fixed installations under laboratory conditions. All recordings made from the beginning of 1993 by Deutsche Grammophon recording teams employ 4D Audio

Recording technology and already we have six 4D Audio Recording systems fully operational.

What does Mr Faulkner mean by the phrases 'multi-multiple microphone and multitrack recording'? Clearly he has not been to a Deutsche Grammophon recording session for many years, or perhaps ever at all. Under my direction, the Deutsche Grammophon philosophy, with regard to microphones, has always been 'as few as possible and as many as necessary, but never all open together and at the same level'. Mr Faulkner will recognise the validity of this approach from his own recording practices and is certainly aware therefore that you will see set up during a session bears no relation to the number of microphone signals going to tape. It is quite simply a case of providing yourself with an optimum choice of microphone positions.

Furthermore, Deutsche Grammophon recording sessions are direct to stereo whenever possible. There must be very good justification, made directly to our Tonmeisters by the artist himself, to do otherwise. Deutsche Grammophon only uses multitrack where acoustic conditions are especially detrimental; for instance, during audio-visual recordings, or live recording where retakes are required when the hall is empty. Otherwise it is direct to stereo.

The suggestion that our Tonmeisters engage in any form of postproduction practice, to the detriment of the true intentions of our artists, is perhaps most offensive of all. Does Mr Faulkner actually believe that artists of the calibre who record with Deutsche Grammophon, would actually tolerate practice of this kind? The Tonmeister is charged with the musical balance of a recording by the artist, he is an engineer who has received a musical training first and foremost. ►

Mr Faulkner's clear implication is that he is better qualified than our Tonmeisters to pass judgment on the integrity of our recordings.

Looks are often very deceptive. The Sennheiser microphones that Deutsche Grammophon uses are actually specially modified by Sennheiser to our own requirements. The Sennheiser microphones that Mr Faulkner may use are likely to have benefited from evaluation work carried out by Deutsche Grammophon. We have had a close working relationship with Sennheiser for many years now and they send laboratory test models of all condenser microphones to us for evaluation prior to production. Certain Sennheiser products are, in fact, the direct result of joint or shared research and Mr Faulkner may be assured that future major developments will result from our relationship which will be of great interest to him.

Mr Faulkner refers to distortion and noise figures for Deutsche Grammophon's remote controlled

microphone head amplifier. This is of great interest to us, as the amplifier represents an entirely in-house development, for which we have never published comprehensive specifications. All that we have ever quoted is a single THD+Noise value of 0.0008% at -15dBFS (0dbFS=18dBu) in publicity material, and a 'better than -120dB' minimum noise floor value (at 10dB gain) in private correspondence with Mr Faulkner.

Clearly these figures do not allow Mr Faulkner to make any proper comparison with similar devices, however we can assure Mr Faulkner that we have viewed all published comparable measurement pertaining to the performance of other similar devices. Some of these are extremely good; however the performance of the proprietary DG device exceeds even these. Furthermore we would obviously not have chosen to incur the high cost of developing such a device if it was available 'off the shelf'.

On Mr Faulkner's points regarding

our A-D converters, we do not require anyone to independently validate our choice or the claims we have made for them. These represent a development paid for by Deutsche Grammophon and, since we are not marketing it for use by anyone other than ourselves, we are hardly going to allow detailed examination by a third party.

Mr Faulkner is quite correct when he states that he had read 'elsewhere' that we are using floating-bit conversion technology; he has read it in our own publicity literature which he has received. Deutsche Grammophon can assure Mr Faulkner that, regardless of whatever convictions he might hold concerning current A-D conversion technology, our converters output with full 21-bit precision. Moreover the continuing development of conversion technology within 4D Audio Recording means that performance is constantly being advanced by our engineers at Hanover Recording Centre. Indeed the 21-bit converters initially in place have already been superseded.

It may be that Mr Faulkner is in

possession of some universally comprehensible and representative means of measuring all A-D converters which accurately rewards cleverly engineered floating-bit techniques, in a way directly comparable with linear PCM systems. Mr Faulkner's total system noise and distortion figure of '-120dB (dithered), etc.' in order to qualify 21-bit designation is a little perplexing. Given the adherence to such absolute theoretical values, in the absence of a better than 96dB dynamic range for instance, CD could never be designated a 16-bit medium. It is moreover arrogant of Mr Faulkner to assert that Deutsche Grammophon is unable to produce such a noise floor figure for its 21-bit conversion, given that he is not in possession of any measurements which would lead him to this conclusion. The fact that he merely does not believe it is possible is no indication that Deutsche Grammophon have not achieved such performance!

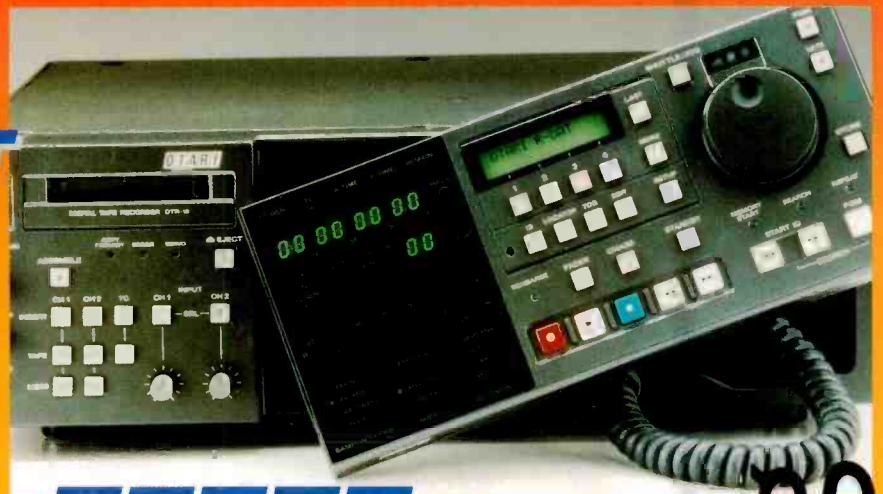
Mr Faulkner should also be aware that we have measurement which

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indicate that several manufacturers of commercially available high-end converters are very aware of the advantage of floating-bit technology and we have the utmost respect for the performance they are thus able to attain.

We can state categorically that what Mr Faulkner refers to as his 'stagebox' would not function as such with the 4D Audio Recording system, devoid as it must be of the proprietary digital engineering that allows the 4D Audio Recording stagebox to operate as a virtual satellite of the digital console, enabling the transfer of many control room operations onto the recording stage while still operated from the console. Mr Faulkner should appreciate that we are not about to reveal details of how this proprietary development has been implemented.

Deutsche Grammophon also recorded with digital consoles as far back as 1985, as Mr Faulkner is well aware, and we do not claim anywhere that all-digital mixing is a development exclusive to 4D Audio

Recording. What we claim is that all-digital mixing is an area within the recording chain where we have been able to effect considerable improvement. Many fundamental operational achievements of the digital mixing process within 4D Audio Recording are entirely the result of software developments proprietary to Deutsche Grammophon. Digital mixing—as it exists within the context of 4D Audio Recording—therefore includes many operational features wholly exclusive to Deutsche Grammophon.

In no way is our publicity on this matter intended to denigrate the work of others who employ digital mixing techniques. Indeed we are very pleased to share with colleagues like Mr Faulkner in the achievement of banishing analogue mixers from the audio chain and releasing classical recordings that are truly DDD.

Mr Faulkner is quite wrong to believe that all requantising systems currently in use with the various classical recording companies apply

the same concept in achieving this end. There is, for instance, no similarity between Sony's approach to quantising and our own. Where systems do share similar operating systems, they employ proprietary algorithms and noise shaping techniques which can produce widely differing audio performance. The fact that a number of them are housed in 'boxes' can hardly be taken as an indication of their *modus operandi*.

We could have called our requantising system 'a box', or we might have called it 'nonsubtracted dither with noise shaped error feedback, incorporating fine tuning from extensive "golden ears" listening tests', but frankly it is a bit of a mouthful compared to ABI.

Deutsche Grammophon identified 24-bit processing and recording as the optimum performance level in developing 4D Audio Recording and indeed we shall possess this capability by the end of the year—both for 2-track and multitrack recording. Anything less than 24-bit would have been intermediary, short

lived and an unjustifiable expense, particularly given that our processing outstrips the best current bit resolution available from any recorders. The advantage of such an intermediary stage in the development of 4D Audio Recording would be at best minimal. Deutsche Grammophon has never at any time claims it was recording with 21-bit recorders.

Concerning Mr Faulkner's final and most spurious criticism, we fail to recognise any plausible connection between Deutsche Grammophon's development of 4D Audio Recording and the issues of CD pricing and the introduction of any new consumer playback formats. We can assure Mr Faulkner that the inherent improvement in sound quality that results from the introduction of 4D Audio Recording comes at no additional cost to the consumer.

**Klaus Hiemann Diplom  
Tonmeister, Director, Recording  
Centre, Hanover, Germany. ■**

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# FINAL ANALYSIS

## Sam Wise puts BSS' long-awaited parametric analyser-equalisers, the *FCS926* and the *FCS920*, through their paces

The BSS *FCS926* is a programmable, 2-channel, 6-band per-channel parametric equaliser with internal real-time analyser. BSS are very well known and respected in the live sound industry, and the *FCS926* is generally optimised for installed and touring live sound applications. However, it will also find its place in the studio, allowing instant recall of various equalisation profiles in onboard processing applications, and to help correct or simulate monitoring system equalisation. Real-time analysis is included, which will speed up the equalisation of installed and touring loudspeaker installations, and provide instant verification of studio steady-state performance.

*Varicurve* software provides manual or automatic adjustment of the equaliser to correct measured loudspeaker response to a predetermined 'house curve' requirement. Even if it is not ideal, it will give the user a very fast starting point to adjust from.

In mono mode, the two sets of six bands of equalisation are placed in series, giving a very flexible equalisation capability indeed.

The *FCS920* performs a similar set of functions, but has no front panel controls. It is intended to be controlled remotely—usually by a *FCS926*, although once equalisation curves have been

loaded, it can be used as a 'dumb' presettable equaliser with states being recalled by either MIDI or *PA-422*.

### First impressions

As the unit is unpacked from its box, it is recognisably from the BSS stable, having a deep grey front panel with easily readable, white, epoxy screen-printed legending. The remainder of the unit is constructed of steel, with a plain passivated finish, relatively ruggedly made, with reinforcements at the rack mounting ears. However, rear or side support is recommended for touring applications.

Although the unit claims to be BS415:1990 approved, it arrived with a mains cable having solid green rather than green-yellow colouring on the earth wire. And I believe, it is now required to supply products complete with mains plug—the *FCS926* did not have one. My third grouse concerns the operator's manual, which has a very nice index with page numbers—however, there are no numbers on the actual pages. The contents of the manual, once found, are very readable and clear. These are very minor items indeed, but less than ideal.

Once connected to my Safebloc power adaptor, the brightly illuminated blue LCD screen burst into life. Contrast and viewing angle on this are excellent. Should your environment be dim, it is possible to turn the display brightness up.

### Equaliser operation

As usual when trying to simulate real use, operation was begun without reference to the manual. I have tested BSS products before, but not for at least a year, so this is a realistic test. Pleasingly, most functions are obvious once you realise that the rotary parameter knob (wheel) on the right is also a pushbutton. Operation is easy for normally used functions such as adjusting equalisation curves (boost-cut, frequency, and filter width), storing, retrieving and comparing them. All of these functions are selected by six

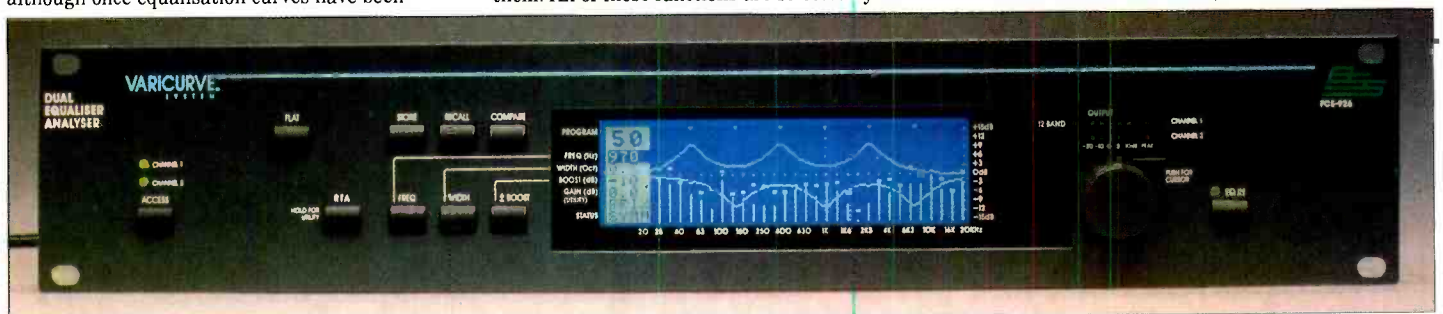
single-purpose pushbuttons, with parameter variations controlled by the wheel. When under pressure, this system should work well. It resembles a manual parametric in operation, except that the confusion of knobs is reduced. The only frustration that I experienced was when I wanted to twist boost-cut and frequency at the same time to quickly settle in on a feedback peak.

The graphically based display shows the frequency response curve that the unit is producing. Combining and interaction between filters is clearly indicated. Seeing this reminds me of a decision taken on a project some years ago. Having used  $\frac{1}{3}$ -octave equalisers for room tuning for many years, I decided to try parametrics, and specified graphics into one hall and parametrics into another hall of the same project. Though parametric equalisation can give extra control in some instances, they proved to be much harder to adjust. In the case of the *FCS926* the results are clearly displayed, making manual adjustment far easier than with standard parametric equalisers.

The bottom of the display is legended with frequency, while the right side indicates approximate boost-cut range. Holding down boost-cut doubles the dB range of the display from  $\pm 15$ dB to  $\pm 30$ dB to make examination of extreme adjustments possible. The left side of the display is used for text information, normally showing the selected memory number, frequency centre of the band being controlled, filter width in octaves, boost-cut in dB, overall gain and the unit's status.

Holding RTA down accesses the Utility menu, which then operates like the others. This provides access to overall gain setting, MIDI channel setting, security locks and similar functions. Operation is very consistent, and therefore easy to remember. At any time punching any of the six main function buttons returns operation to real-time equaliser selection and control.

FLAT acts like a EQ bypass control, returning the unit instantly to a flat equalisation. However, the setting is not lost, punching FLAT again restores the last setting unless an attempt is made to edit the flat curve, in which case the ▶



Heart of the *Varicurve* system—the *FCS926*

TABLE 1

Noise measurement standard	Channel 1	Channel 2
22Hz—22kHz, RMS, unwt'd	-87.3dBu	-87.1dBu
22Hz—22kHz, RMS, 'A' wtd	-90.0dBu	-89.7dBu
22Hz—22kHz, AVG, unwt'd	-88.5dBu	-88.2dBu
22Hz—22kHz, CCIR-ARM 2k	-87.5dBu	-87.2dBu
22Hz—22kHz, Q-peak, unwt'd	-83.3dBu	-83.0dBu
22Hz—22kHz, Q-peak, CCIR 468-3 unwt'd	-76.7dBu	-76.4dBu

Table 1 gives the output noise level performance for various international standards

By this time the unit had a friendly, but not excessive warmth. Transformer and regulator heat is transferred to the case sides, so no special precautions should be necessary. Internal construction is very clean, being on two PCBs, one mounted in the unit base, the other behind the front panel and enclosed to prevent the radiation of unwanted RF noise. Internal wiring is safe, with a retained power lead, and looks as stated as though it will meet BS415 safety requirements once the power lead and plug are dealt with.

The larger capacitors are bonded together to prevent vibration induced lead breakage in transit, and all ICs are socketed for easy maintenance. Interestingly, the optional FSK and PA422 interfaces do not now replace the MIDI connectors, making the unit operate via two interfaces when required. This was not the case with the previously reviewed TCS804 delay system, and is a good improvement.

All audio connectors are the cheaper plastic Neutrik XLR3 types mounted on the rear panel. Since the contacts are similar to metal bodied connectors, there should be no electrical reliability problems with these. They should also cause no problems when the unit is rackmounted. But, if it is routinely plugged in and out as a loose unit, the metal types would give me more confidence. Also on the back are the mains power switch, fuse holder and voltage selector. This unit is intended to be left running continuously—unless the whole system is switched off, of course.

## Inputs and outputs

With gain set to nominal 0dB, actual gain through the FCS926 is 0.14dB on channel 1 and 0.3dB on channel 2, near enough to a real 0dB for any of us. PEAK is indicated with an input level of +17dBu, while 0.3% THD+N distortion level is reached with an input level of +22dBu. With filters set flat, internal-output clipping occurs at about +18.2dBu independent of loading down to 600Ω, a little below the specified +20dBu. +20dBu produces a THD+N of about 1.5%.

Input impedance is almost 10kΩ on both inputs.

Gain control adjustment is over 12dB with a typical accuracy of 0.05dB, an excellent performance. With a 0dBu, 1kHz input signal, OFF results in a signal breakthrough level of -67.4dB on channel 1 and -65.7dB on channel 2, which is not really a good enough in my opinion. These levels do not vary with frequency.

Fig.1 shows common mode rejection performance, which is much better than specified, reaching at least 77dB at the lower frequencies and remaining better than 63.5dB up to 20kHz. The channel separation result can be seen in Fig.2. This is not as good as the specified 85dB, but should be more than adequate for any application where the resulting signals are in a common acoustic environment.

## Noise and distortion

Table 1 gives the output noise level performance for various international standards. The inputs are terminated in 50Ω for these measurements.

Any unweighted noise measurement, taken together with the maximum output level of about +19dBu, gives a dynamic range of at least 106dB, just better than specified and a very satisfactory result. The resulting noise spectrum using an RMS rectifier is shown in Fig.3. The noise is averaged 16 times, reducing random noise by about 12dB and should make any tonal noise more pronounced. However, no tonal noise is apparent. Noise performance is therefore obviously excellent.

Fig. 4 shows the harmonic distortion products generated by an input tone of 1kHz at +15dBu. Though most distortion products are odd harmonics and therefore more audible than even harmonics, the levels are so low as to be innocuous. In Fig. 5, the THD+N is plotted with the frequency of test signal constant at 1kHz while the level is varied. The clipping point is readily seen, and behaviour is as expected. A further THD+N test was run with a fixed amplitude of +4dBu (as specified) while varying

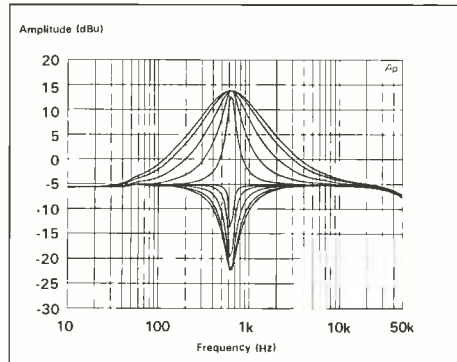


Fig.9: Effect of width adjustment with normal fixed frequency (630Hz) and nominal fixed boost-cut ( $\pm 15$ dB). Channel B. Steps are 2.0, 1.5, 1.0, 0.5, 0.1 octaves

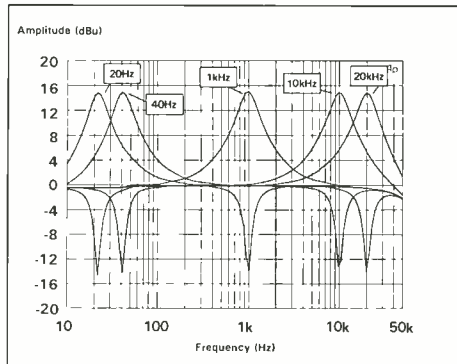


Fig.10: Effect of frequency adjustment with nominal fixed bandwidth (0.7 octaves) and nominal fixed boost-cut ( $\pm 15$ dB. Channel B

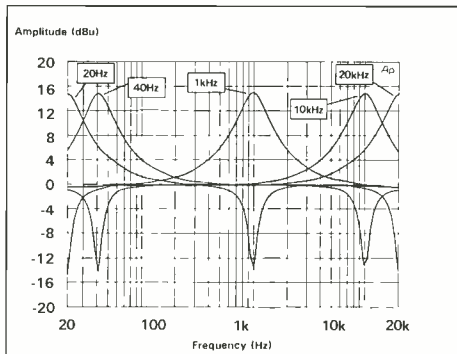


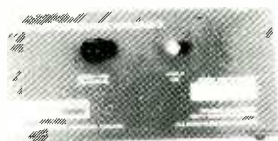
Fig.11: This is the same data as shown in Fig.10, but with the display bandwidth reduced to match the FCS-926 display. Note that at band ends it looks like a high-pass or low-pass filter effect has been achieved when it has not

the generator frequency from 20Hz to 20kHz. The result is boringly constant at 0.005% THD+N over the whole audio band. This too is a good result. SMPTE twin-tone IMD testing at +4dBu gives an excellent result of 0.004%, while CCIF twin-tone IMD is even lower at 0.0006%. No worries here!

## Amplitude response

Since the FCS926 is an equaliser, this should be the most interesting part of the evaluation. With filters flat, the amplitude-frequency response is flat within  $\pm 0.25$ dB. Fig. 6 shows the boost-cut range of a single filter with bandwidth (Q) fixed at 1 octave and frequency fixed at 1kHz. It is evident from these plots that the FCS926 is asymmetric in its response. When levels are boosted, the bandwidth between -3dB points remains essentially constant at one octave—the setting shown on the text display. When level is cut, the ▶

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## The Products

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- Frequency response 35Hz - 25kHz
- Slim 180mm cabinet
- 100mm bass/mid with 75mm voice coil
- 4th order crossover network
- Craftsmen built double veneered real wood cabinets
- Biwire facility via Speakon connectors
- Magnetically shielded

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General purpose midfield transmission line loudspeaker

- Frequency response 25Hz - 25kHz
- Slim 267mm cabinet
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- Craftsmen built double veneered real wood cabinets
- Magnetically shielded

### The MB1\*

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- Frequency response 20Hz - 25kHz
- Slim 381mm cabinet
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*\*New model available Spring '93*

### The BB5

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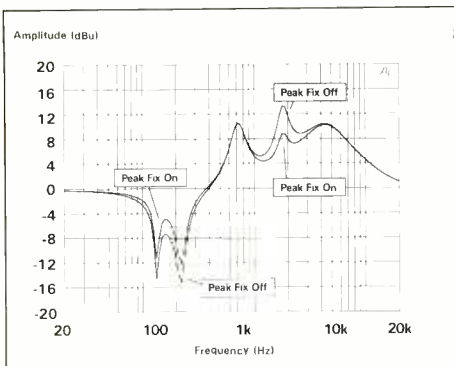
- Frequency response extends to below 17Hz
- Slim 432mm cabinet
- 375mm bass driver
- 75mm soft dome midrange
- Rotatable sub baffle
- High power 4th order crossover network in passive version
- Craftsmen built double veneered cabinet in range of real woods
- Triwire facility via Speakon connectors
- Available with Pro' Monitors own high power amplification



The MB1 Transmission Line Monitor Loudspeaker

## THE PROFESSIONAL MONITOR COMPANY

27 The Avenue, Highams Park, London E4 9LB. Tel: 081 531 5308 Fax: 0582 579278



**Fig.12: In these two curves, the only difference is the use of Peak Fix. In the top curve Peak Fix is off, showing the change in the amplitude of the combined curves. In the bottom curve, the height of peaks is fixed, possibly preventing feedback or loudspeaker overload**

response narrows. At boost settings, the levels are also very accurate, but not so much so at cut settings. This is well and good where the equalisers are being used to sweeten the sound and to attenuate feedback nodes, but where a broad dip is required, several filter sections may be needed.

Out of interest a stereo matching test was devised. In stereo access mode, a more or less random equaliser setup was made using all six equaliser bands. The input to output amplitude and phase of these rather extreme settings is shown in Fig. 7. Then, in Fig. 8, a plot was made of the difference between channels 1 and 2. While the differences look large in amplitude terms, what we know of the ear indicates that these narrow-band differences are unlikely to be heard by most people.

For comparison, an interesting experiment would be to do the same difference measurement between two nominally identical loudspeakers in exactly the same acoustic environment, then when used as a stereo pair on opposite sides of a nominally symmetrical room. The differences would likely be more audible between these and produce a measured difference significantly greater than the FCS926 produces.

Another experiment could be to compare the results obtained between two identical manual 1/3-octave or parametric equalisers with the same nominal setting. These would be likely to be even more different. But with the FCS926, we expect something more perhaps than we really need. The stereo matching of the filters is actually excellent.

Fig. 9 shows the effect of the width control. Here frequency and boost-cut are kept constant and width is varied. Behaviour is very consistent. The asymmetric nature of the filters is evident again. While this is good for resonant peaks, it makes creating a broad cut more difficult since several filter sections may be required.

In Fig. 10, the effect of changing frequency while keeping bandwidth and boost-cut constant are displayed. Note the out-of-band filter response for the 20Hz and 20kHz frequency settings. The response remains bell-shaped, possibly causing unexpected problems. Fig. 11 shows the same information, but with plot bandwidth limited to the 20Hz-20kHz as shown on the FCS926 display. One could be led to believe that at the band ends high-pass or low-pass behaviour had been achieved. The filters do behave well, but high-pass or low-pass filters would be a welcome addition.

The last curve is Fig. 12. Here the result of using PEAK FIX is displayed. As is evident, the height of peaks is fixed when PEAK FIX is active. However, when PEAK FIX is off, the effect of the

filters combining lifts the top of the peaks into what could be the danger zone. Note negative as well as positive peaks are controlled by PEAK FIX.

## Musicality

We listened to the FCS926 over our small Genelec monitors, and found the result pleasing. The unit was unobtrusive, and added no audible noise to our CD-based program source. Though not claiming to have Golden Ears, we are happy to recommend this equaliser for use in the systems which we are designing.

## Summary

The BSS FCS926 is a well thought-out and well-engineered equaliser. Its user interface is consistent, and therefore generally easier to operate than many other programmable pieces of equipment. Its audio performance is excellent. The addition of the remote controller will add even more useful features to the system. For my own

purposes, I would like to have seen the cut curves available in a broader version, switchable would be ideal. The addition of some shelving filters at the band ends or variable high-pass or low-pass filters would make a nice improvement.

The final word is, though there may be some things I would like to see changed, if I had the money I would buy one. The FCS926 would also be considered appropriate for use in the installed sound systems which we design for theatres and concert halls. So BSS, you have done a good job. ■

**BSS Audio, Unit 5, Merlin Centre, Acrewood Way, St Albans, Herts AL4 0JY, UK.**  
**Tel: 0727 45242. Fax: 0727 45277.**  
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# EUROPEAN STUDIO DIRECTORY

## LEGEND TO SYMBOLS:

	Mobile Recording		Digital Editing
	Digital Console		Audio for Video
	Residential Studio		Digital Tracks
	Full-Time Maintenance		Audio Tracks

## CAVERN RECORDING STUDIOS



Van Diemen Straat 206, 1013 CP Amsterdam, Holland; 31(0) 20 6263367; Fax: 31(0) 20 6263368. Owner: Paul Downes.



**Studio/Bookings Manager:** Paul Downes. **No. of studios & dimensions:** 1 x control room, 1 x live room, 1 x editing (digital) room. **Mixing consoles:** Soundtracs Quartz 48 + Automation. **Recorders:** 24 track digital - Akai A-DAM. **Digital audio workstations:** Akai DD1000. **Midi set-up:** Akai S3000, Akai S1100, Akai S1000, Akai S1000 PB + library + sound. **Monitors:** JBL 4435, Yamaha NS 10, Visonic Little Davids. **Specified outboard:** Neve, Focusrite, Klark Teknik Equalisers. Neuman, B+K. Tube Tech, SSL, Urei, Compressor/Limiters. Audio Technica, Lexicon. Eventide, TC Electronic FX. Microphones. **A/V equipment:** Available on request. **Special Services:** Analogue-Digital Transfers (D-A). Studio Design By: "Recording Architecture London" - incorporating their "Black Box Systems". Waterfront location, 5 mins from Amsterdam city centre. Air conditioned and ionised - catering - local bars and restaurants. Natural light in all spaces. Satellite TV, video. **Associated Member:** APRS, AES.



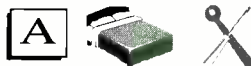
## FEEDBACK RECORDING.

**Recording**  
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Haraldsgade 27, 8260 Viby, J Denmark; +86 115200; Fax: +86 115227.



**Owner:** "Gnags". **Studio/Bookings Manager:** Henrik Kjaergaari. **No. of studios & dimensions:** Studio 1 = 48 track analog, Studio 2 = 24 track analog. **Mixing consoles:** Studio 1 = Calrec A8000, Studio 2 = Amek 2500. **Recorders:** Otari MTR 100, 80 & MTR 90. **Digital audio workstations:** S-1100. **MIDI set-up:** Atari, Cubase in both studios. **Monitors:** Studio 1 = Genelec, JBL, Yamaha, Auratones, Spa, Studio 2 = Dynaudio, Yamaha, Auratones, Spa. **Specified outboard:** **Equipment for Studio 1 - Console:** Calrec A 8000 56ch. (64 frame). AMS mix automation Custombuilt 24 ch effect return console. **Tapemachines:** Otari MTR 100, Otari MX 80, Otari MTR 12 1/2" master, Sony DTC 1000 (Pro Dat), Sony PCM F1, Aiwa cass. **Speakers:** Genelec 1033A, JBL 4311b, JBL 4411 (backmonitor), Yamaha NS 10, Auratones, B&O blaster. **Effects:** Lexicon 480, AMS RMX 16, AMS DMX, EMT 245, EMT 140 (stereo tube), Eventide H 3000 SE, Lexicon LxP 1 & LxP 5, Roland DEP 5, TC Electronic 2290, Bel delay, Roland 555, Roland Flanger, TC Electronic 1210, Audio Design Autopanner, Aphex, TC M 5000. **Compressors:** Urei 1176 LN (2), d Bx 165 (4), Drawmer 1960,dBx 900 (s-limiters, gates & compressors). **Gates:** Dynamite (2), Drawmer (2). **Equalizers:** Tube Tec (2), K+H Universal tube eq, Klark DN 27 (2). **Microphones:** Sanken, Neuman, AKG, B&K Shure Electrovoice. **Sync:** Timeline Lynx, Event controller. **Instruments:** Akai Linn PCM 60, Atari/Steinberg, Kawai Grand Piano, Emulator. **Equipment for Studio 2 - Console:** Amek 2500, 36 ch. **Tapemachines:** Otari MTR 90 Mk 2, Studer B67 1/4", Sony DTC 1000 Dat, Aiwa cass. **Speakers:** DynAudio, JBL 4311b, Yamaha NS 10, Auratones, B&O blaster. **Effects:** Yamaha Rev 1, Lexicon PCM 70, EMT 140 (stereo tube), Eventide H3000, Lexicon LxP 1 & LxP 5, Roland Dep 5, TC Electronic 2290, Bel BD 80, TC M 5000. **Compressors:** Urei 1176 LN, dBx 903, dBx 902. **Gates:** Dynamite, Drawmer, dBx 904, OT Lab (custombuilt) (13). **Equalizers:** Focus Rite 115 HD, Neuman mic. pre amp & eq's, Klark DN 27. **Microphones:** Sanken, Neuman, AKG, Bruel & Kjaer, Shure & Electrovoice. **Sync:** Timeline Lynx, Event controller. **Instruments:** Akai Linn PCM 60, Atari/Steinberg, Emulator, Roland D550, D110 & JX8p, Yamaha TX 802 & Oberheim DPX1. **Special services:** Small Apartment, our own cook?? Full time service.



## SAVE & SOUND STUDIO

H. Gerhardstraat 8, Zaandam, The Netherlands. +31 2990 49354; Fax: +31 2992 1620. Owner: Olof Bosma/Marc Christian.

**Studio/Bookings Manager:** Marc Christian. **No. of studios & dimensions:** 1 studio, dimensions: 7.5 x 5 meters. **Mixing consoles:** TAC Matchless (Cmix), Side car: D&R 4000. **Recorders:** Soundcraft 760 111 (24), Tascam DAT, Ampex MM 1000 (16), Aawai DAT, Teac(2). **MIDI set-up:** Atari 1040, Synchronizers, Trigger (Akai), Synth's, Sampler (Akai). **Monitors:** Tannoy Little Red's. **Specified outboard:** Boss multi effect Comp/lim's and gates: BBE Maximizer, Aphex Aural exciter, Master room reverb, Yamaha SPX 900, Yamaha R100, Lexicon LXP1, Beyer/Sennheiser. **Associated Member:** Owners: BRPG/APRS members.



## HOTLINE RECORDING STUDIOS GMBH.



Nordenstr. 30, 6000 Frankfurt/Main 1, Germany. 069 5970 168; Fax: 069 5532 01. **Owner:** Music Plus GmbH + Co. KG. **Studio/Bookings Manager:** Uschi Block. **No. of studios & dimensions:** studio 1 control room: 25 m<sup>2</sup> (daylight), recording room: 75 m<sup>2</sup>, Studio 2 control room: 27 m<sup>2</sup> (daylight), recording room: 25 m<sup>2</sup>, Studio 3 control room: 22 m<sup>2</sup> (daylight). **Mixing consoles:** SSL 4064 G-Series, Trident TSM 40/32/24, Trident 80 B 30/24/2. **Recorders:** Otari mtr 90, Otari mx-80 24/32-track. **Digital audio workstations:** hybrid arts adap II. **MIDI set-up:** Akai S1100, S1000, Microwave, Yamaha TG77, D50, Atari mega st 4 + notator, cubase, etc. **Monitors:** Yamaha NS 10M, Genelec 1019, Urei 815, Munro M4, Westlake. **Specified outboard:** 480 1, 224 x 1, PCM 70, AMS RMX, TC 2290 + fast trigger option, Yamaha SPX 1000, SPX 900, Rev 5, Rev 7, Eventide H 3500, H 910, EMT 240, Roland dimension D, various gates, compressors and delays. **A/V equipment:** Zeta three synchronizers. **Special services:** Inhouse engineers and producers.



## PUK RECORDING STUDIOS - DENMARK



Kaerbyvej 65, 8983 Gjerlev, Denmark. +45 864 74600; Fax: +45 864 74611. **Owner:** Peter Iversen. **Studio/Bookings Manager:** Peter Iversen. **No. of studios & dimensions:** 2 studios with 90m<sup>2</sup> Air- conditioned control room's - Studio have more than 140m<sup>2</sup> recording areas each. **Mixing consoles:** SSL 4064E with G-Series Computer and Trident TSM. **Recorders:** 2 Mitsubishi x-850, 2 Sony 3324's and Otari MTR 9011. **Digital audio workstations:** Fairlight CMI III and AMS Audiofile. **MIDI set-up:** Fairlight CMI III with Yamaha KX88, ATARI

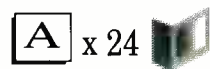
with Cubase and Notator software. Various Midi Synths and Equipment. **Monitors:** 2 x 4000 W Bruel & Kjaer Custom Build Monitors, Genelec 1031A, Yamaha, Auratones & JBL. **Specified outboard:** More than 25 Digital Reverbs including Lexicon 480L, 224XL and EMT 251 and plates. Eventide 2016 and H-3000. Tube-Tech EQ's & Compressors. **A/V equipment:** AMS Audiofile, LYNX, Barco Multisync Monitors. **Special services:** Very luxurious leisure & accommodation facilities. Daylit Control Room & Recording Areas, rates includes Digital Multitracks.



## PINK TONSTUDIO



Luzernstrasse 123, 4528 Zuchwil, Switzerland. +41 (0) 65 25 24 88; Fax: +41 (0) 65 25 30 31. **Owner:** Jurg Naegeli AG. **Studio/Bookings Manager:** Jurg Naegeli. **No. of studios & dimensions:** a) Studio 40m<sup>2</sup>, Control room 30 m<sup>2</sup>, c) ProTools & MIDI room 24 m<sup>2</sup>. **Mixing consoles:** a) Soundcraft 2400 28/24/2, Bargraphs, c) Yamaha DMP 11. **Recorders:** A) Otari MTR 90 MkII; Studer A 812, Dolby SR; Studer A 812 TC; Studer D780 DAT; Studer D 740 CD-Recorder; Sony & Tascam DAT's & Cassette's. **Digital audio workstations:** DigiDisign PROTOOLS. **MIDI set-up:** Akai S 1000 KB, 12 MB, HD; Emulator II; 2 x Emu Proteus 1; 2 x Emu ProCussion; Korg M1 & M1R; Yamaha DX 7; Roland JX8P & D110 & Juno 60; ARP Odyssey; Oberheim Matrix 1000; Hohner String Ensemble; Alesis HR 168 Atari 1040 ST, 4MB; C-Lab Notator; Mac Quadra; Opcode Studiovision. **Monitors:** JBL 4313; JBL 4315; Yamaha NS 10M; Auratones. **Specified outboard:** Lexicon 480L & PCM 70; AMS RMX 16; Roland SRV 2000 & DEP-5 & 3x SDE 2000 & Dimension D & PH 830 & SBF 325 & SVC 350 & 2x Chorus Echo; 3x Yamaha SPX 900 & 2x SPX 90; AMS dm 2-20; Eventide 910; DeltLab DL-2; SPL SX-2; Aphex Compellor & Dominator & Exciter III & C; Alesis Quadraveb & Midiv. III; Ibanez DM 1000; 2x DBX 160; DBX 120X-DS; SCAMP-Rack w. Comp., gates, param. EQ's, De-Essers & Drawmer gates; Klark Teknik graphic EQ's; Yamaha graphic EQ's; T.C. param. EQ's, Behringer Composer; a.s.o. **A/V equipment:** Sony U-matic Hi & Lo Band; Sony Monitors; Fostex Sync. Roland SBX 80 SyncBox. **Specials:** Bosendorfer Grand Piano; Hayman Drums; Hammond A 100 & L 100 with Leslies; selection of rare Gtr. - & Bass Amps & -Cabinets; selection of Gtr. - FX - Pedals.



## DOUBLEWTRONICS

Eugenio Salazar 42. +34 (1) 519 0566; Fax: +34

(1) 519 1496. **Owner:** Jesus N. Gomez. **Studio/Bookings Manager:** Regina Marfil. **No. of studios & dimensions:** 1 - 70m<sup>2</sup> (studio), 1 - 9m<sup>2</sup> (mastering suite). **Mixing consoles:** AMEK Custom G2520 W/Master Mix (48CH). **Recorders:** Sony PCM 3348 - MCI JH24. **Digital audio workstation:** (3) Mac II FX W/SD II (Sound Tools II). **MIDI set-up:** Two large systems to be described here! (emulpor II, III x P, Akai S1100, MP660, Yamaha...). **Monitors:** MDIN - Custom JBL 4435 (3 way-active) W/Crown AMPS (Macro Reference), Small - JBL 4401 - JBL 4412 - Yamaha NS10M (W/Crown DC 300). **Specified outboard:** Lexicon (224XL - 480 - PCM70 - etc) - AMS DMX 1580 - Eventide H3500 - Valley People (Ketex II - GAIN BRAIN - 610 MAXI Q - etc) - UREI - DBX - TC Electronics - KORG - Yamaha... **A/V equipment:** UMATICS, VHS, Color Monitors (Sony). **Special services:** Specialises in digital work. Mastering suite (PCM 1630 w/PQ for CD Prep.) **Association member:** AEGS.



A x 24 D x 48

## IMPULS RECORDING STUDIOS



Wittevrouw Straat 26/B-3020 Herent. +32 (0) 16 200003; Fax: +32(0) 16 290123. **Owner:** Stephan Kraemer. **Studio/Bookings Manager:** Stephan Kraeher, Iben Larssen. **No. of studio & dimensions:** 2 studios. Control Room (a): 20m<sup>2</sup>, control room (B): 35m<sup>2</sup> 4 Recording areas from 60m<sup>2</sup> to 12m<sup>2</sup>. **Mixing consoles:** A) SSL 4048 G Series, B) ADT Magnum 32/64. **Recorders:** Otari DTR900, Otari MX 80, Otari MX80, Alesis ADAT. **Digital audio workstations:** Akai DD1000. **MIDI set-up:** Cubase, Nota or sequencers. Akai S-1100, EMUIII, MiniMoog, Ensoniq EPS, Juno 60, DR4. **Monitors:** STAGE -Accompany SA Master 4549 (as main in both studios). Nearfields: NS10M Yamaha, KRK 9000, Auratones, Qusted. **Studio A: Console:** SSL 4048 G-Series. **Recorders:** Otari DTR-900 (32 Track digital), OTARI MX-80 (24 Track analog) linked by OTARI-Synchronizer. DAT Sony PCM-2500, Revox PR-99 2-Track, Cassette Sony TCWR870. **Monitoring:** Main: Stage-Accompany SA Master 4549 powered by 3 PPA -1200. Nearfields: Yamaha NS-10M or KRK-9000 or Auratones powered by Nikko Alpha-6. Headphones: Beyer and AKG powered by 3 NAD (3Stereo lines). **Effects:** Lexicon 480L, Lexicon PCM-70, Roland R-880, Eventide H-3000SE, TC Electronic 2290, Yamaha SPX-1000, Yamaha SPX-90, Korg SDD-2000, ART DR-1 Multiverb, Roland SRV-2000, Roland RSP-550. **Outboard:** Focusrite Preamp (stereo) and Compressor PSU120 + ISA 130 + ISA115, TUBEtech Valve-Compressor CL-1A, Summit Valve-compressor, Drawmer Dual-Compressor, Drawmer Dual-Gate 201 (2x), Valley GateX, ValleyPeople Stereo-Compressor 610, Aphex type B, Aphex Studio dominator, Klark Teknik Dual param. EQ. **Miscellan:** Alesis D4 Audio/Drum - Trigger, Sony CD-Player, Sony Turntable. **Studio B: Console:** ADT Magnum 32/48 fully automated.

**Recorders:** Otari MX-80 (24 Track analog), Tascam MS-16 (16 Track analog linked by Fostex-synchronizer, Alesis ADAT (16 Track digital) DAT Sony PCM-2500, Revox PR-99 2-Track, Cassette Sony TCWR870. **Monitoring:** Main: Stage-Accompany SA Master 4549 powered by 3 PPA-1200. Nearfields: Yamaha NS-10M or KRK-9000 or Auratones powered by Harman-Kardon. Headphones: Beyer and AKG powered by 3 NAD (3 stereo lines). **Effects:** Lexicon 480L, Lexicon PCM-70, Lexicon 224XL, Eventide H-3000S, Lexicon PCM-41, Yamaha SPX-1000, Yamaha SPX-90, Korg SDD-2000, ART Multiverb, Lexicon LXP-15 Roland Dimension D. **Outboard:** Summit Valve-Compressor, Drawmer Dual-Gate 201, JBL/UREI, Lim.-Compressor (2x), Aphex Type 111, Aphex Expander - Gate (stereo), BBE Sonic -maximizer, Roland SN-550 Noise-Suppressor. **Miscellan.:** Akai Audio/Drum-Trigger, Sony CD-Player, Sony Turntable, Roland Vocoder. **Specified outboard:** Lexicons, Eventide, Focurite, Tubetech, Summit, TC-Electronic, Yamaha etc. **Special services:** Housing for up to 10 people, private bars and TV lounge in every studio.



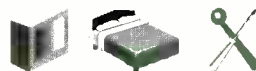
## ABBEY ROAD STUDIOS



3 Abbey Road, London NW8 9AY. 071 286 1161; Fax: 071 289 7527. **Owner:** Chairman, Ken Townsend. **Studio/Bookings Manager:** Colette Barber. **No. of studios & dimensions:** 4, Studio 1: 94' x 55' x 42'H, Studio 2: 58' x 37' x 28'H, Studio 3: 28' x 23' x 24'H, Penthouse: 20' x 20' x 9'H. **Mixing consoles:** Neve URP with flying faders - 64 channel SSL G series, with ultimation, 72 channels SSL 4000E W/G Series computer - 56 channels. **Recorders:** Neve Capricorn Digital Desk, Studer A820, Sony 3348, Sony 3324/A, Mitsubishi X880. **Digital audio workstations:** Sonic Solutions/Cedar. **MIDI set-up:** Atari 1040 with notator and cubase. Akai S1000's etc. **Monitors:** Studio 1 - B+W 801 series III, Studios 2+3 - custom built Qusted monitoring, penthouse - JBLs. **Specified outboard:** Wide selection of outboard gear and extensive range of microphones including many rare valve types. **Special services:** 35mm projection services. In-House engineers, accommodation, bar, restaurant, games room. CD preparation, DMM/Lacquer cutting. Realtime cassette copying, copying from all analogue & digital formats. Digital editing, Sonic Solutions/Cedar sound enhancement systems/ digital remastering, 3 x location recording units, film transfer. **Association member:** APRS, ACCORD.



D x 48 A x 48



## TURNING POINT RECORDING STUDIO

The Hall Farm, St. Nicholas - At - Wade, Birchington, Kent CT7 0PZ. 0843 43304; Fax: 0843 48028. **Owner:** Trevor Vallis. **No. of studios & dimensions:** One, Control Room - 70 Square metres, Studio: 31 Square Metres, Live Area: 100 square metres. **Mixing consoles:** Amek Angela in line 36 ch console. **Recorders:** Studer A800 24 track. Studer A807 Stereo. Sony PCM 2800. Technics & Nakamichi cassette recorders. **MIDI set-up:** Atari 1040 computer with C Lab notar software. Kurzweil MidiBoard S1000, Kurzweil PX 1000, Yamaha TX812, RTL Event Synchroniser, Sycologic M16 Midi Patch System. MIDI Tie Lines throughout studio. **Monitors:** Munro M4 Monitors with Carver PM1.5 AMPS (x5) with BSS crossovers. Munro M2 Mid field monitors with Adcom Amps (x2). NS10's with Yamaha PC1602 stereo AMP. **Specified outboard:** Lexicon 480L, Yamaha SPX 90II (x2), Lexicon LXPI(x2), BEL BD 805 St. Sampler/Delay, Alesis Quadraverb, Lexicon PCM 42. DBX & Drawmer Compressor/Limiters. Drawmer & Valley Gate Noise Gates. DBX DE-Essers. **Special services:** Yamaha Grand Piano, Hammond A100 (B3) Organ with Leslie speakers. Full Board Accommodation. Pick up from stations and airports. Arrangements can be made to fly direct by helicopter to the studio.

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MayFair Mews, 77 Regents Park Road, London NW1 8UU. 071 586 7746; Fax: 071 586 9721. **Owner:** John & Kate Hudson. **Studio/Bookings Manager:** Kate Hudson. **No. of studios & dimensions:** Studio1, Studio2 and Mews. **Mixing consoles:** SSL 4 & TRK and Neve VR60. **Recorders:** Studer - Sony - Otari. **Digital audio workstations:** Macintosh Pro Tools. **MIDI set-up:** Akai S1000. **Monitors:** Urei, Wellard, NSIO's Auratone. **Specified outboard:** ALL - Lexicon, AMS etc. **A/V equipment:** Umatic. **Special services:** CDI (CD Interactive) Sound & Video Recording and Filming. **Associate member:** APRS.



## MAYFAIR RECORDING STUDIOS LTD

11a Sharpleshall Street, London NW1 8YN. 071 586 7746; Fax: 071 586 9721. **Owner:** John & Kate Hudson. **Studio/Bookings Manager:** Kate Hudson. **No. of studios & dimensions:** Studio 1, Studio 2 and Mews. **Mixing consoles:** SSL 48 RS & Neve VR60. **Recorders:** Studer - Sony - Otari. **Digital audio workstations:** Macintosh Pro Tools. **MIDI set-up:** Akai S1000. **Monitors:** Urei, Wellard, NS10, Auratone. **Specified outboard:** All - Lexicon, AMS etc. **A/V**

**equipment:** Umatic. **Special services:** CDI (CD Interactive) Sound & Video Recording & Filming. **Association member:** APRS.



## CONDULMER RECORDING STUDIO/VIA ZERMANESE 1

Via Zermanese 1 - 31020 Zerman Di Mogliano V. To (TV) Italy. 041 457370; Fax: 041 457182. **Owner:** Monti E./Franchin S. **Studio/Bookings Manager:** Francesca Rottigni. **No. of studios & dimensions:** 2 Studios: "A" 80 sqm. "B" 25sqm. **Recording areas:** 2 x 100 sqm. **Mixing consoles:** NEVE V3 - MCJ JH636. **Recorders:** Mitsubishi X-850, Saturn 824. **Monitors:** JBL Custom - Urei 813. **Specified outboard:** Lexicon 480 - 300 - 70 - 60 - 42, Focusrite ISA 131 - ISA 115, Sony R7 - M7 -D7.



## KRAJBJERG STUDIOS

Sonderholmvej 15/DK 9541 Skodstrup, Denmark. 86 99 60 99; Fax: 86 99 69 88. **Owner:** Kim Merinert. **Studio/Bookings Manager:** Frank Poulsen. **No. of studios & dimensions:** 2 studios. 1. 24 traks, Digital, 16 traks, analogue. **Mixing consoles:** Tascam 600, B Studio, D&R 4000. **Recorders:** 24 tracks. A-dat, B studio, MS 16 Tascam. **MIDI set-up:** Atari. **Monitors:** JBL, Yamaha, Avertone.

## WERNER STUDIOS A/S

Rentemestervej 23-25, 2400 Copenhagen NV, Denmark. +45 3834 3405; Fax: +45 3834 3406. **Studio/Bookings Manager:** Henrik Nilsson. **No. of studios & dimensions:** Studio A - 6 x 8m + 6 x 20m + 6 x 4m. Mobil: 24 TRK Analog Caravan. Studio C - 2 x 25m, Control Room: 5 x 9.5m. **Mixing consoles:** Neve V48/48, Yamaha DMP=1000's, Soundcraft 800. **Recorders:** 3 x Sony PCM 3324, 1 x Otari MTR 90 MK II. **Digital audio workstations:** WaveFrames (2 pc.) **Monitors:** Munroe M3 Westlake BBSM8, ATC SCM 100/50 (Dolby surround) & various small monitors JBL/Yamaha and more. **Specified outboard:** State of the art outboard selection. and also old valve gear: Fairchild, NTP, EMT 250, EMT 140, etc. Great mic. Collection including - U67, M19, M50, U17, SM2C, KM254 and many more. **A/V equipment:** Studio C: Post Audio Studio, Dolby surround encoding, big front of desk screen, hard disk recording etc. **Special services:** round the clock maintenance. Digital Mastering: Sony DAL 1000/PCM/1630 etc.

## ANGEL RECORDING STUDIOS LTD.

311 Upper Street, Islington, London N1 2TU. 071 354 2525; Fax: 071 226 9624. **Owner:** James De Wolfe. **Studio/Bookings Manager:** Gloria Luck. **No. of studios & dimensions:** 2 studios - **Studio One Size:** Main studio Area: 867 sq. ft. / 80.5 sq. m. ISO 1 270 sq. ft. / 25 sq. m. ISO 2 162 sq. ft. / 15 sq. m. ISO 3 126 sq. ft. / 11.5 sq. m. ISO 4 262 sq. ft. / 24.3 sq. m. **Studio Three Size:** Main Studio Area: 1660 sq. ft. / 154 sq. m. ISO 1 60 sq. ft. / 5.6 sq. m. ISO 2 150 sq. ft. / 13.9 sq. m.

**Mixing consoles:** Studio One: Neve VR60, Studio Three: Neve V48, Flying Faders. **Recorders:** Ampex/Studer/Sony. **MIDI set-up:** Akai, Midi Patch Bay. **Monitors:** KEF/B+W/Tannoy. **Specified outboard:** Lexicon 224/480/PCM 70, K & H/Tubetech eq, Yamaha REV5/SPX 900/SPX90, Neve/Urei/DBX Compressors, EMT 140 Echo Plates, AMS/TC 2290 Sample RS. **A/V equipment:** Adams Smith 2600 Synchroniser Sony Pro Monitors. **Special services:** 1) 2 large recording areas, 2) Able to record direct to 35mm & 16mm.

## RIDGE FARM

Capel, Surrey RH5 5HG. 0306 711202; Fax: 0306 711626. **Owner:** Frank Andrews. **Studio/Bookings Manager:** Ann Needham. **No. of studios & dimensions:** 1 Studio - Main Room: 48 sq. metres. Booth 1: 20 sq. metres. Control Room: 23 sq. metres. Booth 2: 7 Sq. metres. **Mixing consoles:** Neve VR 60/Flying Faders. **Recorders:** 2 x Studer A800 MKIII machine room wired for all digital formats. Ampex ATR 100 1/4" + 1/2", Mitsubishi x .86. **Monitors:** Qquested Q 215; Dynaudio M2; Genelec S30 B, Yamaha NS10M; etc. **Specified outboard:** Dolby SR on all 48 tracks, wide range of outboard equipment, Comprehensive range of mics including valve mics. **Special services:** First class residential facilities with accommodation for up to 10 people. **Association Member:** APRS; UK Studio Accord.

   x 24

## PARKGATE STUDIO

Catsfield, Battle, East Sussex. 0424 774810; Fax: 0424 774088. **Owner:** Dan Priest. **Studio/Bookings Manager:** Dan Priest. **No. of studios & dimensions:** One studio/1200sq'-25'height/600sq' control room. **Mixing consoles:** Neve VR 60 - Flying Faders. **Recorders:** Saturn/Otari/Ampex/Sony/Panasonic. **Digital audio workstations:** Studer DyAxis. **MIDI set-up:** Cu Base/Atari/Akai S1000. **Monitors:** Genelec 1035A/KRK 900 MidField/AEI/NS10 Nearfield. **Specified outboard:** Lexicon 480L/224/PCM 70 x 3. Urei 1176 comp. Tubetech comp/EQ. AMS/1580ST. A3000SE. DDEE. Dynamite Gates. Drawmer M500. **Special services:** Residential Recording Studio with pool and



tennis courts.



## TOUCHDOWN - PORTUGAL



**For Bookings contact Touchdown Munich: Kirchberstrasse 25, D-8051 Kranzberg, Germany. +49 (0) 81 66 5071; Fax: +49 (0) 81 66 7033. Owner: Terry Drivas. No. of studios & dimensions:** Studio 1: Control RM 60m<sup>2</sup>, Recording Room 200m<sup>2</sup> with IDM ceiling. Studio 2: Control RM 60m<sup>2</sup>, Recording Room 75m<sup>2</sup>. **Mixing consoles, Recorders, Digital audio workstations, MIDI set-up, Monitors and Specific outboard** to be announced. **Special services:** The complex will house two impressive studios, 4 digital edit suites plus ancillary mix facility. Will offer full recording and post-production services. Fully residential, full catering plus option to self-cater, pool, jacuzzi, fully equipped gym, secluded beach, fabulous location. **Association member:** AES.



## TOUCHDOWN STUDIOS



**Kirchbergstrasse 25, D-8051 Kranzberg, Germany. +49 (0) 8166 5071; Fax: +49 (0) 81 66 7033. Owner: Terry Drivas. Studio/Bookings Manager: Anthony Morris. No. of studios & dimensions:** Studio 1: control room, 30m<sup>2</sup>. Recording room 85m<sup>2</sup>. Studio 2: control room, 35m<sup>2</sup>. MIDI room, 20m<sup>2</sup>. Digital editing suite(SSL) 30m<sup>2</sup>. **Mixing consoles:** Studio 1: Neve VRP-60 /with 12 stereo channels. Studio 2: Neve VRP-72. MIDI Room: 32 channel Soundcraft 600. **Recorders:** 2 x Otari MTR-100, 1 x Sony 3348 Digital, 1 x Mitsubish x -86 Digital 2 track, 16 tracks direct to disk, Numerous DATs. **Digital audio workstations:** 2 x SSL Screensound workstation with Soundnet, 2 x N.E.D. Synclavier Post Pro SD 6400. **MIDI set-up:** Wide range inc: EMU III Ex (8ms) with CD-ROM & MOD, Kurzweil 250, Kurzweil MIDI Board, Akai S-1000 (12 mB) with CD-ROM & MOD, Oberheim DPX-1 with CD-ROM; Oberheim Xpander, JL Cooper MIDI Patchbay plus a wide range of vintage & modern outboard expanders. **Monitors:** Control Room 1: Quested Q210 with 21" Subwoofer and Dolby surround. Control Room 2: Quested Q212 with Dolby surround/quested Q108. Assorted Nearfields including Yamaha NS10: JBL Control 5: Audix mm5, Westlakes. **Specified outboard:** Over 60 pieces including: 2 x Lexicon 480L; 2 x AMS DMX -15 2 x AMS RMX - 16, numerous Sony FX, 4 x TC

2290, Numerous Yamaha & Roland effects, Massenburg Mic Pre-Amp/EQ/ comp-Limiter. Tubetech Processors, Fairchild 670 Stereo Comp/Limiter, 2 x Neve stereo comp/limiter, Urei 1178. **A/V equipment:** 4 x Sony U-Matic Recorders/Players, 1 x Sony HDVS-10 UNIHI video recorder, 55" Sony HDTV etc. projectors system, numerous colour monitors. **Special Services:** Catering, Jacuzzi, heated swimming pool. Also access to one of the largest sound libraries currently available. HDTV facilities. **Association member:** AES.



## MASTERS STUDIOS



**Dreilindenstr, 42, CH-9011 St. Gallen. +41 71 255 666; Fax: +41 71 254 098. Studio/Booking Manager: Victor Waldburger. No. of studios & dimensions:** 2 Studios: Studio A: CtrR: 28m<sup>2</sup>, RecR: 75m<sup>2</sup> divided in 3 rooms by glass doors: Live-Room, Stone-Room, Dead-Room. Studio B: CtrR: 22m<sup>2</sup>, RecR: 35m<sup>2</sup> divided in 2 rooms by glass door: Live-Room, Flat-Room. **Mixing consoles:** Studio A: SSL 4048 G + Computer/Total Recall, Studio B: 36CH. & MasterMix Soundcraft TS 24. **Recorders:** 1 Studer A812 1/4", 1 Sony



PCM 7010, 1 Sony PCM 2500 2 x Studer A820-24 Tracks Dolby SR, 2 x Akai Adam 12 Tracks digital. **Digital audio workstations:** Digidesign Soundtools. **MIDI set-up:** Emulator III, Yamaha DX7, Roland D50, Minimoog, CD-ROM & SyQuest Soundlibrary with 4 Gb Sounds, Mac Iix with Performer. **Monitors:** Studio A: Andy Munro installed Dynaudio Acoustics M3 active System. Studio B: Andy Munro installed Dynaudio Acoustics M2 passive System. **Specified outboard:** Lexicon: 480L, PCM 70, Super Prime Time, Prime Time, PCM 60. AMS RMX 16, EMT 246, Yamaha: Rev7, SPX90, Eventide: H 949, 3000 SE, Drawmer Gates, Urei 1178. Tubetech: CIA, PE1B, Focusrite Rack: 2 x EQ, 2 x Comp/Gate/Deess, Neve Prism Rack, Valley People Rack. **A/V equipment:** Sony U-Matic. **Special services:** Inhouse Restaurant, Chalet for Accommodation (10 Pers), small lakes at the studio for swimming/Ice Skating. **Association member:** Action CH-Rock.



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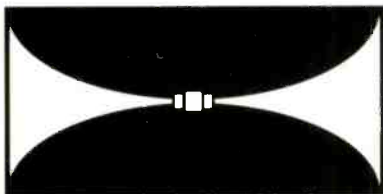
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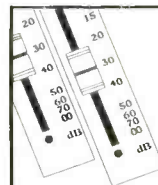
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One of my key strands of reasoning behind this column over the last year has been the intention to look at those areas of practical sound recording to which you will find few references elsewhere. I have often accompanied this assumption with the suggestion that some of these may be as important to the completion of a session (or to your career) as basic engineering skills. And behind my words lies a feeling that we should always be aiming to promote the professional status of the recording engineer.

There has never been a clear public image of what a Recording Engineer is. Neither, in fact, is there any real understanding outside of our industry as to the role of a Record Producer or any of the other 'key' creative roles. The recording industry has been appalling in promoting itself in a productive manner. The comedy stereotypes abound—of the overweight, cigar chewing record company boss; the fast talking, smooth acting Producer behind his dark glasses and of the 'boffin' Engineer with headphones clamped around his neck. And for many of the general public, these are the only images that exist. You and I may know better, but recent TV appearances made in the UK by top record business executives arguing the case for continued exorbitant CD pricing has just reinforced these caricature images for the public. We may be smug in our distance from these types but remember, indirectly it is these people who employ our talents and to whom we look for work. And I feel badly let down as their arrogance and conceit reflects on the whole industry.

On a more practical front, I recently spent some time browsing in one of London's larger record stores, and eventually found myself in the video department. The way that the companies in this area of entertainment release their product is an object lesson in knowing your market—particularly in the area of Laser disc. For many of the 'classic' feature films available, I was offered a considerable choice of alternative 'versions'. First, I could choose between PAL and NTSC video formats (and with that slightly differing programmes), the Restored Version (work done on print and sound), the Director's Cut (he or she was allowed to put back the 20 minutes previously cut by the movie company), the wide-screen



Keith Spencer-Allen

## on balancing stereotypes and the long slide into oblivion

version (that tries to maintain more of the original aspect ratio of the cinema presentation) and the Collector's Edition packaged with a second or third disc containing alternative endings, interviews with the director, cameraman and stars. To have to choose a single version of a favourite film would have been difficult—but I had the choice.

However, in the CD department I was brought back to reality. I found two CDs of material that I never thought would see CD release—rough soundtracks for low-budget films made nearly 20 years ago. They were mixed mono onto 7.5ips with no intention that they should ever appear anywhere except on the soundtrack. The CD release exposes all the deficiencies clearly: the primitiveness of the processing, lack of stereo and high noise level. Worse for me, my name has been retained as Engineer—something I can do nothing about yet reflects very badly for anyone not knowing the background to the recording. They do not even carry the 'This recording was originally made on analogue equipment...' disclaimer.

For me, these examples show opposite ends of the attitude spectrum. I do not know the machinations of the video business and maybe it is as bad as the record business, but it is something we could learn from.

For example, while the video companies have decided to exploit the creative variations possible in their products, there are few occasions where anything other than a single version of a CD is available. In the case of the above soundtracks,

none of the original contributors had been contacted to work on the rerelease even though a couple of hours work could have improved the product beyond belief—at least to stereo with a noise reduction of 15dB.

I acknowledge that, aside from this rather personal example, many original recordings are regarded as 'classics'—so don't touch them. Let's have a Producer's Remix instead. As most of the classic recordings are from vinyl albums, they invariably come in under 40 minutes, and the Remix could therefore appear on the same CD as the Classic version. Surely it would be worthwhile to experiment with a few releases—boxed sets boasting the meaningless 'Digitally Remastered' flash seem to have attracted a positive reaction so why not go further?

Any recording over ten years old would have had limited application of digital signal processing for reverb and other ambient effects. Recordings made in the 1970s were very limited by the available equipment—there were many times when we were left with a single echo plate for reverb and the end product was a total compromise. One gets itchy fingers at the thought of making those old recordings sound like we wanted them to at the time. Equally, there are other recordings I would like to remix as flat as possible from the multitrack so that there is a better master available than the dubious copy of a copy ending up on current releases. If we practice our craft wisely, everyone gains.

In the days when a Recording Engineer got his hands dirty, his role

and function were obvious. Even more recently, when operating levels and interfaces were not as uniform as today, the Engineer needed to understand why two pieces of equipment would not work together—and sort it out.

Thankfully such problems are largely a thing of the past and the role of the Engineer has changed. He or she has become more of an interpreter of artistic requirements through expert knowledge of equipment.

This is no lesser skill but it is different. It seems that now is the time that all those who work with changing technology need to redefine their job and then promote that role. Otherwise, it seems that technology and the industry will continue to marginalise key positions. Not everyone can be a Producer, and good creative people are still required in engineering roles. If, however, the status of the Recording Engineer should decline further, even the externally perceived glamour of the job will not be enough to attract the right people.

With no organisation to effectively represent the Recording Engineer, it rests with the profession itself, and this can be done best by developing our abilities and craft. The industry publications are also useful platforms for comment and I would encourage everyone to make more use of them.

I trust that this does not communicate itself as doom-laden prophecy; that is not my intention. It just seems to me as if, for once, the financial and business interests of the Recording Engineer, the recording studio and the record company might actually have the opportunity to get into step with each other.

For anyone interested in following up on matters covered in previous columns, I would like to bring two AES papers to your attention. The first is *New Aspects of Pop Measurement* by Kersten Tams of Sennheiser (AES Preprint 3235, Vienna March 1992) which details ways of measuring the effectiveness of pop filters and screens of all types.

The second preprint is possibly the shortest ever. *Hey, What About People? A 20-Year Study to Separate Engineer from Operator* by Scott Spain (AES Preprint 2881, New York 1989) is a short but fascinating attempt to express the role of Engineer and Operator in mathematical terms, and to differentiate between the two. It is a truly interesting approach. ■

# Dual Domain Audio Testing

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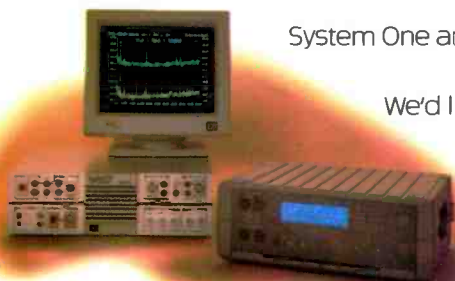
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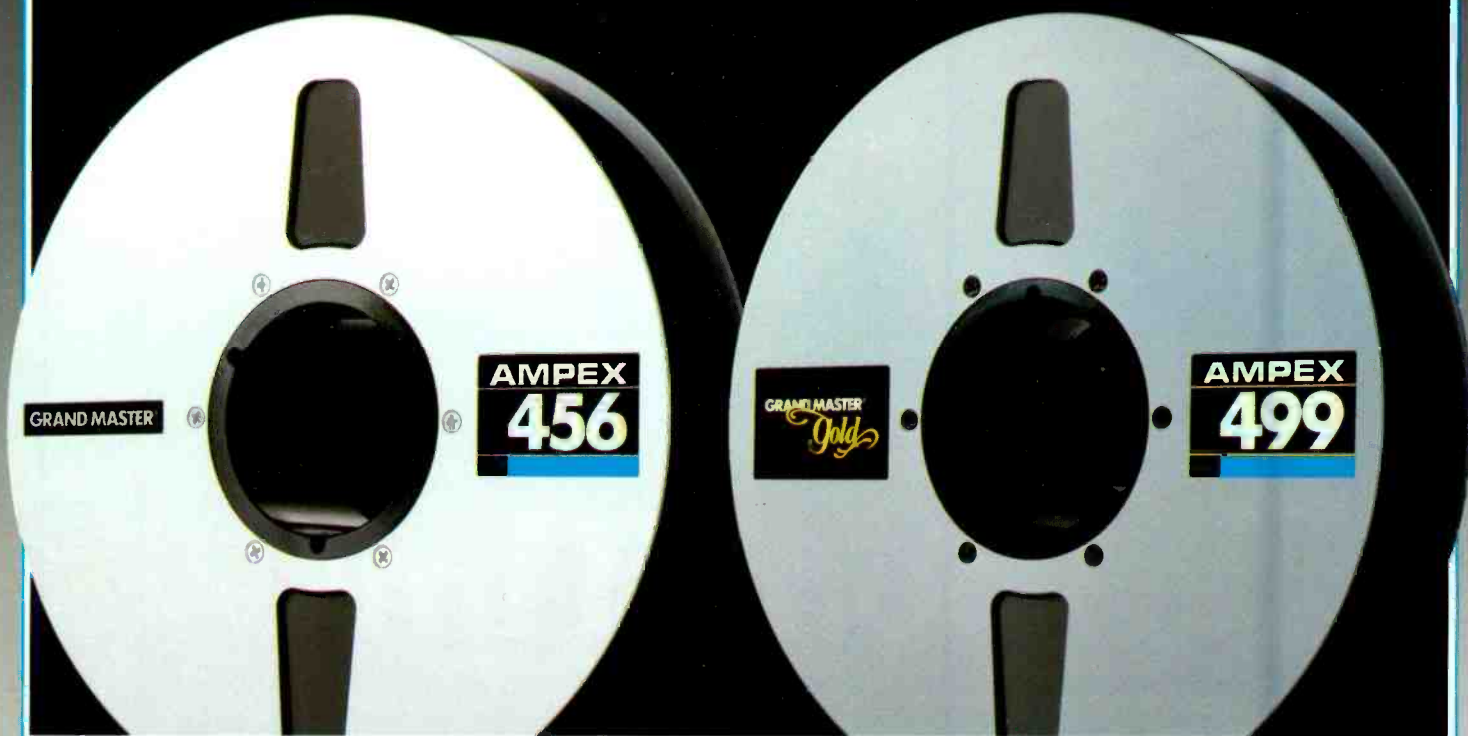
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