

APRIL 1997 \$5.75 £3

# Studio Sound

THE INTERNATIONAL TECHNICAL MAGAZINE FOR  
PRO AUDIO, POSTPRODUCTION & BROADCAST



**Critical listening test:**  
Linear digital recorders  
The Grammys  
and The BRITs



## SSL ALTIMIX

post system preview

## EXCLUSIVES

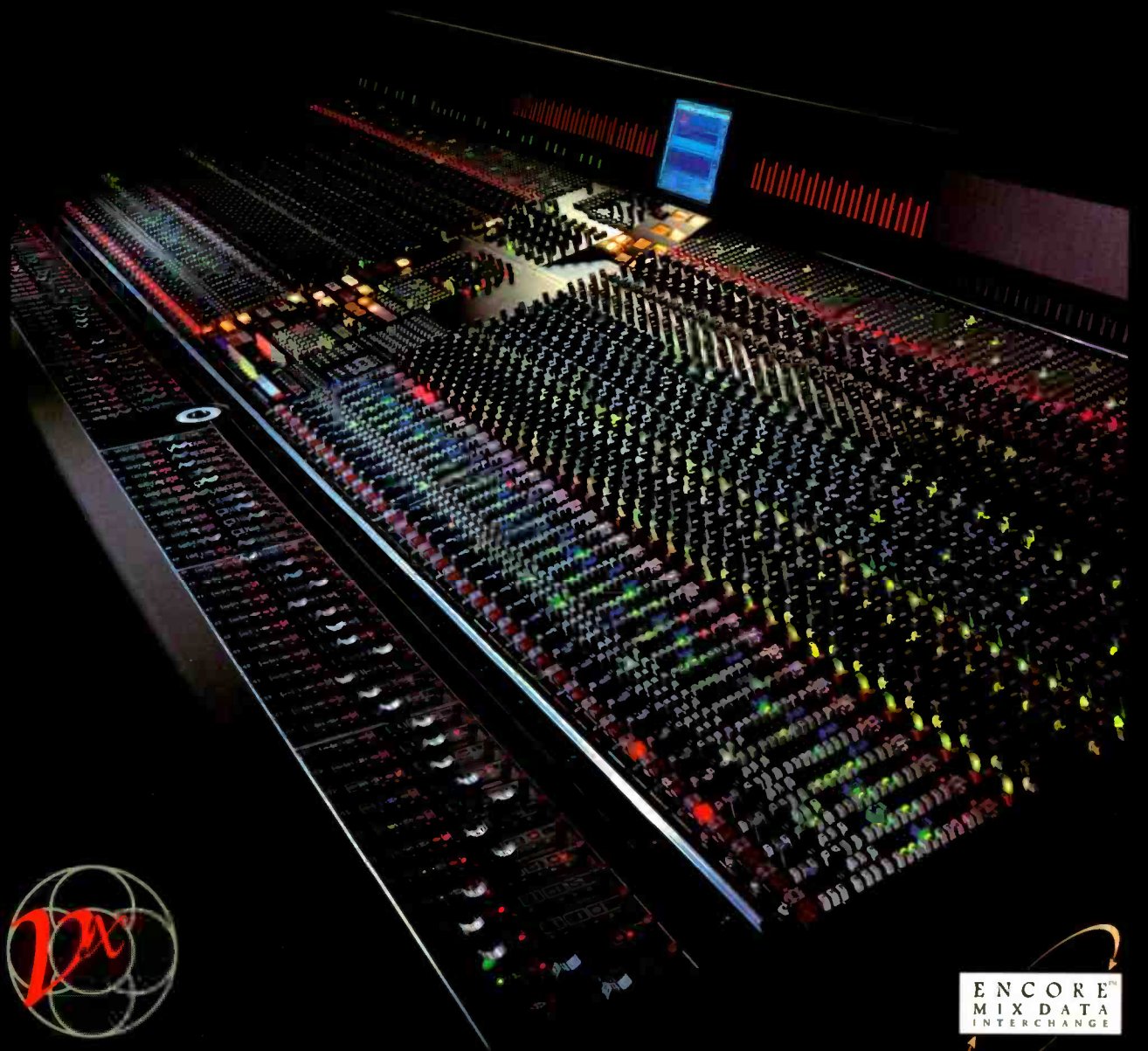
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LAFONT PANORAMIX  
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4

## Editorial

Informed editorial comment from the top

6

## Soundings

The one-stop pro-audio news shop

8

## World Events

Comprehensive and regularly updated

## Reviews

10

### Lafont Panoramix

French film console takes on the world

17

### Creamware

#### Tripledad 2

Hardware evolution prompts DAW solution

23

### Korg 168RC

Mixing to suit Soundlink and pro audio

31

### SSL Altimix

World preview of SSL's new digital post system

35

### New Technologies

The easy guide to new and updated gear

35

### LA Audio 4x4<sup>2</sup>

Attractive and effective dynamics processing



ABOVE: Soundtracs' flagship digital console meets the press in Preview

36

### Neumann TLM50

Mic masters play the classic card with new mic

38

### Smart C2

Compression with power and character

40

### Tascam DA-60 MkII

Popular DAT machine seeks more popularity

42

### Lexicon PCM80 cards

Lexicon's card trick updates the PCM80

44

### Motionworks R2P2

Simple but powerful studio machine control

46

### Preview

Early news of Soundtrac's most ambitious desk to date and the launch of the ADAT Pro

48

### Listen and learn

Studio Sound recently put the full range of tape-based digital recording formats to the ultimate test. Sony's PCM-3348, Nagra's 'D', Tascam's DA-38, Alesis' ADAT-XT and Sony's PCM-7030 compete for the favour of an exclusive panel of expert listeners

## Features

61

### Broadcast: BRIT awards

Bigger and better than ever, few continue to sneer at the production values of the premier British music back slapper. Kevin Hilton slips backstage to discover why

69

### Interview: Roy Halee

From the Sound of Silence, via that Bridge and onto Graceland with Simon and Garfunkel, Roy Halee talks to Richard Buskin

77

### Facility: Electric Ladyland

The spirit of Jimi is still strong in the studio he believed would

match his creativity. Dan Daley gets lost in a purple haze

85

### Broadcast: The Grammys

It's awards fever for the broadcasters. Tim Goodyer catches the red-eye to report on the show that all the others aspire to better

## Comment

98

### John Watkinson

The industry guru signs off his soapbox

100

### International comment

Dan Daley and Barry Fox file their copy

101

### Broadcast

Kevin Hilton faces severe censorship

## Technology

103

### NXT

Speaker technology under scrutiny

106

### Open Mic

Software claims equality with its hard cousin through Penny & Giles' Fred Hoare

BELOW: All hands to the deck for a decisive listening exercise at London's CTS studios



## Classic

THE WORD 'classic' is a curious one. It is now attributed to cuts of jeans that at one time were so classic that you couldn't buy them anymore, cars that you once wouldn't have accepted a lift on a rainy night for fear of being seen, songs that you never liked that much first time around but now remind you of your youth, and bits of gear that by some miracle roll off the production line with it built-in to the circuitry.

All these interpretations are partly correct but the true case for classic status lies in a combination of these elements. The trousers were right because despite the onslaught of fashion they proved in the end to be more timeless—you've never heard of a classic flare—and that car can indeed be referred to as a classic because the ravages of time and rust have made it rare enough in a world of sameness for someone to invest in keeping it on the road. The song is also important because it's still being played and everyone needs a historical backdrop to their lives, while the new classic gear qualifies by its use of tried and tested technology, albeit with an improvement in presentation, despite the onslaught of modern and supposedly better solutions. What they all have in common is longevity.

As the original pro-audio magazine, *Studio Sound* has been around longer than all the others and has been consistent in its relevance to the market it has served. It has been unswayed by short-term fashions, and remains rare in maintaining its editorial integrity in a world of advertisement-linked editorial. It has been the backdrop to everyone's career in this industry and continues to employ proven editorial techniques to get the information across. The presentation may change, you'll notice that the look of the magazine has been tweaked this month to better present the breadth of its content, but we'll continue to do what we know we do best. It's a classic.

**Zenon Schoepe, executive editor**

## Conversion factor

A LOT OF WORK went into coordinating the listening test that appears in this month's *Studio Sound*. A lot. In one of the many phone conversations both prior to and post the event itself, Prism Sound's Graham Boswell was moved to comment 'Don't forget to remind them that the number of bits is meaningless'. Although he subsequently qualified his remark as the worthy of 'tired old anoraks', it remains a valid observation and is sure to come back to haunt anyone rash enough to rate the number of bits quoted for any piece of digital equipment too highly in their buying calculations.

I feel confident that eventually we will have progressed sufficiently towards 24-bit, 96kHz audio recording that neither sample rate nor resolution will be an issue. Instead other, more useful, aspects of the performance will find themselves readily recognised. Eventually. In the meantime, quantum improvements in digital audio quality will continue to be made but they will be published in a marketing haze of misleading claims and carefully contrived spec sheets. The learning process for most end users will be slow and sometimes painful—and made more so by this background of disinformation.

It is against this background, however, that *Studio Sound* set out to assess the performance of a selection of tape-based digital recorders. The exercise is intended to serve a variety of audio pros in a variety of ways, one of which is to raise the issue of outboard conversion systems.

Although the session eliminated all the recorders' onboard D-As to allowed listeners to concentrate on the A-Ds, both stages of conversion can be critical—while a recordist's choice of A-D convertor is generally more consequential than that of D-A, a mastering house will make great demands of its D-As. Either way, it's pretty clear that the selection of convertor competes with that of many other stages in the signal path in importance. And so it is that we present subjective evaluations of these various systems previously only available to those who have auditioned them themselves. Now the results are yours...

**Tim Goodyer, editor**

# Studio Sound

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## Frankfurt—big and slick

**Germany:** If any overwhelming impressions persist in the minds of those who attended February's Musikmesse, then they are likely to be concerned with the exhibition's size, slick organisation and the sheer distances that have to be navigated in order to cover the event adequately. As everyone knows, the Frankfurt show has progressed and expanded since its days of school instruments and printed music although not at the expense of these stalwart areas which are now accompanied by dedicated sound and light halls among many others.

The Musikmesse is big, undoubtedly well organised and still in the ascendant although the clash in timing between it and March's AES Convention in Munich has probably been overplayed as both shows continue to address distinct types of attendee. Even so, the proximity of the two events, in the same country to boot, ought to be avoided in future, purely for reasons of logistics.

The piano hall still manages to generate the most unholy of dins with each keyboard being pounded by a stern-faced virtuoso, but for purity of theme Hall 8 took some beating. Combining a more traditional mix of sheet music, drum kits, some guitars, woodwinds, exotic and ethnic percussion, xylophones and assorted instrument spares, the atmosphere here was more relaxed than some of the more high pressure areas. It harks back to the music shows of my youth before fashionable guitar shapes, configurations and graphics and the 5-pin DIN took the whole party off in a completely new direction. Yes, the old days were really dull.

Frankfurt has always served as a platform for the Japanese giants to show off their technological prowess, and Roland put aside space for a behind-glass museum of its former glories. Yamaha was a little frightening, showing off a lightning fast tracking MIDI violin, a silent baby grand piano and of all things a "Silent Brass" attachment. Demonstrated fixed to the bell of a flugelhorn, the plug mutes the instrument's acoustic output but also incorporates a pickup, which, when combined with headphones and a digital processor, does for brass what the speaker simulator did for electric guitar amps. The belt pack controller can alter reverb and delay settings and mix in additional instrument feeds.

The show saw the unveiling of a number of new processors with an affordable tag. Focusrite had a dual compressor and limiter plus a Channel Strip box, while Drawmer weighed in with the MX30 dual gated compressor/limiter. BSS previewed the decidedly handsome Opal range which currently includes dual channel compressor and gate units.

Other notables included the regular demonstration, in reduced functionality it has to be said, of the Mackie digital 8-buss and Tascam's still unnamed digital desk passing audio on its stand. Sony released the Freedom series of affordable radio mics and some new DAT machines including the beautiful PCM-M1 portable DAT which it claimed was the smallest and lightest machine of its type.

Above all else it is the spirit of Musikmesse that endures as the show enjoys an overwhelmingly positive feeling. For this alone it will continue to grow.



▲ **US:** New York City's SoHo area has seen the arrival of a new mastering suite in Ground Zero. Designed by Tony Bongiovi, the new facility is the work of Zero Hour Records president Ray McKenzie and consultant Jimmy Biondolillo, and is reckoned to be the first step towards a serious multimedia complex including video editing and A-for-V. Ground Zero, US, tel: +1 212 343 0526

▼ **Spain:** A new mobile recording truck has hit the road—the Manor Mobiles' Manor 4 which has been specifically designed for the European market. The vehicle is based in Barcelona and will be managed by Marc Neuhaus, late of El Camion (now refurbished and running as Manor Mobile 3). Neuhaus cites the superior backup of EMI as a critical aspect of the launch. Manor Mobile 4, Spain, tel: +34 929 34 41 41. Manor Mobiles, UK, tel: +44 181 756 0660

## DT opts for Telemod

**Germany:** Deutsche Telekom, one of the world's largest companies and operator of most of Germany's transmitters, is to enable the use of audio processing equipment at its transmitter sites for the first time. Until recently, Germany's radio stations were only able to situate audio processors in the studio.

"Deutsche Telekom presents TeleMod as the cost-effective way to utilise the advantages of audio signal processing for VHF transmitters," commented Walter Sieberichs, product manager—FM & TV Transmitter at Deutsche Telekom. "The customers of Deutsche Telekom have the choice of installing their existing equipment at the transmitter or renting transmitter-located processors."

Initial trials conducted by Deutsche Telekom with the assistance of Orban's German distributor BCI have been pronounced a success.

"The siting of our Orban Optimod-FM 8200 at the transmitter using its composite output has transformed our sound completely," said Felix Konrad, chief engineer at broadcaster RTL. "There is absolutely no comparison to how we operated before, the sound quality and loudness has improved remarkably."

The change in practice has come about due to the enforcement of licensing restrictions by the Bundesamt für Post und Telekommunikation (BAPT) that stipulate that the maximum signal deviation is set at plus/minus 75kHz and that the ITU 412-7 recommendation for average modulation performance be met.

**Orban. Tel: +1 (510) 351 3500.**  
**Internet: www.orban.com**





## New THX certification

**US:** Video and television post operations have become the subject of Lucasfilm's latest certificates. Covering the performance of professional audio-video monitoring rooms, the new certification offers THX standardisation to audio editing, mixing, telecine, transfer and quality control for digital multi-channel AV entertainment.

The standards have been derived from those applied to THX mixing rooms and theatres and will oblige rooms to comply to technical specifications so accurate decisions can be made on both picture and sound during postproduction.

As well as assessing a finished facility, part of the certification process involves consultation with THX engineers on design, construction, selection of equipment and final testing. Following certification, annual testing is used to ensure consistency.

The new certification has already been granted to High Technology Video Inc in Los Angeles, and Twentieth Century Fox, All Post and Novastar are working towards their own certification.

**THX Division of Lucasfilm, US. Tel: 415 492 3900.**

**US:** Currently starring alongside Tom Cruise and Cuba Gooding in Tristar's *Jerry Maguire*, is a healthy selection of Telex headsets. Among the technical extras in the romantic comedy are PH-1 single-phone headsets, PH-2 intercom headsets, PH-87 headsets, Audiocom BP-100 belt packs and a broad selection of microphones. Telex Comms, US, tel: +1 516 8262



## BBC sets audio levels

**UK:** A recent statement from the BBC's Technical Development Group set out to clarify the Corporation's current stand on stereo audio levels and mono compatibility. Although well established within the BBC, the M3 convention is not a standard as such, and therefore presents potential problems to the rising number of external programme suppliers. Further, while the Group claims that while M3 does not present a problem to professional audio staff, automated play-out systems readily fall foul of mismatched audio if replay levels are not correctly set.

The statement begins by extending the Corporation's tolerance to include M6, the level of

which will be modified for transmission. It stresses, however, that it is essential to avoid confusion in the documentation of tapes and that correct line-up tones are used. For television, these must accompany the vision test signal and where a VT clock is used, tones should also be recorded between -20" and -10" with silence between -10" and zero.

Further information on the M3 and M6 tones, as well as mono compatibility is available from Andrew Morrison, Technical Investigations Manager RPR (tel: +44 171 765 5713) for radio enquiries and Laurence Tuerk, Head of Resource Strategy PMS (tel: +44 181 576 7381) for television enquiries.

■ **Shanghai TV** has recently invested in a Soundtracs Virtua digital console. The Virtua is equipped for 64-channel operation and will see service in Shanghai TV's music production work. The sale followed the Chinese broadcaster's introduction to the desk at the Broadcast China exhibition last year. **Soundtracs, UK, tel: +44 181 388 5000.**

■ **London's Abbey Road Studios** saw two Soundfield Mk.V microphones in use on a surround recording for the forthcoming film *Humoresque*. The mics were placed centrally both up and down stage and the B-format signal captured undecoded ready for editing by Classic Sounds in New York. Production formats will be 20-bit 5.1 surround and 20-bit stereo. Conducted by Classic Sound Inc's Tom Lazarus, the recording involved solo violinist Nadja Salerno-Sonnenberg and the 80-strong LSO.

**Abbey Road, UK, tel: +44 171 266 7000. Soundfield, UK, tel: +44 1924 201089.**

■ **The American Music Awards** broadcast put six live bands live to air with a combination of Audiotronics, Soundcraft and Soundtracs desks handling the 220 line inputs. The bands made diverse demands on both mix engineers and equipment, resulting in the use of Summit TLA-100A and DCL-200 comp-limiters on the vocals. **Summit Audio, US, tel: +1 408 464 2448.**

■ **Germany's WDR** state radio station has taken delivery of a further three Fairlight MFX systems, bringing its total to six. The two MFX3 Plus 24-24 and one 8-8 are for the station's new radio drama studios, the output of which is committed to CDR for broadcast. Audio Sonic's move follows that of other European operations: French post house Teletota installing a fourth MFX3, French state broadcaster TF1 taking its first FAME, Swiss Radio installing three FAME systems with a fourth on order, German BOA Video upgrading its MFX2 to MFX3 Plus level, Spanish Nisa Studios taking an MFX3 Plus and UK Zoo Studios post facility installing a customised FAME. **Fairlight, UK, tel: +44 171 267 3323.**

■ **A Detroit** concert by Aretha Franklin given last December provided the basis for a forthcoming live album when it was caught on tape by Randy Ezratty's Effanel Music mobile. Now equipped with an AMS Neve Capricorn digital desk (see the Grammys story in this issue), the mobile used an SSL G Plus with Ultimater and BASF SM900 analogue tape running at 30ips without noise reduction. **Effanel, US, tel: +1 212 807 1100. BASF, US, tel: +1 415 227 0894.**

■ **London's AIR** Lyndhurst Studios has invested in a second Sony PCM-3348 DASH multitrack machine. Since its relocation, the studio has expanded its traditional areas of operation from the popular and classical fields into music for picture work and broadcast. The purchase of a further machine is occasioned by repeated requests for the established PCM-3348. **AIR, UK, tel: +44 171 794 0660. Sony Europe, tel: +44 1932 816269.**

■ **Florida-based Telemundo**—one of America's largest Hispanic television networks—has ordered an SSL Scenaria with VisionTrack. Chosen to provide the required production capabilities and integration of audio and video control, the system will be used for audio-for-video production and is the first such to be installed in south Florida.

**Telemundo, US, tel: +1 305 884 9654. SSL, US, tel: +1 212 315 1111/+1 213 463 4444.**

■ **Belgium's Videopool** is the latest European customer for Graham-Patten Systems' DESAM digital audio unite mixers. The purchase of the DESAM 200 is a part of a concerted move into digital systems which also includes equipment from Abekas and Accom, and is part of the ongoing movement of European television broadcasters towards 16:9 aspect ratio PAL Plus working.

**Graham-Patten Systems, US, tel: +1 916 273 8412.**

■ **London** post facility De Lane Lea purchased two Akai DR16s with IB807V Superview graphic displays to accompany Steve Schwalbe's two new DD1500 workstations (which are installed at De Lane Lea) specifically for work on the recent Channel 4 television production, *The Fragile Heart*, the third series of BBC1's *Bugs* and the new *Crime Traveller* series. The DD1500s will serve track-laying and Foley duties while the DR16s will provide subsequent mixing.

**De Lane Lea, UK, tel: +44 439 1721. Akai, UK, tel: +44 181 897 6388.**

■ **China** Central Television continues its programme of investment with the purchase of over 100 Micron UHF portable mic transmitter and receiver systems from Audio Engineering. The new mic systems will be used by production and ENG crews and include TX503 hand-held transmitters, TX501 belt transmitters and camcorder-mounted SR520 receivers. The system also includes an 8-way MDS-2 modular diversity receiver system for studio use. Further investment from CCTV involves the installation of two Penny & Giles PP20 Microprocessor systems, along with PP20R remote controllers, for the broadcaster's postproduction processing requirements. The PP20 processors are running Studio Suite packages from P&G's Pythagoras audio software suite. Additional P&G kit supplied to CCTV includes an MM16 digital controller, giving real-time hardware control of a Soundscape DAW system.

**Audio Engineering, UK, tel: +44 171 254 5475. P&G, UK, tel: +44 1495 202000. Soundscape, UK, tel: +44 1222 450120.**

■ **British** recording complex, Strongroom Studios, has opted for Otari's RADAR workstation as its 'preferred' recording option. The decision accompanies the imminent construction of three new studio rooms to bring the facility's total to five along with numerous programming and production suites. In spite of the move to RADAR, Strongroom has retained its existing Otari MTR90 analogue machines. **Strongroom, UK, tel: +44 171 729 6165. Stirling Audio, UK, tel: +44 171 372 6370.**

## April

15-16

### Intranet

Olympia 2, London, UK  
Tel: +44 181 742 2828  
Web: <http://www.intranet-expo.com>

16-20

### NSCA

Charlotte, US

21-23

### Cable & Satellite 1997

Earls Court 2, London, UK  
Tel: +44 181 910 7884  
Email: [catherine.barrett@reedex.co.uk](mailto:catherine.barrett@reedex.co.uk)  
Web: <http://www.cabsat.co.uk/>

23-25

### Entech 97

Melbourne Exhibition Centre, Australia  
Tel: +61 2 876 3530  
Fax: +61 2 9876 5715  
Email: [julfus@conpub.com.au](mailto:julfus@conpub.com.au)

23-28

### International Electronic Cinema Festival 97

Montreux, Switzerland  
Tel: +41 21 963 32 20  
Fax: +41 21 963 88 51  
Email: [crawford@symposia.ch](mailto:crawford@symposia.ch)  
Web: <http://www.montreux.ch/symposia>

28-29

### 'The Measure of Audio' AES UK Conference

Baden-Powell House, London, UK  
Tel: +44 1628 663725

Fax: +44 1628 667002  
Email: [AESUK@aol.com](mailto:AESUK@aol.com)

## May

### Expo Comm Wireless Korea 97

Korea Exhibition Centre, Seoul  
Tel: +82 2 555 7153  
Fax: +82 2 556 9474

2-4

### Internet Live

Brompton Hall Earls Court, London, UK  
Tel: +44 181 568 8374  
Fax: +44 181 232 8288

2-4

### Internet World International

Olympia 2, London, UK  
Tel: +44 1865 388000  
Fax: +44 1865 7365 736354  
Email: [conferences@learned.co.uk](mailto:conferences@learned.co.uk)  
Web: <http://www.iwuk.com>

15-17

### Pro Audio Light and Music China 97

Beijing Exhibition Centre, Beijing, China  
Tel: +852 2861 3331

21-23

### MIDEM ASIA 97

Hong Kong  
Contact: Jane Garton, Paris  
Tel: +33 01 41 90 44 39  
Email: [jane\\_garton@midem-paris.ccmil.com](mailto:jane_garton@midem-paris.ccmil.com)

23-25

### Music Instruments Asia 97

### and Dance Tech 97

Singapore  
Tel: +65 337 5574  
Fax: +65 336 06239  
Email: [create@pacific.net.sg](mailto:create@pacific.net.sg)

## June

3-5

### REPLitech International

San Jose, California, US  
Tel: +1 609 279 1700  
Fax: +1 609 279 1999

3-5

### ShowTech 97

Berlin, Germany  
Tel: +44 171 486 1951  
Fax: +44 171 487 3480  
Email: [otsa@montnet.com](mailto:otsa@montnet.com)

4-7

### 4th Annual Latin-American Pro Audio & Music Expo Mexico 97

World Trade Centre, Mexico City  
Email: [chris@ssiexpos.com](mailto:chris@ssiexpos.com)  
Web: <http://www.ssiexpos.com>

7-10

### Nightwave 97

Rimini Exhibition Centre, Italy  
Tel: +39 541 711249.  
Fax: +39 541 786686.

24-27

### Exposhow & Pro-Audio 97

LENEXPO Exhibition Complex, St Petersburg, Russia  
Contact: Irina Neduma  
Tel: +7 812 325 6245  
Fax: +7 812 325 6245

25-27

### AES 8th Regional Convention 97

Sunshine City Convention Centre, Ikebukuro, Tokyo, Japan  
Tel: +81 45 939 7009  
Fax: +81 45 939 7091  
Web: <http://www.aes.org>

## July

1-4

### SMPTE 97

Darling Harbour, Sydney, Australia  
Tel: +61 2 9976 3245  
Fax: +61 2 9976 3774  
Email: [conference@peg.apc.org](mailto:conference@peg.apc.org)

14-16

### 9th PALA 97

World Trade Centre, Singapore  
Tel: +65 227 0688  
Fax: +65227 0913

## September

7-10

### PLASA

Earls Court, London, UK

8-11

### MIDEM Latin America & Caribbean Music Market

Miami Beach, Florida  
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# Lafont Panoramix

There is still a world of difference between a surround-capable music tracking console and a fully-fledged film console. **Patrick Stapley** finds a purpose-built film desk winning converts

**U**NTIL QUITE RECENTLY, Lafont Audio Labs was a largely unfamiliar name to audio people outside of France. But things have changed—and continue to change—rapidly for the Paris-based film console manufacturer which has not only reported record sales for the financial year, but also a huge increase in exports with a massive 80% of its output now going to North America.

'Up until 1994 we sold nothing outside of France apart from a few consoles to Italy,' says company founder, chief designer and MD Jean-Pierre Lafont. 'Despite a great deal of effort, it was very hard for us to get foreign business. I think people are suspicious at first of a console that is made in France—it's maybe like buying a car made in Africa, it has the wrong association. But, I believe if the product is right for the market and correctly priced, it will eventually be accepted. Where it is made then becomes completely irrelevant.'

With over 20 consoles now installed in North American postproduction and film studios, and enquiries growing all the time, Lafont can confidently rest his case. However, it is only comparatively recently that Lafont Audio's name has become associated with sound for picture. In fact, the company began in 1987 by building music consoles—it was five years later in 1992 that the switch was made from music to film studios, with a somewhat disillusioned Jean-Pierre Lafont admitting that the French music console market had become very, very difficult.

France, though, with its state subsidised film industry and prolific output of both feature and TV films, presented a ready-made opportunity for a home-grown manufacturer. And Lafont seized it. The company soon built a strong reputation, and today over 70 Lafont desks can be found in studios throughout France.

The current console range consists of five analogue models: the Chroma, HD-4, and Privilege film postproduction consoles; the Esterel for Foley and dubbing; and a small, LCRS rack-mounting, machine room transfer mixer aptly named the Transfer. In addition, Lafont makes a range of outboard equipment, including preamps, equalisers, dynamics processors and a telephone simulator, all of which have been selling well abroad, particularly into Hollywood where Lafont, with the aid of North American distributor Sascom, has been concentrating his efforts.

The latest development for Lafont Audio is a brand new console, Panoramix, which will be its most featured sound for picture desk to date, and as with other Lafont consoles, offered at a highly competitive price.

To give a flavour of the Lafont console range—both present and future—an overview

of Chroma is in order, followed by a look at Panoramix outlining the changes and additions that have been made.

The Chroma was introduced over two years ago as a hybrid console. Although a fully-specified LCRS postproduction board suited equally to rerecording and mixing, it may also be used for conventional music recording using a familiar in-line, 2+ bus architecture.

The desk is supplied in two frame sizes—40 or 64 channels—and there are three types of in-line I-O module available which can be mixed and matched to suit the client. These are a mic-line module equipped with a compressor, and dual line modules either with compressor or gate. The console also includes four stereo input modules-effects returns as standard with full access to console busing and simple fixed 3-band EQ.

The channel strip begins at the top with a 2+ bus routing matrix of 12 odd-even paired buttons. This is followed by sends to the eight auxiliary buses organised into three sections all with pre-post, chan-mon and on-off switching. The first section is stereo, sending either to Aux 1-2 or Aux 3-4, while the other two sections contain mono sends for the remaining auxes. Aux sends 7 and 8 may additionally be assigned to the 2+ bus matrix to increase the desk's auxiliary capability. However, this facility is directed more at music studios, and in truth is little used for sound to picture work where eight auxiliaries are considered ample. The feature has been removed from Panoramix.

Next down is the input section. Depending on module type, this provides input selection between Mic, Line or Bus, or Line 1, Line 2 or Bus. Bus enables the channel to operate as a subgroup with full facilities and re-routing options. Mic inputs offer 70dB gain, phantom power and 20dB pad—phase reverse is available on all selected inputs. Also included in this section is a LINK button that parallels the selected input to the right-hand channel, thus allowing different processing for scene cross-fades and so on.

**T**HE BUILT-IN DYNAMICS section (either compressor or gate) offers useful basic processing by controlling the main channel VCA. Using the fader reverse facility, dynamics may also be used in the monitor path; additionally a Source Reverse switch enables side chain keying from the non-VCA path.

High-pass and low-pass filters are included for dual line modules, but only a high-pass filter is available on the mic input due to space restrictions. Filters are continuous 12dB oct designs with in-out switching. A high-quality,



4-band equaliser provides broad ranging HF (800Hz–18kHz) and LF (35Hz–700Hz) with bell-shelf selection. Mid bands are parametric together covering 100Hz–7kHz with a Q range of 0.6–5. Gain is  $\pm 16$ dB and pots have a stepped action to assist working in the dark. EQ can be placed either in the channel or monitor paths, and there is a switchable channel insert point positioned directly after the equaliser.

Chroma features two main operating modes—Mix (stereo) and Matrix (surround). In straightforward Mix mode the desk behaves in the conventional multitrack sense whereby channel faders route to groups, are monitored (either tape or bus) on the small faders and fed via left-right pan to the main stereo bus. In Matrix mode a quad configuration is adopted such that groups 1-4, 5-8 and so on feed the LCRS bus with the channel pan controlling LCR and the monitor pan front-back. This arrangement can be repeated across all 24 groups thus enabling up to six LCRS stems to be set up for music, effects and dialogue sources.

Additionally, the monitors may be configured to provide 5.1 speaker selection with individual selector switches routing to L, C,



R, SL, SR, and SB (Sub Bass). This switching capability was a later addition, which explains why the routing buttons have been placed beside the channel fader rather than the small fader (the logical place to find them) due to space limitations.

Provision is made for interfacing surround encoding and mastering systems such as Dolby Surround, Dolby SR.D, and DTS. For use with 6-channel systems, Lafont offers a customised option which utilises a stereo aux send to feed the stereo surround channels.

Also with flexibility in mind, Chroma (as with previous Lafont film consoles) includes an ABC grouping facility for the monitor fader. This allows music, effects and dialogue channels to be arranged into respective groups and controlled globally from a central switching matrix. Each group (or all three) can be switched between bus-tape, muted and soloed. Of course, all these functions may also be performed locally.

Other central facilities include control room monitor source selection between stereo and surround monitoring plus five 2-track sources. The main monitoring level is normally calibrated to cinema listening levels of 85dB or 88dB, and the six speaker outputs may be

individually muted to allow for accurate setup. Calibrated listening can, though, be simply overridden with an Uncal switch allowing freely adjustable gain—additionally there are two alternative speaker circuits for nearfield monitoring. A selectable auto-mute facility is also included that cuts the monitors during machine wind-rewind.

**T**WO INDEPENDENT foldback masters enable source selection from aux buses, the mix bus or follow CRM selection. Simple talkback is provided with individual access to each foldback circuit, the 24-track bus and a direct output connector. The console's solo mode is switchable between AFL (level adjustable) and SIP, and there is a Split function enabling channel and monitor paths to operate independently.

The central section is fitted with six high resolution vu-PPM switchable bar graphs, and a patchable phase meter which can be either a needle type or optional scope type. Bar graphs are also supplied for the aux buses while channel metering may be either bar graph or mechanical vu. Other standard features include a comprehensive, vertical patch-

bay, and Optifile Tetra fader/mute automation—alternative moving fader systems, such as Uptown, are optional.

Of the 21 Chromas that have been sold, many have been specially customised, particularly to meet the demands of American post houses. As a consequence, Jean-Pierre Lafont has been keen to build-in as many features as possible to avoid the need for customisation with Panoramix.

'Customising desks is very time consuming and expensive,' he says 'So when I designed Panoramix I asked people what exactly did they want from a film console, and a lot of the new features have come directly from that feedback. However, the overall philosophy of the design is very similar to Chroma, although the format has changed. When I developed Chroma the format was LCRS, now it's 5.1 or 8 channel.'

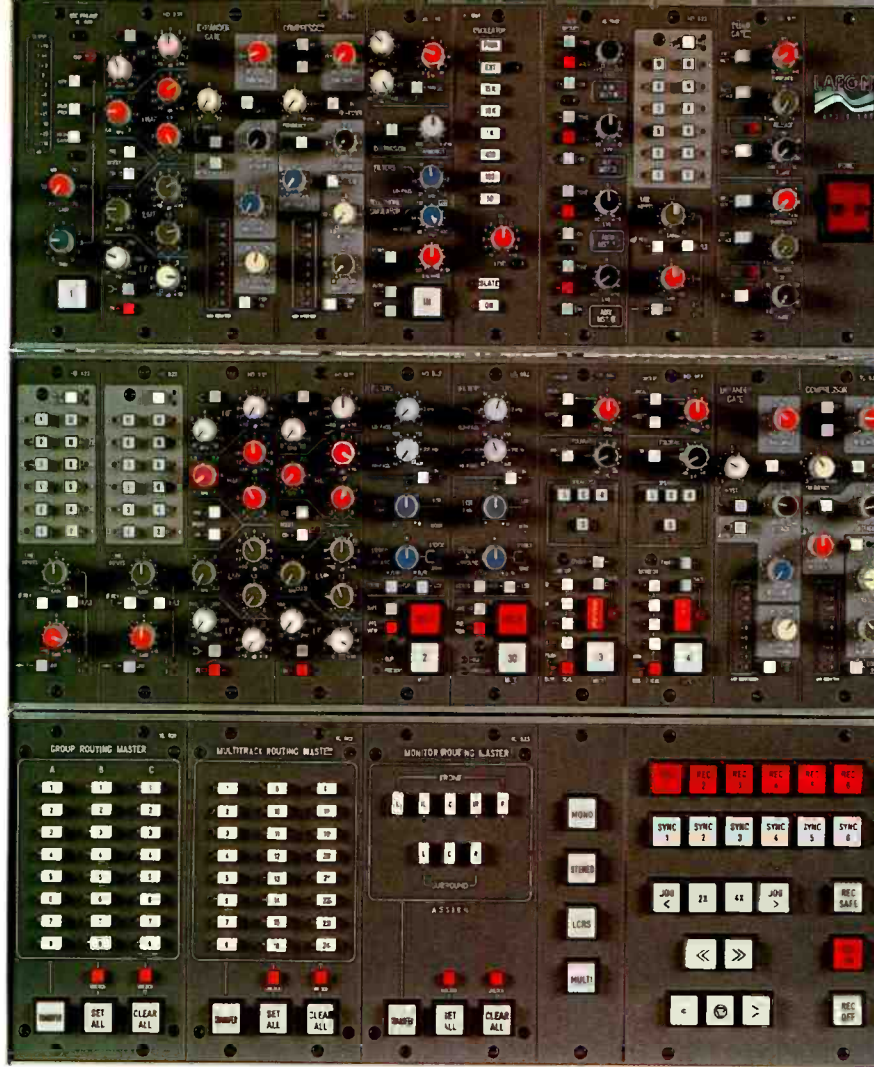
Another distinguishing factor is that Panoramix is not a crossover product. Gone are the music console features that were incorporated into Chroma—notably the removal of the stereo bus, fader reverse, Aux 7-8 assignment to the routing matrix, and key source select for the dynamics sections. It is evident that this is a much more focussed, sector specific console avoiding compromises.

Panoramix will be available in sizes ranging from 32 to 96 channels, using a frame about 1.5 inches deeper than Chroma to fit the longer modules. Currently there is just one type of I/O module available which is a dual-line input. This means that mic inputs have been relegated from the strip, and ancillary mic amps are now fitted into the centre section as required (4 being standard). The Input module uses the same compressor as Chroma although it includes a 5-segment LED gain reduction bar graph as opposed to a single LED indicator. EQ is identical both in terms of control layout and topology.

As the console is now a 6-bus design (L, C, R, SL, SR, SB) it has three pan pots: LCR, Front-Surround, and Surround Left-Right. The small fader can be used either as a monitor or as a second input to return stem feeds from sprocket machines. In the latter case the feed will be from the redundant line input and the monitor return becomes calibrated both in terms of level and speaker positioning.

Unlike Chroma, the speaker routing matrix is arranged beside the small fader, rather than the large fader (as described earlier) which obviously makes more sense. Monitor routing is now 8-channel (L, IL, C, IR, R, SL, SR, and SB) rather than 6-channel.

The same Master Bus-Film switcher panel is included although an extra group (D) has been added thus allowing four monitor groups to be set up (Dialogue, Music, Foley and Atmosphere). It's interesting to note that some American terminology has slipped-in here with the local selector buttons labelled as PD-A, PD-B..., where PD stands



<page 11 for Photo-Electric Cell (PEC) Direct. For multiple engineer applications, additional Master Bus-Film panels may be added to the console.

Perhaps the most marked change to the channel strip is group routing. Panoramix offers 32 groups—8 more than Chroma—in an unusual routing matrix that is divided into large and small fader sections. For the large fader there are six track assign buttons (L, C, R, SL, SR, SB) and four bank keys (A, B, C, D). Thus in 6-channel mode, all six track buttons are selected together with a bank making it very easy to send to 6-track machines.

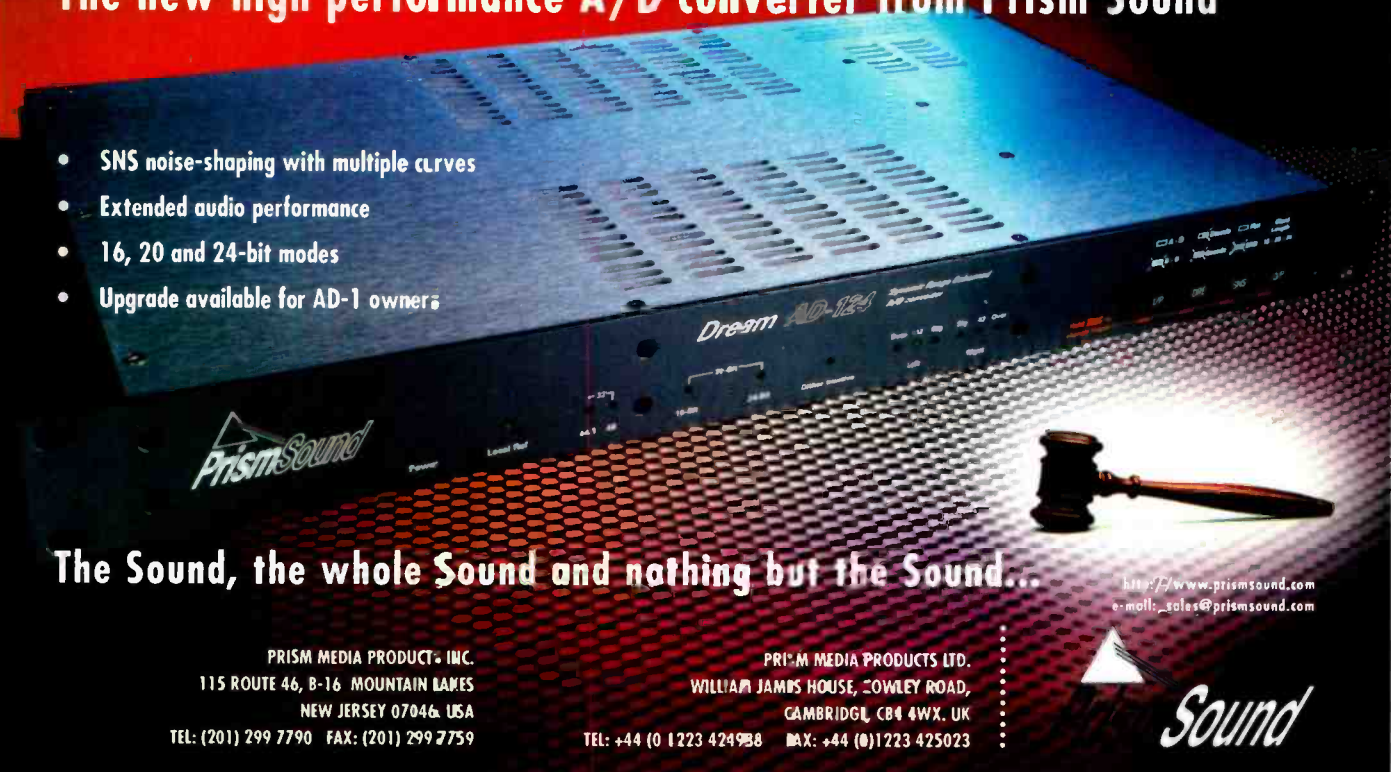
**A** FIFTH BANK is provided for the small fader which allows 8-track routing—however it is understood that a future option will also enable small fader access to the first four banks. To make correlation between tracks and banks a little clearer, the dual ballistic channel bar graphs (which can be switched between input and group) identify groups and 6-channel banks—for example, group 1=A1, group 7=B1, group 13=C1 and so on.

Again for multiple operators, the console can be fitted with special group splitter switching that allows each section of the console separate access to 32 buses, thus a three-man console could provide up to 96 discrete buses feeding three 32-track machines. Similarly, if the desk is fitted with additional Master Bus-Film switching panels, these may also be split between different >page 14

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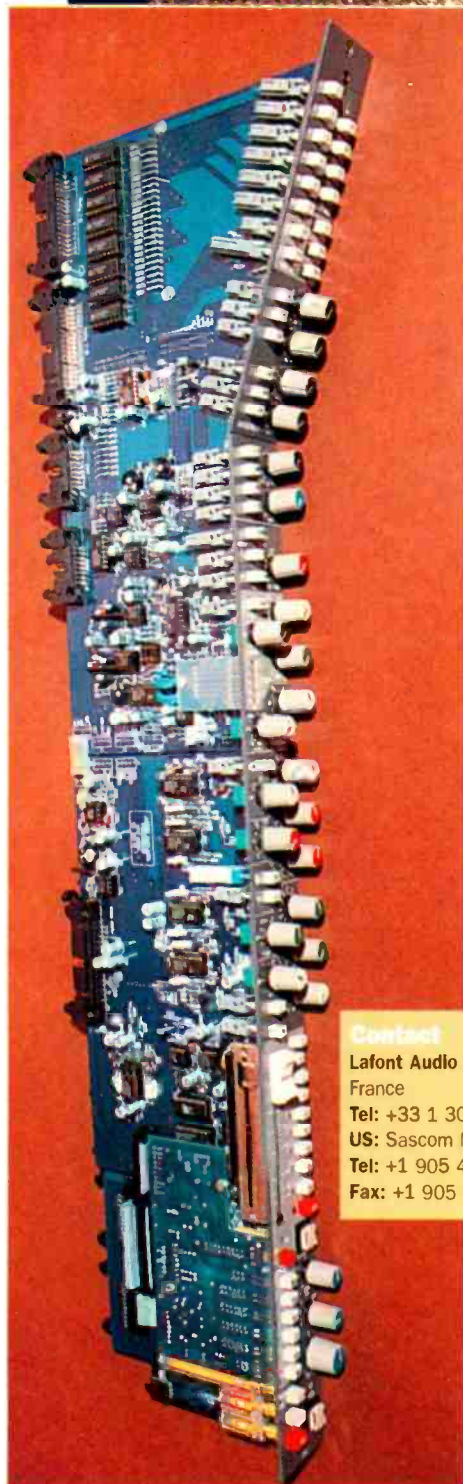


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The men of Merjthur Studios. From left to right: Thierry Lebon Studio director; Laurent Kossayan sound engineer; Bruno Mercere sound engineer; Franck Lebon sound engineer and Vincent Arnardi rerecording mixer



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<page 12 engineers rather than working in a console-wide sense.

Like Chroma, the new desk features stereo effects return modules. These can access the 32 groups either in 6-channel or stereo mode via an image selector that routes to the matrix in Stereo, Reverse Stereo or Mono. In 5.1 mode the signal is automatically spread across all channels relative to the image selection. Monitor routing is also included to the 8-channel speaker matrix. Auxiliary capability is the same as Chroma with two sends switching between aux 1-2 & 3-4, and 5-6 & 7-8 respectively, while the equaliser section has been expanded from 3-band to 4-band.

Other additions include an Academy Filter, pink noise generator, 2-way talk-back with hands-free operation, and Dolby-DTS bypass switching. The console also is supplied with Uptown automation as standard. Optionally available are joystick panners, track arming modules, and transport controls.

Panoramix is scheduled for release next month (May), and Lafont has just announced the first sale of a 72-channel desk to a well established postproduction facility in California which has already installed a Chroma. Other orders from Los Angeles and Toronto based studios are expected to be announced shortly.

According to Jean-Pierre Lafont, Panoramix is likely to replace the HD-1 and Privilege desks as it is more featured and less expensive. At pricing levels that are quite exceptional for the facilities on offer.

Panoramix will without doubt further boost Lafont's international profile, while maintaining the company's impressive sales performance for the future. ■

*Grateful thanks to Thierry Lebon, owner of Merjthur Studios in Courbevoie, for providing time out of a busy schedule for Studio Sound to view his Chroma console.*

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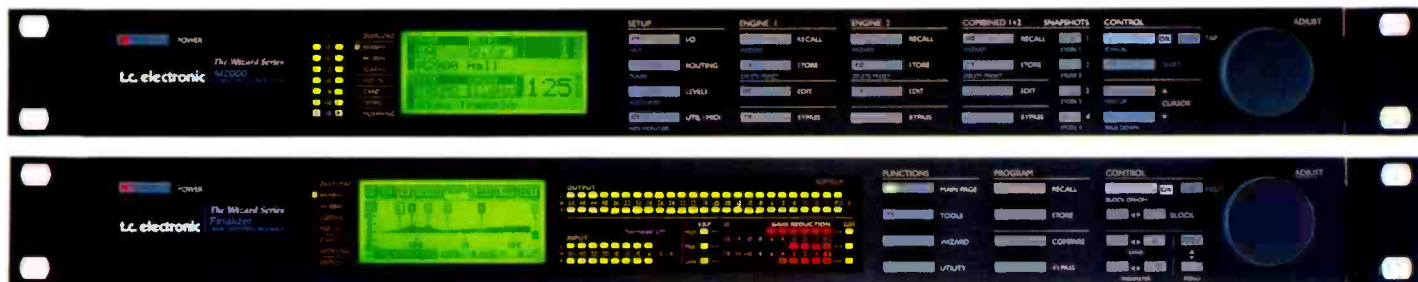
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# Creamware TripleDAT 2

PC power has reached the point where it can support a complete DAW system without the need for dedicated outboard hardware. **Rob James** looks at the next generation of audio workstations

**T**HERE IS MORE than one way to approach the challenge of designing an affordable Digital Audio Workstation. You can either build a machine from the ground up—complete with dedicated hardware and software—or graft audio workstation capabilities onto a personal computer. Until recently it was impractical to do the actual audio processing using a standard PC, since the hardware simply wasn't fast enough or capable of handling the data rates involved. Consequently, the two approaches shared certain similarities in that the audio processing was carried out by dedicated circuitry and DSP chips, whether these were part of a dedicated hardware system or an add-on to a PC.

The inexorable rise in speed and power of affordable PCs has changed the situation, however. Now, given a sufficiently powerful host computer, all that is required is suitable audio I-O and software. The advantage of the new regime lies in the relatively low cost of PC hardware over the older approach with its reliance on expensive short-run, purpose designed hardware. The old approach was also difficult to future proof making upgrades costly; this again is addressed through the use of a suitable PC. This then is the premise of TripleDAT. If the host PC has enough horsepower and bandwidth to process and store digital audio why add more?

The package consists of a half-length ISA card, the TripleBOARD which provides two channels of digital and two channels of analogue audio connections, plus optical digital I-O, MIDI and an infrared remote to control DAT machines. The software is keyed to the board, but the board can be used by any Windows MPC audio and or MIDI-compliant application.

The software provides the usual recording and editing facilities with some highly desirable extras. Included is a suite of plug in DSP modules called WaveWalkers. TripleDAT has red book CD-R writing capabilities and supports a wide range of drives. The bonus here is a streamer application which is used to backup material to DAT—this function is not restricted to audio but also provides a means of backing up a PC's data files. This last was a DOS application but has now been given a friendly Windows front end. As with CD-R a wide range of machines are supported.

The display follows usual windows practice—multiple resizable windows with part of the application in each. The track display can be blocks with sample names or with waveform, although there is a processor overhead if this option is chosen. Similarly, the cursor can be moving with the tracks static or the cursor fixed with moving tracks.

In the TripleDAT system, each chunk of raw audio is termed a Sample and may be in either mono or stereo. Samples are placed into

an Arrangement in the Arranger window. Samples used in an Arrangement must be at the same sampling frequency—48kHz, 44.1kHz and 32kHz being supported. Off-line sample-rate conversion is provided and fades can be added to Samples extremely quickly and intuitively by simply grabbing a small box at either end of a sample and dragging with the mouse. Editing can be achieved very quickly even while material is playing. Crossfades with a variety of curves including equal energy can be made where Samples overlap within tracks.

For more comprehensive attention, Samples or sections of Samples can be brought down into the Cutter display where they can be edited down to sample level. Envelope adjustments can be applied to both volume and pan and using the envelope feature it is possible to completely alter the dynamic of, say, a voice-over in a different way to using conventional dynamics processors. For example, if you have a voice-over from an amateur artist which drops in level at the end of sentences you can make it sound almost professional without introducing unwanted artefacts. Powerful refinements of this feature allow adjustment of volume curve between points and a group of points can be selected and adjusted together.

Audio scrub is obtained by holding the computer's Control key and moving the mouse while a region is selected for looping

in the Cutter. In my experience, once operators are familiar with waveform editing they seldom, if ever, use scrub.

Looping is an intrinsic part of TripleDAT both to extend samples and as a working tool whilst editing or equalising. For music the grid, in beats-per-minute, makes looping a doddle.

Now, given a sufficiently powerful host computer, all that is required is suitable audio I-O and software. The advantage of the new regime lies in the relatively low cost of PC hardware

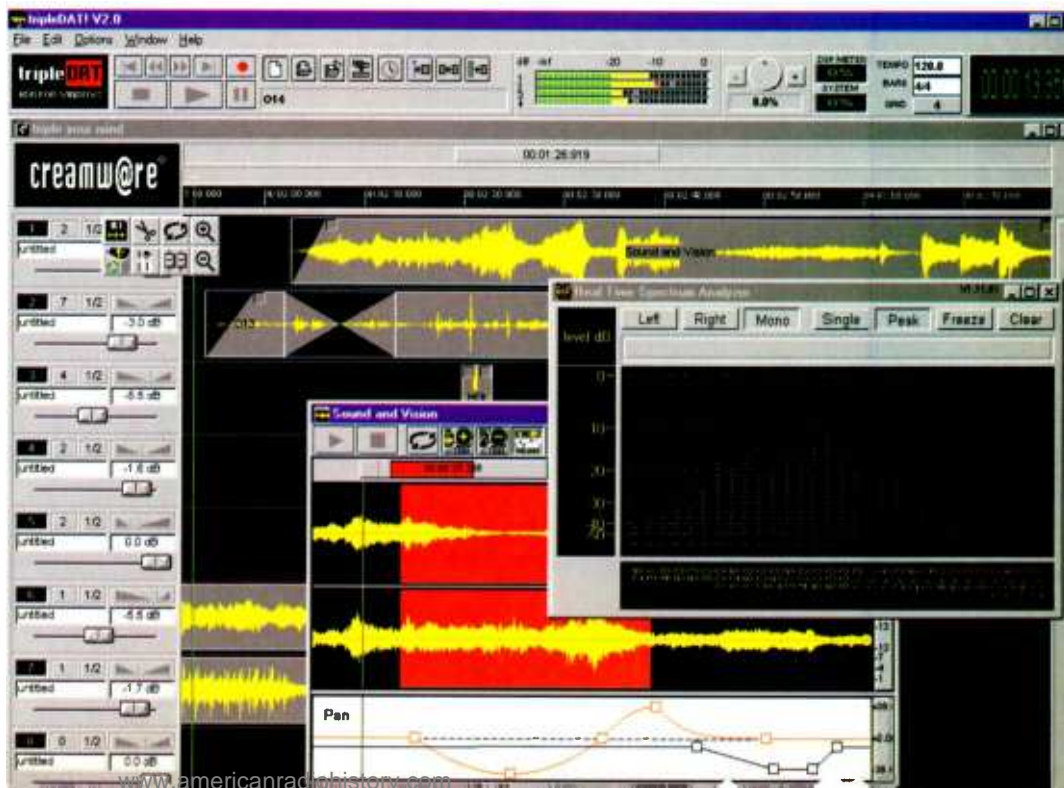
A new multitrack virtual mixer can be opened in its own window with faders, pan pots, aux sends, master and aux return. Plug-in effects can be inserted in the channels or the aux. The mixer can be used for simple balancing, or to bounce down or merge tracks to a new sample.

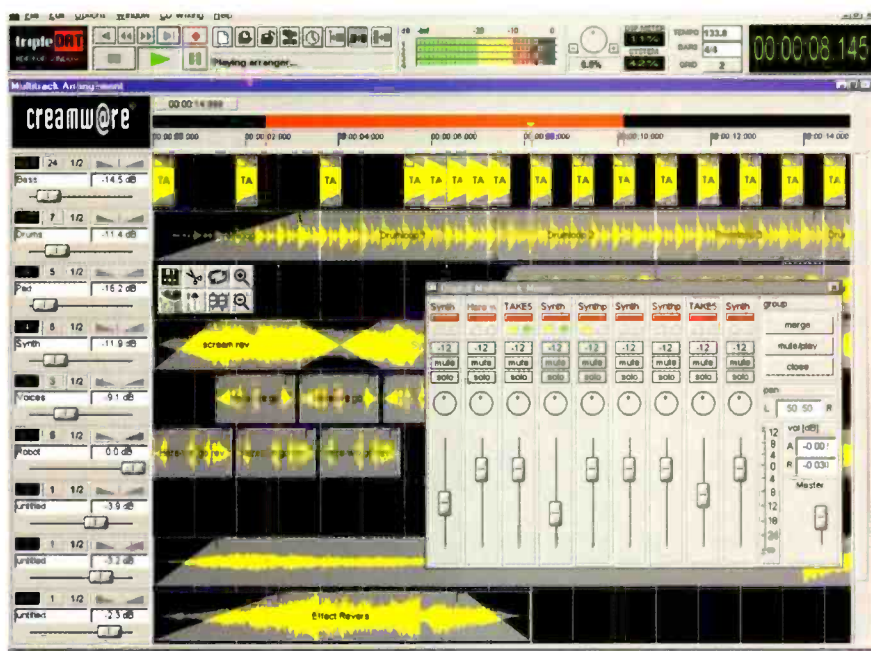
In addition to rodent control, there is an extensive range of keyboard 'shortcuts' most of which are pretty intuitive—Enter plays the arrangement Space stops and 'M' marks.

An unusual feature of the system is the ability to use it as a real-time processor, called Warp mode in Creamware parlance.

The DSP modules supplied offer four band parametric EQ, dynamics, spectrum analyser and correlation, time domain effects including a comprehensive delay and a room simulator. Correlation is worthy of note as it not only provides a simulation of an LED strip from mono to 180° out of phase but also a stereo vectorscope display which shows the distribution. Once you have learnt to interpret this, it gives far more useful information than a simple correlation meter or M&S PPM.

The DSP effects can be used in a >page 18





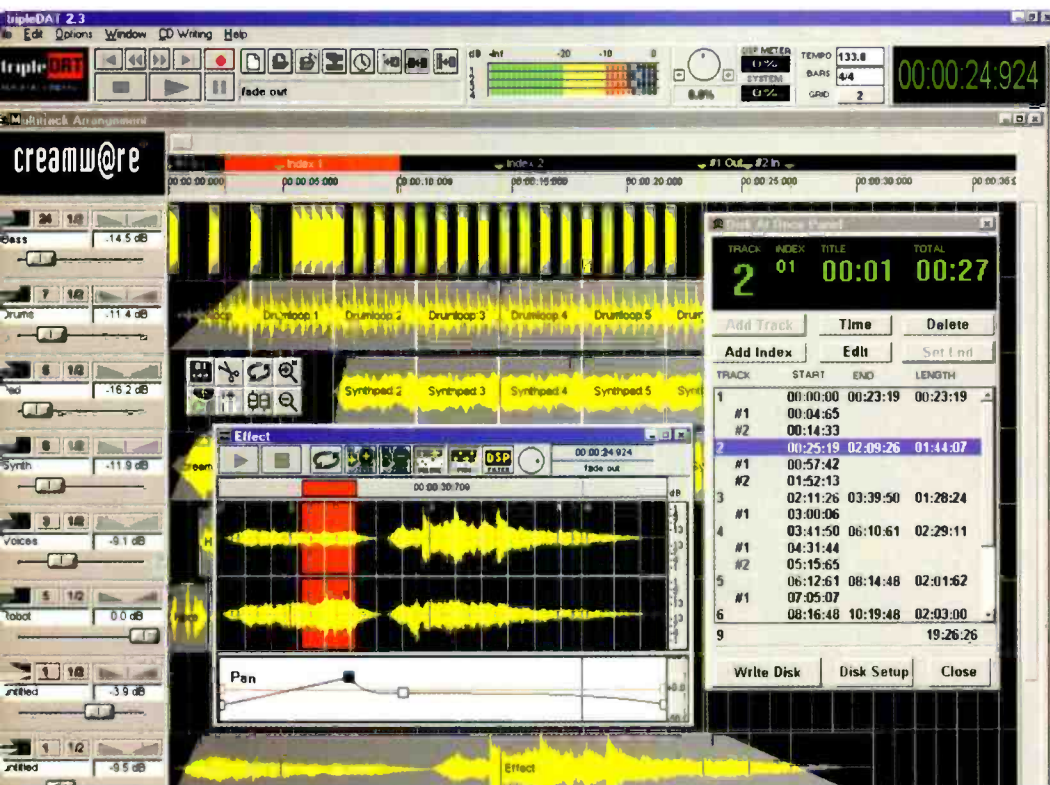
>page 17 variety of ways. They can be applied to samples in real time or new samples can be written with the processing built in. The DSP effects can use a lot of processor power in real time. In order to maximise the number of simultaneous tracks available for processing applied is a good option and is non-destructive to the original sample.

**S**oftware updates to Triple DAT are free, and there are further plug-ins available but at extra cost. The first of these to be released is the Firewalker suite which has an 8-tap chorus, flange and phase module, 8-band parametric EQ, a signal generator and ring modulator, dynamic transposition, metering and an FFT analyser. The modules are attractive in appearance and function effectively.

Just released is suite of plug-in modules providing de-noise, de-click, de-crackle and an 'X-citer' with sub-bass enhancer. The de-click and de-crackle module is controlled with three on-screen sliders with a variety of selectable recognition and re-construction parameters. The processes can be monitored audibly in real time, bypassed to check the effect, or you can listen to what is being removed—this is very useful when setting up. There is a Statistics window which gives a read out of clicks per second removed, crackles per second removed and the totals.

The De-noise module is of the 'noise profile' variety. Some sample profiles are provided or you can use a 'fingerprint' sample from the material. Profiles derived using this method can be saved for future use. On a fast machine stereo processing can be done in real time. This is a processor intensive activity so a better procedure is to fine tune the process in real time and write the processed material to disk off-line. A Spectral Analyser is provided to evaluate the effect together with similar monitoring options to the De-click module. The other parts of this module are the X-citer and sub-bass enhancer. Both of these work by adding harmonics to subjectively enhance the sound.

This is a powerful suite of tools, capable of highly impressive results. Like any powerful process it is possible to overdo it and produce a ghastly noise. It needs to be used intelligently and with sensitivity for the original material. On short acquaintance it will amply reward the time spent learning to >page 20



# Akai digital is the answer, what was the question?

Is there an affordable digital MTR that syncs to anything at any speed with instantaneous lock-up, has proven reliability, records on random access Disks, is compatible with a wide range of products and conforms entire programs in seconds?

There is now, the Akai DD8. A self contained 8 track disk-based random access digital recorder which can replace existing tape or mag machines in any film-dubbing or television production environment. It uses an uncompressed 16-bit linear format and records to a user choice of Magneto Optical or removable Hard Disks.

Akai introduced the World's first audio editor using M/O storage in 1990 with the DD1000, and the mighty DD1500 16 track Digital Audio Workstation is probably the world's fastest system available, with zero loss editing via fast dedicated buttons, digital mixing and EQ and a beautifully clear on-screen display. Now shipping with two years worth of software development including the unique EDL package which allows conforming of EDLs from tape or even from Akai project disks; with this amazing feature the DD1500 can conform entire programs in an instant from studio recordings or rushes on disk. Since 1994, the entire product range has been gradually expanded to provide a family of compatible products, tried and tested. A worldwide digital standard.

The latest addition, the DD8, is the perfect ultra-reliable tool for all professional sound recording requirements without the endless frustrations of tape transport limitations. It's ideal for syncing rushes, recording footsteps, foley or ADR, pre-mixing or mastering: in fact any recording task. It will synchronise to bi-phase or timecode in any direction or at any speed (including slow-motion). It can be fully remote controlled via GPIO or RS422 or even the legendary DL1500 system controller. Tracks can be slipped, nudged, and of course there is full audio scrub.

A single DL1500 can control up to 16 Akai digital units (any combination of DD8, DR8, DR16 or DD1500) via Ethernet. With a DL1500 functioning as its front end, the DD8 offers our full EDL autoconform package and much of the extensive editing capacity of the mighty DD1500 DAW at an extremely affordable price level.

The DD8 TDIF I/O option along with the analogue i/o (balanced on a DSUB connector) allows direct replacement of existing digital MTRs; and being disk based, the DD8 provides freedom from slow, inflexible operating methods and high maintenance costs. The DD8 in fact offers the ultimate flexibility of disk interchange without restriction, giving the freedom to take a disk from a recording stage to a sound editing suite, and from a sound editing suite to a dubbing theatre, at any stage loading into any compatible Akai unit. No time consuming transfer of audio from one media format to another, thus cutting hours from the work schedule. For those preferring to edit using computer based systems, Akai has worked with Grey Matter Response™ to provide DD8/DD1500 support in Mezzo Interchange for Macintosh™ allowing bi-directional conversion capability between Akai and any OMF-compatible DAW. Any conversion between the two formats will also incorporate all new edits in an updated file.

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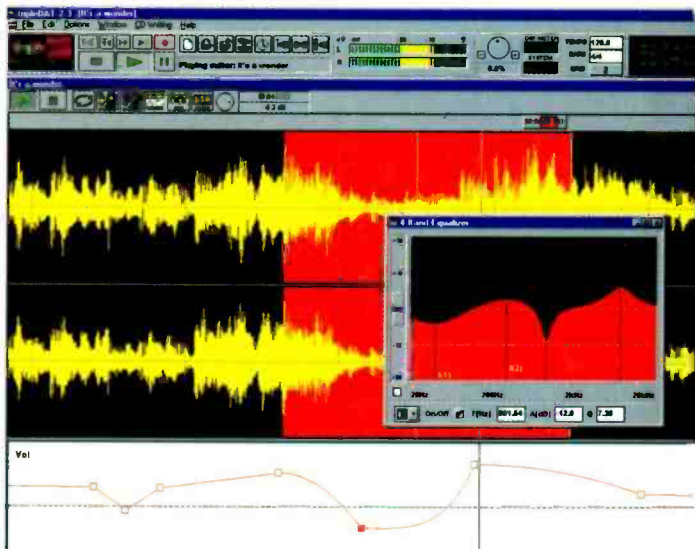
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The caveat with this approach to DAWs lies in the host PC. If you install TripleDAT on a 200MHz Pentium with a fast SCSI Winchester disk system and plenty of RAM, you will have a fast DAW capable of running perhaps 16 stereo tracks



> page 18 use it properly.

Tripledat is well suited to compilation, editing and mastering of material onto CD-R. CD-R writing can be either Track At Once (TAO) or Disk at Once (DAO). If writing DAO, PQ information can be dumped as a text file and printed from a word processor.

The system is currently finding favour in local radio as a fast editing system for news and so on. Synchronisation for music or Sound for Picture uses, as master or slave is accomplished via MIDI Time Code (MTC).

The TripleDAT software can co-exist on a PC with MIDI sequencers such as Cakewalk and also has the useful ability to load and run a completed MIDI file which saves cluttering up memory running a full sequencer. In addition to its native format

TripleDAT can import and export .WAV files.

Consequently, I'm writing this with TripleDAT happily playing audio in the background on the same machine as is running the word processor—I wouldn't recommend doing this on a serious basis but it is a good indicator of the stability of the software.

The caveat with this approach to DAWs lies in the host PC. If

you install TripleDAT on a 200MHz Pentium with a fast SCSI Winchester disk system and plenty of RAM, you will have a fast DAW capable of running perhaps 16 stereo tracks, depending on the real-time DSP functions you need to run at the same time. A properly configured 90MHz Pentium should give eight stereo or 11 mono audio tracks. Install it on a PC with a slow processor and IDE hard drive, and performance will disappoint. The attraction lies in the fact that

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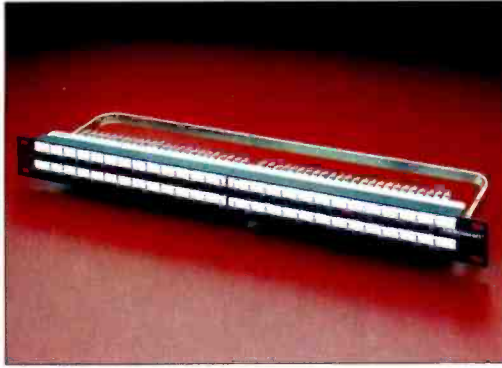
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a fast PC with a decent SCSI hard disk and 17-inch monitor can now be secured for around £2,500 (UK) and PC upgrades are almost invariably cheaper than dedicated hardware. This represents a lot of bang for the buck—or kick for the quid.

For those who want still more,

Windows NT drivers are in development. These will enable the use of multiple-processor PCs to greatly enhance performance at relatively low cost. If the 16-output version, Audiobahn, announced at the Frankfurt Musikmesse lives up to expectations, Creamware will consolidate their position as a serious alternative to considerably more costly DAWs.

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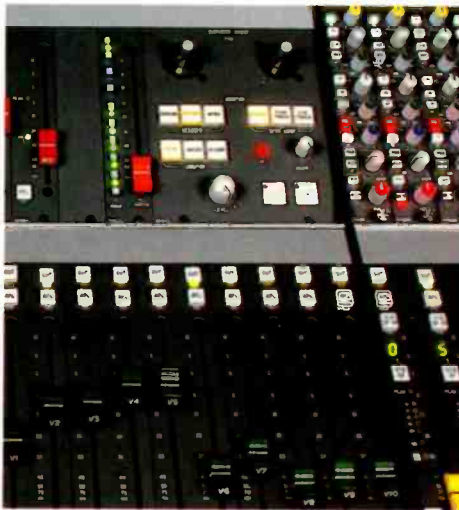
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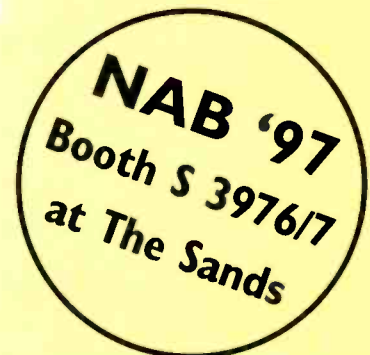


## Calrec S<sup>2</sup>



## Surround

Calrec S<sup>2</sup> 60 Channel Surround Sound Console supplied for Game Greek USA mobile.



# Korg Soundlink 168RC

Having avoided both death and glory for a number of years, Korg's Soundlink is now in line for a series of significant upgrades. **Dave Foister** takes a look at the 168RC mixer and its outboard converters

**K**ORG AND YAMAHA are old adversaries from the days of the analogue synthesiser, with new models and new ideas vying for attention almost weekly. Since then Korg has not attempted to emulate Yamaha's major inroads into the audio market, and its equipment has not appeared head-to-head in our area for some time.

Korg was always full of surprises though, and the appearance of the initial offerings in a digital audio range called Soundlink should make the business sit up and take notice. First out of the box is a digital mixer, the 168RC, with applications beyond its cleverly chosen niche market.

That market is given away by the presence of four optical interfaces and the ADAT logo prominently displayed on all the equipment front panels and literature. Alesis' licensing of

the format to other manufacturers was always an obvious way of helping it penetrate the market, and in the case of the 168RC it helps Korg build a lot of all-digital mixer at a low price.

As the model number indicates, this is a 16-channel 8-bus mixer, but clever onboard patching within both the mixer and its ancillary options make it more flexible than that might suggest. Sixteen channels of ADAT optical I-O are available simultaneously, but individual channel inputs can also be fed from eight channels of onboard analogue to digital conversion. All the A-D inputs are balanced, four will accept microphones, and two have switchable phantom power, giving a pretty good complement for basic tracklaying.

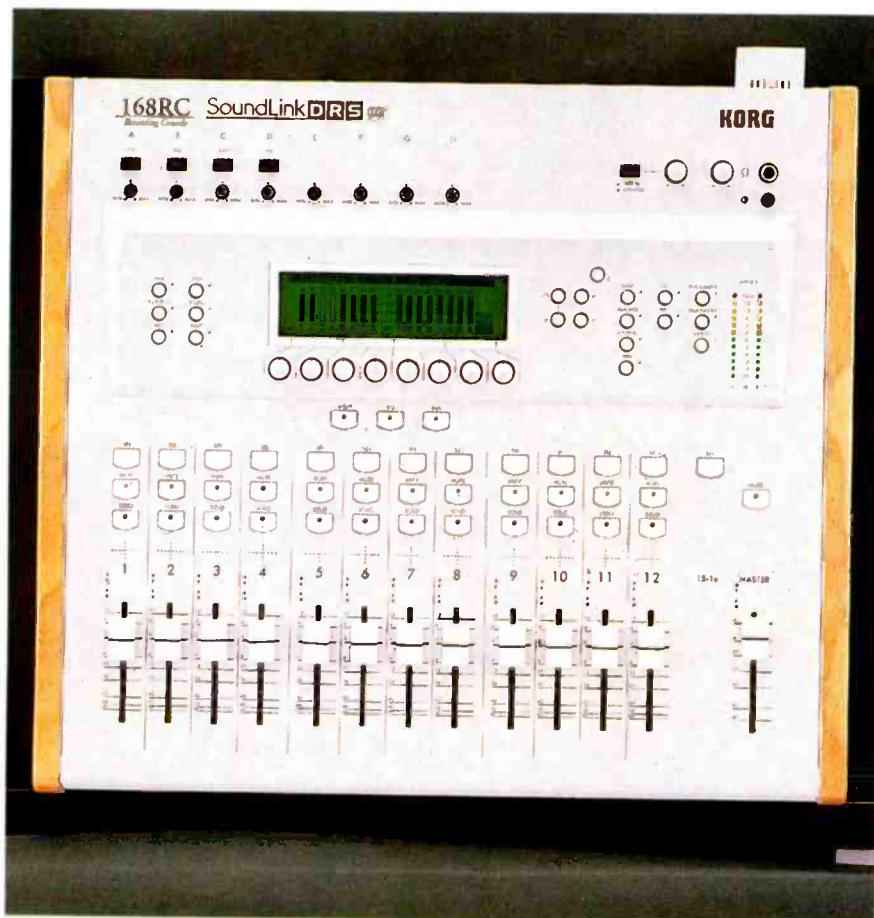
Once inside the mixer, the signals have access to far more facilities than the neatly Spartan front panel would suggest. Operation

of the 168RC revolves, like other small-footprint digital desks, around a large LCD window with software-assigned knobs. On this mixer these are not 360° continuous rotary encoders but standard 270° pots, which as usual seldom point where they should, but the addition of a push switch under each and intuitive nulling operation make this less of a drawback than it might be. The key to getting round the desk quickly is understanding its various modes of operation.

The screen is big enough to cover quite a big chunk of the mixer's signal path at a time, partly by making use of a couple of keys to scroll through related parameters. Even this is more friendly than it sounds, as the size and resolution are great enough to deal with eight parameters at a time via the associated knobs, and as the architecture is partly laid > page 24



Already bridging both pro-audio and high end MI applications, the Soundlink has raised its sights yet higher



Full panel detail of the 168RC

< page 23 out in chunks of eight channels this means the knobs can effectively be assigned as all pans or all Aux 1 sends and so on. There are enough dedicated buttons to make navigating around the screens very easy, as long as you know what's where and where to look for things.

The various basic modes include things like input assignment, output routing, send masters, aux and internal effects levels, and pan.

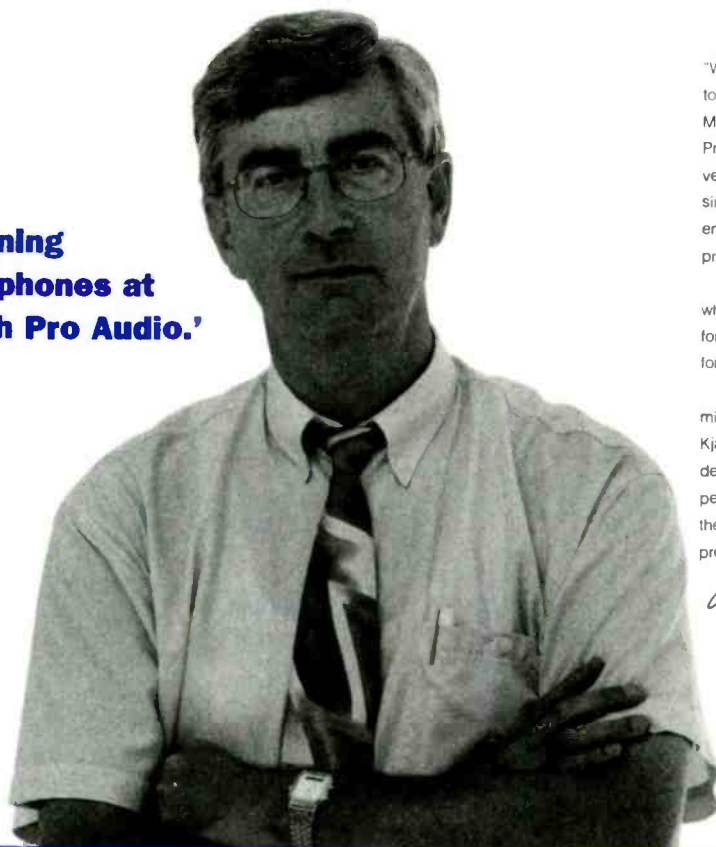
There are enough dedicated buttons to make navigating around the screens very easy, as long as you know what's where and where to look for things

Each of these brings up a screen full of controls covering the relevant parameter for several channels at once. Besides this there is a set of displays equivalent to a single channel strip, called up with buttons conveniently located under the screen. One deals with EQ and one with busing, while the third, called I/S/P (Input-Send-Pan), handles the rest of the functions including aux sends. These screens will deal with the specific channel chosen by the SELECT button above the fader.

The only controls associated with the faders themselves are pushbuttons > page 26

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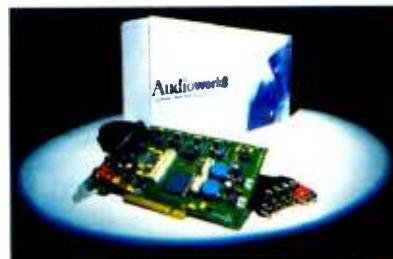
**T**he Pioneer PDR-05 CD-R makes CDs at the push of a button. It can also record one track at a time, for programme editing. The price of the Pioneer PDR-05 is just **£1,105 ex vat**. When sources like DAT or MiniDisc are fed via the optical digital input, recording is automatically started



and stopped in sync with the source.

A standalone unit the Marantz CDR620 at **£2,995 ex vat**, supports all main CD formats with automatic indexing from CD, DAT DCC and MD sources. The SCSI-11 interface allows the recording of large quantities of data (up to 600Mb) in one of the standard CD formats.

## Audiowerk8



**E**magic's Audiowerk8 is a two input, eight output audio card for Power Macs and PCs with PCI slots. The board also has a stereo digital S/PDIF output.

Bundled with Audiowerk8 is the Virtual Multitrack Recorder software package, which turns the computer into a true eight track digital machine. It also allows playback of all eight tracks while recording two further tracks. **Emagic Demo Day 17th April**

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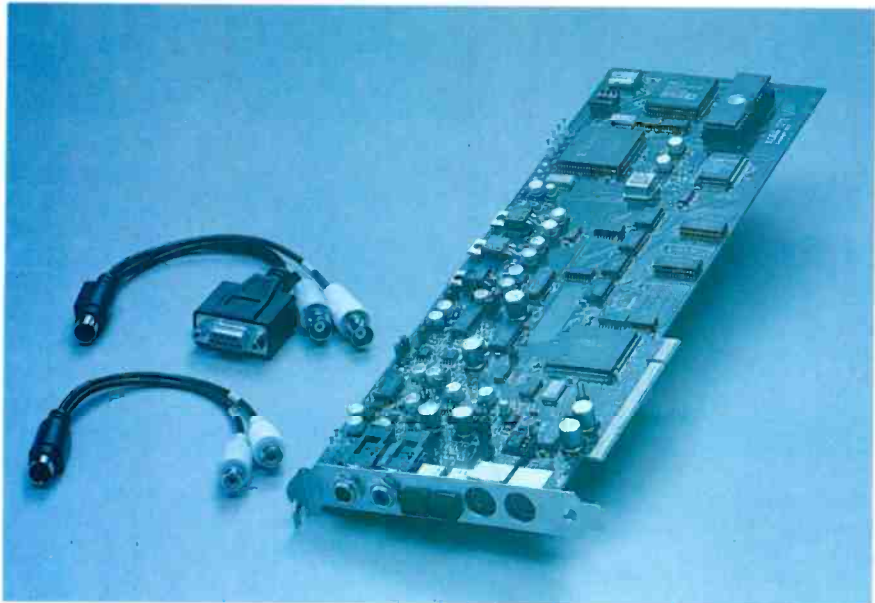
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The 168RC offers optional converters, as shown here

< page 24 for Solo, Mute and Select; there are no knobs, all variable functions being adjusted on-screen with the aforementioned eight controls. The display always shows the current value of a parameter, which of course will rarely correspond to the physical position of the knob. If the knob is moved so that it passes through the stored value it takes control for further adjustment, and it can also be pressed to make the value jump immediately to match the physical position. Toggle switch functions are operated by pushing the knobs,

and some settings which might require rotary switches on a conventional desk are selected by rotating the knob. Scroll buttons beside the screen select which row of displayed controls is active, and clear highlighting on screen leaves no doubt as to what will happen when a control is moved. The system takes a moment or two to get used to, but is well enough thought through that it quickly becomes comfortable to use and flipping around between functions becomes pretty intuitive.

And it soon becomes clear just how much there is to control. Basic as it looks, the 168RC has 3-band EQ on all channels, with fully-parametric mid band, and four aux sends, all individually switchable pre or post. Two of these feed separate onboard effects processors which would be worth putting in a box in their own right.

The EQ has swept low and high bands and variable Q on its swept mid, and has a

The system takes a moment or two to get used to, but is well enough thought through that it quickly becomes comfortable to use

smoothness across the spectrum akin to analogue. A range of  $\pm 12\text{dB}$  on each band gives more than adequate control, and the overlapping frequency bands allow both gentle tailoring and corrective treatments. If further tonal control is required then one of the effects processors may come in to play, as a versatile graphic EQ is one of no less than 31 basic algorithms on offer.

Of course, the effects section does various reverb types and delay related effects, and it also offers combinations such as reverb and chorus as well as gates, limiter-> page 28

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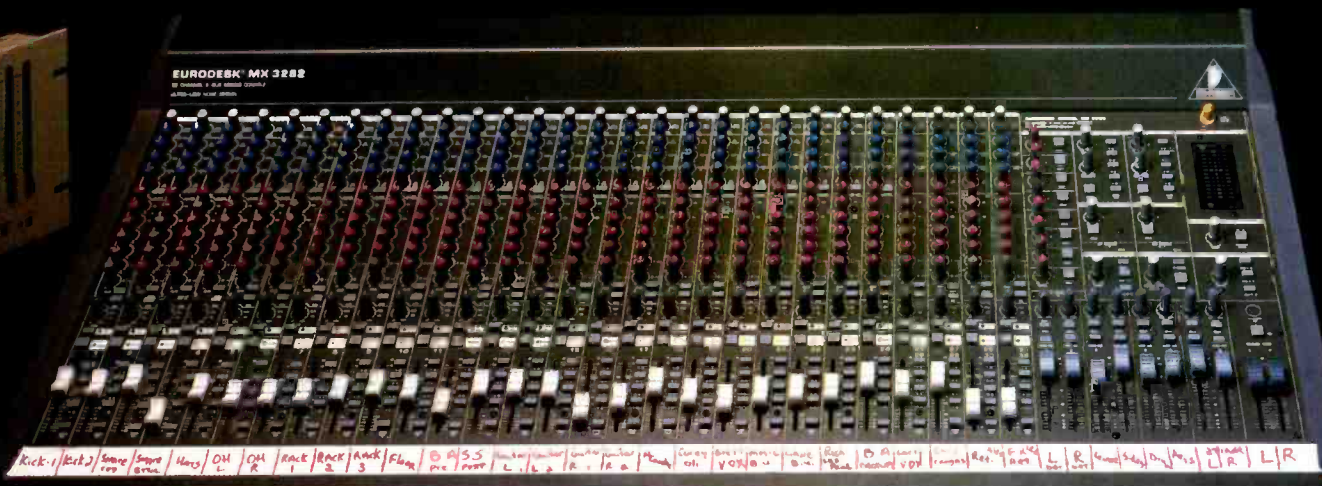
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< page 26 compressors, panning and even rotary speaker and guitar amplifier simulation. The vast majority of these are at least in the same league as the kind of outboards to be expected in this price bracket, and the reverbs in particular are smooth and controllable. All the algorithms have just the right number of adjustable parameters, giving comprehensive user control without the risk of getting bogged down. Again the big screen helps, as it shows several elements of each effect at once and allows simultaneous adjustment of up to eight at a time.

Fifty effects settings from either processor can be stored in memory, as can 30 EQ curves; the EQ can also be paired across

channels for ganged stereo operation. The memory facilities go much further still, however, as 100 complete desk setups can be stored as snapshots. The analogue sections

are excluded from this, but virtually everything else can be stored for instant recall. The faders are not motorised, but levels are recalled with a snapshot and simple null LEDs help with a physical control reset if it is needed. MIDI programs can be used to recall effects patches, EQ settings and complete desk setups, but again that's only part of the story; every control on the desk transmits and receives MIDI controller data and so the whole thing can be dynamically automated with an external sequencer—assuming you've

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got seven or eight MIDI channels to spare. Alternatively, NRPN (Non-Registered Parameter Number) control can be used, which should avoid conflicts with other devices on the same MIDI channel at the expense of being more memory hungry.

Further expansion, or interfacing to equipment other than ADAT recorders, is possible with matching outboard converters, both A-D and D-A converters. Both connect to the opti-

There will no doubt be further add-ons from Korg, and in the mean time of course anybody else's ADAT accessories, such as Alesis' own AES-EBU interface and the like, should work happily with the desk. There are also many workstations which use ADAT interfaces for multichannel digital I-O, and the 168RC could make a very useful front end for such a system

cal 8-channel digital ports, and the A-D unit effectively doubles up the desk's built-in analogue inputs. A useful twist is that it avoids hogging an ADAT port all to itself by having its own optical input on the back, and allowing pairs of channels from this source to be routed through to its outputs in place of the analogue inputs by means of front panel switches. Effectively then it sits between an ADAT machine and the desk inputs, substituting analogue channels when needed.

The D-A box similarly expands the desk's capabilities. As it stands the 168RC has stereo outputs in analogue and SPDIF forms, analogue monitor outputs, and analogue feeds from the two undedicated aux sends. Besides this, any of the eight group buses and the two effect send buses can be sent to one of the digital ports, and the D-A allows these to be delivered in analogue form.

There will no doubt be further add-ons from Korg, and in the mean time of course anybody else's ADAT accessories, such as Alesis' own AES-EBU interface and the like, should work happily with the desk. There are also many workstations which use ADAT interfaces for multichannel digital I-O, and the 168RC could make a very useful front end for such a system.

I found the 168RC quick to learn and flexible in use, and even pressed it into service for a small PA where its memories and onboard effects sped the job up considerably. In conjunction with an ADAT machine recording and mixing were fast and intuitive and showed the desk to be a good deal more grown up and professional than its price and modest appearance would suggest. Its target is different from Yamaha's but it hits it just as accurately. ■



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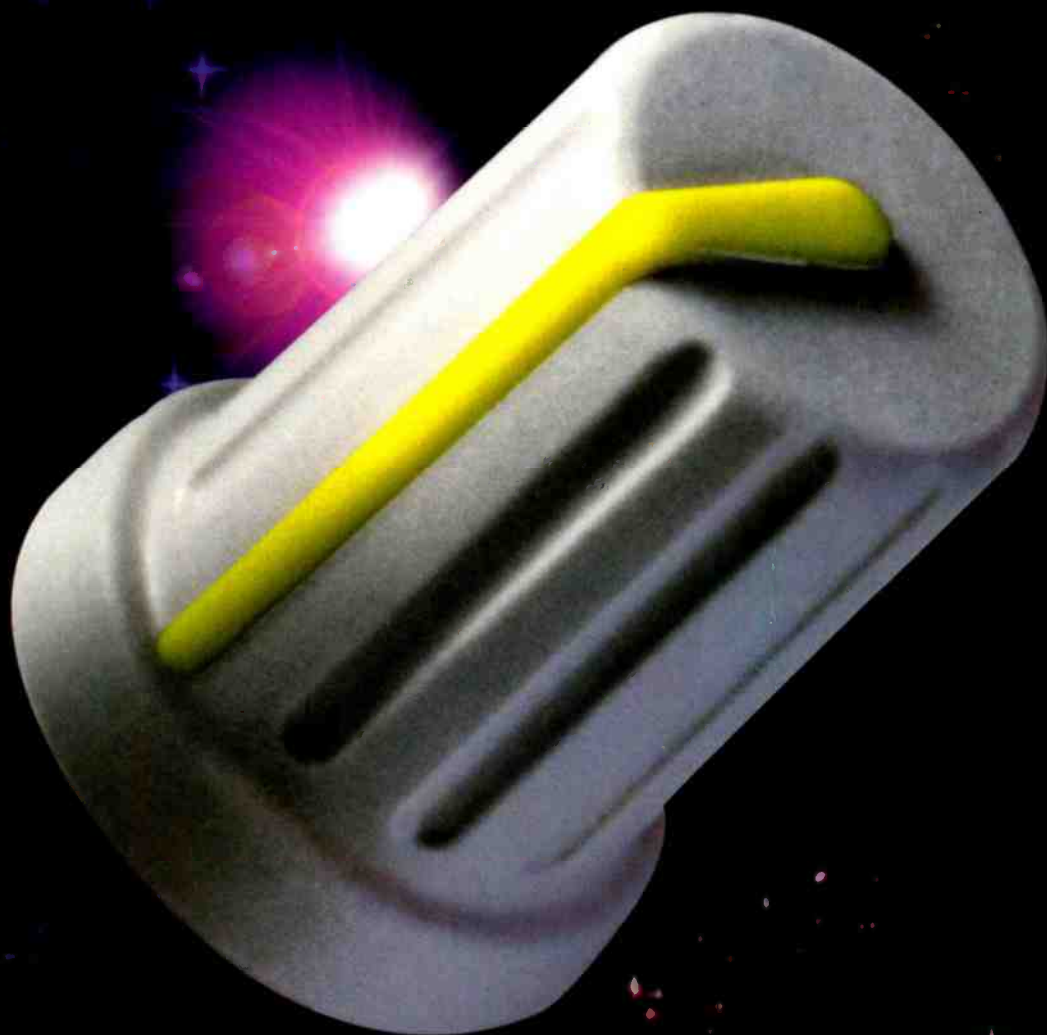
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# SSL Altimix

**Zenon Schoepe** delivers an exclusive preview of SSL's latest digital postproduction digital system, the Altimix, which combines Axiom generation mixing and processing with advanced editing and a picture capability hitherto not seen on a DAW

**L**AUNCHED at the Munich AES, SSL's Altimix is just the latest in what has been a run of products from the company that in less than two years has produced the Axiom large-scale digital desk, the flagship analogue G Plus Special Edition, the smaller Aysis Axiom derivative and now this, an addition to what the company has now dubbed its A-Series digital products range.

This A-Series business is important because it signifies a different generation of technology derived from the Axiom and distinct from that found in the Scenaria-OmniMix family but analogies are apparent. Altimix is the audio for video post accompaniment to the Axiom and Aysis which establishes the traditional SSL family approach higher up the ladder than that started by the ScreenSound-Scenaria-OmniMix clan.

While OmniMix has interfacing to the routing systems of Axiom and Aysis, Altimix is different in employing the same hard disk audio and introduces hard disk video from DiskTrack rather than from OmniMix's VisionTrack. Compatibility for OmniMix in this new A-Series is not complete but is upwards compatible as they will take the former's desk and sound files and can bring these into the Altimix together with certain reduced elements of the automation.

Altimix uses Axiom mixer technology and processing which in itself was a development

of OmniMix but has extra features. To take OmniMix as the specific example, this was designed primarily as 5.1 surround system, Axiom and Aysis are capable of 7.1 as indeed is Altimix but the Axiom and Aysis have panning that is based on XY without the motion tracking that OmniMix has. Altimix has XY automated Axiom-type panning and also the motion tracking panning found on OmniMix.

The new system is aimed at fulfilling post-production duties within a networked Axiom-Aysis equipped operation, particularly broadcast, with full interchange of audio and automation data or for facilities that want something new and are prepared to pay the extra premium that Altimix asks over a comparable OmniMix. However, it's important to stress that Altimix replaces nothing and SSL's existing product range remains current.

It was Scenaria that introduced hard disk-based video as a revolutionary concept to the audio mixing stage allowing for simple cut editing and insertion of black on its VisionTrack. A key enhancement that Altimix brings in this department is cut and paste video editing albeit without crossfades and anything else fancier than this. However, it does allow the producer or director to sit behind the console and move scenes around with the audio editor and formulate an edit, then walk off with an EDL to do it in best while the audio engineer gets on with the mixing and finishes,

hopefully, even before the picture process is completed and without having to wait for a picture edit to work to.

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A key enhancement that Altimix brings in this department is cut and paste video editing albeit without crossfades and anything else fancier than this

The recording quality of the video is variable through compression from 4:1 to 50:1 and this picture quotient in Altimix is resides as a video part of DiskTrack and is an inherent part of the system, you can't > **page 32**





SSL Altimix makes significant leaps in surround control and automation

< page 31 buy one without it, although you can vary the amount you buy. The basic system has three 4Gbyte disks of video storage. The system's constituent parts are the control surface, 48-track DiskTrack, an audio processor plus SSL's RIO concept of I-O blocks. The conventional configuration is for 48 recording-editing-type tracks and 48 mixing channels. Four serial machine control ports and a slaving option take care of synchronisation duties.

How Altimix differs on an operational and presentation level to OmniMix is most interesting. The key structural difference is related to the editing which is performed directly on screen and displays the audio on the left hand side.

This means that the audio that is being edited is directly integrated into the mixer itself and, unlike the ScreenSound arrangement of OmniMix, what you see on the screen is the audio that you're actually mixing and there is no need to transfer it anywhere else to work on it. You can pull up waveform displays, there are a host of editing features and emphasis has been put on allowing editing to be performed two-handed using the keyboard and the pen and tablet. Altimix also implements what are effectively macro pen strokes to perform specific functions and routines.

Recording is non destructive and editing functions are a reorganisation of the order of data on the hard disk every time an edit or copy is performed, the system creates a new edit layer which can be unpicked in addition to an unpeel function for retrieving pieces of deleted clips. A major difference between

ScreenSound editing and how Altimix operates is that the former was designed with the concept of a working disk of 16 editable channels with 8-track simultaneous playback. In OmniMix if you the want to put something on another channel of the system it involves a copy process but Altimix is not restricted in this manner. It can also edit across all 48 tracks does not restrict viewing to 24 tracks on screen, the user is free to time zoom and arrange tracks as required.

The editing of video is subject to similar processes as those with audio albeit with reduced functionality and focuses on SSL's picture activity scrolling display. Edit groups can be specified for locking audio to video and vice versa so with surround sound in mind and an 8-channel premix being cut to a new picture edit, for example, a set of channels can be assigned to an edit group in which any function is applied to all of them simultaneously as would be the case when moving atmos tracks around to a picture cut.

The desk's control surface panels can be moved around in a similar manner to Axiom and Aysis allowing the edit screen and tablet interface to be placed centrally for editing heavy environments or to the side if it's mixing that will be performed most frequently. The 48 channels of the mixer are accessed through two EQ panels, two dynamics processors, pan

controls and fader on every channel arranged as two banks on the 24 moving faders. Another panel takes care of the business of selecting sources to the channels from DiskTrack.

Every channel has EQ and dynamics and is totally automated and this processing can also be fixed on a clip basis. Each of the processing sections have displays which show the curve settings for the EQ and dynamics in addition to value indications near the relevant knobs and there's a control for every function. Like OmniMix, but unlike Axiom, Altimix allows EQ to be applied to a group master with a consequent and relative adjustment made to the group's constituent channels.

EQ is identical to that on the Axiom, 4 full-range bands, as is the dynamics and there's a preset library of settings. These presets and the desk's snapshots can be used to write mix data to the automation.

In pan mode, the pan pots operate as XY controls and as with Axiom the pan point can be picked up and moved around. Pan controllers can also access each channel's eight auxes but they can also be addressed from the channel faders (a la 02R) with the two controllers combined for stereo aux sending.

The console has 32 mix buses and in common with Axiom you can route to any of these in four stems. Precisely how you do this is up to you but the implementation veers heavily towards established film mixing arrangements for surround applications. External source switching is comprehensive and insert send and returns for Dolby or other surround processing devices is included.

Like Axiom and Aysis, Altimix has built-in effects processing but it has an insert concept that is interesting and all its own. Each channel has access to an insert send before or after the fader gain, however, the insert return doesn't have to be mono it can be up to 8 channels. To explain this, it helps if you regard the pan that is applied to the mix busses of the system as being made up of eight faders each sending to an individual buss and it is at this point that 8-channels of return can come in under overall control of the channel fader but under the influence of the selected panning characteristic. Neat or what?

Applications with the internal effects are obvious particularly as the system can run 8-channel reverbs with cross processing algorithms but you could also bring in 8-channels from a DA-88, for example, on one fader. Very clever.

There are a total of 48 effects processors but these don't not have to be dedicated to channels and can be assigned according to need.

The impact of Altimix is by definition not going to be as enormous as the appearance of Scenaria was some years ago simply because the precedent has now been set and any improvements and enhancements of the new system are now likely to be judged above those of the OmniMix rather than above ground zero. This is short changing the new arrival which by any standard is quite remarkable. It makes significant leaps in surround control and automation while the extra picture editing functions qualifies it as the perhaps the best equipped audio product to kick back against the increasing number of picture systems with rudimentary audio facilities. ■

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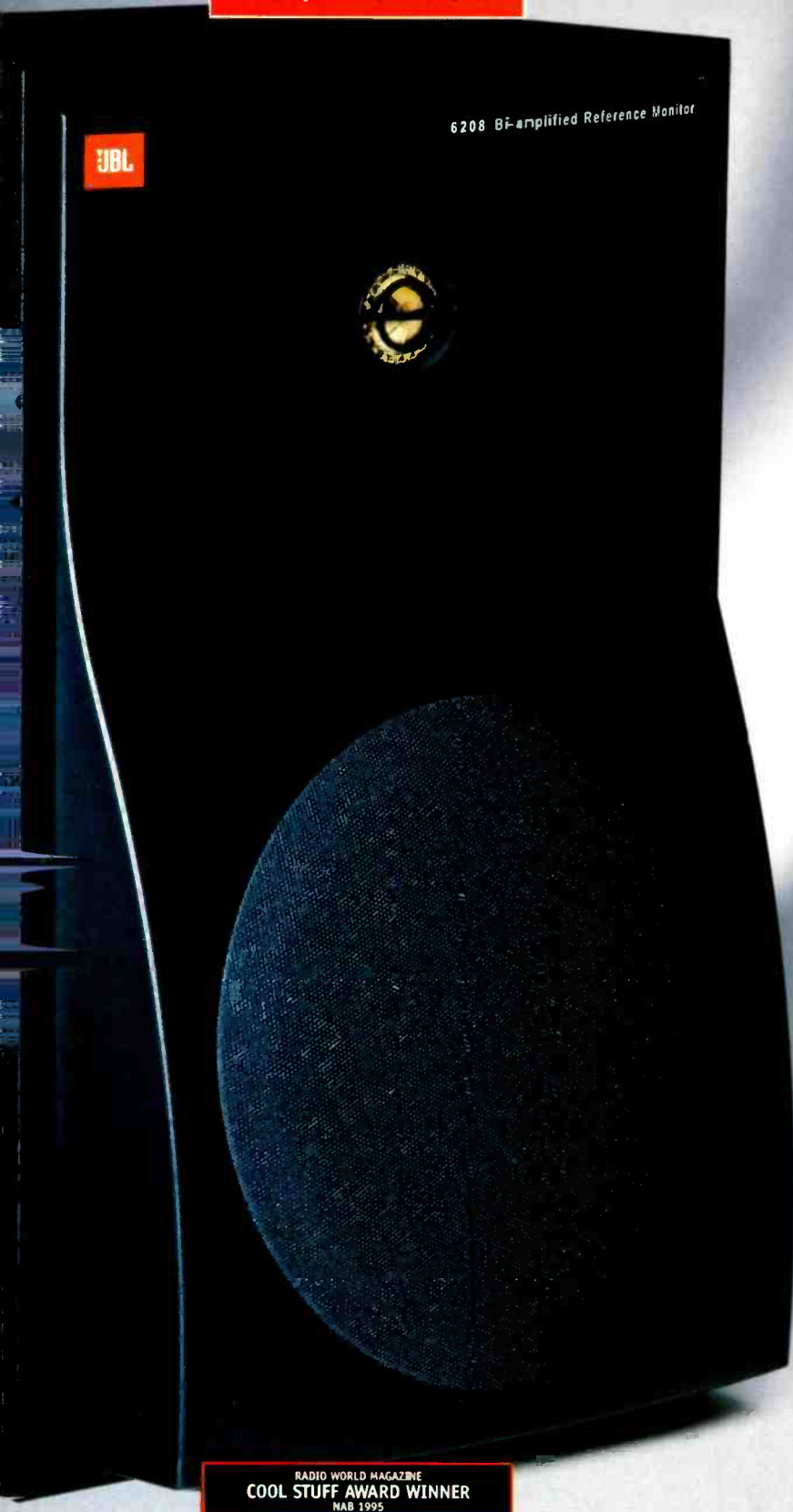
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# The JBL 6208 Bi-Amplified Reference Monitor

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JBL has more experience in designing and building transducers for professional studio monitors than any other company in the industry. We not only use the latest engineering and design equipment, but also the most important test device of all, the human ear. We believe in physics, not fads, so while other companies pick parts off somebody else's shelf, we create our components from scratch. And by utilizing more than 50 years of experience in transducer design, we create the perfect transducer for each system.



## Multi-Radial Design - An Ideal Solution to a Complex Problem.

Combining individual transducers into a system is a delicate balance of acoustics, electronics and architecture. Our exclusive Multi-Radial baffle is contoured to bring the drivers into perfect alignment, so the high and low frequencies reach your ears simultaneously. This reduces time smear for a smooth transition between the low and high frequency drivers. In addition, the gently rounded edges of the 6208 provide controlled dispersion and balanced power response. That means even off-axis, you will hear an accurate representation with wide stereo separation and an immense depth of field.



## Gold/Titanium Hybrid Dome.

By mating the materials to a large magnetic structure, the 6208 can produce extremely flat frequency response and low distortion for hours of fatigue-free listening. JBL pioneered the use of the light but rigid gold/titanium hybrid construction to provide a transient response that is quick and precise for pinpoint accuracy.

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JBL shields all of the drivers so you can place the 6208 right next to your audio workstations without interaction. Gone are the days of compromised monitor placement in your production environment.

## Why Bi-Amplification?

It's a simple fact, a separate amp for each speaker produces the most accurate sound. Each of the 6208's two amplifiers is designed to reproduce the assigned frequencies. And by combining the amplifiers inside the cabinet, you improve the amplifier's ability to control the speaker it's driving for controlled low end punch.

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- Bobby Owsinski  
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components like inductors and resistors. The result is clear, accurate sound at the highest levels.

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## Three in-ear

SENNHEISER HAS REVEALED a channel switchable in-ear radio monitor system called the EK 3052-U which is a miniature UHF stereo receiver system, featuring PLL-controlled switchability over 16 frequencies. Proprietary HiDyplus noise reduction circuitry provides a 110dB SN ratio, an onboard volume control incorporates a cover to prevent accidental adjustment while the small size and light weight 130g including battery—of the unit and an adjustable clip, ensures that the receiver is easy and convenient to wear during live performance. Power is supplied by two AA cells or an optional accumulator pack. LCD status indicators include low battery power warning.

The SR 3054-U is a single-channel stereo UHF transmitter and the SR 3056-U a dual channel stereo transmitter, both for use with the EK 3052-U stereo miniature receiver belt-pack. The units are designed around Sennheiser's PLL-controlled RF frequency switchability, with 16 programmable transmission frequencies on each transmitter. These units incorporate the same RF operational reliability, robust construction and ease of operation as any of the company's radio microphone system. Prominent LCD read-outs show selected frequency, RF output power and signal deviation information. The 1U-high rackmount units are supplied with built-in power supply and can be easily configured for multichannel operation.

Shure has joined the in-ear monitoring crew with its Personal Stereo Monitors (PSMs) and particularly the PSM600 series is divided into two packages. The P6HWE1 is the hard wired version, made up of P6HW belt-pack receiver, E1 universals with foam earpieces (with ten replacements), interconnect cables (dual XLR to LEMO), 9V battery, earpiece cleaning tool and a plastic carrying case. Wireless needs are catered for by the P6TRE1, with P6T rack mountable transmitter, P6R belt-pack receiver, E1 universals and foam earpieces (plus replacements), 1/4 wave antenna, power cable (IEC) for P6T, 9V battery, cleaning tool and carry case.

Both versions have three listening modes: mono, stereo and MixMode.

RCF has also released an in-ear monitoring system, the TX500 IEM, which comprises the TX501 Track transmitter and the TX501 R portable receiver.

Designed to deliver high power into the ear piece, rated at 120dB, the system has an automatic limiter for excessive volume. The earpieces themselves are made from non-allergic silicone and are designed to eliminate auricular occlusion by using acoustic transparency.

The transmitter works with a carrier frequency on the VHF range of 173MHz–240MHz, with seven pairs of frequencies available. It is a FM system with an audio transmission bandwidth of 40Hz to 40kHz. The unit is powered by 12V AC-DC current and is 45x150x485mm weighing 900g. The receiver is 30x120x70mm and weighs 150g. Audio output is via a 3.5mm jack socket. Power comes from a 9V battery Sennheiser, Germany.

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RCF Italy. Tel: +39 522 354111.

## LA Audio 4x4<sup>2</sup>

Competition between the multitude of current dynamics outboard processors is fierce. But the 4x4<sup>2</sup> has features that make it worth a closer look, as **Rob James** reports

**I**N a crowded corner of the market, the LA Audio 4x4<sup>2</sup> is far from being another 'me too' dynamics box. As well as offering the usual compression and gating functions, the 4x4 makes frequency-conscious compression and gating considerably less of a chore than most such units. The process set is a combination of two independent soft-knee compressors, noise gates and pairs of high-pass and low-pass filters. The fun starts when you combine the building blocks. There are two further filters, switchable between low-pass and high-pass, associated with the compressor sections.

For an analogue unit, the 4x4<sup>2</sup> packs a lot in and its 1U-high, shallow-depth rack case. The front panel knobs run across the bottom of the unit with the buttons in a row above the indicator LEDs and gain reduction bargraphs at the top. The rear panel has XLRs for the I-O to the compressor and gate sections. The filter and side chain I-O is unbalanced and on ring send, tip return, 1/4-inch jacks. The key input is balanced but on a 1/4-inch jack. Having three different permutations of audio connector is rather irritating, but given the real estate available on the 4x4<sup>2</sup>, presents a reasonable compromise.

The 4x4<sup>2</sup>'s processing is based on discrete FETs which, the British manufacturer claims, result in processing of a more 'musical' nature than ICs. I am inclined to agree; there is something slightly less clinical and more seductive about the overall sound of this unit as compared to IC-based designs. I am not so convinced that this architecture is a suitable substitute for valves, however. The characteristic sound is another colour in the palate, not digital nor valve, nor IC analogue.

The Channel 1 and Channel 2 gate and compressor sections have identical controls as do the pairs of filters which are grouped with the expander sections. The inputs to the compressors can either be external or from the gate outputs. There is a single STEREO LINK switch in the middle of the unit which links the Range, Attack and Release sections of the gates and the THRESHOLD, RATIO, ATTACK and RELEASE controls of the compressors. The other controls remain active. The linked functions are operated from Channel 1.

The gate attack is switched between either Fast or Auto. This works well for music applications but for speech I found myself juggling of the various controls to avoid clipping the beginnings of words. Compressor attack is selectable Slow or Fast and works well in practice—and presents one less pot to fine tune. The compressor filter sections can be switched between the sidechain (Normal) and the signal path (Half). Another switch selects whether the filter is to operate in high-pass or low-pass mode. In the sidechain the filter determines the band of frequencies which will cause compression of the whole signal—that is, fre-

quency conscious compression. In the signal path the filter determines which frequencies will be compressed, the rest passing unaffected. I found this to work well with percussive sounds allowing control of high energy bass components while retaining the high frequency transients. With the filter in high-pass, de-essing can be accomplished without dulling the sound.

The pairs of high-pass and low-pass filters can be used independently of the expander-compressor (but only unbalanced) or switched to Internal. In this mode there are two options selected by the SNR (selective noise reduction) switch. With the switch out, the filters are in the side chain and allow modification of the frequency spectrum



which will activate the gate. In SNR mode (switch in) the filters determine the frequency envelope which will be passed by the gate when closed. This works in conjunction with the RANGE control, thus if there is background material which you wish to retain at reduced level in addition to LF or HF noise which you want to remove, you can set the filters to remove the unwanted HF and LF and set the RANGE control to retain the wanted part of the signal. When the gate is closed the unwanted parts are gated completely and the wanted spectrum reduced by the amount set by the RANGE pot.

The 4x4<sup>2</sup> is a real problem solver and a versatile creative tool. The onboard filters make sidechain manipulation easy without lots of boring external patching.

If you want real 'smack in the face' bass from unpromising sources or to wreak magical transformations on drum tracks, give it a try. And if you have feedback problems or excessive sibilants on vocals it will help with these as well. ■

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# Neumann TLM50

When it comes to creating a modern classic, few microphone manufacturers have an historical resource to match that of Georg Neumann as **Dave Foister** reports

**F**EW microphone companies are more aware of their heritage than Neumann, but then few have as much heritage of which to be aware.

Now we have the TLM50, an important new model which also harks back to the classics but in a completely different way. The TLM designation places it clearly in context; this microphone has modern transformerless solid-state circuitry from the FET100 family, and belongs with models like the TLM170 and TLM193, neither of which has any specific associations with the 1950s.

But the TLM50 does; the numeric part of its name deliberately links it to the M50. The M50 ranks as a classic alongside the M49, but is a markedly different microphone. It is a dedicated omni, with a capsule assembly purpose-built for optimum omnidirectional behaviour, and it is this capsule concept that reappears in the TLM50.

Many people's only experience of omni operation is the omni setting on a multi-pattern microphone. Since this works by summing the outputs of two back-to-back cardioids it inherits any off-axis frequency response characteristics of those cardioids, and often ends up more oval than circular at higher frequencies. A dedicated pressure microphone produces its omnidirectional output from a single diaphragm, and while it is hard to design out all the deviations from perfect omni response those deviations will be less significant than the compromises of the multipattern microphone, and of a different nature. Neumann's approach with this venerable capsule design is markedly different from most of the others.

The single nickel foil diaphragm is 12mm across and is set in the surface of a sphere of 40mm diameter. The TLM 50's windshield basket is sufficiently thinly lined to allow this curious device to be clearly visible. The lightweight foil construction—the diaphragm is only 2.25µm thick—is not unusual in omni microphones and partly explains the fact that most have an unusually extended HF response and good transient performance. The spherical mounting is much less common, and is designed to improve the diffraction around the assembly and the pressure build-up behaviour in front of the diaphragm. The results on paper show less variation in the omni pattern with frequency.

Obviously there is no polar pattern control, but there remain two switches, one for bass roll-off and one for a pad. The LF performance is so good that Neumann has felt it necessary to incorporate a 30Hz filter permanently in order to protect following equipment, and the switchable filter rolls off below 100Hz. The pad works by reducing the capsule polarising voltage from

60V to 23V rather than by attenuating the pre-amp, and the manual points out that this has a very slight effect on the acoustic impedance of the air space behind the diaphragm and therefore on the HF response.

In the best Neumann tradition the TLM50 comes with a pivoting stand mount incorporating the XLR connector, and it also has a cable hanger assembly provided as standard. The



Inside the TLM50—accuracy and personality

whole package, complete with wooden box, is very much vintage Neumann and the kit is admirably comprehensive and well presented.

And so is the sound. Many people see omnis as only having disadvantages for general studio use, assuming their failure to reject spill rules them out for multi-mic work. Their advantages, including HF extension, lack of proximity effect and relatively uncoloured spill pickup, often outweigh the disadvantages.

The increase in spill can be compensated for by getting in closer without the usual trade-offs and has much less influence on the overall sound anyway, and the TLM50 shows this off well. Its sound is remarkably convincing and open, and it scored highly with a group of vocalists who heard it compared with much more familiar microphones. Those looking for a microphone with a complete lack of its own signature might be better off looking elsewhere, as the TLM50 has a small but distinct element

of Neumann character, but most will see this as a decided advantage. It's a lovely versatile microphone, with a highly desirable combination of accuracy and personality, and should have a very broad appeal indeed. ■

### Contact

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## NEW TECHNOLOGIES

### Fostex multitracks

FOSTEX HAS RELEASED two digital multi-track recorder-editors with the D-90 and D-160 both of which are stand-alone rack-mounting devices with a removable front panel-remote controls hiding a hard drive caddy. The D-90, like the D-80, can record eight tracks simultaneously with non-destructive cut, copy, paste and move editing plus undo and redo. Additional features include 48kHz recording, an additional four virtual reels (total nine) with their own locate points, the ability to chase to MTC and varipitch.

The D-160 offers all of the D-90 features yet records 16 tracks with eight analogue tracks plus eight digital tracks simultaneously. In addition, there are eight 'ghost tracks' permitting eight takes to be permanently stored for one track. It features FDMS-3 (Fostex Disk Management System) which allocates hard disk space per track at the time of recording allowing a 1.3Gbyte disk to offer more than four hours of mono recording. The optional 8345 Time code-Sync card syncs to time code and resolves to Video or Word Clock.

SCSI-2 backup support (standard on the D-160 and optional on the D-90) gives fast 8-track or 16-track backup to external SCSI devices while an ADAT optical interface allows real-time bidirectional 8-track transfers. Both machines have optional balanced 25-way D-connectors.

**SCV London, UK. Tel:** +44 171 923 1892.  
**E-mail:** info@scvlondon.co.uk

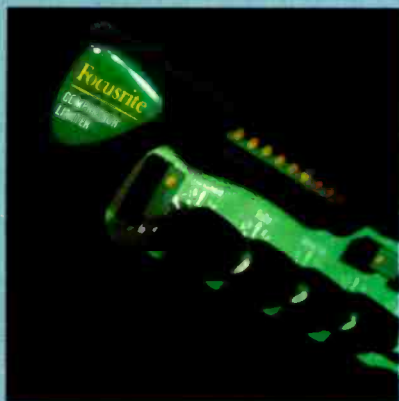
### Focusrite Greens

FOCUSRITE ADDED two units to its Green range at Frankfurt. The Channel Strip direct recording channel handles mic, line and instrument level inputs through a compressor-expander-gate, 4-band EQ and sweepable high-pass and low-pass filters that can be additionally inserted into the side chain of the compressor and expander-gate. The strip is rounded off by an output level pot and multifunction bar graph meter.

The Dual Compressor and Limiter is stereo linkable and fully variable threshold, ratio, makeup gain, attack, and release plus switchable soft knee characteristic and auto release on each channel. It has a separate limiter section with variable threshold and release and switchable Look Ahead attack. High-pass and low-pass filters can be placed in the device's side chain.

**Focusrite, UK. Tel:** +44 1494 462246.

**E-mail:** sales@focusrite.com





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## Smart Research C2

**Zenon Schoepe** discovers a truly professional stereo programme compressor with more than a little extra 'crush'

**S**MART RESEARCH'S outboard range is currently topped by the C2 unit under investigation here. But takes in a wealth of assorted fix-it boxes that stem from company founder Alan Smart's long involvement in the recording industry and his reputation for building the sort of devices that can't always be bought off the shelf. Other units include guitar DI system-splitter boxes, a channel input amplifier for SSL consoles and a rack mic preamp, currently in prototype, that can be remote controlled for 19 gain steps, phantom switching, phase reverse, mute and stereo link.

The C2 is a handsome looking 1U-high device, beautifully built with mechanical gain reduction meters, large high quality green and red illuminated switches, smooth pots and exceedingly attractive hammered metal ears contrasting the grey face of the front panel.

This is a dual-channel stereo linkable compressor designed, it has to be said, primarily as a main stereo mix programme processor but with applications beyond this. It's a development of the original C2 unit that was released some years ago and now has new generation VCAs, high slew rate amps with hybrid FET-transistor inputs, high current push-pull transistor outputs, balanced I-Os, a symmetrical signal path and no electrolytic capacitors employed in the main signal path. Options include an external fader level control input and extra dual-channel slave units for multi-channel setups.

However, the single most novel inclusion on this box is the presence of a switch marked CRUSH which incites FET over-compression with an altered frequency response and more distortion.

Each channel is identically equipped with a fully-variable THRESHOLD pot (-20dBm to 20dBm), switched RATIO control (1.5:1, 2:1, 3:1, 4:1, 4:1, 10:1 and limit), switched ATTACK (fast, 0.1ms, 0.3ms, 1ms, 3ms, 10ms and 30ms) and switched RELEASE (0.1s, 0.3s, 0.6s, 1.2s and 2.4s). The lot is wrapped up on a gain make-up pot offering +20dBm. Each channel has a separate bypass and switched access to an external side chain presented on balanced XLRs. A Stereo switch links the two channel compressor sections.

Sonically it's an obscenely silent unit which smacks of quality. It has the ability to deliver superb low-end wallop and falls comfortably into the mild effector league of compressors rather than the pure transparent sort, which of course is one of the reasons why the market can support so many compressors with sounds of their own.

The Crush facility is very interesting; there is noticeable lift with some EQ brightness seemingly added together with a slightly less precise envelope with just that bit of overshoot that you'd probably like. You can see the ballistics of the gain reduction meter needle change

when Crush is engaged and it seems to do a good 3dB more work. The additional brightness is quite pronounced and is accompanied by a reduction in mid lows but an apparent boost in ultra lows that consequently fits certain material better than others.

This one switch amounts to making the box behave as two markedly different devices leaving you with the decision of whether it's a Crush sort of day or just plain old vanilla. It's a clever idea that adds significantly to the flexibility of the C2 and suggests that a few more Crush settings would have been really neat. As it stands Crush is the more contemporary sounding for those times when you really want to hear the box working while the standard setting is the more natural and less aggressive.

The switched settings are sensibly selected, fast and slow enough to cover all eventualities, with every thing from a gentle squeeze to near brick-wall limiting. If you pile in enough level things can get pretty dirty especially on fast attacks.

Being dual channel the C2 can be used to good effect on solo instruments but this is overshadowed by its abilities on stereo programme processing where it comes in to its element. That's not something that can be said of all dual stereo dynamics. It adds a wonderful splashiness to cymbals and that smooth rolling quality that some compressors have and others just don't. This will make things sound loud for you.

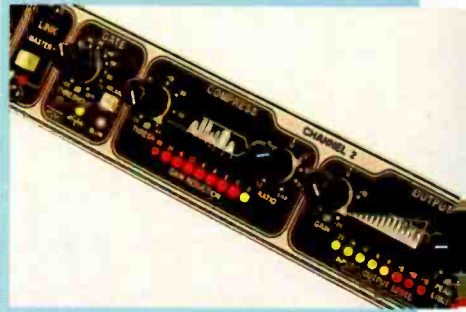
It's a good box, certainly not a me-too product and different enough to warrant careful consideration. Good gear. ■

The Crush facility is very interesting. The one switch amounts to making the box behave as two markedly different devices

**Contact**  
Smart Research, UK.  
Tel: +44 123 5527136.

## Drawmer MX30

DRAWMER HAS debuted a low-priced gated compressor limiter called the MX30. The 2-channel 1U-high processor incorporates some proprietary audio circuits from the company's more expensive boxes and each channel has a variable threshold gate with Programme Adaptive circuitry. This continually optimises such parameters as attack, hold, ratio and release and is followed by a variable threshold variable ratio soft-knee compressor with fully automatic attack and release and an output section with variable gain and threshold zero overshoot limiting.



The unit can work in dual channel or stereo modes in which Channel 1 controls become the master. Connectors are provided on balanced XLRs and unbalanced jacks.

Drawmer, UK. Tel: +44 1924 378669.

## Otari MOs

RELATED IN principle to Otari's MX5050 tape recorder series, the new DX5050 uses 3.5-inch MO discs and has the distinction of being the first 2-track MO recorder that is Wavefile PC format-compatible and thus allows easy and direct data exchange with Mac and Windows based mastering systems.

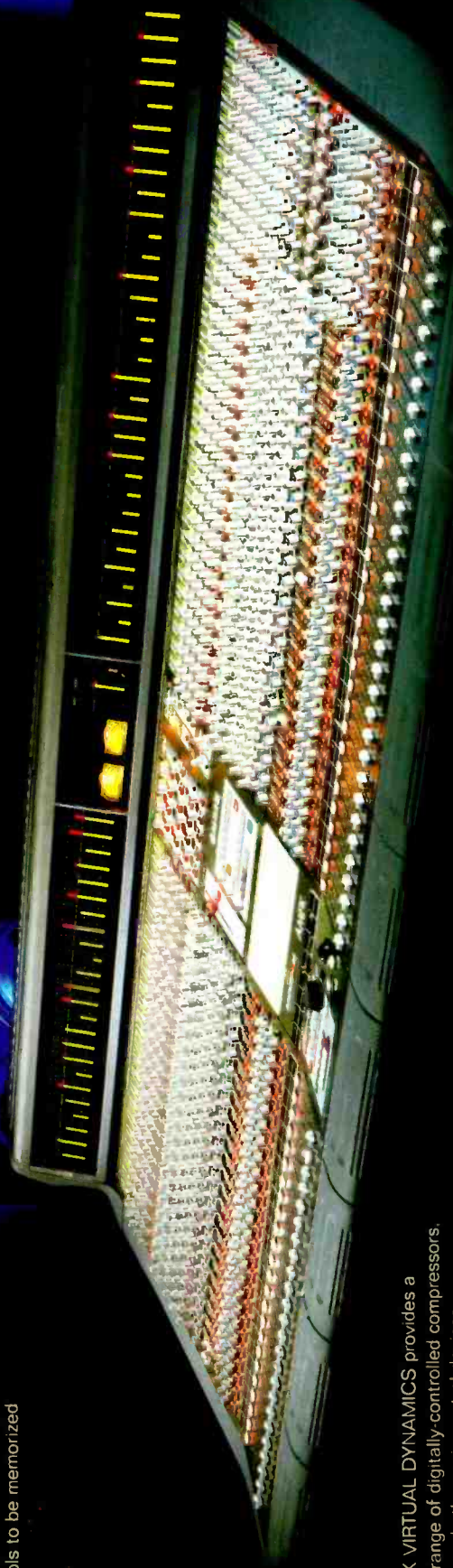
Recording time on the discs is 20, 50 or 60 minutes depending on size in linear 16-bit form and the portable machine includes cut and splice editing and AES-EBU and analogue I-Os.

The machine is complemented by the PD20, essentially a fixed version of the DX5050 which is 4-track, has a remote control, and advanced editing features with a VGA-monitor and integrated synchroniser. Significantly, it is data and payout compatible with Otari's PD80M 8-track DAW. As standard the PD20 has 20-bit A-D/D-A converters and will be available in the summer.

The company's Lightwinder LW10 multi-channel stage and console master fibre optic cable link connects between stage and mixing consoles and is significant in not requiring a computer. Up to 64 channels (48 in/16 out) can be handled by one LW10 using dual transmission lines. Each audio input channel on the stage master has its own mic preamp, phantom power and mic/line gain trim pot. The system has been supplemented by the Lightwinder Colosseum with new features such as PC remote controlled functions of the 8-channel A-D/D-A modules, a 4-channel intercom module in addition to rear slots for 4-channel optional control data I-Os.

Otari, Japan. Tel: +81 4 2481 8626.

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# AMEK

Photograph courtesy of Liverpool Institute of the Performing Arts

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## Tascam DA60 Mk II

The new DA-60 has more than a few incremental changes, bringing some genuine advancements. **Rob James** checks out the changes

**T**HE TASCAM DA-60 Mk II is more than just a Mk. I with the synchroniser built in. The A-D and D-A converters are new. 1-bit sigma-delta A-Ds and 20-bit sign-magnitude D-As. The synchroniser hardware and software have been upgraded to provide better lock-up times with more machine emulations. The DA-60 Mk II also supports 'jam sync'. This enables contiguous code to be recorded, picking up from pre-existing code on tape. It can also 'flywheel' over discontinuous code which can be useful when dealing with rushes tapes.

The DA-60 Mk II comes in the Tascam 'house colours' and is the usual 19-inch rack-mount construction complete with mounting ears. There are some 39 buttons and switches on the front panel, not a bad count for the species. Time-code DAT recorders are one of the more egregious examples of 'feeping creaturism'. In the case of time-code DATs, users are as much to blame as the manufacturers. The many applications of the technology have

can use Free Run.

Don't be fooled by the jog wheel on the front panel—it isn't. The wheel is actually there to enter data and change parameters. The only time it is used for audio is when setting an instant start point using the built-in 3s RAM buffer.

The synchroniser offers the choice of time-code chase, with or without re-chase or RS422 control (Sony P-2 protocol). The time-code chase works as well as expected but for the fastest lock-up times and maximum control I would always use the RS422. This offers emulation of seven other machines so you should be able to find one the controller will talk to. The location and lock up times under P-2 control are far more impressive than the DA-60 Mk.I and are now more than adequate for most uses. I'm not going to quote actual times since so much depends on the particular circumstances, type of controller.

The autolocate is beautifully simple. There are two locations, Memo 1 and Memo 2 with dedicated buttons. Hitting these with the tape stationary or playing-recording loads the memory. Pressing either the loc1 or loc2 buttons locates to the appropriate spot.

Off tape monitoring and punch in, punch out, recording is available courtesy of the four heads. The punch in punch out can be automated using the Memo 1 and Memo 2 locations and the crossfade length selected at 10ms, 50ms or 100ms. Edits can be rehearsed before committing yourself with the deck switching the monitoring between tape and source at the edit point. A pre-roll can be set between 0-15s. Again, this is all quicker to do than it is to describe.

The usual connections to the outside world are all present with the useful additions of unbalanced analogue monitor outs on phonos and a word clock through BNC. Maximum level at the balanced analogue outputs is factory set at +20dBm (0dBm = 0.775Vrms) and can be dealer set at +24dBm or +15dBm.

A general gripe here: can somebody please explain to me why four time-code DAT recorders in one box (a DA-88 or similar) cost the same, or in some cases significantly less, than a single time-code DAT recorder in a box? This is not aimed specifically at Tascam but at all manufacturers of this type of machine. The sales volumes of time-code DAT recorders must surely be higher than those of the 8-track machines so, please, what is the problem?

The Tascam DA-60 Mk II offers useful improvements over the established Mk. I. I enjoyed using it and for all but the most demanding and complex applications this machine is worthy of serious attention before considering some of the heavyweight (and price) alternatives. ■



led to users badgering manufactures to add features specific to their particular application. The inevitable result has been increased complexity and compromises between ease of use and facilities provided.

The DA-60 Mk II achieves a good balance between flexibility in application and relative simplicity. There are nested menus but never more than two layers deep. For example, to change the time-code generation mode you press SHIFT and MENU UP OR DOWN until you find the TC entry. Opening this with the DATA key and wheel takes you to all the available time-code options. Once open, the submenu options remain part of the Shift menu options until you close them. It is much easier to do than describe and there are three registers where complete parameter setups can be stored and recalled—in practice, once you have set up the machine for specific applications it is simply a matter of recalling the appropriate setup. The DA-60 Mk II caters for Rec Run time-code generation from a user-defined start time or, as mentioned earlier using J-sync it will add to pre-existing code. If you just want to stripe a tape with code you

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## Publison Totalstation

PUBLISON HAS introduced the Totalstation 32-track DAW for video and film postproduction, which incorporates many of the features of the Infernal Workstation such as a graphical interface with waveforms. It also has ultra-fast tape backup which works in background.

Main features include 20-bit or 24-bit A-D and D-As; 32-bit digital processing; the ability to multitask; 32 audio tracks using RAID technology; jog and backwards play; 10-band parametric filters; one video track and powerful crossfades options. Totalstations also offer multi-user configuration via separate remote controls and can be networked.

**Publison, France. Tel:** +33 1 4360 8464.

## PR&E's Integrity

PACIFIC RESEARCH & Engineering has introduced a digital broadcast radio console called the Integrity with reset and the option to automate parameters. Integrating an analogue sub-system, the desk is able to keep on air if the digital path fails.

The desk has two microphone inputs; four microphone-line selectable analogue inputs; ten stereo digital line inputs (which can be switched to analogue); four mix-minuses (two telco feeds and two remote feeds with IFB); two programme buses with analogue and digital outputs; programmable recorder selection outputs; control room and studio monitor controls; built-in talk-back-IFB microphone; computer control of desk configuration (set, save, recall) and status identification and diagnosis; Session-Scheduler software; 16 individual 10-character alphanumeric channel ID; DSP voice processing; fader start logic; multiple sample rate operation; and optional Remote Line Selector channels.

**PR&E, US. Tel:** +1 619 438 3911.

**Web:** www.pre.com

## Orban digital three

ORBAN HAS INTRODUCED three new digital products at the AES: the AirTime networked on-air delivery system (a direct result of its acquisition of DDS last year), the Audicy production workstation, and the OPTIMOD 9200 processor for AM radio. The Audicy, Orban's second-generation DAW, performs all its editing in RAM with automatic shadowing to hard disk or removable Jaz drive. It provides simultaneous mixing and processing of 10 audio channels plus submix and stereo input, with PCM linear recording of up to 24 tracks. AES-EBU inputs and outputs are available, and Audicy networks with popular on-air audio delivery systems. The DAW's software offers time-code features such as format mixing, multiple chase modes, and integration with all edit and effects functions. Onboard digital effects include Orban compression and noise gating, Lexicon reverb, parametric equalisation, time compression-expansion and pitch shifting.

Its hardware controller incorporates 13 long-throw faders dedicated to gain control on main inputs, mix channels, and stereo submix. Eleven separate > page 42



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Colin Sheen - Jingles  
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# Lexicon PCM80 cards

Many outboard signal processors require more programming time than a jobbing engineer can find. **George Shilling** tries a selection of program cards for the Lexicon PCM80

**T**HE Scott Martin Gershin PCMCIA-type card contains 100 new presets for the PCM80 using standard algorithms present in the standard unit. These are mainly aimed towards users in the areas of television, film and interactive media. Scott Martin Gershin of Soundelux Media Labs has won awards for his film soundtrack work, and was responsible for the sound design on such films as Oliver Stone's *JFK*.

The presets are organised into two banks, which come up as C0 and C1 when the card is inserted. They also disappear when the card is removed, unless you save any as user presets.

Firstly, there are a number of EQ and filter-based effects. There are several telephone, speaker and PA simulations, where the Adjust knob has been assigned to change the EQ, move the stereo position or adjust the delay or reverb ambience. These kinds of ready-tailored effects are always useful for dubbers.

Next come a number of special effects treatments. There are pulsating reverbs, suitable for explosions, and wacky over-the-top effects for flashback sequences, which only require a 2s burst of input to get going in full effect.

The second bank starts off with a bunch of Cyber effects with names such as Dreamscape. This is rich, dazzling and atmospheric stuff. Following these are a selection of panners and each combines other spatial effects. There are then a selection of tap delays, including something useful Lexicon did not think of: a simple single repeat delay! There are a few surround sound presets: high-end dubbing suites will have full surround panning, but if you are on a budget these give you the capability.

Finally, there are some reverb presets designed for strings. These have a lusciously rich warmth to them.

Many of these programs are aimed specifically at dubbing engineers but the reverbs are very usable by many others.

The Pitch FX algorithm card adds six new algorithms to your PCM80, and 100 new presets based on these. The new algorithms comprise five dual-effects types each containing two independent effects blocks—one of three stereo reverbs and one of three different stereo pitch shift blocks. The other algorithm provides a 4-voice pitch shifter, combined with the PCM80 Concert Hall reverb. All six of these algorithms include a new sub-mixer section, which has its own row on the parameter matrix for changing the sends, returns and routing of the eight ins and outs of the effects blocks. This is for serious boffins with time to kill—but my life is too short.

Once loaded, you can remove the card and

it continues running until power down, enabling you to save settings on another card.

The presets are logically organised across two banks, X0 and X1, and start off with Vocal Shift settings for fixing vocal tuning, and adding detuned voices. There then follow settings for adding harmonies to vocals. These all sound smooth, but there are no intelligent diatonic stay-in-one-key type of tracking harmoniser settings such as those you get on Eventide Harmonizers. Some presets can be MIDI controlled, but you would get more usability from a Digitech Vocalizer or suchlike.

The second bank includes many effects I could imagine using for a dramatic film score, along with some wacky character vocal effects, pitch sequences and pad and drone chorus-type effects. Finally you are presented with accurate varispeed-compensating pitch shift and other utilities, and clean slate versions of each of the six new algorithms.

Overall, these are a useful addition to the PCM80, but too many of the presets have irritating short reverbs or delays added to the pitch effect. This card will be most useful to project studio users who perhaps write and produce soundtrack material.

The Dual FX algorithm card comprises 25 new algorithms offering all imaginable combinations of familiar PCM80 effects and 250 new presets. All these algorithms include the new Submixer section.

The presets are divided into banks of 50: Banks X0, X1 and some of X2 are designed to process stereo input material, and some of them maintain the stereo image of the source while adding processing. X2 also features

some Mono In-Stereo Out presets which can be used with only one input connected. X3 features some Dual Mono In-Stereo Out presets which effectively turn the PCM80 into two conventional effects processors. X3 and X4 have some Dual Mono In-Dual Mono Out settings where each half of the unit functions completely separately, which are useful for inserted effects. At the end of X4 there are all 25 new algorithms in clean slate form ready for the creation of new effects.

If you like what the standard PCM80 does and just want more, then this is the card is for you.

In my experience, memory cards are a nuisance and easily mislaid. Instead, I prefer new software on a chip, as after the initial fitting you can just forget about it. But if you're comfortable with cards, these will neatly enhance an already flexible unit, and resolve some of its shortcomings.

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## NEW TECHNOLOGIES

< page 40 knobs provide real-time pan-aux send-submix functions, as well as discrete parameter control in effects mode. Transport controls are also provided.

The Optimod 9200 is claimed to be the first fully digital processor designed specifically for the demands of mono AM broadcast. The 9200 provides eight factory presets to optimise processing for any music, sports or talk format. A single dial makes processing adjustment easy while PC software allows remote computer control via modem as well.

**Orban, US. Tel:** +1 510 351 3500.

### BSS Opals

BSS OPALS addresses affordable processing with the DPR422 dual compressor and de-esser and DPR522 dual noise gate. Each channel on the former has a variable ratio compressor with the company's progressive knee characteristic. Fully variable controls are provided for threshold, gain makeup, attack and release with a switchable auto setting for attack and release constants. Channels can be stereo linked. De-essing can be performed on broadband or HF only.

The dual noise gate is stereo linkable and has key filter with width control, key listen and duck. It incorporates Auto Dynamic Enhancement (ADE) to boost leading edge information plus fully variable threshold, range, attack, hold and release and a manual gate open switches.

**BSS, UK. Tel:** +44 1707 660667.

**Web:** www.bss.co.uk

### Calrec Digital X-Series

CALREC PREVIEWED its first all-digital desk at the AES, called the X-Series, aimed specifically at radio on-air/production. Many of its functions are screen-based which the company claims solves the compromises of creating a desk that can be used easily by a journalist or DJ but is still able enough to cope with fairly complex radio productions.

Prices start at around £35,000 (UK) for the product which is said to have emerged from the development line of the company's all-digital T-Series desk.

**Calrec, UK. Tel:** +44 422 842159.

### Sony Freedom

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**Sony, Europe. Tel:** +44 1256 55011.



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*equipped two new remote units with CS2000 systems to broadcast live sports and entertainment programs.*



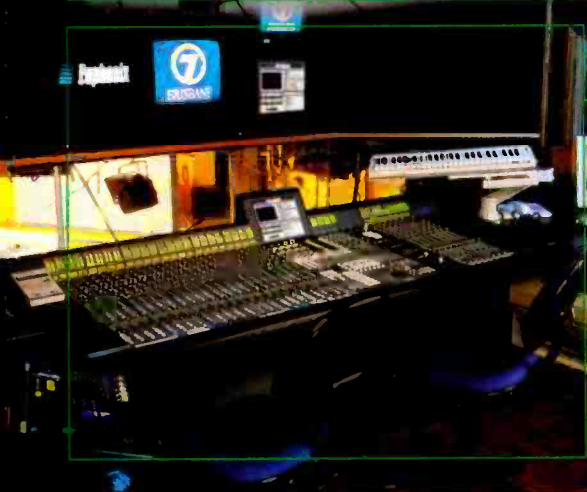
**Lin  
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*provide exclusive live remote broadcast for a major league baseball team, and other independent broadcast projects.*



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*uses Euphonix consoles in five studios across China for music recording and live broadcasting.*



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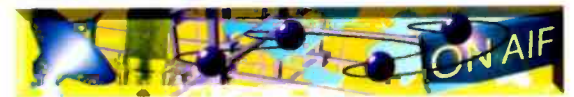
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# Motionworks R2P2

Anyone who's lived in the real recording studio world will agree that one of the most fraught operational areas is that of synchronisation and remote control. **Rob James** evaluates a dream solution

**M**OTIONWORKS pretty little controller, the R2P2, attempts to provide a variety of users with a simple and no-nonsense remote controller. The R2P2 (no relation to any film star robots) is also considerably more compact than its near namesake at a mere 130mm by 235mm. It is also rather less likely to be stopped in its tracks by small pebbles...

At its simplest level of operation, you simply plug in a serial control lead into the R2P2, turn it on and the target machine is recognised and you have the transport functions remotel. A hundred and ten machines are listed in the manual plus generic 9-pin control. If you want



more than straight transport functions, the R2P2 can be configured to provide record control on, say, a DA-88 with all eight tracks accessible. It can loop and edit or locate with stores for up to 10 cue points.

Both the program and machine library reside in flash ROM which can be updated using an RS232 serial connection to a PC or Mac. Updates will be made available from the dealer on disk, which will have a cost attached, or from Motionworks' Web site (currently under construction) for the cost of the time they take to download.

The unit's upper surface has a row of prominent transport controls and associated LEDs, a numeric pad for data entry, an option key (which is effectively the ON-OFF switch), a function key used in conjunction with the numeric keypad to access various functions and four soft-keys associated with the LCD. There are three LEDs

below the jog wheel which indicate whether the processor is alive, if there is a problem and if the machine is armed for recording.

Connections, on the rear panel, are a couple of 9-pin D-connectors for P2 (RS422) and

RS232, a BNC for video sync and the power connector. The R2P2 is powered by internal NiCad batteries. The external charger-power supply is included.

To get to the slightly more esoteric functions you have to use the menus and function keys. The nested menu structure looks daunting on paper, but it only goes three layers deep and is easy to navigate in practice. Things are grouped in a logical manner thus, if you are at the top layer menu, pressing the AUTO soft key gets you to the Goto, Loop and DREC submenus. Selecting Loop gets you a submenu with S-E (start and end times) RCL (recall) and Go!. You can enter start and end times from here or use the RCL key and a number 0-9 to recall a cue point. Then press Go! and away it goes. Various built in diagnostic checks on R2P2s health are available should they be required.

A couple of whinges here: the first is a general one. Half the devices I see these days come with external power supplies often of the 'built into a mains plug' persuasion. These are even more of a pain than the usual forest of 'kettle plug' IEC mains leads. I think I understand the reasons behind this trend—world-wide markets and more stringent safety and emission regulations—but surely there must be a better way. Now to the particular; the labelling for the function keys is orange on a textured dark grey background which is difficult to read in broad daylight, let alone in studio gloom. The jog wheel on my example was stiffer than I would wish. According to the company this may well be an isolated example.

This is one of those genuinely useful devices that make you wonder why on earth somebody hasn't produced one before. Apart from the obvious operational applications in studios the R2P2 is attracting interest from maintenance departments who need a controller to put P2 machines through their paces and to isolate faults on the increasingly common RS422 matrices.

The Sony P2 serial protocol is the nearest thing we have to a universal remote control standard for audio and video machines. Unfortunately the implementation is something of a black art. This can lead to no end of aggravation when attempting to connect machines to controllers from different (and on occasion, the same) manufacturers due to differing interpretation of the protocol. There is an element of risk that a specific machine may not behave in the way you expect so, if you have specific machines in mind, when buying a controller, it pays to check.

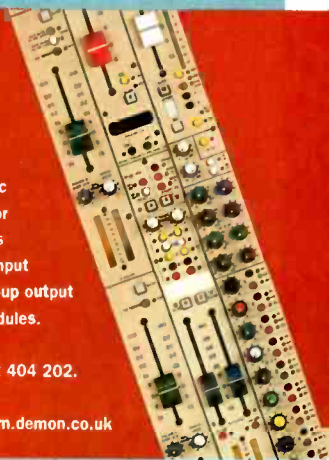
Within these limits, if you have been looking for a small, neat device to remote control a single P2 protocol machine, then this is the only game in town and should do well. ■

### Contact

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295 Forest Avenue, Suite 121,  
Portland, Maine 04101-2000.  
Tel: +1 207 773 2424.  
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## NEW TECHNOLOGIES

Released for the first time at the AES in Munich, Cadac M-type monitor module details showing the input challenge, group output and listen modules. Cadac, UK. Tel: +44 1582 404 202. E-mail: cadac@clivegm.demon.co.uk



### tc guitar box

tc electronic will begin shipping an as yet unnamed guitar multi-effects processor in May, which will be able to run eight different effects simultaneously. Equipped with balanced and unbalanced inputs and outputs, the new unit will incorporate delay presets from the 2290 and pitch capabilities designed by Wave Mechanics.

tc electronic, Denmark. Tel: +45 8621 7599. Web: www.tcelectronic.com

### Studer long distance fibres

To help solve the problem of transferring many channels of microphone level signal from the stage to the mixing console, Studer now supplies the D19 Long Distance Package which uses a single optical fibre cable to transport eight audio channels digitally over large distances in a scalable architecture.

Remote controllable D19 MicADs are used on stage and D10 MultiDAC 23-bit converters at the console position. Alternatively, the 8-channel digital signal can be connected to Studer's D19M Dual ADAT input module and used in the digital form (MADI or AES-EBU).

The Mk II version of the company's D940 digital mixing console has been upgraded with D19 MicADs microphone preamps. Analogue line inputs and outputs have been upgraded by D19M series modules with 20-bit A-D and 22-bit D-A converters. New also is the dual ADAT optical input card and the AES-EBU input card with optional Sampling Frequency Converter. The Mk II features an ergonomically improved surface with green alphanumeric displays instead of the red ones as well as integrated control of local analogue and digital monitor selection matrices in addition to the existing digital DSP monitor router.

The D424 MO 2-track recorder is now available with Software v1.1. New features include time-code chase, 16-24-bit recording, ISO Standard Disks, non-destructive editing, workstation compatibility with SADIE DAWs, a desktop controller and a CD transfer option.

The next generation D827 DASH machine has a new autolocator with new sound memory functions, 20-bit converters as standard, and a new tape cleaning and stabilising system.

Studer, Switzerland. Tel: +41 1 870 75 11.

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Nick named the "Bad Boy", the 704 uses dbx's patent pending Type IV conversion system, with equivalent performance of 27 bit, for the widest dynamic range and most natural analog sounding conversion available. 8, 16, 20 or 24 bit output is offered,

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## Soundtracs digital desk

**S**OUNDTRACS previewed a new large-scale digital console the DPC-11 at the AES as a working prototype which builds on the success of the company's Virtua desk.

Aimed at higher profile music and postproduction studios and priced from £85,000 (UK), the board is in-line in appearance with 4-band parametric bell-shelf EQ, keyed and side-chained compressors and gates, 16 auxes and multiformat output busing.



Worksurfaces will be in two sizes with 64mm and 80mm 100mm motor faders, six colour TFT LCDs and 40-segment LED meter bridge. Like the Virtua, the system has a separate worksurface and convertor rack and incorporates talkback and foldback to two studio areas and a multistem monitoring matrix.

Automation is dynamic and snapshot-based, and machine control takes in remote control of multiple RS422 and MMC devices.

All mixing parameters, including input gains, will be resettable as will the busing structure.

The board is based on Virtua core software but all-new hardware and will be available later in the year. The desk employs 24-bit sampling on the A-Ds and is touchscreen driven with the promise of importing reverb algorithms into the system.

The company is understood to be talking to another manufacturer about the possibility of integrating hard disk recording into its digital desk products.

**Soundtracs, UK.**  
Tel: +44 181 388 5000.

## ADAT Pro launched

THE ALESIS Meridian features the new ADAT Type II format, which records eight tracks of linear 20-bit digital audio without external convertors or multiplexers. The machine allows tapes to be recorded and played back at 16-bit or 20-bit formats and tape recorded on a 16-bit ADAT-compatible recorder (now referred to as the Type I format) is completely compatible with a Meridian.

Additionally, the ADAT Optical and ADAT Sync jacks on the back of the new unit are exactly the same as on the original machine's allowing the Meridian to be combined in a system with older machines and having built-in time code it can function as the master in such an arrangement.

Inputs and outputs for time code, MIDI, word clock, and video reference in and through jacks are all built in while for location recording and postproduction applications, a new read/write SMPTE-EBU time-code track allows discontinuous time code to be printed onto a special subcode of the tape without using up an audio track, so different sections of tape can be uniquely identified without running the risk of mistakes in calculating offsets from the built-in sample accurate ABS time code of the ADAT format. The machine can also read and write 100 named locate points and SMPTE/ABS time offsets to the data section at the head of an ADAT tape.

The transport is manufactured by Matsushita and has seen millions of hours of industrial service in Panasonic's top-end VCRs and duplication systems and features a direct-drive capstan, direct-drive reel motors (no idler wheel

to clean or replace, and no brake adjustments required), tension sensor arms, twin tachometer output and automatic head cleaning wand. This new transport has allowed the introduction of a multispeed jog-shuttle and an analogue aux track, with its own XLR I-O, which acts as a 'ninth track' for cueing.

Individual Meridians in a system may be offset from each other using the onboard 10-key pad, or by various methods of capturing an existing offset, allowing digital copy-and-paste editing from tape to tape. Individual tracks may be delayed up to 170ms. Auto punch-in and out with preroll and postroll are supported, as is Rehearse mode. Auto Play and Auto Return are used in conjunction with any of the 100 locate points in the Meridian's memory, and all of the locate points can be given an 8-character alphanumeric title and stored to the data header at the front of the tape. Onboard digital routing allows for digital copying from track to track within the same machine or between any tracks of an ADAT system.

Meridian has individual input select switches on each track and the machine can record from a digital input on one track at the same time that it records from an analogue input to another track. Connectors are provided on XLR and multipin at +4dBu. A new remote has been developed for direct control of eight Meridians while a remote meter display will also be available.

Shipping is expected to start in the Autumn for a US retail price of less than \$7000.

**Alesis, US.** Tel: +1 800 525 3747.  
E-mail: alecorp@alesis1.usa.com

## NEW TECHNOLOGIES

### FM Processor

APHEX' MODEL 2020 FM Pro digitally-controlled FM audio processor is fully programmable with the ability to be remote controlled and automated and is modular. The unit offers analogue stereo inputs and outputs, Aphex's patented Frequency Discriminate Leveller, multiband compressor, bass processor, peak limiter and a digital remote control.

It uses patented technology from other Aphex products, including selectable DVG, Easyrider compression and the Peak Accelerated Compression (PAC) algorithm, in addition to six patents that are pending on new technology designed specifically for the FM Pro.

The device has three optional module add-ons: a digital I-O allowing the unit to interface with digital broadcast signals; a pre-emphasis processor module with a patent pending 50µs or 70µs pre-emphasis filter for 'spreading' the pre-emphasis; and a Digicoder stereo generator add-on developed using Aphex's patented Digicoder type PPDM stereo generator. Other patents are currently awaiting confirmation on a 'post cross-over' multiband technique designed for the multiband compressor, a bass interactive function that reduces intermod distortion in the peak limiter, and a bass clipper in the bass processor for cancelling distortion.

The FM Pro comes with 16 user-programmable read-write presets, allowing manual or automated recall, and eight read-only presets designed for a variety of radio programme formats that can be used straight out of the box. The front panel gives access to simple menu driven controls; RS232 connection enables users to control and monitor parameters from anywhere on a PC.

**Aphex Systems, US.** Tel: +1 818 767 2929.

### LA Millennium Series

COMPRISES THE GCX2 gated compressor, EQX2 dual 3-band parametric equaliser, MLX2 dual microphone-line preamplifier with DI input and MPX1 microphone processor, LA Audio's affordable Millennium range is now shipping.

The MPX1 is a single-channel processor designed for one-step processing of vocal or solo instruments and combines a mic-line preamplifier with DI input, noise reduction, a 4-mode autocompressor and equaliser in 1U.

EQX2 is a dual channel 3-band parametric equaliser, which can also be configured as a mono 6-band unit offering variable frequency and 15dB cut and boost. Each band has variable Q and each channel is also equipped with a high-pass filter.

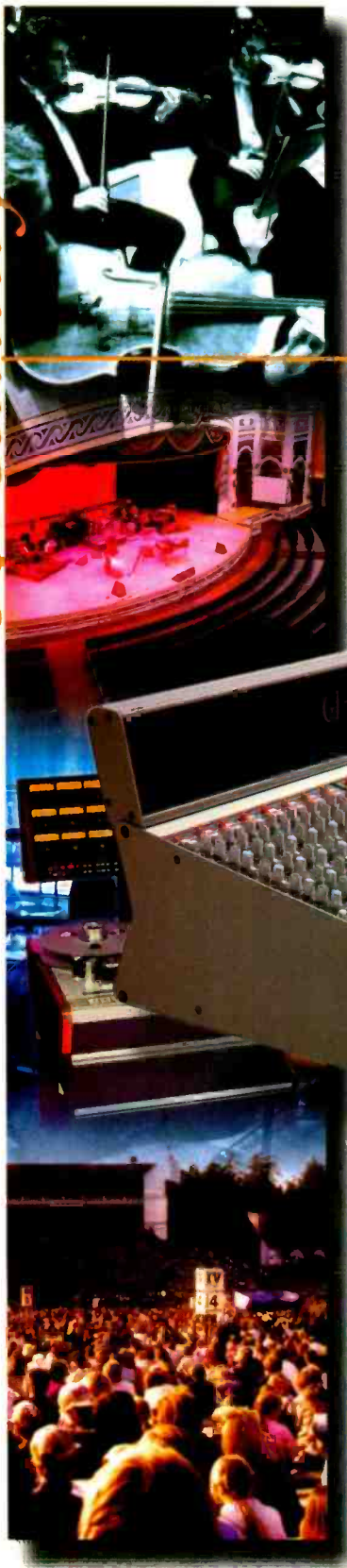
The MLX2 is a dual-channel mic preamp which also caters for line level and instrument connection.

**SCV, UK.** Tel: +44 171 923 1892.

E-mail: info@scvlondon.co.uk



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Tape-based digital recorders serve a wide variety of applications beyond those championed by the DA-88 and ADAT. **Studio Sound** recently assembled a panel of critical listeners with the sole aim of judging audio performance regardless of cost and convenience. The results are surprising

In selecting a number of tape-based digital tape machines for assessment of their audio performance. Studio Sound has attempted to present a subjective but authoritative study which will be of potential benefit to a spread of audio professionals. That many of the machines chosen for the exercise are not directly comparable in terms of facilities, functions and cost is self evident: the machines do, however, represent a cross-section of options with a variety of potential applications available to anyone considering buying or using a digital recording system.

This study concentrates on audio performance, firstly in terms of each machine's onboard analogue-to-digital converters and secondly with the benefit of outboard A-D converters. It does not attempt to directly address any aspect of functionality or reliability.

The line-up of machines includes a Sony PCM-3348, Nagra-D, Tascam DA-38, Alesis ADAT-XT and Sony PCM-7030 DAT. These machines were selected as being representative of each format of tape being used for digital audio recording and it should be noted that each format, with the exception of the Nagra-D is supported by other manufacturers' products. It was decided to take only one example of each in order to make the listening process practical, but each example has specific reasons for its inclusion.

The Sony PCM-3348 is a common studio and mobile recorders' 48-track DASH machine featuring A-D converters comparable with the PCM-3324S. The Nagra-D offers four tracks and stands alone in its recording format. The Hi-8 tape-based Tascam DA-38 8-track modular digital multitrack (MDM) machine is less well featured than the current DA-88 but has better A-D converters which will shortly become standard on the DA-88. The Alesis ADAT-XT also represents the best available performance of its kind, in this case of the S-VHS-based option in the MDM market. The Sony PCM-7030 is a studio stalwart and offers DAT's standard two tracks along with the synchronisation capability necessary for this appraisal.

In each case, the machine is as good a representation of its format as available and should provide ready points of reference to most readers. Outboard converters were provided by Genesis Pro Systems. The choice of converters was largely determined by the intention to offer a point of reference above the anticipated general standard of onboard converters but at a price point that would not preclude them from being of interest to the majority of the listening panel. The Genesis converters are also still relatively new to the market and are thus largely spared any preconceptions that the panel may have had of other converters.

The exercise took place at London's CTS

studio in Studio 1, where the console is a Neve VRP and both large and small monitoring systems are by ATC. The listening panel was assembled by invitation, and included representatives from a variety of disciplines including music recording, location recording and audio postproduction.

Also in attendance were CTS' Technical Manager, Pete Fielder, and representatives from each recorder's manufacturer.

Recording media were provided by CTS in the case of the PCM-3348 and PCM-7030, and by Richmond Film Services, Tascam UK and Sound Technology in the case of the Nagra-D, DA-38 and ADAT-XT respectively.

The listening session was begun by locking all the recorders into sync using a MicroLynx synchronisation system being driven by an Audio Design ProBox 12 slaved to the house video sync. This clocked each recorder and also the first of the Genesis converters to AES-EBU, the subsequent converters were synchronised using Genesis' proprietary slave mode. Each machine was presented with a stereo mix (on tracks 1 and 2 where applicable) of a jazz quintet performing live in the studio. In this way identical recordings were made on each machine first via the onboard converters (Pass 1) and second (Pass 2) via the A-D side of a set of Genesis ADA 20.16 converters (which offer two channels of A-D and two channels of D-A at 16-bit and 20-bit resolution). In the case of both onboard and outboard conversion paths, each machine was presented with the word length appropriate to its default recording setup—all machines therefore received 16 bits with the exception of the 20-bit Nagra-D.

Replay was consistently via the D-A side of Genesis ADA 20.16 converters. This arrangement served the dual purpose of isolating the performance of each machine's A-Ds from that of its D-As and concentrated the panel's appraisal on the A-D converters alone. This approach was chosen on the basis that the performance of any chosen A-D converter becomes inextricably part of the recording, whereas the D-A converter can be substituted at any time after the recording has been made.

Once the recordings were complete, the tapes were rewound and played to the panel either sitting individually or as small groups. The panel was asked to compare the performance of the machines in each recording configuration by switching between the console's tape returns without being aware of which machine was routed to which return, with the band playing on in the studio to provide a room reference should it be required. It was suggested to the panelists that the machines may have been rerouted to appear on different tape returns on Pass 2. They were asked



# All ears!



to make notes and state a preference and rank the machines if possible. On completion of the two passes, they were debriefed and then finally informed of the machines' assignment to the tape returns and invited to comment on their impressions of the recorders in the light of their professional responsibilities, and also to comment on the testing procedure.

Limitations of the test were evident in a number of areas. The original intention of replaying as well as recording with all

machines in sync was thwarted by an inability to sync the ADAT-XT's AI-2 sync unit as desired. This was due to an unfamiliarity with the requirements of the XT and lack of time. Instead, while all the other machines ran under the control of the PCM-3348, the ADAT-XT was flown in manually and, it has to be said, fairly accurately.

On the audio programme, while the lineup of drums, double bass, piano, trumpet and vocal presented the recorders with a variety of transients and tonal requirements, certain listeners would have liked to hear other sources such as spoken work and amplified electric instruments.

It was observed that by opting for a single make of D-A converter, there was the potential for this to consistently conceal shortcomings at the A-D end. The effective performance of the Genesis D-A, however, sat comfortably with everyone, causing CTS engineer James Collins to comment that he was able to hear characteristics he knew certain of the machines to exhibit.

Further to surveying the options offered by current tape-based (linear)

digital systems, it was intended that the assessment should be of interest to as many recordists as possible, whether, for example, they might be weighing up the relative merits of a fully-professional 48-track DASH machine and 48 tracks of MDM with outboard converters, those of a Nagra-D and portable DAT machine or simply which of the competing MDM systems sounds best out of the box.

Disc-based systems, such as the Sony PCM-9000 and Genex GX8000 MO recorders, were not included in order to avoid having to rationalise the many nonlinear systems available. Similarly, an analogue recorder—while easy to include—was avoided to prevent the discussion becoming another aspect of the analogue-versus-digital debate. > page 50



The mustering of the manufacturers

# TESTS & LISTENING



< page 49 Overall, the consensus of opinion was that the test was a valid indication of the default performance of a selection of digital tape machines and justification of the use, where appropriate, of an outboard converter system. Perhaps the most surprising observation is not that the machines did not consistently perform to expectation, either of reputation or price point, but that although certain listeners were quickly convinced that there was practically no difference in performance between the machines on Pass 2, others were confident that there was—even when both A-D and D-A converters were common and the recorders were serving simply as data recorders. Speculation as to the reasons for this has only just begun...

That the exercise was subjective precludes and statistical summing up. Instead, abridged comments have been attributed to each of the panel members along with engineer, James Collins, whose familiarity with the control room gave him a valuable insight.

**Laurie Taylor** BBC Senior Sound Supervisor  
**Duties:** studio-based TV light entertainment-sitcom work on speech

**1<sup>st</sup> Pass Preference:** none

'I didn't experience any significant subjective difference between any of them. They all sounded sensibly like the band in the studio. The only one I would have thought I could hear the difference would be the 7030 which I work with regularly.

'For all the purposes I ever work with they

are all interchangeable. The only doubt would be over the 7030 because it was at a lower level and I couldn't bring quite the degree of judgment to bear. I wouldn't have thought I could identify any of them by their tonal grouping. The only one that I thought had any significant difference, that I could convince myself probably was a bit brighter, was the DA-38. The differences are of absolutely no consequence within the sphere of work I do; the machines were as good as identical. I would certainly join any bit of any one of them to a bit from any other and expect to get away with it. I would have no problems using any of them.

'On the second pass initially I thought I could hear something to do with the 3348 but I couldn't convince myself.

'The criterion I've always used when assessing material is whether the difference is less than the difference between two sorts of professional microphone—like a U89 and a 414, and the difference here is considerably less.

The only danger with the test is not being able to present things synchronously can lead you down the wrong path, but it's certainly valid compared with what you meet in real life.

(These opinions are Laurie's own, and not those of the employer)



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**Matthew Roberts**  
 Postproduction Engineer  
**Studio:** The Bridge  
**Duties:** voice recording  
**Uses:** Lexicon Opus  
**1<sup>st</sup> Pass Preference:**  
 ADAT-XT



I liked the Nagra the least but even the lowest rank I've given is quite acceptable.

Listening live was slightly irrelevant, I'd rather have been in on the original recording. I would have much preferred to have been listening to straight speech, which is more familiar to me so the differences become more apparent than with music.

On the first run I would have expected more difference, but that's not to say that on another day I wouldn't have put them in a different order. Certainly, the second pass with the outboard converters sounded better but the I have to stress that the difference between the best and the worst is very slight.

It would also have been nice to have a choice on the D-A, so that you could settle on what you preferred before starting to listen.

**Christian Wangler** Location Mixer  
**Duties:** mostly for TV  
**Uses:** analogue stereo Nagra  
**1<sup>st</sup> Pass Preference:** ADAT-XT

On the first Pass I thought that Machine 1

(PCM-3348) sounded a little sharper but I found it very hard to say that one machine was really better than any other because it's all so subjective. However, I ranked Machine 4 (ADAT-XT) as more mellow in the bass end, I thought it was warmer, but I found it hard to tell a difference between Machines 2, 3 and 5 all of which I ranked equal second. The point about all the sounds was that I could have EQed all of them easily to sound the same.



On the second pass I would suggest that Machine 1 (PCM-3348) was perhaps a little harder but was not able to discern a difference between the rest.

My main critique for all recording machines is that most of the places that we get ourselves into have recording conditions that are so appalling that I sometimes wonder if it's any better than a tin can on a piece of string. In terms of high quality, often the information that is going into the machine is not very high quality simply because of the conditions. The quality of the machine becomes almost academic.

**David John**  
 Film Location Mixer  
**Duties:** working on *Les Miserable*; > page 52



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**Piers Ford-Crush** Director  
**Studio:** Eden Studios  
**1<sup>st</sup> Pass Preference:**  
 ADAT-XT



'On the first pass I was pretty sure I didn't like what was happening on Machine 3 (Nagra-D). I used Machine 1 (PCM-3348) as the reference, the only problem was that by the time we got to Machine 5 (PCM-7030) I couldn't decide if 5 wasn't identical to 1. Machine 4 (ADAT-XT) seemed to be a bit cleaner by a small margin than machine 1 and I ranked it best and considered Machines 1 and 5 as joint second, followed by Machine 3 (DA-38).

'I failed to have a ranking on the second pass although Machine 4 (ADAT-XT) worried me because as it got a lot louder it almost felt like there was some peak distortion. With the other machines I thought I was hearing differences but then wasn't sure. I certainly felt Machine 5 (PCM-7030) was better than 4 (ADAT-XT). I have to say that the differences weren't nearly as marked as they were with Pass 1.

'There definitely were quite specific characteristics between what it now turns out were the input processors.'

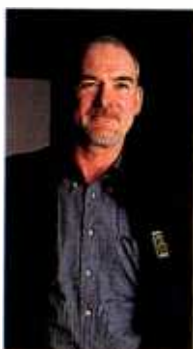


**< page 51**

*Day of the Jackal*

**Uses:** Foxtex PD4s; HHB-Aiwa DAT; analogue time-coded Nagra as 'security blanket'

**1<sup>st</sup> Pass Preference:** none



**Mike Gardner**  
 Technical Director  
**Studio:** Eden Studios  
**1<sup>st</sup> Pass Preference:**  
 DA38, ADAT-XT



'I don't think we had long enough to judge them with enough different material. Machine 1 (PCM-3348) had some edge in the mid and I thought that Machine 2 (DA-38) and 4 (ADAT-XT) sounded smoother. Machine 3 (Nagra-D) had a mid-band edge that I didn't like.

'On Pass 2, Machine 1 I thought there was somewhere a mid edginess which is the same as I heard on the same switch on Pass 1. Machine 2 (DA-38) sounded smoother and rounded on the vocals and I would say this was perhaps the best on Pass 2. I felt there was edginess on Machine 3 (Nagra-D) while on 4 (ADAT-XT), I thought there was almost some distortion. Overall my rankings were quite similar to Pass 1 but very close to one another although I preferred Machine 2 (DA-38). 'To be honest I think that if you had exactly the same signal on all the buttons we would have still come out with various comments.'

**Rob Buckler**  
 Managing Director  
**Studio:** The Strong Room  
**1<sup>st</sup> Pass Preference:** Sony 3348

'The thing I found difficult was having a reference point because that becomes the first one you hear. For the first pass, on Machine 1 (PCM-3348), I thought the vocals appeared open but maybe a little bit thin > page 54

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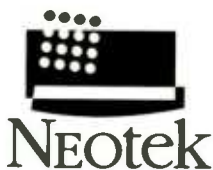
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< page 52 although the general sound was fairly complete to me. Machine 2 (DA-38) had a slightly closed mid range compared with 1 but slightly more low end, Machine 3 (Nagra-D) seemed to have a slightly thinner sound compared to 1 and 2, and Machine 5 (PCM-7030) had low low-end definition compared with 1 and the vocals weren't very open or clear.



'On the second pass I got the feeling at times that I was listening to the same thing as Pass 1 but mixed up. I felt Machine 1 (PCM-3348) had low definition in some of the low end but then the vocal presence and the mid range was good. Machine 2's (DA-38) vocal sounded a little closed and generally even a little compressed, Machine 3 (Nagra-D) had a very open vocal with a clear bottom end and it was fairly well balanced. Machine 4 (ADAT-XT) was the only time I ever thought about graininess. In the second pass I preferred Machine 1.

'The only machine I had a problem with was Machine 4 in the second pass.

'It's interesting that we perceived XXa similar sort of thing and XX such a difference in Pass 2 which was in effect listening to the storage. That's very strange even though the differences between all of them was less.

'I've listened to different convertors and there are differences, but this wasn't like we were switching between an Apogee, a Prism or an Audio Design.'

**Stuart Thomas**  
Technical Manager  
Studio: The Strongroom  
1<sup>st</sup> Pass Preference:  
ADAT-XT



'On the first pass, Machine 2 (DA-38) had a thicker bass than Machine 1 (PCM-3348) and seemed less complete. Machine 3 (Nagra-D) felt a bit awkward. Machine 4 (ADAT-XT) I liked.

'On the second pass, Machine 1's (PCM-3348) bottom end didn't seem to go down as far but it did sound polished. Machine 2's (DA-38) vocal seemed to sit back a little more. Machine 4 (ADAT-XT) I described as comfortable and dynamic(ish) while 5 (PCM-7030) was very full and open but a little harsh.

'It's a very personal thing, like listening to speakers. If everybody agreed on one particular speaker sounding great there would only be one manufacturer but there are reasons why there are so many different types because they suit different people's hearing, their use and the type of music they play. This is a very similar thing, with convertors it's also an emotional thing.'

**Geoff Foster** Chief Recording Engineer  
Studio: AIR Lyndhurst

Duties: film scores,  
albums  
1<sup>st</sup> Pass Preference:  
PCM-3348



'On Pass 1, It was between Machines 1 and 4 (PCM-3348, ADAT-XT) and I would say they were the higher grade formats, the imaging was better, but in the end I decided that I liked Machine 1.

On Machines 2, 3 and 5 I thought the imaging collapsed a little and I felt Machine 2 (DA-38) was rounder, almost compressed if you told me there was a soft limiter on the front of that I wouldn't be surprised. Machines 2 and 3 (DA-38, Nagra-D) seemed to have a little more bottom end. I most liked Machine 5 (PCM-7030), it felt the most muddy. They all worked. I don't know if they were the same machines on Pass 2 but I would suggest that perhaps Machines 1 and 4 had been swapped over. Machines 1 and 4 had the best imaging and I felt they had the most space around them.

'On Pass 2, Machines 2, 3 and 5 all sounded more or less the same. The imaging on Machine 2 (DA-38) was the worst but they were all much closer than they were on the previous pass. Again 1 and 4 (PCM-3348, ADAT-XT) felt the better ones although I'd say Machine 4 was the better one this time around. It was kind of like they'd all had the same A-D but different D-As. Pass 2 was more consistent and they all seemed closer to each other.

'I've learnt that the XT sounds better than some of the others, THAT'S interesting but my experiences of the mechanical nightmare of the old machines means it will still be out of the running purely from a practical point of view. Whenever I've used ADATs on a session you always at least once have to turn everything off because it hangs up and gets all confused.

'Had I known what the machines were I would have found it harder to believe that the XT sounded better in the second pass. However, I don't think it would have coloured my judgement that much.

'What really doesn't surprise me is that Machines 2 and 5 (DA-38, 7030) were what they were and that 5 was a DAT because I don't like DAT. A little interesting exercise is to take a DAT, play it 100 times, clone it, play it 100 times, clone it, play it 100 times, clone it. You still theoretically have a high quality recording but lock the last one up to a copy of the first version before you played it 300 times and you would be amazed at the difference.

'What I've learnt from this is that what I've known in the past is still valid. I hate DATs for this reason.

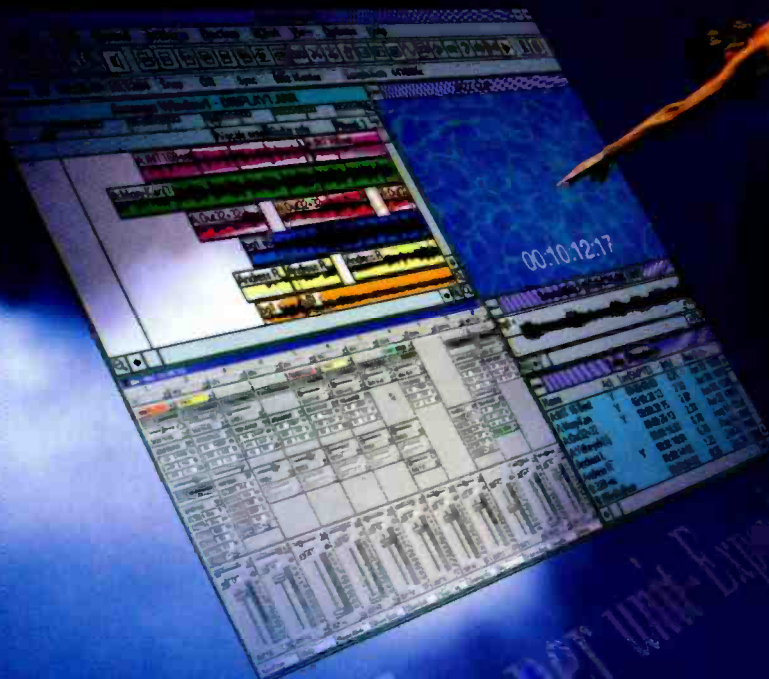
'We use outboard convertors depending on the budget but the bottom line is that Joe and Josephine Public put one hi-fi speaker up on the bookshelf, the other down behind the sofa and it doesn't matter what I do. From my experience great reviews are given on recordings that were done against all the rules of good recording technique and bad reviews for things that sound great. Record sales bear no relevance whatsoever to what we've done here.

'This preoccupation with this > page 56

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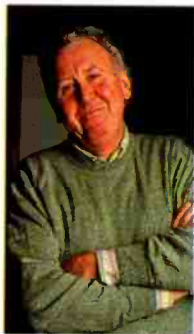
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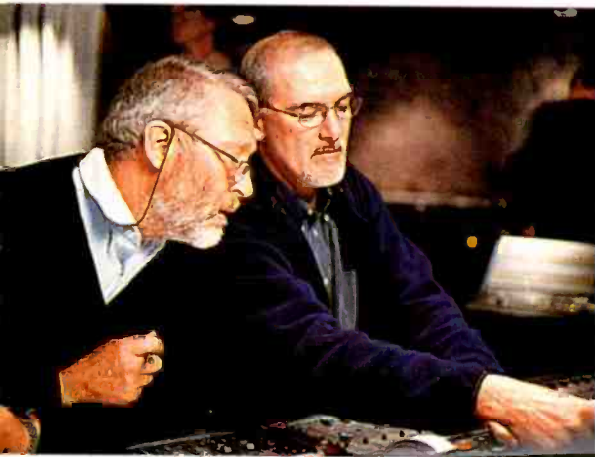
< page 54 convertor, that convertor, 20-bit, overhead cam, turbo-charged, etc does get in the way of people making good records. The downside is that you have people recording in their front rooms and I think it sounds like it. That's not necessarily a bad thing but the technology that allows you to make a record like that is actually what the record is about.'

**Adrian Kerridge**  
 Director  
 Studio: CTS Studios  
 Duties: music recording  
 1<sup>st</sup> Pass Preference:  
 ADAT-XT



'You've chosen a broad range of instruments with a wide spectrum, a percussion instrument which is the piano, the trumpet, drums with high cymbals plus the voice which covers the whole range. You could, for example, have added a string quartet but what we had covered a fairly broad spectrum.

I was listening for the openness of the



sound and the spread and the depth, principally the openness of the cymbals, the depth of the bass and air around the recording. On the percussive instruments I was listening to the edginess you can get on some digital machines.

'On Pass 1, Machine 4 (ADAT-XT) I thought was good all-round. I rated Machine 3 (Nagra-D) second but the piano was a little tubby, the voice was thin the trumpet was okay, overall pretty good. Machine 5 (PCM-7030) had less air around the sound and the voice was harsh, Machine 1 (PCM-3348) the voice was harsh, the bass thin and lacking depth and the sound was slightly thinner all round. Machine 2 (DA-38) again I said the piano was tubby, it all lacked air and the voice didn't sound particularly open.

'On Pass 2 it was much more difficult to put an assessment on although I ranked Machine 4 (ADAT-XT) as best all round. Machine 1 (PCM-3348) I put second—the voice was slightly smaller and the cymbals were open, Machine 5 (PCM-7030) had a smaller sound but a good bass, Machine 3 (Nagra-D) was thinner in the voice, the bass and the piano were rounder but there was a bit of edge on the trumpet and the voice. Machine 2 (DA-38) I put last—the trumpet was edgy, the voice was thin and there was no air around the whole of the sound and the piano sounded smaller too.

'Now knowing what I was listening to would explain why it was tighter to differentiate between the machines in the second pass but there was still a difference. That doesn't surprise me because we've experienced this here ourselves in the small tests we've done. People say that digits are digits are digits but they're not, it depends how they are handled.

The ADAT-XT has to come top in my book, but the 3348? That's a tremendous surprise.

'On Pass 2, the differences were smaller but I could hear a difference especially on the DA-38. What we've always known at CTS apart from the differences between machines is that if we can buy an A-D and D-A with every piece of equipment then it makes a big difference.'

'I've learnt that some manufacturers are listening to the voices in the world and other manufacturers maybe have not caught up yet. Those voices from the studio floor saying do something about the convertors and don't always believe that digits are digits because they ain't.

The only thing I got a bit wrong was putting the 3348 which I put fourth on the first pass and second on the second pass, which tells me that we've got input convertors on that machine that are not as good as they could be.

The lesson is to put the ADAT-XT convertors on a DA-38 transport and you've got a great box at a great price.'

**James Collins** Engineer  
 Studio: CTS Studios  
 Duties: engineering music and film sessions  
 Uses: Sony PCM-3348, Studer D827, Sony 7030

I was very interested to do today because it's not often you get the chance to listen under controlled conditions. Unless you set up like we did today there's no way you> page 59

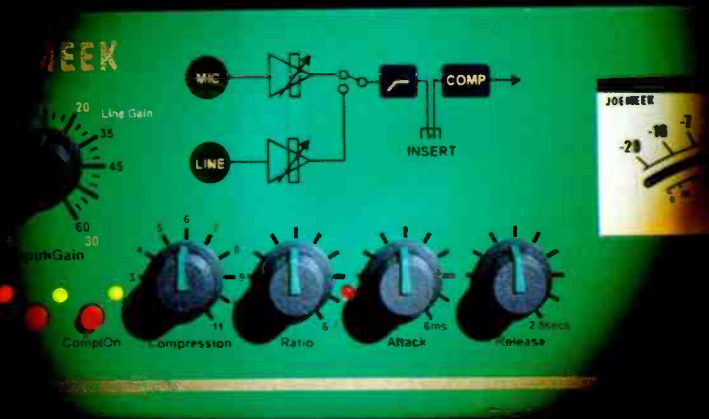
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## CTS Studio 2 The Capricorn room

**C**TS STUDIOS' AMS Neve Capricorn room went on line in May 1995 and continues the association between the studio, the brand name and its digital desks which started when it was the first studio in the world to go digital with the Neve DSP in 1984.

Studio 2, home for the 48-fader digital desk, is described as a multifaceted room that slots into the CTS complex in Wembley which has four studios in addition to other ancillary facilities. The jewel in the crown undoubtedly remains Studio 1 with its Neve VR and 120-musician recording area which has played host to numerous big film scores, classical recordings and popular music albums as well as this Studio Sound listening exercise.

Studio 3 houses a DDA while Studio 4 has an early Neve 8038 of a similar type to that originally in Studio 2 which went Stateside to make room for the Capricorn.

"For the type of work we're doing in that studio we needed to take ourselves further into the 20th century," states CTS director Adrian Kerridge. The opportunity was taken to completely redo Studio 2 courtesy of Recording Architecture, and to provide a mid-sized 40-musician live area with an interesting balcony plus large isolated drum booth and vocal booth all finished off with a floor of prime American oak.

Monitoring is via ATC SCM200s with SCM10s for the surrounds.

The studio can run in NTSC or PAL at the flick of a switch with a variety of picture sources and video monitors handling 5 x 4 and 16 x 9 TV formats.

< page 56 can say one machine's A-Ds sound better if you're listening via its own D-As.

Ideally, I would have preferred a more dynamic programme with some very low-level stuff. With that qualification I did hear differences, and I heard what I expected to hear apart from in one area. On the analogue in test, both Sony machines were what I expected; I found the XT XX and the Tascam

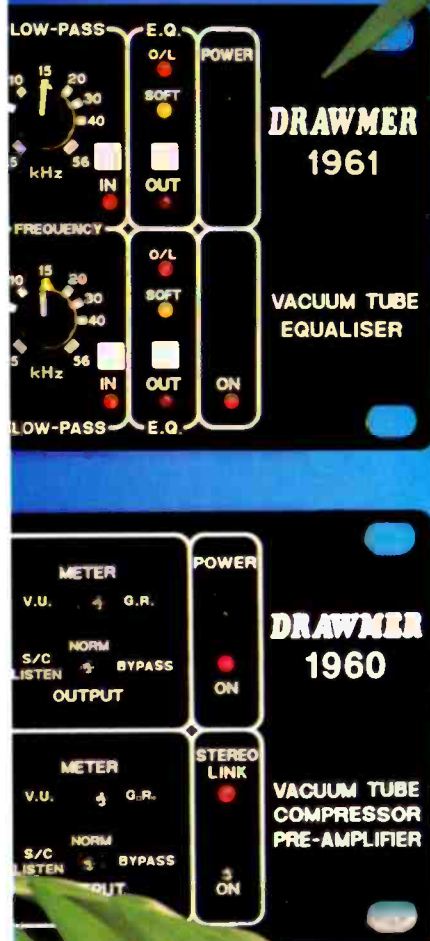
sounded more like each other than I would have expected; and I found the Nagra to be a little bit dull. On the digital in test, all machines I found similar except that the 3348 still sounded bright.

"What it comes down to in my mind is what you pay for the equipment in the first place.

If you buy a Tascam and you want to sync it up you buy an SY88 as an extra, if you want to interface it AES-EBU you buy an extra. The same with the ADAT. If you buy a 48-track DASH machine, it has everything—you plug it in and leave it alone. The more domestic video-style machines you have to hack together, if you pay the money in the first place, it's all there.' ■



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# The BRIT Awards

BRIT AWARDS

Building a new reputation over the rubble of its past ignominies, the UK's BRIT Awards is finally investing not only in slick presentation but in delivering audio worthy of a music show. **Kevin Hilton** reports

**L**EGEND has it that Alfred Hitchcock storyboarded his films so meticulously that he didn't bother to watch the action when it was finally shot. Everybody maps out what should happen but, due to circumstances, not everyone can be as sure as the Master of Suspense. Which is why Toby Alington, sound supervisor on the 1997 BRIT Awards, took some satisfaction from the fact that, with a couple of hiccups, his schedule pretty much worked out. Unlike Hitch, he couldn't take his eyes off the action.

The BRIT Awards are the UK music industry's annual back-slapping bun-fest: a time to recognise talent and seriously increase album sales. Once seen as a pale imitation of the Grammys, the ceremony has worked hard to live down the debacle of the 1989 event, when two non-professional presenters—Mick Fleetwood and Samantha Fox—looked bewildered as everything fell apart around them. All on live television.

Since then the ceremony has been recorded and postproduced, ready for transmission the following evening. The 1996 event racked up UK viewing figures of 12.8 million, a record for a terrestrially broadcast music show.

This year the programme was also pre-sold to 137 countries world-wide.

Alington first worked on the 1994 Awards, when he was called into remix the soundtrack for international distribution. Now operating as Audio Logistics, which organises audio production for various types of event, Alington chalked up his third BRITS this year. He observes about the event, 'It has grown hugely in stature over the last six years'.

The task faced by all the technicians is a daunting one: a 2-hour show that features presenters, play-back material and live performances, all in front of an audience. Proceedings were due to kick off at 8pm on Monday 24th February, with the finished programme

set to air at the same time on Tuesday 25th. 'With that kind of schedule, it all has to be about planning,' says Alington.

Central to this was a global patching spreadsheet detailing every mic, splitter and desk channel for the house system, monitors and mobiles. This was only changed centrally to guarantee that everyone was working in the same time zones. To ensure that all the elements set down on paper received equal attention in reality, Alington brought in all four Manor Mobile trucks, assigning distinct functions to each.

Manor 1, equipped with a 48 input SSL E-series console (with a G-series computer) and a 24 input API, worked on Jamiroquai with Diana Ross and the Bee Gees (who played

live but also used some backing tracks). Truck two, featuring a 144-input Raindirk, worked on the Manic Street Preachers and Sheryl Crow, both using 32-channel rigs.

Skunk Anansie and the Fugees (24 channels each) were mixed in Manor 3, which additionally handled the playback tracks for Mark Morrison (who sang live), The Artist Formerly Known As The Artist Formerly Known As Prince (who was due to sing live

but, as is his prerogative, chose not to) and the act that, depressingly, hit all the headlines, The Spice Girls. Backing tracks were sourced from SADIe hard disk and played out through a Yamaha 02R.

The small Manor 4, known affectionately as Zipper, was the 'hub' for the whole audio setup and dealt with dedicated audience mixes, communications and other links. This brought together the output monitor mixes from the other trucks; these were routed as a stereo mix to the Visions scanner, where TV sound mixer Dave Taylor prepared a combined output featuring hands, audience, VT, grams feeds and presentation mics.

As it was a live performance >page 62





page 61< as well as a TV show, there was a full front-of-house system (designed and coordinated by Dimension Audio with a Turbosound Flashlight and Floodlight system supplied by Britannia Row Productions), with stage crews bustling around to achieve tight turn-arounds (the tightest of which was the four minutes between the Fugees and Sheryl Crow). Band outputs were brought to the mobiles via five sets of 64 pair BSS active splitter boxes (a further 32 passive splitters handled line-level signals for communications).

'Some of the changes were very tight,' agrees Alington. 'The only hold-up during the show was the change-over between Sheryl Crow and the Manics, going from a 32-channel rig to 40 channels in 11 minutes. But the stage crew was brilliant.'

This was once everything got going, as there is no longer the imperative of live television, the start of the show can slip back, which it did this year by nearly 50 minutes, due to problems in getting in some of the public audience (as opposed to the industry audience).

**I**N ALINGTON'S words, once the show did start, 'it roared along'. This is one of the reasons why several analogue consoles were used, rather than one resettable desk. Alington explains. 'The only area for delay were cock-ups by any of the artists or had turn-arounds. At that kind of speed, there's nothing like having the tactility of an analogue console at your fingers—it's a major security factor'.

Alington's original plan was for the three band trucks to record monitor mixes of their respective artists, which would then be remixed in Manor 1. The schedule was constructed so that the middle part of the show was dealt with by Manors 2 and 3, leaving Alington free to do a final mix of Jamiroquai and Diana Ross, who were the second act on, while everything else continued.

'It wasn't ideal,' he says, 'I did that mix in 20 to 25 minutes, in between going off to do Prince. The Jamiroquai-Diana mix worked but if I had had the time I would have made it sound "bigger".'

This expediency was necessary to shave any time at all off the postproduction process proper, which was due to start when Manor 1 was driven to post house TeleCine in Soho during the early hours of Tuesday morning.

'There weren't enough hours in the postproduction schedule to have mixed all the bands after the event,' says Alington, 'so every minute we could save during the show was time off a tough postproduction schedule.'

One occasion where this philosophy worked was with the Manic Street Preachers.

'That was the only monitor mix that was used without any re-mixing,' explains Alington. 'Will [Shapland, Manor 2 engineer] did a great job of that straight off, getting the Manic's big wrap-around guitar sound. It's always nice to remix things but there are times when it goes right first time. There are two schools of thought in this situation: either

**Awards**

- Best Group**  
*Manic Street Preachers*
- Best Album**  
*Everything Must Go*
- Best Newcomer**  
*Manic Street Preachers*
- Best Solo Male**  
*George Michael*
- Best Solo Female**  
*Gabrielle*
- Best Dance Act**  
*Kula Shaker*
- Best Video**  
*Say You'll Be There*
- Best Soundtrack**  
*The Spice Girls*
- Best International Group**  
*Trainspotting*
- Best International Newcomer**  
*Fugees*
- Outstanding Contribution**  
*Robert Miles*
- Best Single**  
*Wannabe*
- Best International Group**  
*The Prodigy*
- Best Video**  
*The Spice Girls*
- Best International Group**  
*Wannabe*
- Best International Newcomer**  
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## Radio coverage of BRITs '97

Television coverage of the BRIT Awards may now be prerecorded and postproduced but radio listeners can still catch up with proceedings on the night almost as it happens. The Awards are covered live on BBC Radio 1FM in a show produced for the station by independent company Wise Buddah, run by DJ Mark Goodier, Bill Padley and Jeff Smith.

Now a veteran of this event, Wise Buddah subcontracts BBC Resources Outside Broadcasts to provide technical facilities. The show was linked by Mary Anne Hobbs in a mobile studio, with co-presenters Andrew Collins and Stuart Maconie pretending to be in a Volkswagen camper van back-stage, catching up with artists as they went by. (In reality they were in one of two BBC technical caravans, which served as additional studio/production areas).

Hobbs linked CDs, interviews (prepared on Digidesign Pro Tools and then transferred onto Denon MiniDisc) and the live performances, which came from the Visions scanner as a stereo pair. The idea was to give the impression of a live show, even though the end-result was 'staggered', being made up of prerecorded elements played out later.

In addition to the Radio 1 programme, Wise Buddah also prepared a version for worldwide syndication, which consisted of live performances and interviews.

page 62< track a band pretty dry, so it sounds like a bad demo, or rely on the machinery to do the tracking and concentrate on producing a polished monitor mix with effects and dynamics. I'm of the latter school.'

The monitor mixes were laid onto digital multitrack (a mixture of 32-track Mitsubishi and 24-track Sony machines), with a Tascam DA-88 running as a submix of live audience, videotape feeds and separate presentation mics, all of which could be retrieved if necessary. A full stereo mix featuring the monitor mixes, presentation and audience effects were recorded onto DAT in the Visions scanner. Once the first half of the show was complete, Tele-Cine dubbing mixer James Hines took a tape back to Soho and loaded it into the studio's AMS Neve AudioFile, ready for the edit. Part two was

similarly loaded onto disk once Manor 1 arrived on site.

Parked outside, the truck was connected to the dubbing suite using a digital link. The plan was, once a fine video cut had been produced of the first part, the finished mixes would be cut in to replace the guide (monitor) tracks, with everything autoconformed to picture. 'With the live studio mix the idea was to tidy up the edits and the audience links, giving everything a quick polish,' Alington comments.

The original plan budgeted three hours for each part: there were five blocks of 20 minutes, making a total of 105 minutes (giving two hours once commercials have been added). Because the show was recorded as live, the prerecorded nomination packages and the advertising break 'bumpers' were already in the right place in >page 66

BELOW: Tony Alington on his third BRITs



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Channel	1-8	9-16	17-24	25-32	33-40	41-48	49-56	57-64	65-72	
FOH A	Sheryl Crow				Playbacks	Prince	FX/Pres			
FOH B	Fugees				BeeGees					
FOH C	Jamiroquai & Diana Ross							FX		
FOH D	Manic Street Preachers				FX		FX			
FOH E	Skunk Anansie				FX		FX			
Manor 1	Jamiroquai & Diana Ross							BeeGees		
Manor 2	Manic Street Preachers				Sheryl Crow					
Manor 3	Skunk Anansie			Fugees			Playbacks	Prince	Fugees	
Manor 4	Audience	Manors	Comms							

page 64< the stereo mix. Once at Tele-Cine, Alington and Shapland still had the bulk of the acts to mix. 'Mixing Jamiroquai-Diana Ross during the show and using the Manics monitor mix was a start,' says Alington, 'but we still had seven more to deal with. We started with the Bee Gees and then went on to Sheryl, the Fugees and Skunk Anansie, taking about an hour and a half on each, polishing things and adding EQ if necessary. The playbacks were tweaked, which was the beauty of doing them on the 02R because all the effects could be called back as rehearsed.' Due to time constraints, there was not

ABOVE: BRITs 97 desk layout

enough time to do much with the presentation links, although, as a live performance, there was some leeway here. 'It would have been lovely to tidy up some of the presentation but it wasn't possible due to the schedule. But after all, it is "live" and Dave Taylor had done a superb presentation mix. The disadvantage when it comes to the music is that people consider the BRITs to be a post-produced show and so the expectation is for it to be a polished, finished production but it is basically live.'

A crucial element in any live, audience-based show is the reaction; the trick is to convey the atmosphere in the hall without either drowning out everything with screaming or making things sound like they were recorded in a library. 'They were really up for it,' says Alington. 'Tim Fraser in Zipper looked after the 20 or so audience mics, providing Dave Taylor with a finished reaction mix. There were two stereo pairs for this, one on the kiddie pit [young fans at the front of the stage] and one for the bulk of the hall. It was the most usable live audience mix because somebody was concentrating on it full-time.'



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The whole show was billed as being in Dolby Surround. The nomination packages had been prepared by Alington on digital Betacam in this format, while the audience was wrapped around by being patched through the desk and phase reversed to produce a rear pair. A final element was added by a digital Orban TV Optimod 8282 compressor, which was used to give a tight, commercial radio feel to the overall sound.

'67 The Orban was perfect for this kind of show,' observes Alington, 'it's an excellent postproduction tool.'

The first four parts worked smoothly and

**You know why they are, but do you know their names?**

were delivered to Carlton Television at 3.30pm on Tuesday afternoon. The only real problem came with the final segment. 'One of the reasons why things went so well is that we sorted out the EDLs early on,' says Alington. 'Historically this has been a problem, especially if there are a whole series of non-sequential cuts. But I've written a software program that goes through and sorts out what we need and what we don't. It only takes ten seconds to clean up the EDL and ten more to

auto-conform. The hold-up on Part 5 was due to a lot of video sub-masters being made when the editors were doing a fine trim for time, which is standard practice with the final segment of a TV show like this.' Once sorted out, the last part was delivered at 7.15pm.

The last section of Alington's pre-planned schedule read: '16.30—wrap/back-up/pub'. The crew was eventually in the Northumberland Arms by 19.30, where they saw the start of the programme they had been working on all night.

'That's the acid test,' smiles Toby Alington, 'standing in a bar with a whisky listening to your work on a four-inch monitor speaker.' ■

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Roy Halee can legitimately claim a place among the true pioneers of music production. **Richard Buskin** learns about his part in mixing the producer's and engineer's roles and pushing the envelope of multitracking

**F**OR engineers the real creativity of doing things for yourself has been taken away,' says Roy Halee. 'Now you do it with the push of a button.

You program the sound that you want and there it is, but the creativity of using rooms and natural echo chambers, of opening and closing a chamber by hand to give the same effect that an AMS unit will provide, is gone, and that's a real shame because the analogue way inevitably sounds better.'

Still, the fact that Halee, legendary producer-engineer of artists from all areas of popular music, is now into his fifth decade in the business can be attributed as much to his ability to adapt as to his musical and technological talents. As he himself says: 'In a lot of respects I'm guilty. It's now a lot easier to have all of your toys there with you in the studio. I guess we've become lazy.'

Roy Halee's career began with an audio stint at CBS Television in New York in the 1950s, prior to him securing a job in the editing department at Columbia Records. From there it was a short walk to the studio, and, once ensconced in that environment, Halee's start was an auspicious one; the recording sessions for *Like a Rolling Stone*, Bob Dylan's first album after he had decided to plug in his guitar.

'That was very fortunate,' Halee asserts with more than a hint of understatement, 'because at that time Columbia Records didn't have any rock 'n' roll artists per se. They either dealt with classical or with legit pop acts such as Tony Bennett and Johnny Mathis. Dylan, on the other hand, was their first folk rock act, and on the strength of that job I got a bit of a reputation in the city. The song 'Like a Rolling Stone' was a 6-minute single, which was unheard of at that time and I don't think they really liked it at Columbia Records. But then, when the damned thing took off, it turned a lot of heads.'

'As with everything else back then it was recorded live, and we used one of the consoles which had been manufactured by Columbia's own engineering department together with Ampex 3-track machines. Then there was also an unbelievably good microphone collection; a lot of M49s, M50s, U67s, U47s, C12s—the kind of run-of-the-mill stuff that was just taken for granted at the time and which is now worth a fortune.'

Halee soon found himself working with outside clients such as The Lovin' Spoonful, The Dave Clark Five and The Yardbirds, at a time when the latter featured the devastating twin-lead guitar line-up of Jeff Beck and Jimmy Page.

'The session I was involved with was when they cut *I'm as a Man*,' Halee recalls. 'I remember being very impressed with the guitarists



## That touch of experience

because they used little amplifiers at low volume settings, which was the exact opposite of what everybody else was doing, yet the sound in the control room was, of course, enormous. Evidently they were hip to the idea that if you play a little softer you get a bigger sound when it's recorded.'

**A**s an engineer back in the mid-1960s Roy Halee was expected to provide musical input in addition to technical expertise while not even receiving an engineering credit in return. Sometimes this extended itself to him fulfilling the role of a less-than-competent or absent producer—indeed, when he produced some sessions

for singing duo Peaches and Herb a couple of years later he received neither a production credit nor one for the engineering.

'I'm not bitter about that,' he says. 'It was all part of the gig, part of the training, and I was grateful to be able to do it. I was having a good time, and it's only when you grow older that you realise you were being taken advantage of. I mean, I didn't get any royalties, I didn't get any credit, but what I did get was a lot of experience doing a lot of different acts. Jazz, rock, classical... Man, you name it and I was able to get my hands on it. I even worked on show material with 40, 50, 60-piece bands, a chorus and soloists all live. It was invaluable. These days I think it's almost impossible for an engineer to >page 70

<page 69 have that many opportunities, but I broke in doing that stuff.

Along the way Halee also acquainted himself with a couple of guys who he now refers to affectionately as 'Paul and Artie'—Simon and Garfunkel—who, on the brink of international success, were also about to commence a professional partnership with Halee that, both collectively and separately, continues to this day.

'The first time I met them was in 1964 when they came in to do an audition for producer Tom Wilson,' he says. 'The company signed them and released that audition as the album *Wednesday Morning 3am*.'

Sales of the album did not encourage the duo to stay together, yet while Paul Simon was in England Tom Wilson decided to capitalise on the then-burgeoning folk rock boom by going back into the studio with Halee and overdubbing an acoustic version of *The Sound of Silence* from the audition sessions with electric guitars, bass and drums.

'They weren't even aware that the song was being overdubbed,' says Halee. 'It began to catch on in Boston and it spread across the country, and then the SOS went out for them to come back and make an album.' The resulting disc, which took its name

from the No.1 single, would also include hits *Homeward Bound* and *I Am a Rock*.

'Simon and Garfunkel really helped me a lot because they started the idea of the producer-engineer. At that time engineers were not producers and producers were not engineers. You could work with bad producers but there were also some very, very good producers who did their schtick—which was the music—and basically left the engineering to the engineer. Simon and Garfunkel, on the other hand, obviously felt that I was really producing their records with them, and that I should be credited for this and paid a royalty.'

Aside from Tom Wilson there were producers such as John Simon and Bob Johnston who worked with S&G. 'Bob Johnston produced Dylan too,' points out Halee. 'In fact, around that time I was on practically all of [Johnston's] sessions, and I thought he was a good producer. Very exciting, he got a lot of emotion going in the studio, which impressed me as other producers were not getting the musicians fired up. There's a certain talent in that.'

Regardless, it was Roy Halee who S&G chose to work with, and this points to a conscious decision to collaborate with someone who was not only an inciter of performance but also approaching the songs from the technological aspect.

'In reality I was producing the records with them,' Halee confirms. 'I could get involved

musically, and I started to get very close to Paul who would bounce songs off of me; "What do you think of this? What do you think of that?"; and so on. And things therefore evolved to the point where I was a member of that group.

'Musically, engineering-wise we were a team, and as a result of that we were able to do a lot of innovative stuff. Quite honestly, if a regular producer had been involved he wouldn't have known what the hell was going on! You know, linking up two 8-track machines to make 16, and going out and making work tapes... The second 8-track would be used as a work tape to go and overdub voices in a church; do it as a remote, bring it back to the studio and overdub on it,



'Artie and Paul': Halee met them in 1964

That wasn't being done at the time. So, it was great. It was innovative and very, very creative from an engineering standpoint.'

At that stage Halee was still working on staff at Columbia, and as such he was limited by the attitude of not only the senior in-house technicians but, moreover, the all-powerful union. Rules and regulations were still very much the order of the day, albeit that these were soon to prove the undoing of those who tried to enforce them.

'There was a union, it was a problem and I was always stepping on their toes, although not on purpose,' says Halee. 'You know, going way back to the beginning when I was editing, a lot of times a producer would come in and leave a classical musical score with me. It would say, "Edit here, edit here, edit here, edit here..." and I actually got into trouble with the union for reading the score! That wasn't my job. But hey, those were the rules and as a result of that Clive Davis, who had taken over as the boss of Columbia Records, asked me to go build a studio in San Francisco and work out there. We had a lot of acts there—Janis Joplin and several others—and I wouldn't have the union problems that existed in Nashville, LA and New York. In fact, they had to close all of those studios eventually as they just couldn't compete with the independents, particularly the Hollywood one which was a disaster. The rules were so strict; they'd walk

out and take a union lunch hour in the middle of a recording session. It was maddening. Because of that when Columbia would try to sign acts the acts would say, "Well, fine, we'll sign, but we don't want to work at your studios. We want to have the freedom to work elsewhere".'

Halee subsequently did open a Columbia Records facility in San Francisco which was affiliated with a union, but a far more liberated one, and he stayed there for five years, during which time he worked with Blood, Sweat & Tears, as well as Paul Simon and Art Garfunkel on each of their debut solo albums. Needless to say, the trusty Columbia console was the desk of, well, choice, so to speak, but Halee did not have too much of a problem with that.

'What they lacked in terms of transient response and air and dynamics they more than made up for in terms of their reliability,' he says. 'The reason for this is that the people who designed them came from the old school of doing a Broadway show with 80 musicians, a chorus and God knows how many people involved, where they could not afford to have a breakdown. So there were none. In all my years at Columbia Records there was never a console breakdown. Never. They were like the Rock of Gibraltar.'

'It was in San Francisco that Artie and I did the first-ever link-up of two 16-track machines, using SMPTE and the Eco system to lock them up. I'm sure that we were the first ones to do that in this country, and I can remember calling New York and saying, "You know, we're doing something very innovative out here. We're linking up two 16-track machines, recording 30 tracks across four inches of tape and going down to LA with a work tape, overdubbing strings and so forth, then coming back here and overdubbing voices... It's very interesting". And the answer I got was, "Well, don't tell anybody!" Now I understand why they said that, because they would have had to equip all of the studios in New York, LA, Nashville and Chicago, and they would have had to spend a fortune!'

**W**HILE the environment was now more conducive to making good records, the fact that few rock-oriented musicians were actually based in or around San Francisco meant that Halee found himself constantly travelling to Los Angeles.

'I can remember trying to do overdubs with the San Francisco Symphony Orchestra, putting headphones on them and watching them freak out,' he says. 'They couldn't relate to it at all. So I'd fly down to LA and work with players who were probably not as good, but who would sit down with >page 72

# Down by the Bitstream

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Halee recorded *The Boxer* with two 8-tracks running wild

<page 70 headphones and play like they were in their living room. So I left Columbia and went to ABC Records in Los Angeles, where I became head of A&R.'

ABC was floundering, but Halee managed to sign artists such as Steven Bishop and work with the likes of Rufus and Chaka Khan, prior to the label's demise within eight months and his decision to go independent. He also

moved back to New York and began using studios such as Sound Mixers, Media Sound and The Hit Factory, but not before he had engineered The Byrds' 1968 album, *The Notorious Byrd Brothers*—which, with Gary Usher producing, employed phasing, close miking and various sonic experiments to great effect—and produced S&G's record-breaking *Bridge Over Troubled Water* album (which

spent more than 300 weeks on the UK charts).

'We did the whole Byrds album with two 8-track Ampex machines running in tandem with no sync,' recalls Halee, 'and I did a lot of Simon and Garfunkel that way too. That's how we did *The Boxer*, running two 8-track machines and using a third machine to drive them. After all, on a song like that, how could you possibly have a band with a full orchestra, strings, dobro licks, and brass and a hundred voices at the end on just one 8-track machine? You could do it, but you'd have about 900 generations.'

'Basically, with the setup we were using, the tape ran through the capstan, and we would line the other tapes up with an arrow or a chalk mark, start both of them at the same spot, keep our fingers crossed and they would be very close practically all of the time. However, when we remixed *The Boxer* the machine started overheating because we were working on it so damned long, and it kept going way out of sync at the end of the tune where all of the voices and all of the action started to happen. So I had to mix it every two bars and splice. Overall, however, it worked beautifully.'

While Garfunkel helped a lot with the vocal arrangements it was always Simon who contributed the most in terms of production, and this creativity would continue with his solo projects, albeit with considerable changes in approach.

'The *Graceland* album was really a total change for him,' says Halee. 'Before that project he would always come into >page 74

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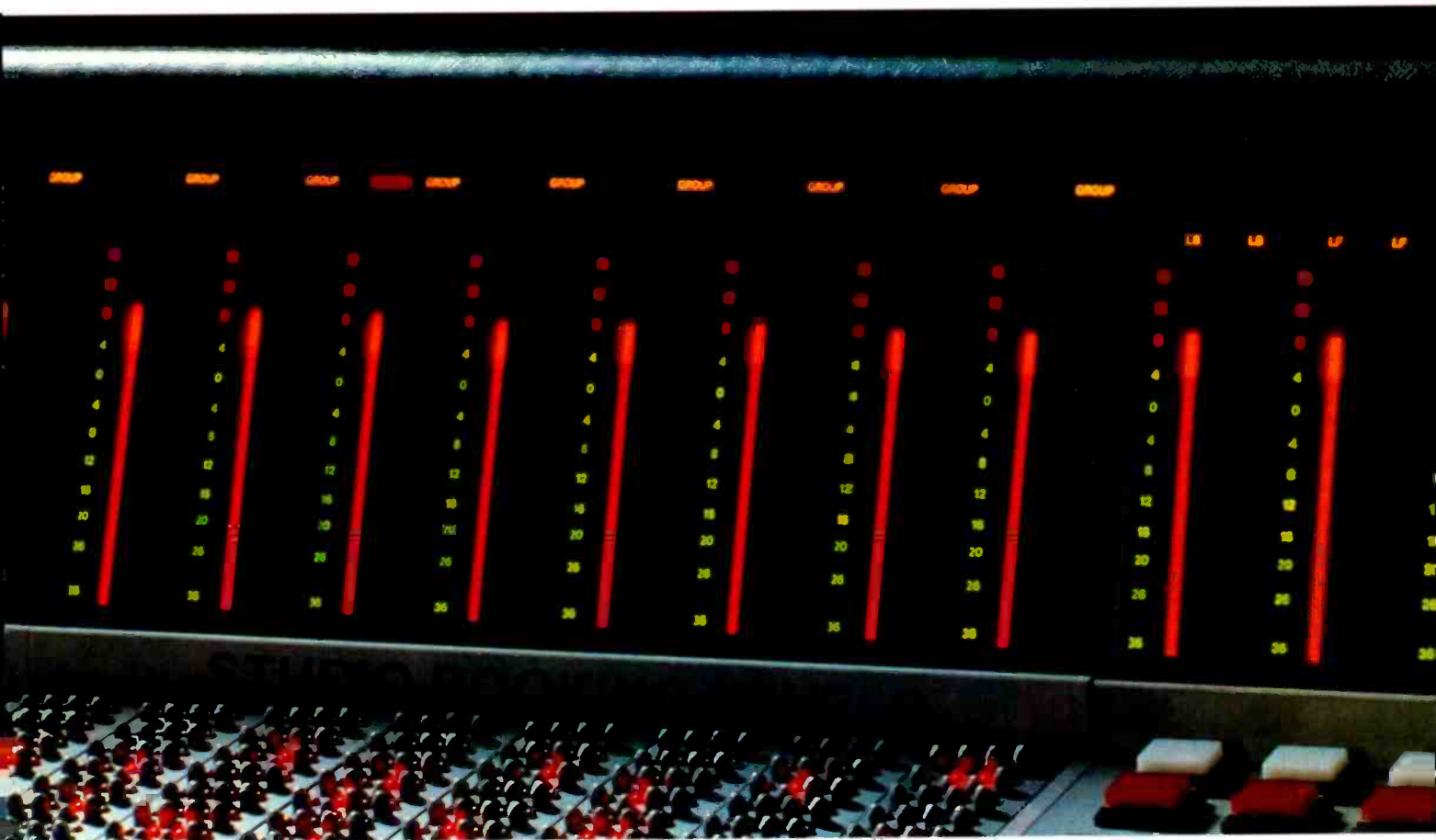
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<page 72 the studio with a song, or at least the sketch of a song, bounce it off of Artie or me and lay it down as a demo—for instance, I have a demo here of *Bridge over Troubled Water* before the song was really finished, with Paul, as usual, playing it on guitar. Then we would go in the studio with a rhythm section and it would become a finished song.

‘However, with the Graceland project it was more of a case of collecting grooves of South African music and then making the decision to go over there and do some cutting. It was a very tough project to do but a very pleasant experience. We worked with several different bands in Johannesburg, and when I set the musicians up they’d like to work very close together. At the same time they also had to be isolated so that we could do a lot of editing—let’s pull out the guitar here, let’s remove that—in order to make songs, because they were just grooves. We had to have the flexibility to erase.

‘So, there we were, in a studio that we didn’t really know, and I couldn’t put the players in little rooms all over the place with headphones. They had to be close together with eye contact to get the feel and the groove going, yet also isolated in terms of the

sound, and that was my job.’

And how did Halee achieve that feat?

‘At this point in my life I’ve run into just about everything, and there are ways of setting up a rhythm section and achieving good isolation without having to put them in closets all over the place. The right choice of microphones and levels certainly helps, and so that’s what we did and then we returned to

New York and transferred the 24-track analogue tape to digital for editing purposes. It’s just too bad that we had to lose the analogue, because the analogue tapes always sounded infinitely better. For versatility of editing the digital is great, but sonically it can’t compare.’

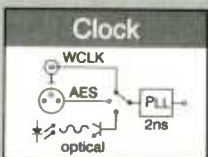
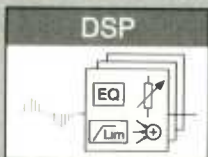
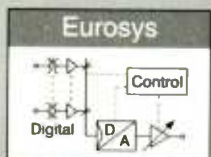
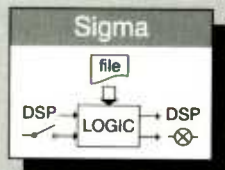
Paul Simon’s latest venture is a 2-hour Broadway show for which he has written numerous songs, and with which Roy Halee is certainly happy to be involved.

‘A couple of the songs are just out of this world,’ he enthuses. ‘Paul Simon at his best, I think. Just fabulous, man, just fabulous. You know, he’s a great guitar player, he’s studied the guitar, he’s studied classical guitar, and he’s a very gifted guy. Very, very smart, and very competitive, and that has always come through in his music.’

With the Graceland project it was more of a case of collecting grooves of South African music and then making the decision to go over there and do some cutting. It was a very tough project to do but a very pleasant experience

‘I hope that Columbia releases the new Simon and Garfunkel compilation set that they’ve been working on. They went back to the original master 3-track, 4-track and 8-track tapes—they couldn’t go to the dual-8s because they don’t know how to do it. You see, when I had to work on some of these compilation CDs the tapes that they supplied me with were second, third and fourth generation copies, and just deteriorated to the point of being ridiculous. They lose tapes, or they don’t want to make the effort to find them, and the story I always got was, “We can’t supply the originals so you’ll have to work with these”. Well, some producer there went on a crusade and literally worked for two years to find all of the masters, and they found them in Nashville, they found them in LA and they found them in New York. The result is that they remixed a lot of the stuff from the original masters, and the sound of what they’ve sent me to listen to is just unbelievably good.

‘It’s a revelation, and it brings back a lot of memories: Of how the bass harmonica was miked on *The Boxer*; of Hal Blaine playing the congas with that AMS sound on the backbeat, courtesy of an echo chamber being opened and closed by hand; of the bass drum pattern on *Bridge over Troubled Water* which could only be achieved with 3M tape machines because the head spacing enabled it to come out in that rhythm; of Paul and Artie actually in the echo chamber at Columbia on *Only Living Boy in New York*... Yeah, a lot of memories!’



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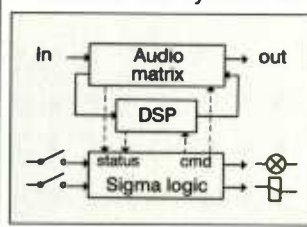
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AND  INPUT A01   PEGEL_OPEN == 1
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Sigma_end
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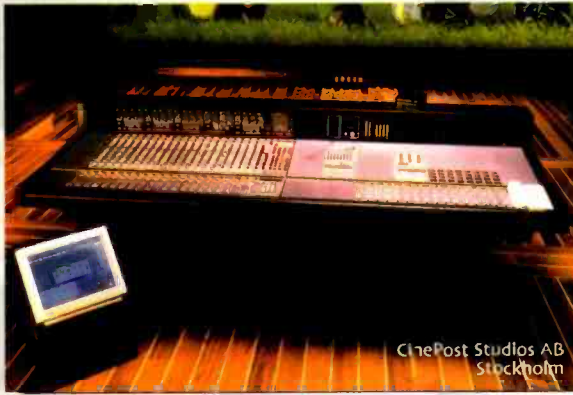


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# Electric Legend



ABOVE: the original Datamix console in Studio A has given way to a Focusrite Forte—serial #002  
LEFT: the Soviet-style Hendrix mural

New York's legendary Electric Ladyland Studios presents a curious convergence of rock history, pragmatism and big business sensibility—and it also has a ghost. **Dan Daley** traces the history and anticipates the future

**T**here is nothing subtle about the presence of Jimi Hendrix at Electric Ladyland Studios. Upon entering the large security door that separates the facility from the bustle of West Eighth Street's jumble of shoe stores and head shops in Greenwich Village, a frosted icon of Hendrix on the glass stairway divider greets visitors. Hendrix's image resides in virtually every room of the 3-studio subterranean complex, from small photos in lounges to the massive Hero of the Soviet Union style memorial mural that covers the front wall of the recording room of Studio A—Jimi's room.

Twenty-seven years since it opened its doors and 26 since the guitar master died in 1970 (he was only able to work in it for a month), it is still his studio in many ways, although the documents tell you unequivocally that it belongs to one Alan Selby, a former investment banker from the Bronx who quickly tells you that when he first walked

through its doors back in 1975, he had no idea what he was getting into.

'I really didn't know what a studio really was,' he recalls, relaxing on a couch in the Studio A lounge, where tropical fish swim in an in-wall tank under the faraway gaze of yet another Hendrix image. 'I didn't even really like the Village; I got mugged here once when I was a kid. I thought records were made by a bunch of guys sitting down and doing it all at once and then it was over. I knew nothing about overdubbing and mixing and what really went on making a record in a studio.'

Neither, apparently, did Selby's father, also a banker, who bought the then two-room facility that year from the estate of the late guitarist, which was then at the beginning of legal thicket from which is only now beginning to untangle itself.

Construction was started on the studio in 1969 when Hendrix and his then-manager, Michael Jeffrey, acquired a lease on the space,

at first intending to build a nightclub. It was only after encountering problems getting the necessary municipal permits that he decided instead to make it a recording studio.

Designed by architect John Storyk and Hendrix' engineer, Eddie Kramer and with input from a young Phil Ramone as technical consultant, Electric Ladyland—simply 'Electric Lady' has been the shorthand almost since the beginning—was the scene of many of Hendrix' artistic cul-de-sacs, engendered in part by a nasty drug habit but which nonetheless have often found their way onto bootleg recordings and authorised editions since his passing. While Hendrix himself recorded only five albums as a solo artist, versions of his work from demos to post mortem overdubbed collections number well over 100 releases. The cult of Hendrix remains as strong—if not more so—than it was during his few brief peak artistic years.

But music is a business, and Jimi > page 78

## We ain't afraid of no ghost...

**R**eports of Hendrix haunting his own studio have been part of the studio's lore almost since the artist's death in 1970. The reports are probably apocryphal; they seem to consist, rather than of sighting, of 'hearings'—an echoey, reverberant, far-away guitar lick from the bowels of the basement. The most notable recipient of these visitations is Nicky 'Topper' Headon, drummer for the Clash, whom Selby says told him he saw an aura of light and heard drums playing in the distance one evening when there were no other drummers around.

Hendrix was nowhere near Electric Lady when he died—that event took place in a

London hotel. But while he may be a banker by training, Selby has enough showbiz acumen not to overtly quash these rumours. He relates the time that actor Eddie Murphy came to the studio to work on his 1992 *Party all the Time* dance record with Rick James and, encountering Selby in the men's room, asked him about Hendrix's ghost.

Says Selby, 'I told him, the ghost only appears to the studio owner. Then I said to him, "Maybe you'd like to buy a recording studio. Did you bring your chequebook?"'

I looked in the mirror and I could see him cracking up laughing. And I thought to myself, this guy gets \$50m to make people laugh and I just cracked him up for free. It's just like the studio business.'

The next year, Murphy did indeed build a recording studio—replete with an SSL—in his New Jersey mansion.

< page 77 Hendrix was around long enough to have figured that bit out, so he might look benignly on the business he has become in death. He certainly would understand the thinking of Selby senior when he bought the assets of the studio at auction in 1975.

'He was a banker, and he looked at it as an asset,' says Alan Selby. 'The space had a long-term, friendly lease and he intended to continue to run it as a recording studio, even if neither of us quite knew what that involved.'

In retrospect, Selby's naivete is charming and quite reminiscent of the character of the times, when the music itself overshadowed the business that was trying to harness it, before anyone really saw the economic massiveness that was shadowing the rock 'n' roll beast.

The space had been The Barn, a Village big-band dance venue owned at one time by vocalist Rudy Vallee. The studio idea evolved between Hendrix and Jeffrey to help offset Hendrix's habit of block-booking studios like Record Plant so that he could go in and noodle at will. It's reported that Hendrix spent \$300,000 in 1968 alone on studio time for such ad hoc sessions.

Construction began in June, 1969, with a projected budget of \$350,000. (By the time it opened in 1970, the actual cost had ballooned to over \$1m, with a \$300,000 advance from Hendrix's label, Warner Bros.)

Storyk's design called for gently curving walls of concrete, partly to offset standing waves and partly to compensate for noise and vibration from the Sixth Avenue subway line and the movie theatre upstairs (which has been shuttered for nearly six years and which Selby has been negotiating on and off to secure for an additional studio). Late during that first year of construction, crews also found out the hard way that the site straddled the Minetta Creek, an underground stream that had been covered up during Manhattan's hectic decades of growth. That first encounter with Mother Nature set construction back three months, and the studio flooded again in 1977. To this day, several pumps—electrical, mechanical and manual—run or are available 24 hours a day keeping the creek at bay, and their thumping can sometimes be heard in the bathrooms.

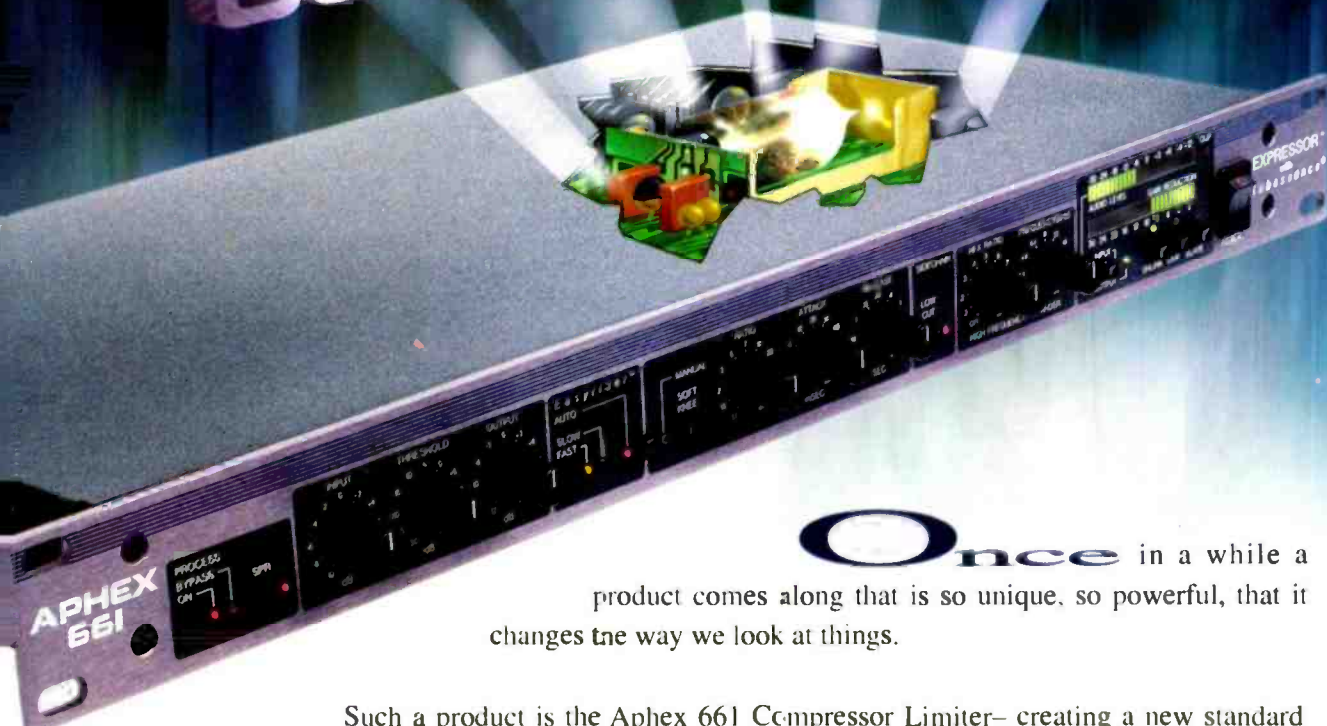
Studio A's design was 'tall with lots of mass,' as Storyk described it in an earlier interview. The combination of lots of masonry, high floated ceilings and the hydraulic issues created a unique space—some studio users over the years have come to believe that the water actually helps with low-frequency response, Storyk says sceptically. The studio was finished off by a long, curving mural painted by Lance Jost—and disliked by Hendrix himself—that leads the corridor between Studios A and B.

The original consoles—in Studio A and the later-completed Studio B—were Datamix desks, one of which surfaced a few years ago and was purchased by Microsoft CEO and Hendrix fan Paul Allen for \$80,000 from Sotheby's auction house. Studio A now houses Focusrite's 64-input serial #002 Forte console, installed in September, 1988, and equipped with Massenburg moving fader > page 80

**LEFT:** The image and spirit of Jimi Hendrix still dominate Electric Ladyland over 25 years after his death. His ghost has also been sighted



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ABOVE: More detail of Electric Ladyland's unique Hendrix-based decoration

< page 78 automation. It is one of only two ever completed. It's unique in that the mic preamps are separate from the rest of the console electronics, which the studio's engineers maintain provides a more pristine signal. Tape machines are vintage Studer A 800s and A 80s, and monitoring is via George Augspurger custom 2-way enclosures with TAD components powered by four Manley 350W power amps.

Studio B was intended as a mix room, and uses the same monitoring arrangement as Studio A. The SSL 4000 that had occupied it for so long was replaced in late 1996 with an 80-input SSL 9000j desk with Ultimatum and—in keeping with the Purple Haze motif that covers the rest of the facility—is purple. The 17x27ft control room is connected to a 19x21ft overdub space, but one that has developed its own fan base for tracking dates.

Studio C, the facility's final room, has a 64-input SSL 4000G-series in its 14x23ft control room and a 19x21ft adjacent studio. Monitoring is via Westlake MX-1 2-way monitors and an optional 18-inch JBL subwoofer. Each studio has its own private lounge area.

The studio underwent a refurbishment in 1977-78, which included the purchase by Selby's father of three Neve desks, a pair of 8068s and one 8078, which were the studio's primary boards until the arrival of the SSLs in 1984. Their implementation was remarkable in that Selby's father set his son on the course of going to banks instead of the finance companies that most New York studios relied upon. Having bankers in the family helped, but it also reinforced the notion to Selby that the studio had to be run as a business, not with the technical toybox mentality that had been so pervasive in the generation of independent recording studios that had come on the scene around the same time that Electric Lady did. Hendrix's own financial effusiveness—he reportedly

would reel off tens of thousands of dollars in cash at a time after major gigs to fund studio construction—was fast becoming a relic of a changing industry.

A large part of the management that has evolved at Electric Ladyland is Mary Campbell, who as studio manager for 14 years has a tenure nearly as long as Selby himself and whom Selby recently named president of the studio, in charge of finance, marketing and management.

When Selby walked through the doors of Electric Lady the first time, he had no clue as to how to run a recording studio. His ingenuity was again apparent when he went to several other New York studios and eagerly enquired if their ownership would help inform him on the nature of the business.

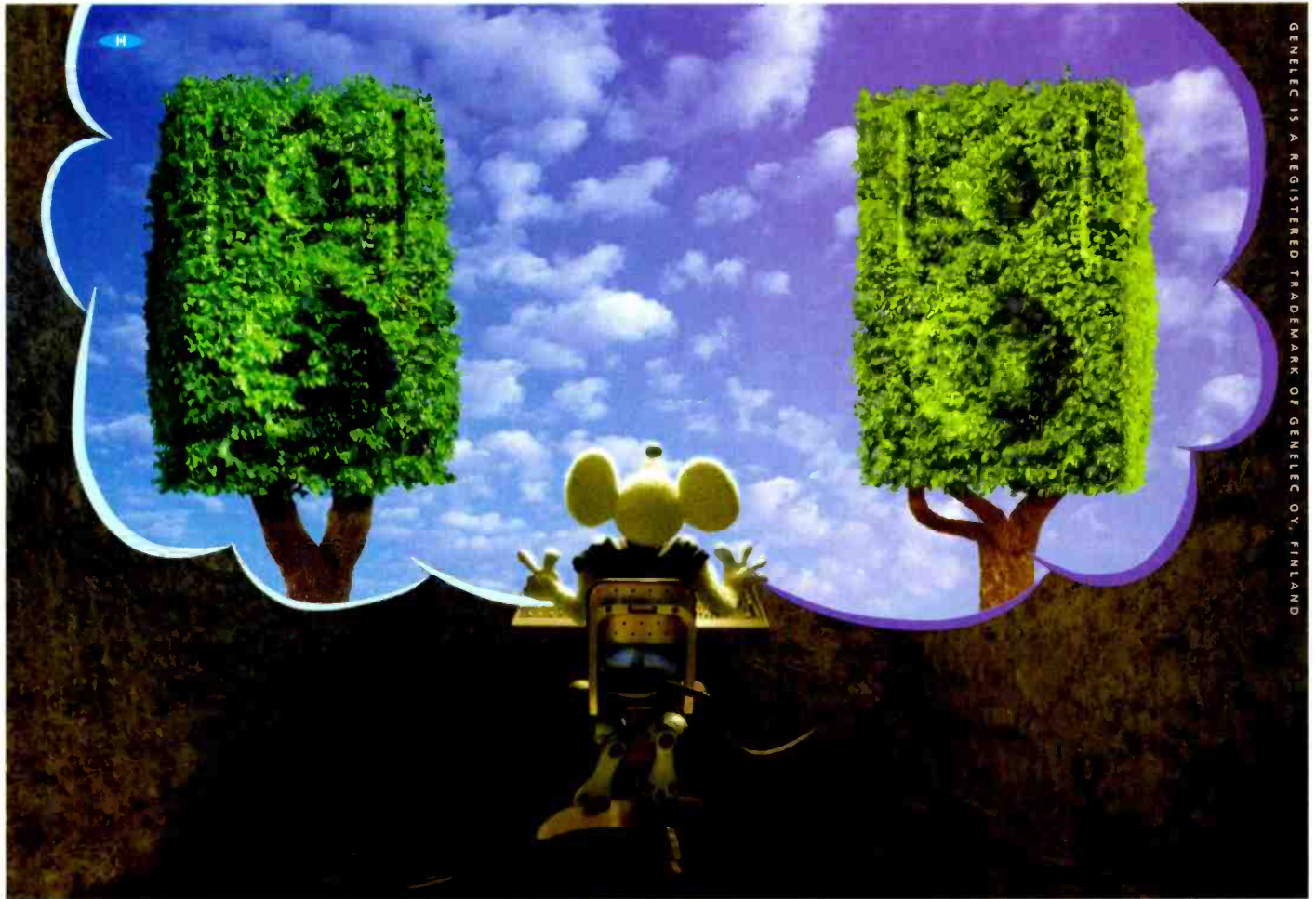
'One place I went to, the owner said she'd tell me all about it, as long as I paid her a consultation fee,' recalls Selby. 'I think that would have made her one of the industry's first studio consultants. I passed on that offer, but it took me about six weeks to figure out the basics and it hasn't really deviated any since then—it's based on service and the customer is always right. It was the same things that my father taught me from all the businesses he owned, from rental properties to bowling alleys. You walk a fine line but you always try to please the customer.'

That, however, was not quite enough for Electric Lady's early days. In fact, says Selby, there were times in the late 1970s when he wasn't sure if the studio could make it.

'You have to remember how it was back then,' he stresses. 'The prime rate was 20% in those days and you would be paying four points over that. That was \$25,000 a month in interest on \$20,000 in principal. I had just gotten married and I was working from 9am. till 11 at night and you had to find ways to make the business make sense.'

For all the Hendrix aura that remained around the place, it was not > page 82





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< page 80 enough, in these pre-nostalgia days, to attract upper-level clients. Relief came with a phone call, in 1978, from Chris Kinsey, an engineer who would be working on the Rolling Stones' forthcoming *Some Girls* LP. He needed two weeks of time in New York on short notice. Selby, still something of an ingenué to the protocols of the studio business, asked if the time could be paid for in advance. The reply was surprisingly and quickly affirmative, and once in, the Stones stretched two weeks into a year.

'It rescued us,' says Selby. It also brought the studio to the attention of a new generation of artists. In 1979, management company Champion Entertainment, owned by future Sony Records mogul Tommy Mottola, was having trouble funding the back half of a do-or-die record for Hall & Oates, who had been dropped from Atlantic Records in 1978 and whose initial RCA releases had fared poorly.

'Tommy told me straight on in a meeting, "I don't have the money to finish the record",' Selby recalls. 'They said they needed a couple more weeks. I gave it to them.' The result was 1980's *Voices*, which yielded four massive singles including *Kiss On My List* and *You Make My Dreams*.

'After that, Tommy brought me all his business,' says Selby with satisfaction.

The studio's clients list blossomed: it covers three single-spaced pages and includes everyone from AC/DC to Zappa and continues to lengthen. Selby also entered into an arrangement in the mid-1980s to do live radio broadcasts from Studio A, and *Live From* > page 83



Studio C with 64-input SSL SL4000G and Westlake MX-1 monitors

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**ABOVE: The Lance Jost mural, that Hendrix disliked, in the corridor linking Studios A and B**

< page 82 *Electric Ladyland* projected the studio via syndicated broadcasts for five years and boosted its recognition and its fortunes that much further.

Jimi Hendrix's spirit remains on, both as part of Selby's unabashed marketing strategy and as a cultural presence. Selby says letters from all over asking about the studio and Hendrix continue to trickle in regularly, although he rarely replies to any of them. The studio has resisted efforts to expand, almost as though Hendrix himself is putting the brakes on changing things too much.

In 1996, Selby made a bid in conjunction with Manhattan real estate developer Richard Kalikow on the bankrupt Power Station Studios. The bid would have secured the building itself but a larger, more comprehensive bid on the building and its contents won out. The darkened movie theatre upstairs has been an elusive trophy for some years, although Selby says he's on the verge of acquiring that space for a possible orchestral recording space. But what he has learned from all this is that expansion is still possible in the rough-and-tumble world of high-end

studios—if you time it right.

"The big mistake a lot of studios have made is, they see business slowing down and they panic and think that they have to expand," observes Selby. "That's the opposite of what I learned from my father. You expand when things are good. That's why I put the 9000j in when I did, and that's what I'll base adding a new studio on. I learned that lesson when I learned that you borrow money to expand instead of leasing equipment. If you can treat it like a business, then you can make it work." ■

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More usually the home of the New York Knicks and Rangers as well as a regular concert venue, Madison Square Garden hosted this year's Grammy awards. **Tim Goodyer** sits in on an historic audio broadcast

**T**HIS is the challenge: take a high-profile entertainment awards show involving live music performances from internationally famed artists and broadcast it to over a billion television viewers in 170 countries. You need to know that the music side involves the use of some 500 or 600 microphone inputs and a diversity of music that ensures any single act may use as few as two mics or as many as 80. The turn-around time between performances directly equates to the time taken to present an award, and the 1,2000-strong audience is packed with the elite of the music, film and TV worlds. Further, the broadcast is to be live and accomplished with a single audio console in one mobile truck parked almost 1000 feet from the stage. Oh, and the venue has a busy underground train service just 30 feet beneath it.

'This is the single most complex audio production in television broadcasting done anywhere in the world,' confirms the Chicago Recording Company's Hank Neuberger, who is serving as Mixing Supervisor for the 39th Grammy Awards. As we talk, we are surrounded by last-minute activity in the Effanel mobile barely an hour away from the broadcast.

Previous years' Grammys have been held at the Radio City Music Hall in New York or at the The Shrine auditorium in LA which are 5,500-seat theatres where the truck is much closer to the stage and mic-level feeds are practical. This year's move to Madison Square Garden, however, brought with it the almost prohibitive cable run.

'Madison Square Garden is renowned for being a difficult place to record in because the arena itself is on the fifth floor of this building in mid-town Manhattan and so trucks can't get near the stage,' agrees Effanel Music's Randy Ezratty, who is one of three mix engineers handling the show. 'We've recorded here a

# The Grammy Awards



bunch of times over the years and it's always been a very difficult cabling situation. It's 750 feet to the street and we've had to put microphone preamplifiers in the venue and send line level down to the truck.'

But this is not an analogue setup. Nor is it the two-truck setup used previously. Instead, an 80-fader AMS Neve Capricorn has been installed in the Effanel mobile in readiness for making the 39th Grammys the first

digital, single truck audio production. Accompanying the move to digital have come five remote mic preamp-converter racks and a corresponding handful of optical cables.

'Like a lot of music-oriented award shows, the Grammys technically depends on a proper audio mobile for its music performances,' explains Ezratty. 'It has the conventional video personnel doing the podiums and the audience but the music mixes are handled by a mobile.'

As Ezratty is eager to concede, this is not the first use of a Capricorn for an awards show or live broadcast—a fact which goes some way towards explaining the presence of The Nashville Network's Marc Repp alongside mix engineers Ezratty, John Harris and Mark Hutchins.

'We also do the sound for the MTV Music Awards and last summer I was told by the producers that the PA was going to use a Capricorn to mix all the bands for the show. I was taken aback by it, like "My God, they beat us to it...". We were watching these guys carry all these cardboard boxes into the Radio City Music Hall. And they mixed all the bands without even the luxury of being able to test it out at the shop.'

> page 86





< page 85 Marc Repp is really the guy who started it in terms of bringing it to the broadcast world. Everybody's been so afraid of bringing a computer to live broadcast because computers crash, but this guy was bold enough to give it a shot and now has been doing it for over a year. So that and our first-hand experience of the MTV awards made us feel that it was not as bold as maybe we think.'

Bold or not, the decision was not taken lightly and was based on the performance of Ezratty's team over the last five years and their

experience recording many of the artists' live work. The decision to install the Capricorn in the Effanel truck also was timely.

'The producers of the show asked us to research that and we realised the Capricorn would give us the ability to store and recall settings for all our acts including all our input levels, all our EQ, all our compression,' Neuberger recounts. 'The Effanel truck made the decision to put in this console pretty much to hit the target of being ready for this show.'

BELOW: Randy Ezratty, right and John Harris



'We had an SSL G Plus Ultimatum console until about six or eight weeks ago,' Ezratty recalls. 'The second truck would have been either another SSL or a Neve VR—we were fine with either.'

**F**ACED WITH 14 bands, three hours of air time and a cable run that invites a variety of disasters (regular interference on the TV monitors serves as a constant reminder), it was clear that this could be no cardboard box arrangement. The fibre-optics are all military spec provided by Telecast, the remote units contained AMS Neve's technology and were all custom built by AMS Neve who had support people in attendance.

'They knew what we were up against more so than we did,' says Ezratty. 'We knew how great the console could be but we didn't know the ins and outs of making a conceptually great system work. We knew what we needed on the road—fail-safe power supplies, heavy-duty wiring, a lot of insulation for travel—but they bought the digital expertise to the table and translated those needs into a bulletproof system. The fibre system was specified by us: we told them what would be a great length and we described how rigorous the conditions would be and they researched it and found the state-of-the-art technology. They've sought out a lot of the peripheral things that they don't actually manufacture and integrated them into this system.'

The benefits of the new approach became evident from the outset. Instead > page 88

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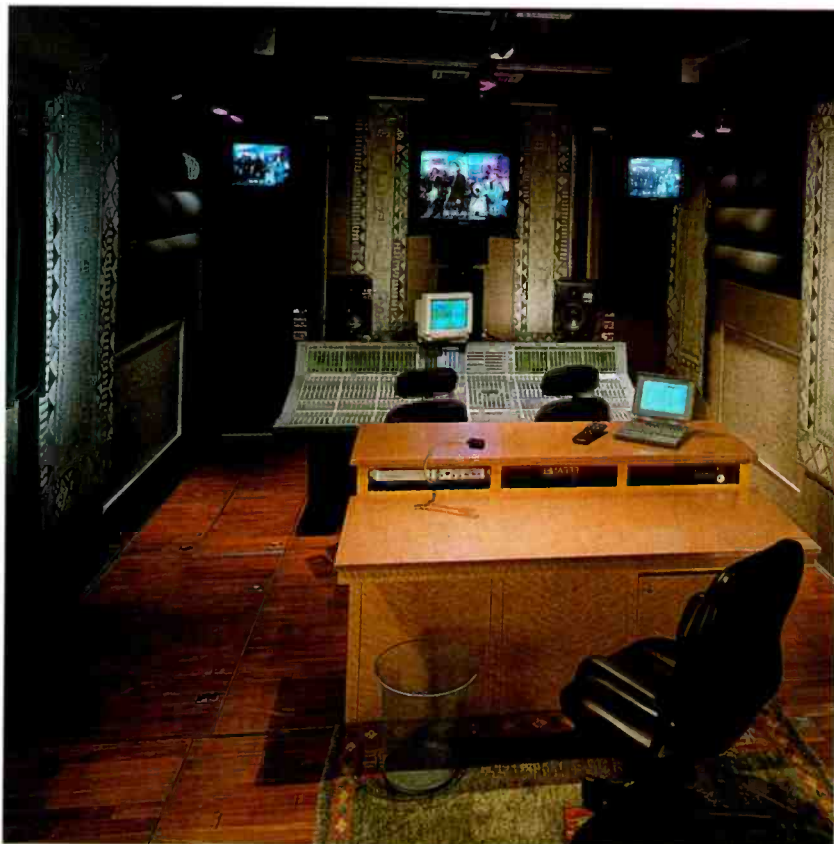
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< page 86 of fighting to be closest to the stage when the site survey was done, Ezratty was able to adopt a more relaxed attitude.

'We just set ourselves up where it made sense and let everybody else be a little bit closer. Our cable reel is 1600 feet now so even if we're 200 feet from the stage the signal is still going to have to go through 1600 feet of fibre optics—there is no degradation, so we only have one length of cable.'

Both signal routing and synchronisation followed standard TV broadcast patterns with mic feeds standard split at the stage between the Clare Brothers monitor desks (two Big by Langleys and a Yamaha PM4000 for speech) and the truck ('In the past, they would have split bands alternately between two trucks.') Time code and video reference come from the television truck and the entire system, including the Capricorn, is referenced to video sync. Stereo audio is then fed back production mixer

Ed Greene in the video truck who balances the complete audio. The Effanel mobile is also running a Sony PCM-3348 however...

'Rehearsal is a vitally important part of this,' Ezratty explains. 'The rehearsal period seems very luxurious in that it starts on Sunday and goes through Wednesday afternoon and the show is actually broadcast on Wednesday evening, but there is so much non sound related activity—staging, lighting, camera blocking—that we get very small slices with the artists. The 48-track is to take each microphone to its own track so that we can get one of these rehearsal per-

formances to multitrack tape without any processing and then when they're doing all these other tasks we can put up the tapes and practice. We even have DA-88s as overflow machines in case it goes beyond 48 tracks. More important than that, the artist can come in after they've rehearsed and work on their mixes with us and the confidence factor there has been extraordinary.

'We're running 16-bit here but we can put 24 bits down to the Sony 3348 and the DA-88s. I mention that because I'm dying for the classical recording people to know what we're up to...'

**We even have DA-88s as overflow machines in case it goes beyond 48 tracks. More important than that, the artist can come in after they've rehearsed and work on their mixes with us**

Although it is essentially a hands-off arrangement, artists' engineers are also welcome in the mobile to discuss arrangements and cues. Personal equipment and requested outboard also plays its part in delivering the artists' performance. There are no artists working to tape this year ('and that's a real first for a number of years') but there are loops and samples in some setups.

'There's a rack over there that belongs to Beck and has all his presets in it so when it gets to his song it'll get used. Also, if someone's really keen on a particular effect we'll get it for them. As a matter of fact, we've just put onboard a tc M5000 digital processor with four stereo engines in it and with that we're getting pretty much most of the effects that we need. We have that, a tc 2290 for delays and an Eventide 3000 and a Lexicon 480 if anybody wants it, and between them we're in pretty good > page 90

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< page 88 shape. We listen to the records a lot before hand and usually when the artists come in we'll say "We're hearing this delay here on the record, do you want it on the performance?" and they'll say whatever."

Technically it all appears to be in hand—but what about the mixers?

"Although we've eliminated one truck, it became clear to me that the human capacity didn't increase when we got the technological capacity together," Ezratty states. "So John, Mark Hutchins and I work in turns and we also work together and listen together—it's a nice team attitude."

Perhaps it's appropriate that it is among these awards that audio pioneer Rupert Neve receives a Technical Grammy. Watching the programme go to air it's clear that yesterday's technical limitations are being challenged by a bold but realistic team. The Capricorn crashed on the evening before the show—and again shortly before going to air. The situation required a 90-second 'soft reset' to turn it around while the console continued to pass audio throughout. Most impressively of all, it induced no sign of panic in the mixing crew.

"It almost pleases me that we've experienced a few system crashes during setup this week because there is a comfort factor in knowing when and how it can happen," comments Ezratty. "I don't mind saying that because, in the same breath, it should also be said that the circumstances under which it did crash were well beyond any situations that would occur during a live on-air mix. And it occurred when we were doing things we could never have dreamed of with an analogue desk.

"Capricorn is a computer and computers go down, but everybody who knows and loves this console totally goes past that. It's so powerful that it's an acceptable risk—we've already accomplished so much with it that when it sets us back we're still ahead of the pack. And for a live broadcast, when we're on the air we're asking very little of it. Most of its power is going to be used in rehearsals and in practice sessions.

"It could go down during the but so could an analogue console. Quite frankly, at Madison Square Garden with a big copper cable going up 650 feet and a train going through Penn station you could get some

sort of magnetic field that copper is more sensitive to and an analogue system could be prone to go down. Which one is more fragile? The digital. But think of your word processor and an IBM Selectric typewriter; the IBM Selectric is probably the most dependable, but I don't see people carrying them around. The power of the alternative system makes the down side worth it.

"If it does go down people will notice and it is my ass on this show. But the video truck is also getting a PA feed and in an arena this size the PA is effectively doing a broadcast mix because very little of the sound is coming directly from the stage, and with as good a mixer as is on this show, if we went down and they had to go to the PA mix, I have to say it would probably be better than a lot of network mixes that are out there anyway. And the likelihood of us not being able to get up after a song is very low. I feel pretty confident."

If anything Neuberger's confidence is still higher: "After three days of rehearsals, the Capricorn's been pretty much perfect. I can't imagine how we could have done this show in an arena without it."

The overall challenge of presenting the Grammys from Madison Square Gardens involved solving more problems than those presented by the audio alone. But solved they were, and in spite of such hiccups as operation problems with the stage, the Garden's David Checkitts was optimistic about the future.

"The producers of the show, really took it as a challenge to take the Grammy Awards to a whole new level," he said. "They're the ones who designed the set and turned the arena into an intimate theatre. To be seen by a live audience of 12,000 people that includes fans as well as the industry is going to make it special, let alone the billion or so that will see it around the world. We expect this not only to be the biggest but the best show we've ever produced here. Without a doubt.

"I don't think you could move this set into any other place and have it look like this. We hope that allows us to have the Grammys back, if not every year, certainly in their bouncing back and forth between LA and New York, we'd like to believe they'd always be at Madison Square Garden." ■

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Neve 8108 - 56 channels, 48 group, in line with b/p/b	£30,000
Neve 5/1 - mini, 2 b eq, mic pres, discrete	£750
SSL 4048 E/G - 48 mono, 8 stereo (56 modules), dual line, TR, G comp, mic amps	£77,000
SSL 5316 - 20/4, 16 mono, 4 stereo, 8 IMO's, reset, 5 dynamics, ext. p/b	£15,000
Trident Vector - 48 Ch, in line, film panning, 32 groups, dynamics, 5 years old	£30,000
Midas XL2 - 56 channel (40+16 stretch), 1/c, 3 x psu. Amazing!	£20,000
Soundtracs ERIC 64 Ch Tracmix, 2 yr. MINT	£20,000
Soundtracs Megas - 24 Ch 24 Mon, Midi Mute	£3,500
TAC Scorpion - Mk2, 32/8, 8x8, flight-cased	£3,500
TAC Magnum - 36 channel, MIDI, extra p/b	£9,500
AmeK G2520 - 56 frame, 48 fitted, Mastermix 1 auto, 1987. Re capped, mint condition	£26,000
DDA AMR 24 - 28 Ch, 36 frame, PPM, phase meter, extended patchbay, private use	£15,000
A & H GS3 - 32/8, midi mute, 1 yr. old	£2,500
Yamaha DMC 1000 - Stereo software, DA, AD's etc. Wooden console surround	£7,000
Yamaha DMR 8 - 2 systems available with loads of accessories + DRU 8	£call
Studiomaster - 8/4 wedge 19" rack mount	£175

### MULTITRACKS

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Studer A 820 SR 24T - only 1,770h A1 MINT condition with 24 channels internal Dolby SR	£25,000
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Timeline Lynx system supervisor	£795
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Sony MDS B3 - minidisk recorder/players with editing facilities	£995
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TC M2000 - BRAND NEW SPECIAL	£call
Lexicon PCM 70 - 2 more available	£1,100
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Delta Lab - DL 2 acoustic computer	£295
Delta Lab - DL 4 timeline DDL	£250
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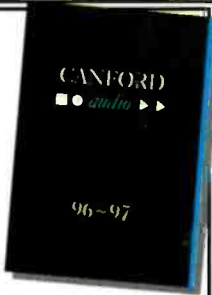
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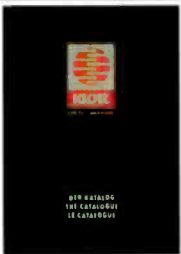


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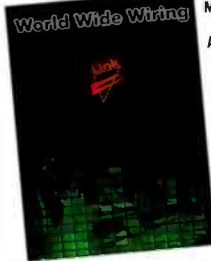
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# It's goodbye from him

As Shinto celebrates beginnings rather than endings, the column that has challenged so many malpractices, misconceptions and maniacs is about to metamorphose into a solution to the problems it identified

**I**T SEEMS HARD to believe, but this is the twentieth column in this series. Nearly two years since Tim Goodyer said, 'would you like to...?', and I said, 'you bet!'. I must admit to having enjoyed the challenge and judging by the kind reactions I have had it has not been a complete disaster. I remain convinced that iconoclasm has a place in technologically advanced societies especially where the technology advances at a rate where the user finds it hard to keep up.

I was determined from the outset that each column would be a quality item. The problem with a regular column is that it has to be written whether or not there is anything to say and the temptation is to waffle on to fill the space. I'd rather quit while I'm ahead than fall into that trap. The search for burning issues has been very difficult as even the most prejudiced of individuals can only have a finite number of hobby horses. Frankly, thinking up a topic for each column has sometimes been pretty hard. The exceptions have been where, quite out of the blue, someone somewhere has been very obliging and chosen to speak using the end of the alimentary canal which is normally devoid of illumination of either the optical or the intellectual kind.

I don't see any need to suffer fools and its nice to be sufficiently articulate to ease the suffering. It has been particularly satisfying to lampoon the high-end hi-fi fraternity where conviction is so often in inverse proportion to knowledge. I've recently fitted conical spikes and an oxygen free interface cable to my line printer because it improves the quality of the printout. Naturally enough, lesser mortals with untrained eyes can't see any difference, but I can still justify the vast amount I spent because I've convinced myself that I can tell. However, enough is enough and the Watkinson File has gone off to be resharpened to make sure that it remains abrasive enough whilst its owner remains paradoxically as blunt as ever. So it's goodbye from him; at least in this manifestation. However, as any patent will remind the reader, other embodiments are possible.

Whilst all walks of life have a proportion of denizens who distance themselves from reality, the audio industry does seem to have more than its fair share of those who walk in darkness. I am convinced that a lot of this is due to the bizarre way in which the industry goes about recruiting and (not) training. How else can we explain the myths and old wives' tales which would not look out of place in a mediaeval religion; the vendors of snake oil and pigs with wings which remind one of the quack doctors in a travelling circus?

In days of yore when the only thing with wings was Paul McCartney, the tea boy might watch someone razor-blade editing and even-

tually it would be obvious what was going on and the day would come when he could try it. Aye, things were right simple back then lad. We 'ad 'oles in our shoes and we lived in a box at side of t' road. It really was possible to learn a skill by copying. But you tell that to the kids of today and they don't believe you.

Unfortunately those days are gone for ever and even nostalgia isn't what it used to be. The successful audio engineer of the future will be one who understands some principles because he has learned them first hand rather than getting them second hand or worse from his boss. Many of today's employers don't know what they don't know and avoid employing anyone who appears to know too much in order to avoid looking stupid in comparison. Thus in many cases we are locked into a circle of self-sustaining mediocrity.

**T**ODAY WE need to break that circle. This needs more than training, it needs education. Anyone who is unsure of the difference between the two should consider the subject of sex. Education means learning the principles of a subject which can then be applied to any task. If the task changes, the educated person can work out what to do whereas the trained person suddenly becomes untrained. I remember well how many people became untrained with the introduction of digital audio and it is sad that many have stayed that way.

I wish that it were otherwise but what else can explain the seeming dissatisfaction with the sound quality of many digital systems? It would appear that the theoretical knowledge needed to get digital systems to perform in practice as theory allows is quite rare. Unfortunately the problem is not confined to the digital domain. Why do different models of power amplifier sound so different? Why do people shy away from EMC compatibility instead of welcoming it? Why is it that the loudspeakers in so many control rooms produce too much sound of their own and not enough of the input? The result is the large number of CDs having defects which are audible with good monitoring.

It has been a delight to find that Studio Sound shares some of my views on education in audio and we have decided to do something positive rather than just bemoaning the fact. Consequently, although the Watkinson File is no more, the unfortunate reader is not going to escape the hairy one that easily. Starting soon I shall be going back to basics and producing a series of tutorial articles. These will assume nothing and work up to something useful. An if a few myths can be disposed of along the way, so much the better. Oh, and these articles come with a free no-fly zone for pigs. ■

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## US: Prepare to be boarded

It's time to forget useful information and prepare for more glamour, more hype more technology and more reinvention writes **Dan Daley**

IN THIS SPACE once before I've addressed that most insidious of American inventions: advertising. At the time, I was referring to recording studios and their recent discovery of marketing. It used to be that a studio would build its fortunes on its reputation and having its word spread from person to person based on their experiences there. But in the age of the project studio, that approach has gone by the board.

In case you haven't noticed, the manufacturers of professional audio equipment have realised the same thing. The days when a piece of professional gear would become successful based on word of mouth are equally over. At a time when more manufacturers of more items are trying to sell more things to more people—the broader market brought about by project studio technology and an MTV culture that says not only can anyone be

a star, but that you can produce and engineer the recordings yourself—the professional audio business has been transmogrified from a pleasant cottage industry into the dreaded widget economy, in which tape decks, desks, outboard gear and all other things audio are designed for and marketed to a mass market. But when these boys go at it, the notion of marketing takes on a whole new meaning.

The thought brings to mind some recent examples of product roll-outs, including the new Euphonix CS3000, which is being debuted at trendy theme cafés around the world (such as at the Harley Davidson Cafe in Manhattan in February). The grand daddy of them all is still the participation of JBL Professional at the 1996 MTV Europe Music Awards in Paris, where JBL set up shop next to Burger King and across the way from Jose Cuervo Tequila in Les Halles, broadcasting the message that professional gear—and a successful career in music—is available to anyone, not just the pros. Combine that with Fender's line of clothing (hey, who says you have actually play the darn thing?) and Gibson guitar ads in *Esquire* and *The New Yorker*, and you're watching the professional audio industry reinvent itself to range much further afield than the burger-and-caffeine-infested netherworld of all-night recording sessions and club gigs.

What does a reconstituted pro-audio industry augur? Does it affect quality? Not directly, anyway. But like any mass-market product, advertising and positioning are already starting to replace word-of-mouth as the foundation for building a product in the market.

Celebrity endorsements are on the rise, as is the use of comely models as eye-catchers in advertisements. Somehow they seemed appropriate in the guitar shredder mags, but for tape? With so many new products all coming out closer together (a la the abbreviated generations of the computer industry, since so many new systems are software-based), confusion is beginning to become an issue. That's a problem for a manufacturer that wants to distinguish its product in a crowded market, but it's anathema to users who haven't dealt with the issue of compatibility and who have, for the most part, stopped reading manuals.

It's also causing a rush through formats. MiniDisc, a format once considered deader than a door nail for the mass consumer market, has been revived for the mass audio market even as it's viewed by some of its adherents as a bridge technology. The thinking is, if you make it simple and cheap enough, users will be less reluctant to toss it when the next format comes barreling through. Just set aside a couple of days to transfer all your masters from one to the next. You will have the time—there won't even be a manual to distract you, just a laminated one-sheet 'quick-start' (another migrant from the computer industry).

Let me be clear about this: there's nothing wrong with this; it's simply the normal evolution of the economics of an industry. Music technology could not be made and operated by elves forever. And while the pro-audio landscape now has more paths and potential landmines dotting it than ever before, that same

## Europe: The down side

Until and unless a high sampling is agreed, 88.2kHz or 96kHz recordings will require down conversion for commercial release. The possible quality compromise is becoming a hot topic, writes **Barry Fox**

THE DEBATE on a new standard for DVD-Audio has taken a fresh twist. Future 'super-fi' recordings will be made at high sampling rates and there are fears that distortion will be introduced when the signal is down-converted to 44.1kHz/16 bit format for release on conventional CD. There is already a rate split between DVD and Red Book CD. The audio for DVD-Movie is locked to 48kHz, by Dolby Digital AC-3 surround. CD is locked to 44.1kHz. DVD-Movie and ROM drives will also play conventional CD Audio and ROM discs. So they must clock at either speed. DVD-Audio players must also clock at a higher speed; 96kHz is the figure used by Pioneer for its demonstration players and recommended by the ARA, Acoustic Renaissance for Audio.

The record industry trade bodies, IFPI, RIAA and RIAJ, are insisting that any DVD-A disc must be of hybrid type, with two recording layers. One layer will be high density DVD standard at a depth of 0.6mm and the other will carry the same music in Red Book standard at a depth of 1.2mm. This single-inventory disc will deliver Super-fi in a DVD-Audio player and conventional CD quality sound in an ordinary Red Book CD player. The hybrid disc will thus carry signals at two sampling rates. Mass market inertia will keep

CD the main release standard for many years. DVD-A may never catch on. So down-conversion is a key issue.

And according to James Moorer, of Sonic Solutions, the lack of any clear mathematical relationship between 96kHz and 44.1kHz will produce spurious spikes in the converted waveform. There is of course a simple relationship between 96 and 48kHz, but the Red Book is set in stone at 44.1kHz. The use of 88.2kHz sampling, as proposed by Philips when the Acoustic Renaissance for Audio first started talking about a super-audio disc two or three years ago, is locked out by the adoption of 48kHz audio for all other DVD formats.

In a paper presented to the AES last year in Los Angeles, Moorer builds a persuasive case to show that 'the numerical requirements for a 96-44.1kHz conversion are substantially more severe than for a 96-48kHz conversion, since we are not talking simply about the frequency response of the filter, but the generation of (semi-periodic) noise'. This must be music to the ears of some members of the DVD Consortium, who resent the royalties they must pay to Philips on CD. The use of a 48/96kHz audio standard helps divorce all the new DVD formats from the original CD standard. This has been a running theme from Toshiba and

Time-Warner dating back to their original SD (Super Density) disc. Optional [When the SD Alliance teamed up with the Philips/Sony Alliance on MultiMedia CD, one of the main sticking points was the choice of a name for the new combined technology. Philips wanted to retain the tag 'CD', while the SD Alliance flatly refused. The compromise reached was DVD. The hybrid audio disc will effectively be a CD and a DVD disc combined.] On the face of things the argument against 96kHz conversion seems specious. Most studio recording equipment is now switchable between 48kHz and 44.1kHz, and Decca's own equipment has always used 48kHz. Likewise the digital video recording systems use 48kHz. Surely 96-44.1kHz should prove no more troublesome than 48-44.1kHz? Bob Stuart of the ARA and Meridian, acknowledges that there is 'some foundation' to the claim that 96-44.1kHz conversion can degrade quality, but 'only some and only now'. As Stuart points out, advances in digital signal processing are so rapid that by the time DVD-Audio discs and players are on sale, conversion technology will have overtaken the problem. Moorer's paper acknowledges that 'if sufficient care is taken with the numerical issues there will be no difference between the conversion from 88.2kHz to

## Technology: cert X

The censorship lobby is intimately aware that arguments have grown up with the media it would censor. But it is technology, not people, that is increasingly responsible for their outrage, writes **Kevin Hilton**

**O**NE OF THE TRUTHS that we grow up with is that television is bad for you. But everybody born since the 1950s has grown up with television. (One of the let's-embarrass-the-kids stories in my family is of me as a baby being propped up in front of the set to keep me quiet; during this period I apparently developed a strong liking for David Janssen in *The Fugitive*.) While it is a good tool to keep the rug-rats quiet, parents don't want their offspring vegging out in front of the tube all the time—which is where the warning stories came from. 'It'll ruin your eyesight, they'll go square.' 'Are you watching that again, it'll rot your brain.'

The influence of TV, video and films has been much discussed over the past five years, particularly in the wake of the series of murders, shootings and road-rage incidents that have baffled, bewildered and shaken society. Among the usual suspects lined up for blame were the cinema, video player and TV set. In 1993, when this debate was getting into its second stage, I interviewed movie director John Carpenter and asked him about this issue. He said, 'It's an old, old story—people looking for some answer of out chaos. Movies are the most obvious, easiest target and the type of thing that can be legislated against'.

In the US, Carpenter is one of the film makers who has been singled out by the moral majority as somebody who does not show any 'restraint'. Something that has allowed directors to show less restraint is technology: computer effects and animation can destroy buildings and morph people into other things; digital audio sampling and editing can create sounds that in themselves can churn the stomach; and prosthetics can be used to distort and disfigure the human form.

Some people tend to get a bit misty-eyed in this debate, yearning for more innocent days. One quote I read recently had someone harking back to The Wizard of Oz, that gentle tale of a wicked witch who turns people into stone, wants to kill and eat a dog and herself is eventually melted in graphic detail. Charming.

While it cannot be denied that what we watch has some effect, regardless of age, the present crusade threatens to install a nanny state. The UK is perhaps at the centre of this debate but moves are afoot both in the US and in France to tighten up classification and censorship. In separate announcements, President Clinton and the European Parliament have

backed the implementation of the V-chip, which can restrict access to specific material.

Children are the main concern in this matter but the policy makers are assuming that parents have either no control over what their offspring watch or the effect it may have. As Livinia Carey, director general of the British Video Association, says, 'Parents may decide to sit and watch a film with a child and explain things as they happen, to lessen the shock'.

The situation has escalated and now politicians are trying to clamp down on what may be harmful to adults. As someone who survived the brutal TV of the 1970s, I like to think that I can tell the difference between what happens on a rectangular screen and what happens outside my front door. As another director, David Cronenberg (whose film *Crash* has been branded 'degrading'), astutely points out, 'Censors tend to do what only psychotics do: they confuse reality with illusion'.

**T**his mistake has already been made by some TV producers. Forget Cronenberg films, forget drama serials about women taking their clothes off and turning into wolves, the really problematic area today is the bafflingly popular genre of true life crime, rescue, hospital watches and dangerous drivers. These shows are usually fronted by respected news readers and journalists and presented as an off-shoot of current affairs. In reality they're human misery served up for our rather prurient delectation.

Again technology has made much of this possible: smaller, lighter cameras, microphones and recording equipment that enables small crews, or even one person, to make a full production. Then there are the variants, which are more akin to undercover surveillance gear than broadcast spec. When it was first used, there was something exciting and different about cameras hidden in briefcases to catch out wrong-doers—now it's commonplace and not a little boring.

A side issue is that viewers are getting used to poor quality, both in vision, due to the use of 'upgraded' domestic video formats, and audio. How many times have you watched a programme where subtitles have had to be added because the location recording is so bad? It may be immediate but it's not real life because it's being filtered through a TV screen. And that soft picture quality really will ruin your eyesight.

map opens doors to many people who might otherwise have been shut out altogether from music. Entire genres, from hip-hop to new age, owe their success, if not their existence, to mass-market pro-audio technology.

What we have to be careful about it to maintain a slightly elevated sense of scepticism (not cynicism; that's my job) about products, and to try to return some empiricism to the process of evaluating them. That means weaving our way through a thickening jungle of advertising hoopla (although a lot of professional ads are now fun to look at, even if they don't really tell us anything). Communications is the key: the trade magazines are one way, but with so many more people in this business playing with so much more gear, I'm betting that the Net turns out to be the word-of-mouth of the future. Cruise around some of the pro-audio forums and check out the comments. It's eye-opening.

Advertising has become a lot more fun in recent years, not just in this business, but for the same reasons—it's crowded out there, and you have to push the envelope further to make a dent in the collective psyche of consumers. But be aware that you will be appealed to emotionally a lot more in the months and years to come in this industry, rather than being attempting to be clinically persuaded by what you see on the spec sheet. (In fact, if you haven't noticed yet, those spec sheets are disappearing from ads, too.) So enjoy the colourful spectacle unfolding before us. But remember to read the fine print.

44.1kHz and a conversion from 96 kHz to 44.1kHz'. The issues thus becomes, how difficult is it to attend to the numerical issues. The debate over the new DVD Audio standard has as much, if not more, to do with industry politics than recording technology. It seems to explain why Philips has now backed Sony's proposal for Direct Stream Digital, the bitstream system that uses a very high multiple of 44.1kHz for sampling into a very rapid stream of single bits. James Moorer's paper refers to DSD as the '*Lingua Franca* of mastering formats since it can be concerted to any release format with no additional degradation'. He acknowledges that 'real-time processing of DSD signals requires special hardware' and gives Sony's DSD board for SonicStudio as an example of this special hardware.

Otherwise the job can be done in non-real time, much like video compression. In many respects this reinforces the ARA's warning that the use of DSD makes all types of signal processing more difficult. Although DVD-Audio is several years from any mass-market launch, and the record industry is decidedly unkeen on any new format that could unsettle the existing market for CDs, the issues are important because standards set now will shape the future of audio through the next century. The DVD Consortium is debating the relative merits of 96kHz PCM and bitstream DSD. Optional [Never forget that when Philips demonstrated CD in the late 1970s it was a 14-bit system, with a smaller disc (to make car players easier to fit in a dashboard), and reduced capacity and playing time.

While it is a good tool to keep the rug-rats quiet, parents don't want their offspring vegging out in front of the TV all the time; which is where such warning stories as, 'They'll go square!' come from

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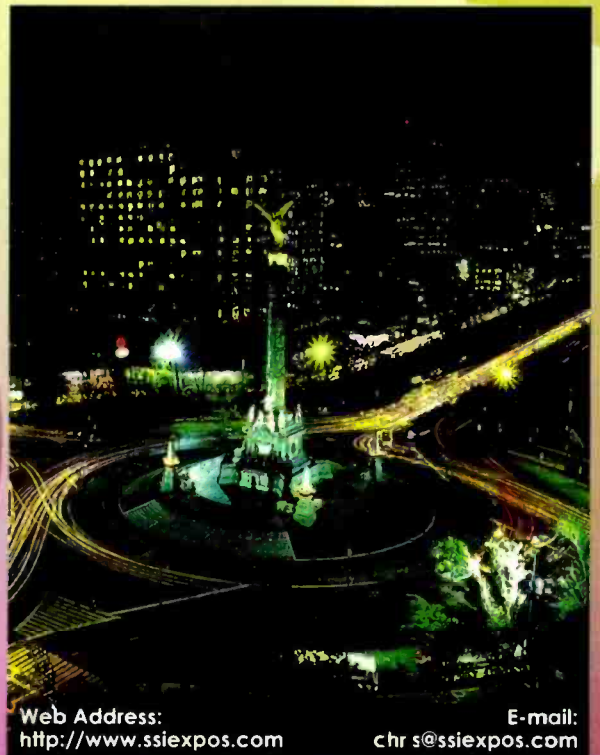
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# NXT loudspeakers

The NXT flat-panel loudspeaker was launched in a blaze of publicity, making a number of dramatic claims. **John Watkinson** examines the new loudspeaker's relevance to accurate studio monitoring applications

**I**N ALL WALKS OF LIFE we are constantly faced with new messages, not all of which are useful. Credibility is established if what is said about what we already know is true and balanced. However, what are we to conclude if the description of what we already know is at variance with our understanding? Sadly NXT's white paper comes into the latter category as it has chosen to promote its transducer technology alongside a unique view of how existing loudspeakers work:

The first paragraph of the white paper claims that all previous thin flat panel speakers have been failures. Perhaps they should try telling that to Quad, Apogee, Martin-Logan and other manufacturers who have been selling such things for years. As the works of a Quad ESL-63 is only 40mm thick, I would say that was a pretty successful thin flat-panel speaker. And as Quad is owned by the same group as NXT, somebody must be spitting teeth. I just hope the current excitement doesn't drain funding from Quad's R&D effort.

'Hitherto the perfect loudspeaker was conceived to operate like an ideal piston,' the paper continues. That's news to me; I need only quote Stanley Kelly: 'The most important parameter affecting the performance of a loudspeaker is cone flexure'.

The NXT loudspeaker is a flat panel which is driven at some point by a transducer which may be electromagnetic or piezo electric. Fig.1a shows a moving coil inertial drive where motor thrust reacts against the mass of the magnet. Fig.1b shows a moving coil bender drive where the motor and the magnet are both fixed to the panel. A piezoelectric bender drive can also be used which will be familiar to those who have ever taken the back off an alarm watch. In fact it all looks so familiar I wonder what the inventive step is, because the white paper certainly doesn't reveal it.

The vibrations from the transducer propagate in all directions through the panel and reflect from the unterminated edges to produce standing waves which eventually decay. This decay will be due to energy loss through sound radiation and through the internal damping of the material of the panel. NXT claims that 'the conversion efficiency of mechanical energy to acoustic energy has been confirmed to be almost 100% for an NXT

panel'. It then says '100% refers to an acoustic comparison with a piston of the same area'.

Frankly I don't know what this means. It is about as informative as claiming that a light bulb consumes 100% of the electricity supplied to it.

Let's look at how such a free-edged panel will work in the real world, starting with a low-frequency analysis. In order to produce LF sound all transducers, whatever their principle of operation, have to generate a volume velocity. At LF the only thing that matters is the size of the panel with respect to the wavelength. Where the panel is acoustically small—a good deal smaller than the wavelength—the volume velocity is obtained by simply integrating the displacement over the entire panel area.

Now, the moving-coil woofer that I am lis-

tening to as I write is quite capable of delivering the goods at 20Hz, where the wavelength is about 17m. Consequently any NXT panel which will fit in my house will be acoustically small at that frequency. It is fairly obvious that the greatest volume velocity will be obtained when the panel moves as a rigid piston. As Fig.2 shows, any antiphase motion whatsoever will reduce the LF output because the air will simply move from a forward moving area to a receding area, making a bender driven panel very inefficient. Consequently NXT's account of how its panel works is the exact opposite of what is required at LF where the pistonic motion it eschews is just what is needed.

However, unless the NXT panel is made of some material with the mass to modulus ratio of blancmange I can't see how it could achieve at only 20Hz the 'complex and dense wave structure' shown in their white paper and reproduced in Fig.3. In my opinion it doesn't. I reckon that at LF NXT's bender driven panel will be very inefficient and the inertia driven panel must move as a near piston dipole, where it offers no advantage over existing dipoles such as electrostatic panels and gradient woofers. All of these suffer dreadfully from front-to-back cancellation and in my view NXT panels of reasonable size will never be able to radiate much low-frequency. Why else would the frequency response curves in > page 104

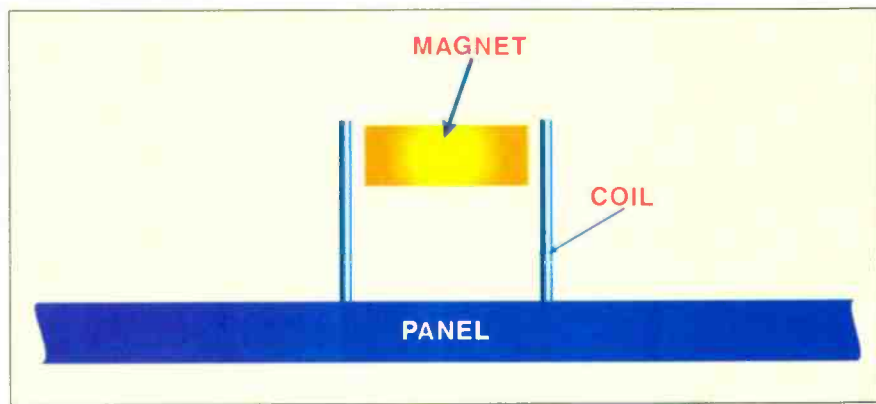


Fig.1a: Inertial panel drive

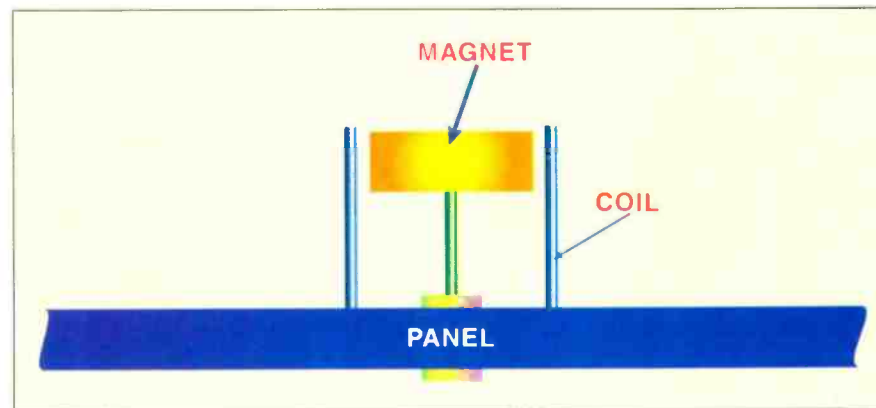


Fig.1b: Two ways of exciting the NXT panel

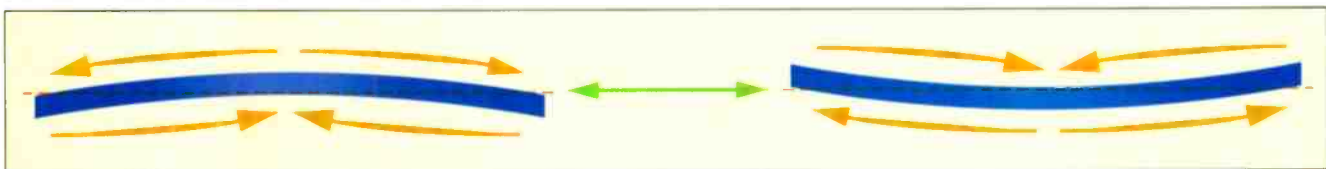


Fig.2: At LF a bender panel is acoustically short-circuited and is less efficient than a di-pole

# Advertiser's Index

AKAI .....	19
ALLEN & HEATH.....	47
AMEK.....	39
AMS NEVE.....	IFC
APHEX.....	79
AUDIO LTD.....	5
AUDIO PRECISION.....	71
AUDIO TECHNICA.....	72
AUDIX/SCV.....	99
BEHRINGER.....	27
BEYERDYNAMIC.....	90, 91
CALREC.....	22
DANIEL WEISS.....	50
DANISH PRO AUDIO.....	24
DIGIGRAM.....	60
DK AUDIO.....	8
DRAWMER.....	59
ELECTRO VOICE.....	58
EUPHONIX.....	43
FAIRLIGHT.....	37
FAR.....	66
GENELEC.....	81
GHIEMETTI.....	50
HARRISON BY GLW.....	75
HHB.....	53, 65
JUNGER AUDIO.....	82
LAWO.....	74
MACKIE.....	107
MJQ/NTI.....	83
MUSIC LAB.....	25
NAB.....	68
NEATO.....	8
NEUTRIK.....	26
ORBAN.....	63
PENNY & GILES.....	33
PRISM.....	12, 51
PRO AUDIO ASIA (P.A.L.A) ...	105
RICHMOND FILM SERVICES ...	66
RSP TECHNOLOGIES.....	84
SENNHIESER.....	OBC
SOUND TECHNOLOGY.....	88, 89
SOUNDFIELD.....	28
SOUNDSCAPE.....	55
SOUNDTRACS.....	41
SSL.....	73
SSL (ULTIMIX).....	8
STAGETEC.....	67
STIRLING AUDIO.....	29
STUDIO SOUND INT'L.....	102
SUMMIT AUDIO.....	13
SWITCHCRAFT.....	21
TANNOY.....	76
TASCAM.....	16
TC ELECTRONIC.....	14, 15
TL AUDIO.....	20
360 SYSTEMS.....	87

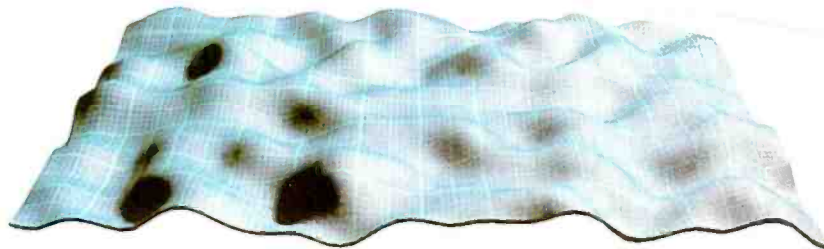


Fig.3: Vibrational modes of NXT panel from NXT white paper

< page 103 the white paper mysteriously terminate at 200Hz?

The lowest frequency response quoted is for a panel of 1.5m<sup>2</sup> which manages to respond down to 60Hz, although the number of dBs of loss at that frequency is not quoted, nor is it made clear whether this is on a wall or not. As the Quad ELS-63 has a diaphragm of only 0.4m<sup>2</sup> yet manages to respond down to 60Hz I rest my case. In practice NXT panels used in full-frequency range applications are going to need subwoofers and as these will have to be conventional much of the advantage of the flat panel evaporates.

**N**XT claims 'In contrast to a conventional dipole speaker an NXT is termed bipolar meaning that the rear radiation may be summed constructively with that of the front. Clearly not only does this improve efficiency, but it also removes the necessity for an enclosure or baffle'.

In my view this is misleading in addition to stretching the definition of a pole to infinity. At HF the radiated power from the two sides of a conventional electrostatic dipole speaker will be summed by the ear as you can easily demonstrate by getting someone to hold a blanket behind an ELS-63. At LF both the conventional dipole and NXT both fail.

Turning to mid range and treble frequencies where the NXT panel can at least radiate some power, an acoustic analysis turns up some interesting results. Firstly the 'complex and dense wave structure' means that the spatial attributes of the radiation will be unusual. The panel is acoustically large at HF. Different parts of the panel will be vibrating in different phases. In order to see what happens a particular point in front of the panel it is necessary to integrate all of the radiation reaching that point from the whole panel area allowing for the path length differences.

As I understand it, the wave structure is frequency variant, this means that the frequency response at a fixed point will be highly irregular on a fine scale of frequency. Equally the polar diagram will also be highly irregular on a fine scale. The reason that the NXT panel works is that these irregularities are beyond the frequency resolution of the ear because of the finite width of the critical bands. Consequently the frequency response to a human will be a smoothed version of the theoretical result, as will the polar diagram.

The directivity patterns shown in the NXT white paper bear this out, with some lobing visible although the polar diagrams are meaningless because the reader is not told

whether the scales are linear or logarithmic or what the units are. The directivity is compared somewhat unfairly with that of a 'typical 6 1/2-inch cone speaker' which is predictably unimpressive at HF. Its a pity they didn't make a fair comparison with a complete speaker having a tweeter or with a Quad ESL-63 or an Apogee ribbon speaker both of which I believe have a smoother off-axis frequency response than the NXT panel.

NXT makes a play about how the panel suffers less 'power drop with distance'. This is compared with the inverse square law drop of a conventional speaker, although the curve shown for a conventional speaker doesn't actually exhibit an inverse square law. What is not said is that the inverse square law only holds in an anechoic room, which few of us listen in. Neither does NXT bother to specify the size of the panel it's comparing with a conventional speaker. My guess is that its a couple of metres across. The NXT panel is acoustically large at HF and the acoustic near field extends some way away. In the near field the drop with distance will be less, but beyond it the drop will be almost the same as for any type of speaker and will be dominated by room acoustics.

**M**y greatest reservation about NXT is that I can't see how it can produce sharp stereo images. As NXT refers to the 'non-specificity of the acoustic image', it would appear that it can't. A distributed mode transducer of any kind produces a message at the listener's ears which confuses the precedence effect. Many of the multiple versions of the original sound which NXT launches will arrive within the 700µs time/intensity trading region producing an apparent sound source which could be anywhere within the subtended angle of the panel. Consequently, if the reproduction of an intensity stereo signal is attempted, the virtual sources will be smeared by an amount equal to the panel width.

So what's it for? Well, there are plenty of exciting applications for NXT where the shortcomings aren't a problem. Talking domestic appliances, lightweight speakers for laptops, talking notice boards and headlining speakers in cars are all perfectly good places to use it. It's a shame the white paper dresses it up to be more than that because there's good money to be made in those applications.

But don't throw out your studio monitors, and if you want good stereo imaging with thin wall mounted speakers I would try a Bang and Olufsen dealer. ■



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# It's never 'only software'

We should resist the temptation to underestimate the complexities and importance of software development, argues **David Hoare**, technical manager at Giles Studio Equipment

**I**T'S ONLY Software! is a time-honoured phrase, heard in many situations, usually rather dismissively. From the purest point of view, it is obviously a true statement—what could be simpler than writing or designing something that is only ever in one state or another? Depending on the context, however, the phrase has far-reaching and constantly changing implications for an R&D team.

Is software a component or is it a sub-system? The simple answer is both. Software resides as a component on disk or chip, and, at the same time, makes the whole system function. Software is certainly the most critical part of any product, as it comprises a highly complex interaction of '1's and '0's, binding together the complete hardware system and its user. It could be said, by way of a primitive analogy, that one megabyte of software is equivalent, in mechanical engineering terms, to eight million parts, moving both synchronously and asynchronously. All parts must be in the right place at the right time—all of the time.

To the design engineer and manufacturer, this mechanical system would offer a serious challenge, but with software, it is the design engineer who is probably challenged the most. The design engineer must consider the system as a whole, encompassing all of the associated effects caused by his software and make sure that any undesirable consequences of error are avoided. The manufacturer will be concerned about the best source of disks or chips because, to him, it is another component in the overall bill of materials. From the point of view of the electronics, components now contain more and more complex functions within them. The days are almost gone when electronics integration was an exercise in looking through countless data books, from countless manufacturers, and deciding which chips performed what functions, while asking 'will it interface with the next chip in the circuit?' Technology has now integrated these chips into a single microprocessor, ASIC or other forms of large-scale integration, all generally controlled by software. This, obviously, is a little tongue in cheek, but it does illustrate an increasing trend towards total electronics integration and

overall software control. A move which generally helps the manufacturer.

Software is becoming increasingly more complex, more pivotal in the system requirements, and certainly more costly to develop. On the plus side, software tools have improved and this helps to ease the burden. The key to high-quality software is ensuring that the product definition is of such a standard that the programmer can systematically break down the design into manageable blocks for coding. It is often the case, however, that the product cannot be described in sufficient detail on day one, and it is only after the development of some code that the product really starts to take shape and develops a character.

Classical software design calls for low coupling between modules and high cohesion within modules. These 'simple' design rules try to ensure that only minimal data is passed between modules and, therefore, changes in one module have little or no effect on the others, and that code within a module is 'tight' and efficient. The main benefits of this approach are that code is more easily debugged and maintained, and can be upgraded as, and when, new ideas and features are introduced. Our recent experience

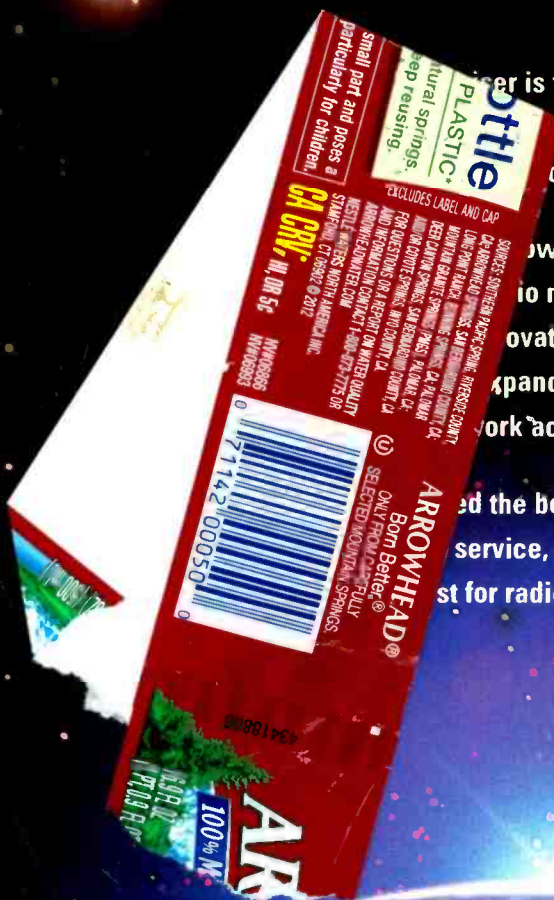
has evolved around the development of the Audio Multiprocessor, which comprises a hardware platform—combining DSP and microprocessor chips—integrated with some exceedingly complex processing algorithms. The latter aspect requires continual development and expansion, to allow for changes in the audio industry's working practices, customer demand for different processor types and general market forces. The successful integration of hardware and software is critical to products of this type. A key part of the process is to ensure that software running live on a development system will run just as smoothly on the target system. Therefore, the whole development process calls for a multi-skilled approach to unite the hardware and software disciplines, with strong team-work very much the order of the day.

**C**OMBINED WITH the increasing degree of integration that is possible are the ever greater operating speeds now achievable. DSP chips, for example, are reaching far greater speeds with higher data throughput increasing a design's complexity, while also significantly increasing its capability. A single instruction can now perform many operations and, for example, a 'barrel-shifting' technique can shift large blocks of data in a single cycle. Software is becoming slimmer and more concentrated, and more 'real-time' than ever before, which is good news for the audio industry in particular. New software-intensive products should also enjoy a shorter development time, with a resultant faster time-to-market, although progress on this front will have minimal effect on the manufacturing cycle itself, save for a reduced chip count.

For any company, which has successfully developed an efficient and robust system with inherent flexibility, there will always be a need to provide more functionality and more features to improve the salability of the product concerned. Some may cringe, some may nod sagely, and some may recognise the implied hours of midnight oil-burning, but all design engineers and manufacturers will recognise the phrase, 'it's only software!' ■

The logo is a circular emblem with a yellow border and a black background. Inside the circle, a blue snake is coiled around a pair of blue headphones and a blue audio cable. The text 'Mics Plus Speakers in a Professional Snake!' is written in yellow in the upper half. The word 'whirlwind' is written in large, bold, black letters in the lower half. The border of the circle contains the following text in yellow: 'CABLES • SNAKES • PANELS • MIXERS • AMPLIFIERS • ADAPTERS • CONNECTORS • WHIRLWIND • ROCHESTER • NY • U.S.A. • 14612 • +1/716-663-8820'.

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