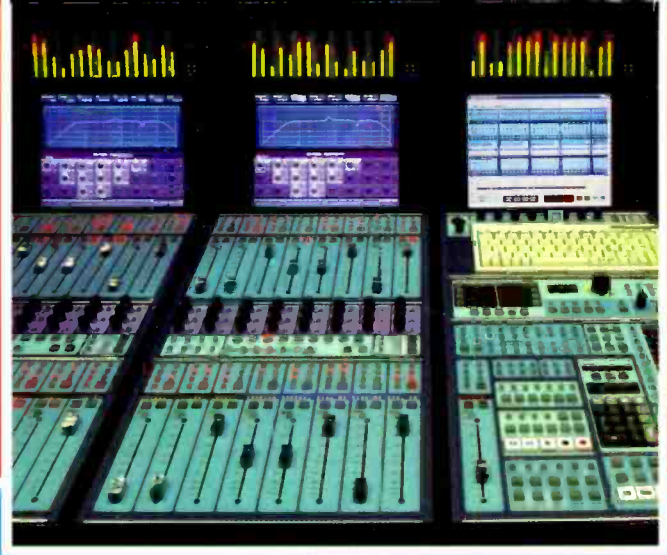


October 1997 \$5.75 £3

# Studio Sound

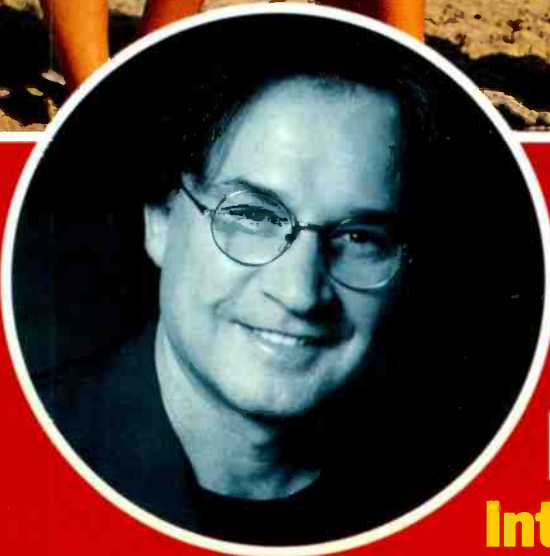


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 DACS Micamp  
 Symetrix 562E  
 Oram Octasonic  
 SPL Spectralizer  
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25th ANNIVERSARY ISSUE



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[www.prostudio.com/studiosound](http://www.prostudio.com/studiosound)



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## Be afraid

THREE MAJOR ISSUES have emerged to haunt us as we hurtle towards the turn of the century: the undisputed requirement for slick and sensible interchange between DAWs; the staggering potential of multichannel sound within the context of music production (if you haven't heard a properly executed multichannel mix of a stereo recording you are familiar with then you are currently disadvantaged); and the unbearably brooding presence of higher resolution digital audio.

Of the three I am surprised to conclude that interchange is the most easily achieved given an extra portion of good will push from the manufacturers involved. Multichannel music production still requires time to demonstrate it's worthiness to those who would be involved in generating it and there are still a number of grey areas concerning the delivery medium and the more specific requirements of the creative monitoring environment that need to be ironed out or at least faced up to. However, it is the spectre of higher resolution audio that chills me to the bone because it will infect just about any aspect of audio you'd care to mention.

Higher definition audio has enjoyed an unprecedented level of discussion, predominantly for its role within DVD, but I think there is now a danger that the desire to discuss has eclipsed the impulse to act. Higher resolution audio will happen, precisely how remains to be seen, but it will be here soon.

What bothers me is the dismissal with which the subject is greeted in some manufacturing circles, how it is questioned and doubted, how lips curl. If a domestic 24-bit/96kHz distribution medium was to arrive tomorrow then few of you would have the tools to create for it. If it were to arrive in a year's time it would still be unlikely that the majority of DAWs and digital desks would be able to handle it. Those who are not worried do not understand the implications.

Ask your preferred digital supplier for the contingencies they have made for higher resolution audio.

**Zenon Schoepe, executive editor**

## Technology's chalice

I THINK I FIRST became aware of the extent of people's need for direction back in school. I recall looking out of the library window once and seeing students who, deep in juvenile conversation, thought they were wandering randomly around the school playing field actually following the lines that defined football and hockey pitches. Subconsciously they were most content to follow arbitrary lines defined by someone else for completely unrelated purposes.

Since then I've recognised the theme in many aspects of recreation and business—not to mention art. There seems to be something deeply buried in human nature that demands if not a model to emulate, then constrictions against which to define character. Certainly, the latter has proven an integral part in art over the generations—sometimes in terms of materials and certainly in terms of practices. Most of us, for example, can count the recording sessions that have been damaged by excessive opportunity rather than availed by it.

Although it didn't seem like it at the time, the byword adopted by so many of the MI manufacturers during the 1980s was the most damning comment on the decade's music that could have been issued. How else can you rationalise an era that was heralded by the revolutionary values of punk rock and gravitated towards stadium rock with the slogan, 'The only limitation is your imagination'? What greater indictment could the '80s music scene have sought than to be charged with the responsibility of realising the extent of its imagination and to have delivered Howard Jones?

Latterly we have been offered the bait of high-definition digital audio, delivered by a future-proof multichannel medium. Right now the general level of enthusiasm is high (there were 'analogue dissenters' to be heard all through the digital synthesiser 'revolution' too) and the possibilities once again seem to be boundless.

But I challenge us all to keep our technical opportunities in line with our creative imagination. Not to do so will be to accept another of technology's poisoned chalices.

**Tim Goodyer, editor**

# Studio Sound

**Incorporating Broadcast Engineering**

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## Show stoppers

**The Netherlands-US:** It's certainly true that the Amsterdam International Broadcasting Convention (like its US counterpart, NAB) makes light of audio's place in the grand scheme of TV and film production but the opportunity for audio people to take the fight to the enemy is not to be missed. Similarly, the US AES, the world's largest pro-audio convention, rewards those who participate. But with barely a fortnight between them, IBC and the New York AES Convention placed a considerable strain on certain of the pro-audio players.

The dust on the September show endurance test is now settling, and with it the opinions, successes and failures of those who took on either, or both, of these two contrasting shows. Where one is Europe's premier broadcasters' platform the other is the States' premier audio outing. Both continents, meanwhile have counterpoint shows—the US has the National Association of Broadcasters and Europe its own AES Convention. But to opt for one or other discipline or territory is to badly underestimate the growing internationality of the audio business—and the aspirations of its show conveners.

So while IBC favoured manufacturers of lighting systems, cameras and countless digital video editors and effects systems, it offered audio a modest hall of its own. AES made no such consideration to video manufacturers (nor was any asked), but then not all audio exhibitors felt that an IBC 'audio hall' best served their purposes. There were those who were confident that they could best serve their own ends—and those of the video industry—by being 'on hand' to field audio questions in the larger and busier halls generally dedicated to video. It's not a new ploy and it remains open to speculate on the outcome should all the audio exhibitors abandon the audio hall in pursuit of a more devious approach to selling audio excellence to those lacking appreciation for its finer points. But for those who took on IBC as opposed to taking it in, it seems to have worked.

Of course, launching a major new audio initiative in the face of all those oh-so-impressive and oh-so-costly video systems would have been to waste an opportunity. So it was that New York got the best of audio's efforts. As indications of the direction audio is presently taking, new or emergent

consoles were to be found in almost every aisle and every conveyor manufacturer was eager to talk 24 bits at 96kHz. Meanwhile, the significance of the Tascam (Timeline) MMR8 tapeless DA-88 variant was not lost.

The mood in New York's Javits Centre was decidedly 'up'. From Sony's announcement of the sale of an Oxford console to Peter Gabriel's Real World Studio through a further Oxford and an SSL 9000j to NYC's Hit Factory on, it was business, business, and business. In that order. Whoever you talked to, it was clear that business was being done—not 'done' in the desperate sense of a few recession-stricken shows ago, but in the sense of there being a future to professional audio once again.

Nevertheless, it was only the IBC that managed to find room for a genuine audio award—in its 3rd International Wide screen Festival it acknowledged Leo Franssen of the Dutch VPRO operation for his work on the film *Zeeland Girl*.

**Tim Goodyer**

## AES Analogue Forum

**US:** With so much attention focussed on digital technology, it's tempting to forget just how good and how useful analogue technology continues to be. And it was this concern that drove Bruce Bergeron to convene eight concerned professionals in the NY Hilton during the recent AES Convention to air their views and discuss them with each other and an invited audience. So it was that under the banner of an 'Analogue Reality Check', noted producers Ed Cherney and Allen Sides took the stage with Gateway Mastering mentor Bob Ludwig, Studer's Bruno Hochstrasser, ATR's Michael Spitz, and Gerd Cyrener and Steve Smith

## Coded messages

**US:** In the course of the on-going evaluation of various coding systems for inclusion in the DVD specification, Santa Monica's Pacific Ocean Post recently hosted a listening session involving Dolby Digital and MPEG coding systems. Arranged at the request of the Japanese DVD Consortium, the test involved 30 invited listeners whose task it was to assess the relative performance of the two coding systems under double blind conditions. Set up and supervised by POP engineers, the test required its subjects to compare various coded and uncoded programme material and then to vote in a secret ballot. The published



from BASF-EMTech and Quantegy.

Following an indication of how healthy Spitz' analogue tape machine specialist business is, Cherney won the hearts of all present with a frank confession of his despondency over the current standards of digital sound quality. Statistical accounts of Gateway's analogue work and Smith's analysis of the record charts (crediting some 85% of No.1 records in the Billboard charts to have been made on analogue tape), Allen Sides' account of the analogue work going through his Ocean Way studios scattered around the States, Cherney should have been somewhat reassured.

The assurances given by both Smith and Cyrener on behalf of the tape manufacturers were particularly welcome, including commit-

ment not only to continued production but to further R&D on analogue tape, and also the promise of a new analogue tape to come soon from Quantegy. Studer's Hochstrasser, meanwhile, identified a slowing down of analogue business up until around two years ago that has since picked up significantly—particularly over the A827. Given the plight of enthusiasts in other areas whose efforts are not recognised by their industry, Cherney appeared to take the audience with him in his relief, gaining a warm round of applause on his departure.

Interaction with the audience also showed a genuine level of support for analogue from day-to-day use to the difficult area of archiving.

**Tim Goodyer**

**US:** The passing of Quintessential Sound founder Gabe Wiener is to be marked in NYC by the construction of the 6-storey Ars Nova building. Commissioned by Wiener and designed by the Walters-Storyk Design Group, the building will form the HQ of Quintessential Sound Inc and house QSI Digital Mastering Labs, the PGM Recordings classical label, the Mosaic Entertainment theatre, film and TV production company, and the 67-seat Ars Nova Theatre. The mastering operation will consist of six editing suites capable of handling up to 24-bit, 96kHz material for multichannel DVD release and be accompanied by a CEDAR audio restoration suite. QSI-PGM. Tel: +1 212 586 4200



◀ **UK:** The BBC's Wood Norton-based CBST (Centre for Broadcast Skills Training) has opened a new TV training studio. The new facility features 16:9 compatible monitoring, a GVG 100 composite vision mixer, a new ADB Vision 10 lighting console and a new Amek BCIII audio console. The result of some eight months' work, the Centre now has over 500m<sup>3</sup> of TV studio space dedicated to training—with courses available to the general broadcast industry. **CBST, UK. Tel: +44 1386 420216**

▼ **US:** Seattle's Summer Nights at the Pier is a regular event in the city's vibrant music scene. Taking place in front of around 4,000 punters on Pier 62-63, this year's concert featured Lyle Lovett, Boz Scaggs among others for which SR specialists Carlson Audio used EAW KF850 loudspeakers driven by a selection of the new QSC PowerLight series of amplifiers to bring the noise.



## New industry awards

**UK:** The 50th Anniversary celebration of the British APRS will see the establishment of three new pro-audio awards: The Most Exciting New Production (sponsored by Solid State Logic), the APRS Professional Recording Association Award in recognition of a Lifetime's Service, and The APRS Professional Recording Association Award for Technical Achievement (sponsored by Studio Sound).

The Most Exciting New Production Award will recognise the achievements of new creative talent. Nominations will be canvassed from a range of professional industry bodies, including the A&R community and all APRS members.

The winner will receive a year's free membership of the Re-Pro organisation, and £5000 from SSL.

SSL's Hazel Simpson commented: 'As a leading contributor to the industry, SSL is keen to find new ways of encouraging and rewarding up and coming talent. We need young blood to keep our business vibrant, and we are delighted to have found a new way of putting something extra back. SSL is committed to supporting the APRS Most Exciting New Production Award as an ongoing event on this basis'.

Designed to recognise the outstanding technical achievement of an individual or company within the audio industry, the Technical Achievement Award will be judged by a panel of APRS representatives, together with *Studio Sound* Zenon Schoepe and Tim Goodyer. The panel will canvass nominations from within the APRS membership and from the *Studio Sound* editorial team.

*Studio Sound* publisher Steve Haysom commented: '*Studio Sound* is delighted to be associated with this award. We feel it is important to acknowledge the far-reaching technical achievements that drive our industry and this new award is the perfect medium. As the leading publisher in this market, we are pleased to be working with the APRS to help raise public awareness of the industry's most significant technical milestones'.

The celebration dinner is being held on the first night of *Vision & Audio 97* at Earls Court 2, London (4-6 November 1997).

■ The Canadian Broadcast Corporation increased its recent investment in Soundscape hard-disk systems by adding a further 12, bringing its total to 80 systems. All are to the v2.0, Win95 specification. Unusually, the Soundscapes are trolley mounted to enable them to be freely moved around the CBC facility where they are used in a variety of applications including dubbing and editing.

**CBC, Canada. Net: www.cbc.ca/Soundscape, UK.**

**Tel: +44 1222 450120.**

■ LA post house Vitello Video joins Motion Entertainment and Eligible Music studios in recent purchases of KRK monitors. Vitello has taken a RoK BoTTom subwoofer, while Motion Entertainment and Dave Stewart's Eligible Music have each taken a pair of M9000B/Ss. In the UK, London's Air Studios has also purchased a pair of M9000B/Ss.

**Air Lyndhurst, UK.**

**Tel: +44 171 794 0660.**

**KRK Monitoring Systems, US.**

**Tel: +1 714 841 1600.**

■ German public broadcaster WDR has installed the territory's largest AMS Neve Capricorn to date. The Cologne-based facility's Studio 4 has replaced its Neve DSP with a 72-fader Capricorn equipped with 64 mic-line inputs, 16 AES-EBU inputs, 16 analogue and digital auxes, and four stereo main outs. The studio is used for recording big band and pop for broadcast and CD release.

**AMS Neve, UK.**

**Tel: +44 1282 417282.**

■ California's Skywalker Sound has brought its tally of WaveFrame workstations to 32 with the addition of a further 12 systems. The new installation includes 10 8-track systems and two 16-track systems intended for mix delivery. Skywalker uses WaveFrames for its dialogue editing, ADR work, and Foley recording and editing.

**WaveFrame Corporation, US.**

**Tel: +1 818 843 7004.**

■ London postproduction facility Saunders & Gordon has made a Soundtracs Virtua digital console the centrepiece of Studio 5. The Virtua is equipped with an expander unit and keeps the company of a Synclavier system in the newly refurbished studio which has also been certified by Dolby for surround mix work.

Fitzrovia, meanwhile, has ordered a second AMS Neve Logic 3-AudioFile system for installation in Studio 1. The 16-output AudioFile will see first use editing and mixing the BBC's Children's Hospital. Further Soho activity has seen Tele-Cine post installing Genelec monitoring throughout. Tele-Cine recently completed posting Michael Palin's *Full Circle* BBC travelogue series.

**Saunders & Gordon, UK.**

**Tel: +44 171 580 7316.**

**Tele-Cine, UK.**

**Tel: +44 171 916 3711.**

**Soundtracs, UK.**

**Tel: +44 181 388 5000.**

**Genelec, Finland.**

**Tel: +358 17 813311.**

■ The Pittsburgh-based Unitel Mobile Video has ordered a second Calrec Q2 analogue console to accompany the Q2 recently installed in its 53-foot Unitel Gold television truck. Both

desks are equipped with 60-channels, the second intended for installation in an identical 53-foot truck, Unitel Silver, which is expected to be commissioned in early January. Both trucks are intended for mixing to air and also for multitrack mastering. Mobiles run by NDR in Germany and Polski TV in Poland, meanwhile, have installed SSL Aysis digital production systems in their OB trucks.

**Calrec Audio, UK.**

**Tel: +44 1422 842159.**

■ Egypt's ERTU (Egyptian Radio and Television Union) has adopted the HNB Portadat PDR100 as its house standard location recorder. The move has seen 300 PDR100s purchased which will be used for all ERTU's radio OB and ENG work. The ability of the PDR100 to resist the hostile Egyptian climate was a significant factor in its adoption.

**HNB, UK. Tel: +44 181 962 5000.**

■ Canadian postproduction house Medallion PFA Film & Video has installed a Lafont Panoramix console in its Mix Theatre 7. The console is fitted with 68 channels and four sub-masters of Flying Faders automation and will be used for the facility's heavy load of rerecording feature films and long-form television programmes. Medallion is also considering replacing the automation on a Neve V-series console with Flying Faders in the interests of consistency.

**Medallion PFA Film & Video, Canada.**

**Tel: +1 416 593 0556.**

**Lafont Audio Labs, France.**

**Tel: +33 1 3474 6539.**

■ Regional television channel France 3 has opted to replace its tape-based systems with Avid nonlinear broadcast and editing systems. A total of 25 systems will be installed, consisting of 14 NewsCutter digital news editing systems and 11 Media Composers editing systems. The Avids will play a key part in the postproduction of France 3's local news coverage and magazine programmes.

**Avid Technology, Europe.**

**Tel: +44 1753 655999.**

**Fairlight, UK. Tel: +44 171 267 3323.**

■ Russia's first SSL SL8000GB console has been installed in Moscow's TSN broadcast operation. TSN operates a popular 24-hour news service and the console is expecting imminent commissioning.

**SSL, UK. Tel: +44 1865 842300.**

■ A new London recording facility has been opened by Sade's keyboard player, Andy Hale. Deliverance features a 48-channel Otari Status console and 24-track Radar nonlinear recording system. The console is equipped with Otari's new Eagle automation system and the studio is already enjoying forward bookings extending to the end of the year.

**Stirling Audio, UK.**

**Tel: +44 171 372 6370.**

■ New York production facility, Superdupe Recording has begun the renovation of its audio-for-video rooms. Under the guidance of the Walters-Stork design group, Studio Two has been equipped with a 24-track Fairlight FAME workstation, Doremi hard-disk recorder, Neve mic preamps, MotionWorker synchronisation and Spondor monitoring.

**Fairlight, US. Tel: +1 213 460 4884.**





## October 2-5

**18th Nordic Sound Symposium**  
Bolkesjø, Norway.  
**Contact:** Seem Audio:  
**Tel:** +47 66 98 27 00.  
**Fax:** +47 66 84 55 40.  
**Email:** soundsymp@nrk.no  
**Net:** www.nrk.no/soundsymp/

## 9-11

**LLB**  
Stockholm, Sweden  
**Tel:** +46 8 24 07 00.  
**Fax:** +46 8 21 84 96.  
**Email:** llb@branschkansliet.se

## 16-19

**7th Intermedia 97 Music Expo**  
Hala Ludowa, Wystawowa Street 1,  
Wroc/aw, Poland.  
**Tel:** +4871 481821.  
**Fax:** +4871 481451.

## 16-20

**10th International Audio, Video,  
Broadcasting, Motion Picture  
and Telecommunications Show**  
Milan Fair, Porta Metropolitana  
Pavilions 9/1, 9/11 10, Milan, Italy.  
**Tel:** +39 2 481 5541.  
**Fax:** +39 2 49 80330.  
**Email:** assoexpo@assoexpo.com

## 20-22

**Asia Cable, Satellite &  
Broadcast 97 (ACSB 97)**  
Putra World Trade Centre, Kuala  
Lumpur, Malaysia.

**Tel:** +6 (03) 264 5663.  
**Fax:** +6 (03) 264 5660.  
**Email:** acsb@mfsb.po.my

## 23-26

**Reproduced Sound 13**  
Hydro Hotel, Windermere, UK.  
**Tel:** +44 1727 848 195.  
**Fax:** +44 1727 85 0 553.  
**Email:** Acoustics@clus1.ulcc.ac.uk

## 26

**The National Vintage  
Communications Fair**  
Hall 11, NEC, Birmingham, UK.  
**Tel:** +44 1392 411565.

## 28-29

**Broadcast India 97  
Technical Symposium**  
Chavan Centre, Mumbai, India.  
**Contact:** Kavita Meer  
**Tel:** +91 22 215 1396.  
**Fax:** +91 22 215 1269.  
**E-mail:** saicom@bom2.vsnl.net.in

## 28-29

**9th ITA Magnetic and Optical  
Media Seminar, MOMS**  
The Palm Springs Marquis Hotel,  
Palm Springs, California, US.  
**Contact:** Charles Van Horn  
**Tel:** +1 609 279 1700.

## 30-1 November

**Broadcast India 97**  
World Trade Centre, Mumbai  
(Bombay), India.  
**Contact:** Kavita Meer  
**Tel:** +91 22 215 1396.

**Fax:** +91 22 215 1269.  
**E-mail:** saicom@bom2.vsnl.net.in

## November 4-5

**22nd Sound Broadcasting  
Equipment Show (SBES)**  
Hall 7, National Exhibition Centre,  
Birmingham, UK.  
**Tel:** +44 1491 838575.  
**Fax:** +44 1491 832575.  
**Email:** dmcv@pointproms.co.uk  
**Net:** www.i-way.co.uk/~dmcv/  
sbes.htm

## 4-6

**Vision & Audio 97**  
Earls Court 2, London, UK.  
**Contact:** Michelle Calder  
**Tel:** +44 181 948 5522.  
**Email:** michelle@smexpo.demon.co.uk  
**Net:** www.aprs.co.uk

## 5-8

**Apple Expo 97**  
Grand Hall, Olympia, London.  
**Contact:** Fox Parrack Fox  
**Tel:** +44 171 436 4336.  
**Fax:** +44 171 436 4224.  
**Email:** sbratton@fpfhub-  
.mhs.compuserve.com  
**Net:** www.apple-expo.com/apple

## 6-9

**Música 97**  
Portugal.  
**Contact:** Mr. Gonçalo Graça Moura  
**Tel:** +351 2 998 1400/27.  
**Fax:** +351 2 995 7499.

**Email:** gsgm@exponor.mailpac.pt  
**Net:** www.exponor.pt

## 18-20

**Digital Media World 97**  
Earls Court 2, London, UK.  
**Tel:** +44 181 995 3632.  
**Fax:** +44 181 995 3633.  
**Email:** digimedia@atlas.co.uk  
**Net:** www.digimedia.co.uk

## 18-22

**Pro Audio, Light  
& Music China 97**  
Tianjin International Exhibition  
Centre, Tianjin, China.  
**Contact:** Ms Shuping Wang  
or Mr Kun Tao  
**Tel:** +86 22 23321067.  
**Fax:** +86 22 23301376.

## 29-3 December

**International Broadcast 97**  
Hall 8, Jakarta Fairgrounds,  
Kemayoran, Jakarta, Indonesia.  
**Tel:** +6221 4204300.  
**Fax:** +6221 4201151.  
**Email:** +ib97@mmp-net.com.  
**Net:** http://mmp-net.com/ib97

## December

### 9-11

**BCS India 97**  
New Delhi, India.  
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## Ares explained

In response to Neil Hillman's review of the Nagra Ares C (*Studio Sound*, August 1997) I'd like to quote from the Ares-C user manual: control of the input sensitivity, dynamic range, signal-to-noise ratio, decibels.

The dynamic range is the ratio between the loudest and softest sound levels. The dynamic range is large for a symphony orchestra compared to that of an announcer reading a news bulletin. The signal-to-noise ratio is related to dynamic range. It is important that the softest sound level to be recorded is considerably stronger than the noise. Thus sound with a large dynamic range requires a high signal-to-noise ratio.

However, this ratio can be practically equal to the dynamic range in the case where the noise level is close to the threshold of audibility. The subjective perception of the sound level follows a law which is approximately logarithmic. It is for this reason that it is customary to measure sound level as a logarithmic unit. This is the decibel (dB). Each time the sound power is multiplied by 10, the number of decibels which that represents is increased by 10. Thus an increase of 100 times equals 20dB, a 1000 times equals 30dB etc. It should be remembered that the power is proportional to the square of the amplitude. The voltage which a microphone gives is proportional to the amplitude. In other words, if the voltage increased 10 times, the power increases 100 times and corresponds to 20dB. The decibel is a measure of power ratio and not an absolute value.

In taking as a reference, a sound corresponding to a variation of pressure of  $2 \times 10^{-4}$   $\mu$ bar (value considered as the threshold of audibility at 1kHz) a scale in absolute value will be obtained. A sound of 90dB will therefore mean 90dB above  $2 \times 10^{-4}$   $\mu$ bar. The sensitivity of the human ear varies with frequency. In order to compensate for this, the sound level should be measured with filters simulating the variations of sensitivity of the ear. Thus the decibels become the phon referred to  $2 \times 10^{-4}$   $\mu$ bar.

The potentiometer scales of the Ares-C are graduated in decibels referred to  $2 \times 10^{-5}$  Pa for 0dB.

$$1\text{Pa} = 1 \text{ N/m}^2 = 10^4 \text{ bar}$$

$$(\text{Pa} = \text{Pascal, N} = \text{Newton})$$

$$1\text{h} = 10^2 \text{ (h} = \text{hecto)}$$

$$2 \times 10^{-4} \mu\text{bar} = 2 \times 10^{-6} \text{ hPa}$$

At 1kHz, these decibels are the same as phons but as the Ares-C does not have such filters, it cannot be considered as a phon meter.

With the sensitivity potentiometer adjusted for 70dB, a sound of 70dB captured by a normal microphone (0.2mV/ $\mu$ bar into 200 $\Omega$ ) and attacking a normal sensitivity preamplifier, produces a recording at -10dB level. The modulator will indicate -10dB.

At 125dB, the scale is divided in two

parts. The area from infinity to 125dB is considered as a danger for overloading the preamplifiers and is only a zone for fading-out. This means that the audio signal is too strong. It is therefore necessary either to reduce the signal level by means of an attenuator, provided the microphone itself is not saturated, or to switch the input to a less sensitive position.

The area from 125dB to 74dB is the range that needs to be used for a correct 0dB recording keeping in mind that close to the 74dB area, the preamplifier noise, together with the noise depending on the type of compression selected, becomes more important.

Also, the Ares-C selling price including ISDN, one PCMCIA 20Mb, NiCad charger and soft carrying case is not £35,500 but £4,790 in the UK.

**Luc van Zandycke, Nagra, Switzerland**

## CD-R sample-rate conversion

I read with great interest the letter from Mr John D Barnes (*Studio Sound*, August 1997) regarding the observations, and concerns he has relating to a number of commercially available audio CD recorders that corrupt noise-shaped digital audio data streams by automatically passing them through their internal sample-rate converters, and subsequent re-dithering devices. I am pleased to inform your readers that this is not the case with the HHB CDR 800 as it uses a unique chip set which automatically bypasses the SRC when it is presented with a true 44.1kHz signal.

I hope this clears the matter up regarding the HHB CDR 800, if you need any further information I would be glad to oblige.

**Steve Angel, Sales Director, HHB Communications, UK**

## Level best

Unfortunately, a critical line was missing from my July *Open Mic* piece.

The line should have read: 'if I must make recordings with ADATs or similar systems, I invariably use the -10dBv inputs of the machine with the +4dBv inputs and outputs of the mixing console', not 'I invariably use the -10dBv inputs and outputs of the console'.

The point I was making is that in some cases what seems to be a mismatch is actually the best solution to a problem.

**Philip Newell, Spain**

## Cable query

John Watkinson writes that plating connectors to reduce their surface resistance is a waste of time and money. I don't think I agree. He is quite correct to state that a cable cannot be a source of non-linear distortion at audio frequencies but that the cable must, unless soldered, necessarily terminate in a connector that has a pressure contact with a mating half. All

audio current has to traverse the junction of the two. Ideally the two surfaces will be in intimate ohmic contact but after a period of time chemical or electrolytic corrosion will very frequently prevent this. The resulting quasi-conducting connection can show non-linear distortion that may vary from minor to gross. Has any audio engineer not heard the appalling grate of a 'dirty jack'?

The gold flashing of contact points—as opposed to the cosmetic plating of the connector body—is not there to take advantage of any magical skin effect but to guarantee a conducting path that will remain linear and 'ohmically stable' despite city pollution or maritime salt winds. The result of using a surface metal that is not prone to corrosion is undoubtedly measurable and obeys the laws of physics—as well as a few chemical ones—so I hope John will not condemn me as a hi-fi hypist if I go on using plated connectors when I want a cable to work linearly in arduous conditions.

**Chris Woolf, Broadcast Systems Engineering, UK**

## AES update

John Watkinson's logical dismemberment of the Church of the Most Holy Cable is a lovely essay to temper the encroachment of mindless dogma, and a retreat from the scientific method, so rampant of late. Enjoyed his droll points of view immensely, which I luckily tasted when I met him about 10 years ago at a NYC AES meeting (Hi, John). Priceless. Encore! (How about the 'conditioning' CDs that 'demagnetise the copper printed circuits' in your equipment, for another real hoot?! OR the coming 'crazed' move to 24-bit audio, a theoretical 144dB range toppled by our way above zero degrees Kelvin environment...)

Good to read the fine article on the audio for this Summer's most memorable film, *Contact*, and ditto the behind the scenes look at the first significant NASA triumph in years, Pathfinder.

A few errors crept into the otherwise excellent look back on the history of the AES, within the year-by-year timeline. I may not have caught them all, but please to note: *Forbidden Planet* was a 1956, not a 1958 MGM film release. The stereo LPs began in 1958 (on Audio Fidelity and soon after ABC-Paramount, copies of which I still have), not 1959. Finally, Mort Subotnick trumped my *Switched-On-Bach* (surprisingly not mentioned—oh well, at least Bob Moog received a fine encomium) by only one year, coming out in 1967, not the amusingly early date of 1957 given.

(Also, wasn't Emory Cook experimenting with his binaural records by 1952, not the 1953 date given?)

Small stuff. Otherwise, please keep up the good work!

**Wendy Carlos ■**

October 1997 *Studio Sound*



# Barry Bongiovi

Photo: Robert Sirmio

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# Digital dubbers

Older means of providing audio for film are wearing thin and the race is on to create a new digital standard. **Rob James** reports from the dubbing front on the beginnings of a new gold rush

**T**HE LAST COUPLE of years has seen a variety of new concepts firing the enthusiasm of manufacturers and users alike. The 'digital dubber', for example, has been seen as a solution and an opportunity. Film mixers and facility owners in particular are attracted by the promise of a cost-effective replacement for the rather agricultural and expensive sprocketed magnetic film hardware that has been the mainstay of feature film and film for TV postproduction for decades.

Compared to a full-blown digital-audio workstation (DAW) it would appear deceptively simple to build an 'improved' replacement for a 35mm 6-track magnetic film recorder-reproducer. The truth is a little more complex: the magnetic film machine is a highly evolved piece of technology, refined to a specific purpose.

The early rash of trade show mock-ups have taken a long time to appear as saleable products and several have fallen by the wayside as the full scope of the user requirements became apparent.

An early entrant on the scene, Akai, is now producing a second-generation machine, the DD8, which is delivering reliable performance in exacting conditions. The latest version of software allows disk interchange with Avid's Audiovision and Digidesign's Pro Tools.

Concurrently, Genex is in the market with a 96kHz, 24-bit capable machine that, with the current v3 software, has not proved popular as a film dubber.

Meanwhile Dolby has announced the 'Dolby Drive' which, although preproduction samples keep cropping up, has yet to see the light of day as a commercial reality. Timeline, after divesting itself of Studioframe (née Waveframe), is about to enter the market with an 8-track dubber which will be sold and marketed by Tascam. Digital Audio Research has launched the OMR8; and Fairlight the DaD.

But tape is fighting back with the release of the Tascam DA-98, a 20-bit capable, improved version of the ubiquitous DA-88 and there is the potential for promise from the next generation ADAT Alesis M20 and Studer V-Eight.

Graham Hartestone, head of postproduction at Pinewood Studios, and one of the few UK facilities managers still sitting on the fence was cautious of what he was looking for in a digital dubber before he would invest. His first requirement is universality; in an ideal world the solution would be adopted by all the players in the film industry, world-wide, at the same time. His next concern is the delivery end. At present the major studios who call the shots are still insisting on 35mm magnetic film for most purposes; although Hartestone

concedes that in practice a DA-88 tape is often acceptable.

In terms of machine performance, the emphasis is currently on the control and transport 'dynamics'. In other words, a digital dubber should perform no worse, and ideally better, than a 'modern' high-speed magnetic film machine. Specifically this means from any condition, stop, rewind or locate selecting play should produce synchronous sound in under 1s. Further, rhythm is very important to dubbing mixers. The time taken from selecting play to achieving sync playout should be fairly constant to enable the mixer to get into a rhythm when repeatedly attacking a problem area in the mix, and, for the same reason, reverse sync play is essential.

Hartestone would like to see an 'Again' function—pressing one key would repeat the last roll back or locate, play and punch into record at precisely the same point as the last attempt. Given a suitable digital dubber this is really one for the controller manufacturers. Finally, it is crucial that a final mix made on one machine should sound identical when played out on another machine.

## Fairlight Digital audio Dubber

**T**HE FAIRLIGHT APPROACH to DAWs is slightly different to that of other manufacturers—and particularly noticeable is their approach to the design challenges posed by digital dubbers. The Fairlight DaD (Digital audio Dubber) is a replay-only machine. It follows the Fairlight DAWs in its ability to extract a full 24 tracks with real-time crossfades from one hard drive. If an optical drive is used the track count drops to 12 with real-time crossfades. This impressive performance is achieved by some clever use of software and hardware, not by employing 'super fast' drives.

The DaD comprises a 3U-high rackmount box, the FD-24 and a neat remote controller, the FC-100. One FC-100 can control up to 24 FD-24s for a maximum of 576 replay tracks. Controllers and dubbers can be networked, allowing simultaneous control of multiple dubbers from multiple controllers (currently two). The FD-24 unit may be fitted with up to six audio-channel cards, each of which can reproduce four channels of audio, with crossfades and 4-band EQ. Each dubber has an internal hard drive that is used for software and caching. The front panel of the FD-24 has a prominent BRS (Big Red Switch) for mains and a full height 5 1/4-inch drive bay that can be equipped with optical or removable drives. The rear panel has a mains IEC input and outlet for daisy-chaining drives. Two XLRs cover time code I-O and a pair of BNCs are provided for video or wordclock reference input. Two RS 485 connectors take care of



Fairlight Dad



control and networking, and a Centronics SCSI connector is provided for connection of external audio storage devices. Each channel card is fitted with two D-connectors for analogue and AES-EBU output. D-As are the 18-bit sigma-delta 64x oversampling sort.

The FC-100 remote control is a slim, desk-top unit, powered via the network connection. Top left are 24 TRACK keys arranged in two rows and blocks of eight. Curiously the blocks are arranged with, for example, 1, 2, 3, 4 and 13, 14, 15, 16. Each TRACK Key has internal red and green LEDs which show track status. Green solid means the track is active—has audio loaded into the buffer and ready to play, no green indicates muted or not used in current project. Red solid indicates the track has been slipped away from normal sync, and red flashing means the track has been selected for slipping. Top right are banks of LED indicators in the same arrangement as the TRACK keys which show the status of all dubbers controlled by the unit. A solid green indicates dubber active, flashing, dubber currently selected. Red indicates one or more tracks on the dubber are slipped. Yellow solid indicates dubber locked to time code, flashing, waiting for code or not yet locked.

Below the TRACK keys is the main LCD with five associated soft keys. The display is backlit but could be clearer. To the left of the soft keys is the RUB key which, in the current software version, produces a test tone in conjunction with the TRACK keys. Bottom left are transport control keys including the all important reverse sync play and CHASE keys. CHASE enables time-code chase for the selected dubber. To the right of the display there are five keys arranged in a vertical row. At present only the TITLE, SLIP and SYNC keys have any function. There is a numeric keypad with ± (increment, decrement) keys, ENTER and SHIFT plus a further key labelled RUB OUT that erases typing errors.

Two keys above the numeric pad are designated ALL, and select all tracks or all dubbers depending on operational mode and machine which is used to select between dubbers. The final controls are a nicely weighted jog wheel and a couple of keys for Mark In and Mark Out which will be used in a later version of software to slip regions rather than whole tracks.

The DaD takes around 15s to boot from switch on; this compares well with PC or Mac-based systems. You are presented with a screen that has options to load a project or set up the machine. Setup allows dubber and controller IDs to be checked and set, diagnostics to be performed, and Meter and Race parameters to be switched on or off. Meter appears on the Title menu screen and is a measure of the state of buffer loading in the system—how well the disk drive is keeping up with system data requirements. Race affects what happens when the DaD is asked to sync to a new time-code value. When it is off dubbers predict how long they will need to load enough data to sustain playback. Then they start to load data for that much time downstream of the current time code. With Race switched on, the dubber loads at the first time code it 'sees' and then 'races' to get in sync with the time code.

Preparing a dubber for operation is accom-



DAR OMR8

plished by loading a Project. Such projects must be prepared on an MFX3 Plus workstation and be saved with the command MDL (Make Dubber Language) which only takes a few seconds. Fairlight is promising plug-and-play from Avid AudioVision drives in early 1998.

Hitting the LOAD soft key presents a list of projects on the hard drive. A project is selected using ± keys. Hitting ENTER starts the loading process. The EDL and other data is transferred to the internal drive and buffers are loaded. For a short project this takes around 30s. The Sync menu allows selection of timing reference for the digital master clock. Choices are; internal, LTC, WCLK (external) or Video. The expected frame rate for incoming time code should be set. 'Pull ups' and 'pull downs' can be achieved by setting incorrect frame rates which cause the dubber to run at the wrong speed—setting frame rate at 29.97fps but feeding 30fps time code results in a 0.1% speed increase. Time code can be displayed as time, 35mm feet or 16mm feet. This setting also affects how the track-slip controls behave. If time is displayed the smallest slip increment is subframes (1/16th frame). If 35mm feet are displayed the smallest increment is 'sprockets'—1/4 frame.

A dubber can be slipped against incoming code or individual tracks or groups of tracks on a dubber. If a dubber has been slipped individual tracks may be further slipped. Tracks can be slipped while running in sync to facilitate synchronising dialogue, and so on. This can be done by pressing the + and - buttons, in which case the sound is interrupted while the buffers reload, or by using the jog wheel which gives seamless audio. Positive shifts make sound arrive earlier, negative, later. Slips can be reset by selecting a track or tracks and pressing the CLEAR soft key. Offsets can be captured by 'parking' the main dubbing theatre chain and selecting tracks or an individual dubber, typing in a time-code value and hitting the CAPTURE soft key.

The DaD is an interesting mixture. If you already own Fairlight workstations the DaD provides a cost-effective way of providing a large number of replay tracks for mixdown and dubbing. The replication of film-dubber functions is impressive, but there are omissions. If you set out to copy the functions of existing analogue kit it is a good idea to copy them all, or provide attractive alternatives. The DaD does not have preread outputs. For those unfamiliar with film prereads the dis-

play takes the form of a row of lights usually situated under the projection screen. An extra replay head is mounted on the magnetic film machine a fixed distance in advance of the audio replay head. When audio is detected on a track, a signal is sent to the display which lights up from left to right over, perhaps, a second or two. When the last lamp on the right illuminates the audio arrives at the relevant fader on the mixing desk. This can be mimicked on a digital dubber by use of GPI outputs. These devices have been popular for years in film-dubbing theatres.

An acceptable alternative is a scrolling track display, but the DaD does not provide this, which is a shame as the Fairlight workstation track display is among the best in the business.

A notable plus of the DaD is its ability to replay projects prepared on Fairlight DAW's complete with level, crossfade and EQ processing performed on the fly with the same results as a full-blown workstation. If a reel requires editing adjustments the disk can be easily removed and 'fixed' on a DAW then brought back to the theatre to complete the mix.

Worst case start time, 24 tracks of simultaneous output after a long rewind, is around 5s. For most 'real world' conditions payout is achieved in 2s or less.

The DaD avoids the major design headaches of good punch in, punch out performance by the simple expedient of being replay only, however, the MFX3 plus DAW is a good performer in this area. The most significant aspect of the entire package is the ability to reproduce 24 tracks with crossfades and 4-band EQ from one disk. This really can reduce logistical headaches.

## DAR OMR8

THE DAR OMR8 has been a while coming. It has been at various trade shows for some time, but is now 'real'. It is an 8-track digital audio recorder using a Light Intensity Modulation Direct Over Write (LIMDOW) magneto-optical drive as the primary storage medium. The LIMDOW drives have a capacity of 1.3Gb per side and are faster than the older types allowing simultaneous recording on eight tracks. The older M-O drives need to do a separate erase pass before recording. As the name implies LIMDOW drives can record in one pass. One side of a disc gives 30 minutes of 8-track recording at 44.1kHz, 16 bits. Alternatively a [page 14 >](#)



< page 13 fixed or removable hard disk drive may be used. Recordings can be made at 44.1kHz or 48kHz sampling rates, and 16, 20 or 24 bits. DAR is intending to make 96kHz recording an option on the OMR8. It is clearly aimed at the film dubber market, although there are other obvious applications in music recording, live theatre, theme parks and museums, and so on.

The unit is a 3U-high 19-inch rack mounting or freestanding box (The rackmounting ears are removable). The front panel is finished in DAR's house colour of charcoal grey. This is a nonreflective Nextel-type finish. There is a half height 5/4-inch drive slot, occupied on the test machine by the LIMDOW M-O drive, eight bright bar-graph meters with over-mod indicators and select buttons for recording, editing and locating. Below the meters are seven Setup panels which are used to enter and display all important machine settings. To the right, arranged vertically, there are seven function keys. RESET resets the overload LEDs, TC-FILM changes the time display between time code, 35mm feet (units of 16 frames) and 16mm feet (units of 40 frames). MEM1 and MEM2 are scratch-pad locator memories. Pressing either key loads the memory with the current location. AGAIN locates to the last point at which PLAY was pressed and plays from that point.

Loop does the same thing except when you arrive at the point at which the LOOP key was pressed it repeats the section until another transport control is used. The last key selects what the stereo digital I-O addresses.

Transport controls are on the right and with

two notable exceptions, are tape-recorder style. The exceptions are a reverse sync play key and the TABLE key. The Table function enables more creative work to be achieved with the OMR8. The transport buttons are illuminated. There is a chunky control wheel with good feel that is used in conjunction with three associated buttons to provide audible reel rock or audible speed control. (Both are limited to 1x maximum speed, forwards or backwards.) The audio quality in both these modes is excellent. The third key is POSITION which enables you to adjust the currently displayed time-code value. A fourth key in the same group enables Gate recording.

The time-code display doubles as the display for other information depending on mode. Beneath the display are seven illuminated edit keys which allow marking of in and out points, Erase, Overlay and Copy together with Undo and a SHIFT key that gives access to Cut, Insert and Clean functions.

An illuminated mains switch, headphone jack, and volume pot, and a selector switch for Mix, Mono or Selected tracks complete the front-panel controls.

The rear panel is busy, if not crowded. Sixteen XLRs take care of analogue I-O, converters are 20-bit. Four further XLRs deal with LTC I-O and AES-EBU I-O. All eight outputs will be available in AES-EBU format on a D-connector when development of the I-O board is completed. SPDIF is also provided on the usual phonos. The stereo AES and SPDIF I-O will be able to be selected to pairs of tracks.

Further D-connectors cover bi-phase, MIDI

or IBM-compatible serial mouse, RS422 and external VGA monitor for track display. RS422 provides Sony P2 protocol (9-pin) remote control capabilities. Functions remotely controllable include: track arming, chase sync control, transport commands and disk presence indication.

Video reference and AES wordclock I-O are on BNCs. An IBM compatible computer keyboard can be connected to an AT-style DIN socket, and there are blank spaces on the panel for options such as SCSI, GP I-O, networking, and a remote front panel. GP I-O can be used to control the transport functions, plus record arming and tallies.

Primary setup can be achieved using an external VGA screen, mouse and keyboard. This covers areas such as bi-phase pulse rate and whether recording is destructive or non-destructive. The monitor can also be used as a scrolling track display, if required. The monitor, keyboard and mouse are not required for ordinary operation of the machine although they are highly desirable if you are going to attempt any serious editing, and the scrolling display obviates the need for time consuming, unwieldy, paper cue sheets.

The OMR8 is well suited to live recording. In the event of some cataclysmic mishap—tripping over the mains lead 20 minutes into a recording, the most you will lose is the last 20s.

The Gated Record mode allows a threshold to be set to trigger recording, a minimum record time after a trigger event and the minimum spacing between trigger events. Two triggers closer together than this **page 16 >**

## 'How would you describe the world's Top 100 microphones?'



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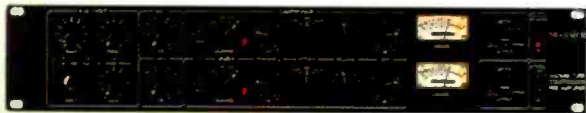


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< page 14 parameter setting will result in one recording covering both events.

The Table function provides a separate recording area to the main, 8-track 'reel'. Material—sound effects can be recorded in Table mode and pasted into the reel. Similarly the Table can be used for editing the reel, material can be Erased, Copied or Cut to the table and Overlaid or inserted back into the reel. Editing takes place across all selected tracks. Once on the 'Table' material can be auditioned and topped and tailed before spotting back into the reel. In order to avoid any possible confusion the meter display goes inverse video when the TABLE key is pressed. UNDO will undo the last destructive edit operation, restoring the 8-channel reel to its previous state.

Under local control play is achieved in around 1s from stop or rewind. In remote this increases to around 2s.

The operational requirements for a digital dubber present some considerable challenges to the manufacturer. Not the least of these is the reclamation of disk space. When used as a recorder in a dubbing theatre the recording needs to be destructive since, with the many attempts to get a section of the mix right, the disk would quickly fill up with redundant data. To achieve this a considerable amount of housekeeping has to take place when dropping into or out of Record. To this add a normal operational sequence of events in a dubbing theatre; you are recording all eight tracks, make a mistake but continue recording to the end of the scene. You then hit the REWIND button, (without going through Stop)

go back to a few feet before the mistake, hit the PLAY button, compare what is coming out of the desk with what is already recorded to match levels (PEC-Direct switching) and punch into record, fix the mistake and then drop out of record. With modern high-speed film machines the whole operation I have just described can be accomplished in, perhaps, 5s, and you can punch into and out of record in a second or so, as many times as you might wish in quick succession. To some extent the speed at which this can be accomplished in a digital dubber is dependant on disk bandwidth, but also on the time taken to write directory information and perform other housekeeping. DAR are to be congratulated on their dedication to M-O technology which, while highly desirable operationally, is still slower than hard-disk technology. The OMR8 manages to play audio from rewind in around 2s, but this time is not yet a constant—plus there are limitations on how quickly you can go back into Record. DAR understands the importance of the rhythm of the dub, and is working with operators to continually improve performance.

Slipping tracks, another common dubbing operation, that is changing the sync of a track or indeed the whole reel against the master is

easily accomplished from the front panel.

The OMR8 is designed from the ground up as an OMF-compatible recorder. The disc format is OMF compatible and the basic file format is Microsoft-IBM .WAV and DAR is enthusiastic about the proposed AES interchange standard. Eight-channel reels prepared on other DAR workstations may be replayed from the OMR8 and reels recorded on the machine can be moved to an editing station by simply moving the disc. The

machine can also form part of a network with other DAR machines if the networking option is fitted. With the ability to sync to LTC, bi-phase or 9-pin, together with parallel remote options and the possibility of a second front panel remotely sited, the OMR8 should be able to integrate with the variety other equipment commonly found in dubbing theatres. If DAR can succeed in making the delay before audio is heard after pressing play nearer a constant, and can fulfil its ambitions for improvement to the drop-in, drop-out performance, they should have a competent digital dubber on its hands. Meanwhile, the machine is a solid performer for other applications. It looks good, is easy to learn and operate and offers a high level of compatibility now, and in the future. ■

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# Tascam DA-98

Following Tascam's 'streamlined' DA-38 comes a higher-spec version of the successful DA-88.

**Rob James** welcomes an addition to the Hi-8 DTRS family and suggests its a chip off the old block

**O**NE OF THE most successful concepts of the 1990s is the 8-track digital multitrack. Yet in spite of—or perhaps assisting in—its popularity, there are only two formats in worldwide use: Alesis' ADAT standard, based on VHS cassettes, and Tascam's DTRS standard, based on the Sony Hi-8 cassette. Common to both formats is the employment of rotary head technology.

Of the two, it is the DTRS machines which have made a major impact in sound-for-picture facilities. So ubiquitous have they become that manufacturers of digital dubbers (hard disk or optical disc) make a virtue of 'plug compatibility' with DTRS machines. As a result, the 'Tascam tape' is now the nearest equivalent to 35mm magnetic film as an international multitrack exchange standard in this field. The workhorse machine since the beginning has been the Tascam DA-88 (and its Sony clone) which has been joined by the equally-desirable and more cost-effective, although more limited, DA-38. Latest addition to the family is the DA-98.

The DA-98 is a 3U-high, 19-inch rack-mounting unit with handles fitted on the mounting ears to facilitate manipulating the not inconsiderable (11kg) weight. As a further aid to serviceability in a professional environment, mounting holes are provided for the Accuride 200 series guide rails which help with removing and replacing the machine from the rack.

Rear panel connections are rather more sparse than the DA-88 since there are no individual connectors for analogue I-O. The 9-pin RS422 (Sony P2 protocol) and time-code chase/MIDI synchronising are now standard features, so there are XLRs for time-code I-O; DINs for MIDI In, Out and Thru; and a 9-pin D-connector for RS422. Audio I-O is all on D-connectors, two for balanced analogue in and out and one for digital input on Tascam's TDIF format. As with the DA-88 there are optional converters for AES-EBU or SPDIF and SDIF2. Word sync In, Out and Thru and video In and Thru are on BNCs—the Thru connections are self-terminating. Three D-connectors allow daisy-chaining of DTRS machines and connection to the optional remote control and meter unit. A further D-connector is provided for parallel remote control.

The Front panel follows Tascam house style: the tape slot is top left, time display below it, with transport controls at the bottom. Above the transport keys are buttons to control Autolocate, Rehearse, Auto Punch-ins and Punch-outs, Auto Monitoring, Shuttle Monitoring, Repeat, Clear and a SHIFT key. When SHIFT is pressed, most of these buttons become function keys. On the far left are three further buttons and indicators which select between digital and analogue input,



select Chase mode and confidence replay. The right-hand side is occupied by eight large, bright bar-graph meters with REC FUNCTION switches and indicators and associated INPUT MONITOR switches. These allow monitoring of inputs to tracks irrespective of current transport status. Three adjacent LEDs indicate one of three standard reference levels, -16dBFS, -18dBFS (EBU) or -20dBFS (SMPTE). A nice touch. Below the input monitor switches are CLOCK REFERENCE SELECT and TIME CODE RECORD buttons and associated LEDs. The centre section has a 20-character x 4-line LCD panel for menu displays, large cruciform cursor keys together with ENTER and ESCAPE keys. Also in the middle are the SHUTTLE switch and control and, at the top, the FORMAT key and indicators.

The DA-98 brings some major improvements and a lot of detail changes which improve ease of operation when compared with the DA-88.

To begin with, the A-D converters are now 20-bit resolution sigma-delta 64x oversampling devices and the D-A converters are 20-bit resolution sigma-delta 8x oversampling.

The DA-98 is still a 16-bit linear recorder—and thus tapes recorded on it are completely compatible with the other DTRS machines—however dithering is provided on the track inputs to accommodate longer word lengths. Dither can be triangular, rectangular or switched out altogether. As with most things in this life, you don't get something for nothing—while dither can improve quantisation noise and distortion at low signal levels, the trade-off is a poorer signal-to-noise ratio. Rectangular dither is claimed to give around 3dB better signal-to-noise than triangular, but at the expense of noise modulation which may become audible on low-level programme material. Tascam suggests experimentation with the type of programme you are intending to record to achieve the best compromise. In practise, the machine sounds noticeably better than I remember the DA-88 sounding.

Confidence mode is helpful in assessing the effect of the various dither options and is a useful addition to the monitoring. As the name implies it allows off-tape monitoring. There is a delay of around 240ms or four





Close-up of the front panel showing transport and management controls including the new confidence monitoring facility

frames (at 25fps). Tracks may be individually selected to confidence monitoring using the INPUT MONITORING keys. One limitation of Confidence mode is tracks can only be armed for recording in pairs—1&2, 3&4, 5&6, 7&8. Source-tape monitoring is comprehensive with a variety of options determining how outputs will behave in different record conditions.

DTRS format machines are frequently used to produce master tapes for delivery so a welcome feature is the inclusion of an error rate display. This can be set to display the error rate for each of the two main heads at either the centre or edge of the tape. This is also use-

ful in diagnosing tape faults or when cleaning or other maintenance is required.

The time-code chase and 9-pin synchronising functions together with time-code generator are built into the machine and seem to be better optimised than the DA-88 with the add-in synchroniser. All the usual frame rates are supported and pull-up and pull-down functions are provided to cope with the drop frame rates. Varispeed record and playback are possible at up to  $\pm 6\%$  although not when the unit is slaved to another machine or synchronised to external wordclock or video.

The new LCD and menu system has com-

pletely removed the need for any internal or external DIP switch settings to change modes or parameters. Navigating around the menus will be immediately familiar to anyone who has used a Yamaha 03D or similar. There are 12 menu 'groups' at the top level. The bottom row of the display reminds you of currently set values or the contents of the menu group under the cursor. The function keys are used for three things: to jump between menus, as extra locator memories or as numeric input keys. Frequently used menus such as setting punch-in and punch-out times can be assigned to function keys.

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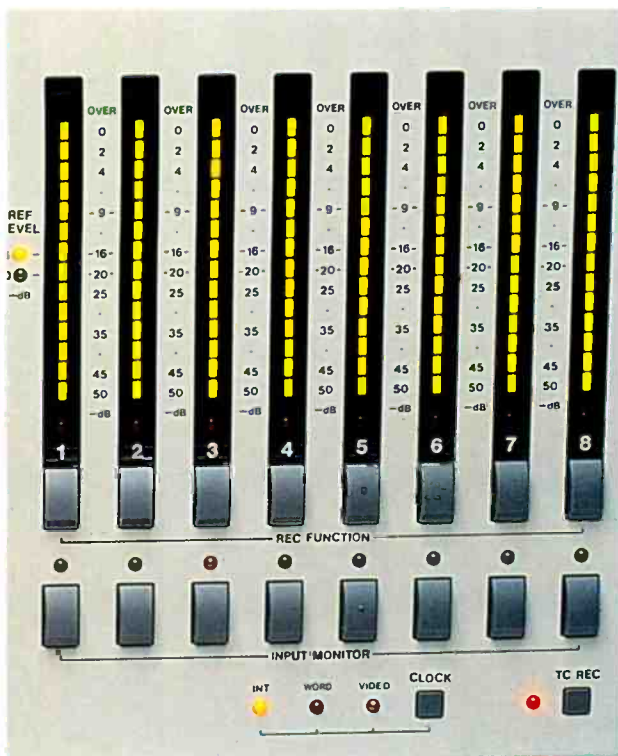
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**Metering, arming, level reference and sync options**

< page 19 The Track Copy function allows any track to be fed by any input or any track output. This effectively works as a digital patchbay. External inputs are selected globally between analogue and digital. It is not possible to have some track inputs analogue and some digital concurrently, and it is not possible to combine tracks, but there is an extremely neat feature which took me a little while to understand. For example, if you have already recorded a voice take, onto Track 1 and you wish to rerecord again on Track 1 over the same section of tape but retain the original recording, the DA-98s Track Copy will allow you to copy Track 1 to another track while rerecording on Track 1. The net result of this is the original recording on Track 1 is replaced with the new version but a digital copy of what used to be on Track 1 is recorded on, say, Track 8. This is potentially an extremely powerful tool.

The DA-98 is also equipped with a built-in oscillator with frequency selectable to 440Hz for tuning or 1kHz for line up.

With so many user selectable parameters, a welcome feature is the ability to store up to three user setups. This enables the machine to be quickly switched between different jobs requiring many parameter changes. There is also a default option which restores everything to the manufacturers settings.

Analogue machines are not the only ones

and sampling rates become a mandatory delivery requirement. ■

The existing accessories for the DA-88 and DA-38 machines are fully compatible with the DA-98—the format converters and the RC-808/848 remote controllers and the meter unit. Up to 16 DA-98s or combinations of DA-98, DA-88 and DA-38 can be synchronised together for a maximum of 128 tracks.

The DA-98 will sell for the same price as the current DA-88 and therefore represents a considerable bargain, particularly compared with time-code synchronisable DAT recorders. There is an argument for the inclusion of AES-EBU interfacing as standard although this would have an effect on the price. For many users the availability of TIDIF interfaces on other equipment, such as the Yamaha 03D which I used for this review render the extra expense unnecessary and simplify the cabling.

The DA-98 is far simpler to operate than its predecessor with a number of useful additions not the least of which is off-tape monitoring and, of course, the time code and 9-pin synchronising capabilities are built in. The improved converters and dithering should allow the DA-98 to consolidate the position of DTRS as a standard interchange format, at least until higher recorded bit

to require regular maintenance. The DA-98 makes this reasonably painless by incorporating an internal cleaning mechanism which can reduce the need for manual cleaning. Hours meters are provided for the head drum and head search time. Interim services are recommended at 350–400 hours with a full alignment check every 1,000 hours. In practice as with other rotary head machines these figures vary wildly between machines, depending on environment and type of tape. I know of some machines (DA-88) which are still happily running at 2000 plus hours without major attention and others which have required head changes well before this.

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# Sonifex The Courier

The future for solid-state location recorders promises to be bright, but the fire is only just beginning to catch. **Neil Hillman** alights on The Courier

**O**N A BLEAK, windswept Saturday in October, I am doing my bit for charity. Straddled between vociferous and vocal vendors of *The Big Issue* and *The Socialist Worker* at Birmingham's New Street station, trade is not so good for my red and green lapel ribbons (Stereo awareness—please take sound advice...).

Later, in the station that used to be owned by British Rail, over a polystyrene cup of a beverage formerly known as coffee, I'm musing over the design origins of the machine now known as The Courier from Sonifex; and I can't help but think that this machine has been heavily influenced by the motion picture industry—I'm talking about high-grossing box office blockbusters here with articulated Winnebago motor homes, military defence-sized budgets and worldwide licensing deals for kids beakers and lunch boxes.

Someone, somewhere deep in the British Northamptonshire countryside, has an unhealthy obsession for *Star Wars*. How else could you explain away an achingly pretty design that resembles so closely the Millennium Falcon, Han Solo's celestial cruiser? But as Han would say: 'Buckle-up Princess, we're in for a bumpy ride.', as there are other players out there shipping proven products, with more waiting in the wings to launch. Bottom line: the solid-state recorder market is growing at a rate just this side of light-speed.

The Courier is one of a number of solid-state recorder-editors employing PCMCIA hard disks to store full-bandwidth digital audio, and with an entry price of £31.925 (UK) this is a contender promising to square up to Nagra's Ares-C and Mandozzi's DART (see *Studio Sound*, August and September 1997) in terms of comprehensive features, while cost will be the battleground against the awaited, but assumed to be less sophisticated, Marantz PMD 690. How the challenges pro-



vided by Maycom's Digicorder, Dialog 4's C-Taxi or Eela Audio's Reportable recorder are dealt with will be determined by Sonifex' own ability to get a reliable device into the marketplace; and to meet its published targets of providing the software updates (available free to download from its Web site) that will greatly improve the specification of the machine from its present v1.0 form. The idea is sound—buying early into the system now will not leave you vulnerable to being left behind by its updated big brother a few months down the road, providing you have a reasonable modem and 15 minutes or so to spare. Alternatively, a diskette will be supplied with suitable handbook updates.

Version 1.0 software provides MPEG layer 2 and uncompressed .WAV recording, instant upload to external editing workstations and top and tail editing. Version 1.5 promises full graphical scrub-wheel editing, while v2.0 will bring audio file transfer via modem, ISDN or GSM mobile telephone and dialling from memory. The last planned update will be with v2.5, enabling live audio transfer by either ISDN or a standard telephone line.

The basic review version was so recently removed from Sonifex HQ, it was still warm as I removed it from its packing, and the loaded v0.99 software was sadly still not fully utilising all of the features available on this model.

The first impressions of the machine are of its incredible lightness—it is just 1.4kg fully laden—and its intense beauty; with an uncluttered front control panel that defies you not to

run soft fingers across its face.

Much of the weight saving has been gained by the use of ergonomic moulded plastic for the casing, and the adoption of 6V domestic/semi-pro 8mm, camcorder batteries as its portable power source. Quoted figures for a 3000mAh battery suggest that an operational life of about four hours recording should be possible between changes, which can be carried out 'hot'. Internal rechargeable cells allow for 1 minute of changeover time via the quirky battery retaining recess at the bottom of the machine that requires a definite technique, but this is aided by the fact that the battery can be fitted either way round. A mains unit that cleverly adapts to any pin configuration via four adaptors, allows power to be taken from any outlet in the known world, accepting voltages between 100V and 240V, simultaneously charging the fitted battery if necessary.

Soft rubber boots protect the bottom corners of the machine in the advent of it being dropped, clearly the result of extensive 'battered toast-testing', and for its lack of weight it certainly does not give the impression of being flimsy or overly fragile—and lets face it, with the intended end-user a radio journalist, the device must be, er, robust.

The front face of The Courier carries the main transport controls of PAUSE, REWIND, PLAY, FFWD, STOP and a key that comes into play with the editor, MARK, all mounted below the smallish central LCD screen. During the recording process the screen displays the Left and Right channel levels as a bar-graph







< page 23 horizontally against a scale that may be chosen from the Setup menu of either PPM or dB calibration with peaking indicated at adjustable points between 4 and 7 for the PPM or 0 and +12 for the dB meter. Also shown is the recording file number and the duration in standard h:m:s (hours:minutes:seconds) form. In playback, the screen displays the same information but this time the recording timer counts down to the end of the track. The screen can also display the battery level in both Volts and percentage capacity remaining, while showing the amount of disk time used by means of the non-latching BATT/DISK switch immediately below the POWER button, mounted at the top left-hand side of the front face. Also in this column of four switches is the LIGHT for the LCD screen and at the bottom, the MONITOR button to listen to a confidence feed with the audio delayed by a few seconds, the actual delay time depending upon which sample and bit rates have been selected. The Courier is at present the only recorder to offer a read-after-write facility, and very welcome it is too.

Recording to disk is straightforward with a sliding switch for RECORD and under that a similar button REC PAUSE, that enable levels to be set and metered before the REC PAUSE button is slid back home again to the left and the recording process commences.

The right-hand side of the front face is occupied by the dual-input, ganged rotary pots, calibrated 0-10, recessed and clutched with sufficient friction to prevent inadvertently knocking the input levels once set.

The last three buttons on the front face are related to the software control and are a central execute key (marked with a standard computer 'return' key symbol) and MENU UP and MENU DOWN keys mounted above and below it, also 'standard-keyboard' marked with up and down arrows. Neatly set into each of these keys is a tiny LED that in the case of the up and down keys illu-

minates as the limiter begins to operate and in the return key indicates a low battery voltage.

The left-hand side of the machine houses the PCMCIA-type drive slot, the ISDN connector, RS232 9-way D-connector for audio file transfer and male XLR 4-pin mains input socket.

The right-hand side houses the monitor speaker-headphones level pot, balanced left and right female XLR analogue inputs (with an impedance of 10kΩ). Next to these the left and right male XLR analogue outputs (with an impedance of 50Ω) and finally the male XLR AES-EBU digital output. The monitor speaker on the top face of the machine is muted by the insertion of the headphones 1/4-inch stereo plug into the socket next to the LEVEL pot.

The top face of the device plays host to both hardware and software controls, with recessed toggles to switch Left or Right inputs between mic or line, enable +8V phantom power to the mic inputs, switch in the limiter or place in line the 125Hz rumble filter; and soft keys for the editor sit alongside the large scrub-wheel that drags the audio waveform past a fixed 'replay' head.

Courier is configured through menus navigated easily through onscreen prompts that can allow you to make simple selections of preset configurations from a title shown in the Setup menu. A station engineer may choose to call a setup containing 22kHz mono, MPEG 6:1 compressed 'speech'. It then becomes much simpler for reporters to ensure they are recording in the most applicable manner than wade through lists of foreign terms.

It was much later in the sodium twilight of street lamps, closing stores and retiring shoppers that I realised that, due to the apathy of the general public, I had spent all day in Courier contemplation. I gathered my pin-board of unsold ideals and took my leave from the cold city, before evening revellers crowded the streets once more.

As Darth Vader himself reflected: 'This will be a day long remembered.' ■

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# Dolby Surround Tools

The latest additions to the Pro Tools TDM stable bring Dolby Surround to an unsuspecting new market for the first time. **Dave Foister** loads them up and flies them around the studio

**H**OW THINGS CHANGE. Not long ago, encoding surround sound using Dolby equipment was strictly a big boys' game, using leased kit under direct supervision from Dolby consultants for big motion pictures. The presence of the original surround information on the video releases of those films started the Dolby Surround snowball rolling, bringing us all the trappings of home cinema and making it worthwhile to produce TV series, radio programmes and music CDs in Dolby Surround. The addition of Dolby Surround computer games completes the line-up, and the potential for using surround constructively on all of the audio media we have to deal with makes the idea of an accessible Dolby encoding system very appealing. Postproduction houses in particular are already facing the necessity of having Dolby encoding available, and for many the ideal solution would be a system integrated with their DAWs. How thoughtful then of Dolby to produce Dolby Surround Tools, a TDM plug-in system for dealing with Dolby Surround within the environment of the Digidesign-Macintosh platform.

Dolby Surround Tools is not just one plug-in but a suite of related processors, all sitting comfortably within the TDM framework, but inevitably with special needs of their own. Crucial to the whole thing is the Encoder plug-in, that produces 2-channel encoded audio from four discrete sources. Within Pro Tools the sources can be buses, with two for stereo left (L) and right (R) and two for centre (C) and surround (S), or even the system inputs. The encoder comprises two 2-channel plug-ins which must be inserted into two stereo channels. One is the master, and includes the main display window; this carries the L and R signals while the slave plug-in carries C and S. All this sets itself up automatically, and the window simply shows meters for all four input levels, as well as the levels of the 2-channel output—the only control to adjust is input level, ganged for all four channels, giving +6 to -12dB of gain. This not only acts as an overall gain makeup to feed the processors at optimum level, but can compensate for the additional level generated by matrixing the four into two.

The resulting encoded signal can be recorded as it stands, and should obviously be monitored in surround. Any Dolby Surround decoder can be used at this point, but the TDM package includes a decoder so that it can all stay within the computer domain. This must be patched to the 2-channel encoder output and produces four signals for feeding the monitoring system. This, too, has input and output meters, but also has controls for calibrating the monitor system. Each output has a TRIM control with up to 18dB of attenuation, and a pink-noise generator can be auto-

matically or manually stepped round the outputs so that acoustic levels at the mix position can be matched. Ideally, perhaps, amplifier levels should be adjusted rather than having to set up the decoder parameters every time, and the noise sequence will help with that too. The surround channel is delayed by 10ms-100ms to allow for the shape and size of the listening room. All these parameters are saved with a Project, but default to factory values every time the plug-in is loaded afresh, hence the suggestion that level matching be set up elsewhere, unless Templates are set up with the room's required settings.

Templates can also help with the patching of different setups, and a selection is provided with the software, allowing for various jobs such as recording to DAT while monitoring in surround off tape, for which inserts in a pair of groups are used for the DAT I-O. This is a real time-saver, as hooking up these elements where you want them is a set-and-forget operation, not something you need to be creative with.

Unlike the Panner—where most plug-ins mimic existing hardware systems, Dolby Surround Tools goes one step further and adds this facility, which can only be duplicated in hardware with sophisticated third-party equipment. This powerful extra is a graphically controlled panner, that allows a sound to be directly moved around the surround system with the mouse. A simple square grid shows a cursor representing the current position, that can be grabbed to move the sound in real time like a joystick.

A PCI-based system can support two of these on independent sources, although a NuBus Mac can only manage one. Furthermore, Pro Tools 4.0 and higher allows full dynamic automation of the panning movement, a trick only achievable in hardware on a very few consoles.

Setting up and using the panner is very straightforward. It's a separate plug-in, that is inserted into a mono signal path in the usual

way, but then sends its panned output direct to the encoder inputs to be mixed with the conventionally bused 4-channel mix. Besides the graphic indication of position, there are numeric read-outs and sliders for the two axes—front-rear and left-centre-right—and if a more precise localisation is required than can be achieved directly with the mouse on the grid these sliders can be used instead. Movement is immediate and smooth, and the automation can cut the time required to, say, fly a helicopter round the room to a fraction of what would be required with existing Dolby



Decoder



Encoder

hardware and DAW level-pan automation. An input fader and a MUTE button are provided along with a level meter, and the grid helpfully shows when the source is panned hard to the left or right front speaker by lighting the relevant symbol in the corner.

While computer games can make use of premixed surround effects (and no doubt this will be an enthusiastic market for this package) there is also a clear benefit to be had from interactive surround panning, where the player's actions or other variable factors can determine where a sound will be heard. This is now possible with Dolby's Game mode, an elegant means of pre-encoding an audio file from a single mono source so that final positioning can be simply achieved during gameplay with the playback system's surround decoder doing the rest. All this **page 29 >**



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## MX3282

...but it was also developed for elevation to unknown heights\*.

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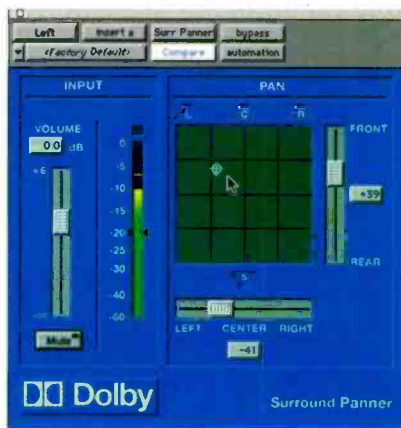
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< page 28 does is place the source signal onto two channels, one carrying the straightforward signal for the front, and the other with the necessary phase differences and delay to appear as a rear signal. On playback of the file, the joystick, mouse or other parameters simply have to mix between the two for front-rear movement and pan across the front for left-right positioning.



Panner

saving a lot of complex processing. Surround Tools comes with a Game Mode Encoder for the partial pre-encoding, together with a Game Mode Positioner, strictly for monitoring and checking purposes, that can simulate the final actions within the game. The encoder is as simple as it could be, with an INPUT TRIM control and level meters for the mono input and the two outputs. The Positioner resembles the main Panner module, but without the input controls, as with the Panner, movement is achieved with the mouse on a grid or by means of a pair of sliders.

This completes the line-up of what constitutes as comprehensive a set of tools for Dolby Surround manipulation as you could wish for. All possible media are catered for, with one significant exception: Dolby takes pains to point out that the system must not be used in an attempt to encode surround for full-blown motion pictures. While pre-mixes can be auditioned through the encode-decode process to see how they will survive, they must remain as discrete 4-channel mixes through to final mixing and production. At this stage Dolby hardware is still required to produce the final encoded film soundtrack, as it also incorpo-

rates additional processes such as SR noise reduction and optical track limiting that for obvious reasons are not part of Surround Tools. At the same time, the ability to preview the effect of the processing is valuable, as it is freely acknowledged that what goes in does not come out exactly the same; centre information will unavoidably (because of the nature of the process) be present on the left and right decoded outputs, and information panned left or right will appear on the surround channel. This is an accepted part of the system's behaviour, and Pro Logic decoders use additional steering to improve separation, but it is as well to know at the pre-mix stage how the final image will be presented and make any necessary adjustments there and then.

For other applications, the 2-channel Pro Tools output will be in fully compatible encoded form ready for Dolby Surround decoding, and the finished product can carry the Dolby Surround logo provided simple formalities have been gone through with Dolby. The Soundhouse, the London facility that showed me its Surround Tools equipped studio, has been pioneering Dolby Surround for radio, originating the various comic strip series that have been carried by BBC Radio 1, such as *Batman*, *Spiderman* and *Judge Dredd*, as well as a radio version of *Independence Day*. All of the material so far broadcast was prepared using standard Dolby hardware, so The Soundhouse is ideally placed to assess the advantages of Dolby Surround Tools; apart from the simple convenience of having all the processing integrated into the one workstation in the digital domain, the automated real time panning is regarded as a huge and unforeseen bonus, allowing effects that were previously produced laboriously using automation of Pro Tools' mixer to be achieved far more quickly and more convincingly.

Most other plug-ins have competition; this has none. If Dolby Surround features at all in your Pro Tools work (and if it doesn't now it probably will) you need it. ■

Studio Sound October 1997

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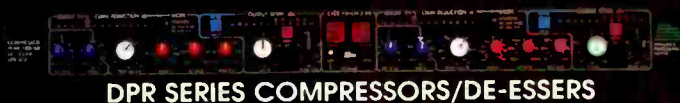
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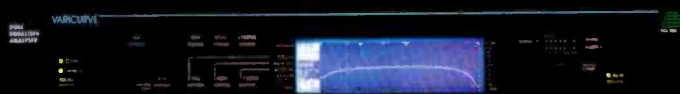
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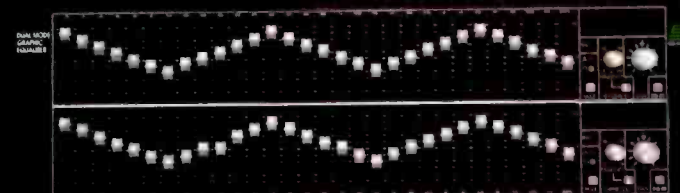
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## Ramsa digital desk

The long-rumoured Ramsa digital desk made a clandestine appearance on the Panasonic stand at the AES. Slated for release after NAMM at a price of around \$5000 (US), the desk is targeting the Yamaha 02R. The WRDA7 is also similar in appearance to the 02R employing a large LCD mounted at the top right of the compact surface and employing an assignable facilities type strip to the right with press-sensitive controllers. It features 16 analogue and 16 digital inputs, 24-bit A-D/D-A conversion, 32-bit internal processing, 8 buses, and 4-band EQ and dynamics on each channel.

A derivative of the large-scale DX1000 digital desk installed in a number of Tokyo theatres, the new board has moving faders, MMC, 5.1 capability as standard, 50 snapshots and dynamic automation although an external computer will be required to store larger volumes of mix data.

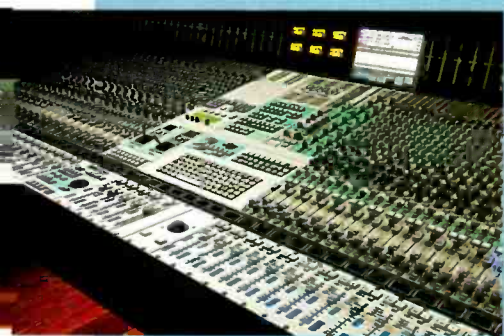
Two WRDA7s can be strapped together to create a larger mixer with full bidirectional control between the two. A variety of interface cards will be available including ADAT, TDF, AES-EBU and SPDIF.

Ramsa, US. Tel: +1 714 373 7277.

## Amek Soho

Amek has re-engineered the technology of its DMS to develop the Soho lower-cost digital desk designed to accompany third-party DAWs in post. With 16 output buses and 48 channels at mix with EQ, dynamics and auxes, the desk is fully automated and able to work in 5.1. Two sizes are available: a circa £30,000 (UK) version with 8 faders, 32 digital inputs, 8 analogue inputs and 4 mic inputs; and a £40,000 version with 16 faders, 24 analogue inputs, 32 digital inputs and 4 mic inputs.

The news coincides with the release of a Rupert Neve designed channel strip for the Recall live desk and an in-line variant of the



9098 analogue board called the 9098i which can work in 5.1. The largest size has 120 input modules with both signal paths having motorised faders while the centre section houses a TFT screen for the Supermove automation. A new master section handles all master, monitor and control functions and monitor changes, common automation tasks and individual or global channel functions and dynamics processing can be performed from here.

Amek, UK.

Tel: +44 161 834 6747.

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Studio Sound October 1997

# Otari Advanta

Otari has grabbed the digital bull by the horns with a 24-bit-96kHz capable digital console. **Tim Goodyer** offers a preview

**I**F YOU WANTED to indulge yourself in mixing console technology during the month of September, the New York AES Convention was a good place to do it. Adding up the various unveilings, variations, adaptations and previews, you could be forgiven for thinking there had never been a recession. And there was certainly no hint of apology surrounding the debut of Otari's decidedly upmarket Advanta digital desk.

Billed as large format digital recording and production console representing 'a dramatic departure from the consoles you might be used to', the Advanta was big in both profile and physical presence. And with so many people talking up the issue of high-bit, high-speed recording, Advanta's claim to full 24-bit, 96kHz capacity was comfortably in keeping with the general push towards taking digital audio a quantum leap forward.

Comprised of 8-channel sections and a centre section, Advanta makes extensive use of displays to provide what Otari calls an 'elegant' graphic user-interface. These colour screens can be used to display a variety of information including channel settings, EQ profiles event lists, output routings, and so on. The displays are accompanied by a healthy number of hard controls laid out to resemble a conventional desk with meters at the top of the channel strips and two sets of 10mm in-line faders along with a selection of assignable buttons and switches below.

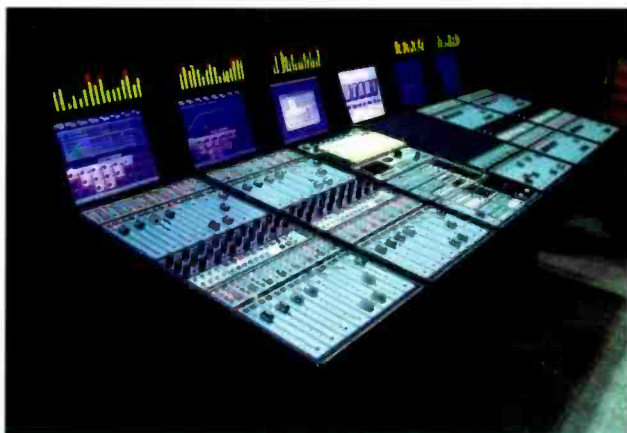
The centre section has a master display (a second master display can be added to show a DAW or sequencer) for setup, automation information and so on; a mapped controller; QWERTY keyboard; and master section for control of monitoring, machine control, soloing, and so on—again, Otari has taken care to preserve the impression of a familiar control surface.

Input to Advanta can be entirely digital or via mic pre-amp/A-D modules. These offer a -127dBu EIN level for mic input which, while impressive in itself, is essential if the desk is to have a chance of performing adequately to 24-bit resolution. Frequency response of the converters is quoted at a very standard 20Hz–20kHz with distortion at better than 0.006% 80Hz–20kHz at -1dBFS input and noise at better than -105dB unweighted 20Hz–20kHz. Once in the digital domain, all DSP is performed on a 40-bit basis.

The output D-A converters are 20-bit as standard with an option of upgrading to 24 bits, giving a -106dBFS noise floor, unweighted 20Hz–20kHz.

The system uses five DSP and CPU elements and, for signal processing including reverberation—briefly, a DSP 'farm' takes care of I-O, audio processing, a Pentium engine looks after automation and synchronisation, further Pentium processors are used in the master section, for path control and to manage the surface scanning. The DSP farm is based around Analog Devices SHARC chips and is expandable to a total of 72 processors. The heart of the control system is a 200MHz Pentium chip with 32Mb RAM that talks to the console via CPCI bus.

Advanta will support up to 128 input channels with, typically, 48 multitrack buses, 10 aux sends and 8 submix outs for music tracking and up to 3-operator configuration with a choice of dedicated or mapped input section for film and postproduction versions.



The mapped option offers simultaneous control of EQ, routing, dynamics, and so on, for up to 16 signal paths via shaft encoders. The dedicated version employs 12 servo-controlled pots to control up to 8 signal paths.

The automation included in Advanta is Otari's Eagle system already in use on the Elite and Status consoles. This covers all operational aspects of the console—level controls, parametric EQ controls, signal dynamics settings, aux controls and bus sends are all scanned and automated in either snapshot or dynamic modes. Scanning is every 0.25–1 frame (to 8 sample accuracy) depending on control type and with 14-bit resolution.

Superficially at least, Otari seems to have done its homework well. And if the attention grabbed by Advanta at AES is any indication, a digital console that supports future 'fast and wide' digital audio standards—previously the subject of much reservation and debate among console manufacturers—may not only be impressive, but well received. ■

### Contact:

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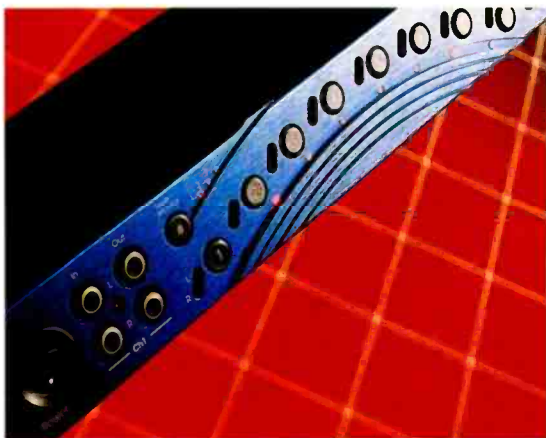


# Total Systems SPA-2

There's more to preamps than serving the demands of the microphone.

**Benedict Grant** assesses a preamp for line level signals

**I**N OUTBOARD, first impressions count for a lot. And in the case of the Total Systems SPA-2, design and construction are remarkable: the 1U-high case boasts a flawless red anodised finish, and the front panel is a work of art, with the eight SOURCE-SELECT switches arranged in an arc between concentrically milled grooves and cut-outs. Internally, the design and construction are of an equally high standard. The circuitry, which occupies seven separate PCBs, employs a mixture of ICs and discrete components. Input and output switching is electronic, via analogue switch ICs. Robust potentiometers with metal shafts are used throughout, and the main output level control is an Alps conductive plastic pot.



An optional RIAA amplifier board can be fitted to convert Channel 6 to a turntable input.

The unit offers eight stereo channels; of these the first four are designed for use with recording machines and have outputs as well as inputs. Channels 1-6 are unbalanced, and operate at a nominal level of -5dBu, switchable internally to +4dBu. Connections to channels one to six are via phono connectors. The input and output sockets for channel 1 are located on the front panel. Channels 7 and 8 have electronically balanced inputs operating at +4dBu and are accessed by XLR connectors.

Source channels are selected by eight push-button SOURCE SELECT switches, which are also arranged in an arc and occupy the centre portion of the front panel. Adjacent to each switch is a red LED which lights when the channel is active and recessed behind one of the arcs cut in the front panel, a pair of multi-turn trim pots which adjust the input sensitivity of the channel by  $\pm 5$ dB. It is possible to select more than one channel at a time.

The SPA-2 has two signal paths, main and monitor. The tape outputs on channels one to four are fed with the signal from the channel(s) selected by the SOURCE SELECTION switches. The main stereo outputs may be fed with either the signal selected by the eight SOURCE SELECT switches, or may be

switched to derive its signal from the tape monitor path, by means of the TAPE-SOURCE switch. The tape monitor path can be assigned to monitor any of Channels 1-4 by the pressing TAPE SELECT switch which steps through these channels. A row of adjacent LEDs shows which channel is being monitored.

The main stereo outputs of the preamplifier are balanced and appear on a pair of XLR connectors. A large, clearly calibrated gain control adjusts the output level between -60dB and +18dB relative to the nominal output level. Alternatively the output gain can be set to 0dB by pressing the FIX switch, which is recessed slightly to prevent accidental operation.

The MONO switch operates on the main signal path, and sums the left and right components of the selected stereo signal(s). It is configured so that when identical signals are present on the left and right channels the signal level remains unchanged when Mono is selected. The BALANCE control allows adjustment of the relative levels of left and right signal, and operates immediately post the main source select section, thus controlling the signal fed to record feeds 1-4.

Two stereo headphone sockets with an output level control are provided. The headphone signal is derived from post the TAPE-SOURCE switch.

I used the SPA-2 for several weeks to select the signal source for a bank of cassette decks in a small copying bay where it has proved to be a flexible and capable performer—although its handsome facade sits a little incongruously in an otherwise stark environment.

On a critical note, I would have welcomed the duplication of the inputs and outputs to Channel 1 on the rear panel: while I was using the unit, I had a machine permanently connected to this channel, and had to run leads from the rear of the rack round to the front in order to do this. Also some basic form of output metering would have been useful, and the more utilitarian engineer may feel that utility has been sacrificed to aesthetics in the omission of a labelling strip. However, these criticisms detract little from the unit: sonic performance is flawlessly transparent, and it is very easy to operate once its architecture and the intricacies of the tape-monitoring system are understood.

In summary, the SPA-2 is quite the most elegantly styled piece of equipment I have seen for a long time. The quality of components and construction are superb, and the unit has exemplary performance. I am sure that this pre-amp will find many uses in the studio environ-

ment, whether switching between source machines in a copying bay, interfacing domestic equipment with balanced systems, or extending monitor or 2-track return switching on a mixer. ■

**Contact:**

**UK:** Canford Audio, Crowther Road, Washington, Tyne & Wear NE38 0BW.  
**Export Sales:** +44 191 415 0044.  
**Fax:** +44 191 416 0392.

## NEW TECHNOLOGIES

### Oram consoles

Sharing in the console frenzy at AES were John Oram's Series 48 digitally controlled analogue console and Series 4 small format analogue desk. Making a big play on its TOR automation system, the Series 48 is a fully-fledged 48-bus hybrid desk featuring the Oram Hi-Def parametric EQ on a per-channel basis, onboard dynamic processing, 10 aux-per-channel capability, and up to 8-channel output busing for surround use. The Total Operational Recall dynamic automation and Flashback snapshot systems both use a dedicated microprocessor for each input channel to ensure that the full dynamic automation (including motorised faders, and all channel buttons, rotaries, all busing and input assignment) is near instantaneous. Curiously, TOR also uses a satellite time reference to uniquely date-stamp every automation session and move. Available in both straight and 'winged' frames, prices for the Series 48 start at \$292,640 (US) for a 48-channel console and run to \$438,960 for 72 inputs.

Still in the analogue domain, Oram's Series 4 is a scaled-down version of the Series 8, 8-bus desk, coming in 8, 10 and 12-input versions with 100mm faders and five aux sends. The Series 4 is also available as a flightcased location mixer offering mains or (10 hours) battery power and intended for broadcast and theatre applications. Prices start at \$4,718.82 (US) for an 8-input desk.

**Oram Professional Audio, UK.**  
**Tel: +44 1474 815300.**

### Tapeless portable

The ReporterMate MTR/64 is a portable tapeless recorder with editing and commu-



nications for journalists which uses PCMCIA cards. The unit is suitable for live or file transfer and includes voice-over possibilities, a double PCMCIA slot and support of audio compression of MPEG Layer II, G722, G711 and WAV. Voice activated recording, AES-EBU connection and a help function are part of the package.

**You/Com, Netherlands.**  
**Tel: +31 15 262 5955.**

### CEDAR Series X

Breaking the price barrier that has kept digital audio restoration an elite operation is CEDAR's Series X. Presently consisting of three boxes—the DCX declicker, CRX crackle and DHX dehisser—the X line has come about through the availability of new chips capable of supporting new restoration algorithms. All units are real-time processors and based on 40-bit **page 34 >**

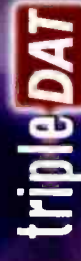
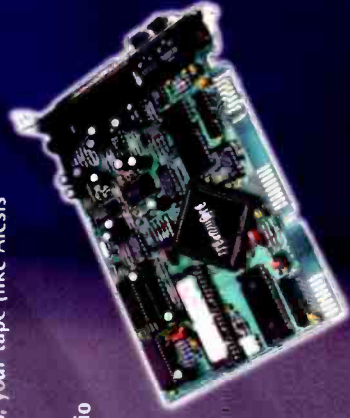
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CreamWare announce the launch of IUA116 - but be forewarned... you'll have to add your name to the list of recording engineers who are ahead of you in the queue for one! Why? IUA116's all new, yet mature and stable - we've taken our proven tripleDAT interface and added the powerful capacity of 16 I/O's, whilst keeping all the features that earned tripleDAT a 1997 I.E.C. Award nomination! Why gamble with new products that are not proven in the field? Don't risk your valuable studio time and recording talents with one piece of hardware combined with some 'off-the-shelf' software interface. IUA116 is a finely tuned hardware AND software solution. No installation problems and no waiting for an update that actually works! Install TDAT16 and your creativity starts flowing. The fastest editing with all the power tools that make tripleDAT so outstanding: integrated CD-Writing and a whole suite of excellent REALTIME effects. You won't find a product like this at any price! TDAT16 is the HDR solution for the digital studio. Now you're digital, stay digital. Link your digital mixing console, your tape (like Alesis ADAT or DAT) and your TDAT16 powered PC together without ever having to turn back to analog.

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**Millennium**  
172 Derby Road • Nottingham  
NG7 1JR • ph: 0115 9552200

**Music Lab**  
72-74 Eversholt Street • London  
NW1 1BT • ph: 0171 388 5897

**Music Village**  
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RM6 6PP • ph: 0181 597 0103

**Music Village**  
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**Rose Morris**  
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21 Denmark Street • London  
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tel: 0181 693 3355 Fax: 0181 693 6936 Email: sales@system-solutions.co.uk



trifidelity at work.



# BPM CR-10 StudioTeknik

The simplicity of the latest Studioteknik mic belies its quality and capability. **Dave Foister** checks the state of German mic design

**B**PM STUDIOTEKNIK is nothing if not consistent. While others offer us ever more bizarre microphone designs or blatantly mimic someone else's classics, BPM has come up with a house style all of its own. The CR-10 may be smaller and simpler than the increasingly familiar existing range, but it looks pretty much like a sawn-off CR-95, with the same capsule housing and grille, the same stand clamp and the same overall shape, finished in the same precisely engraved satin silver casing.

BPM's microphones to date have been very much in the best German traditions: a chunky tapered cylindrical body supports a large side-firing capsule enclosed in a basket of a distinctive shape, and is big enough to carry the expected selection of switchable functions, with choices of polar patterns, pads and filters. Prominent in the catalogue has been the valve TB-95, complementing the solid-state CR-95 to produce a small but comprehensive range which has found favour both in commercial facilities and in more modest studios thanks to its competitive pricing.



Clearly there's room for more, with the new CR-10 stepping in a rung below the bigger originals. The CR-10 offers BPM styling and quality but with a reduced flexibility that is reflected in the price. The result is the reviewer's nightmare (in the nicest possible way), a take-it-or-leave-it cardioid microphone with no controls or adjustments whatsoever. The fact that such microphones exist—and there are several of them—reflects three things:

the universal popularity of cardioid working, with some engineers rarely trying anything else; the fact that SPLs high enough to require pads in a good microphone design are relatively rare; and the inevitable presence of high-pass filters on the console into which they are to be plugged. Given these circumstances, the usual switches become surplus to requirements, and in fact it would be interesting to know how large a proportion of its life the average 414 or U87 spends set up just like the CR-10. An important advantage of restricting

the pattern to cardioid, of course, is the fact that only one diaphragm is involved, as opposed to the back-to-back pair needed for variable patterns, greatly reducing the complexity and cost.

The package of accessories makes it clear that any corner cutting has been kept strictly in the area of facilities, and that in terms of quality the CR-10 is by no means a poor relation to the models that have preceded it. BPM microphones generally come packed in an aluminium flight case worthy of a complete valve microphone kit with its accompanying power supply. There's no such requirement here of course, so the case has more foam in it than anything else, with snug cut-outs for the microphone and its bits and pieces. A suspension mount is supplied as standard, clamping firmly round the body with a sprung arrangement like a bulldog clip—the same clip as used by Rode. This is the only method of mounting the microphone on a stand, and is commendably firm and free from sags and bounces while doing a good job of isolating the microphone from shocks in the stand. Swivelling is locked with a levered screw and supports the weight more than adequately. Since this mount is used by more than one manufacturer it is presumably a third-party OEM item, and it seems to me that whoever produces it could make a killing selling similar designs to other manufacturers whose mounts so often leave much to be desired. Also in the flightcase is a foam windshield and, unusually, a microphone cable.

All in all then, this is a kit that takes itself seriously, and clearly expects us to do so as well. The confidence is entirely justified by the performance, which places the CR-10 firmly in the high quality league. A microphone of this type should be at home in a wide range of applications, and this certainly appears to be the case here. A full, broad sound is supported by comfortable handling of high levels, complemented by commendably low noise. The depth and warmth one would hope for from the large diaphragm is there in full, but the upper end is more biting than that might suggest. There's a subtle but undeniable presence to the sound which helps with vocal punch without getting hard, and brings out the edge in horns to good effect. At the same time I had good results from it on string bass, where again its slight brightness complemented the round low end well.

These characteristics make this a good half-way house between straightforward neutrality and a sonic signature, the latter not being so pronounced as to compromise its general usefulness. The balance is well struck, producing a microphone whose simplicity belies a capability of being more than just an all-round workhorse. ■

### Contact

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## NEW TECHNOLOGIES

< page 32 floating-point DSP operation and support 24-bit I-O on both AES-EBU and SPDIF connections, giving performance comparable to that of the existing line of CEDAR processors. Where Series X differs most significantly is in the simplicity of its operation and lack of programmability.

Anticipated usage extends from 'traditional' audio restoration through to on-air broadcast processing. Prices are not yet set but will not exceed £4,000 (UK). More Series X units will follow in due course.

The new line accompanies CEDAR's departure from the HHB stable and the establishment of CEDAR Audio USA in Portland, Maine.

**CEDAR Audio, UK. Tel: +44 1223 414117.**  
**CEDAR Audio, US. Tel: +1 207 828 0024.**

### Crane Song preamp

Flamingo is a 2-channel discrete class-A mic preamp said to be capable of emulating vintage sounds and creating distinctive new ones. Input gain is selected by a stepped switch and is followed by a continuously variable attenuator for gain trim. Each channel has individually switchable phase and phantom power and the 1U-high rackmount has two 22-element vu meters with an overload meter. Two switches marked Iron and Sound put iron in the audio path and change the type of amplifier respectively.

**Crane Song, US. Tel: +1 715 398 3627.**

### Drawmer MX40

Follow up to the MX30 gated compressor-limiter is the MX40 punch gate which has three controls per channel complemented by pushbutton selector switches. Peak



punch circuitry accelerates the leading edge of the signal to heighten dynamics while a trigger frequency control adjust frequency conscious performance. Pots control threshold and release while pushbuttons activate external key source, filter in-out, key listen, peak punch, attenuation range and bypass.

Drawmer has also added the DA6 6-channel stereo or 12-channel mono distribution amp with balanced XLR I-Os. An output section has a headphones circuit for monitoring outputs individually.

**Drawmer, UK. Tel: +44 1924 378669.**

### Acoustic Energy AE-2 Pro

Nearing the completion of their development, Acoustic Energy's new AE-2 Pro close-field monitors were exposed to the criticism of a selection of professional users at London's Abbey Road Studios recently. Offering some 250W peak programme handling, the new monitor is designed for horizontal meter bridge mounting taking into account the proximity effect of the console surface and uses two 130mm coupled bass drivers, two 25mm silk page 36 >

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# Solid State Logic

NEWSLETTER

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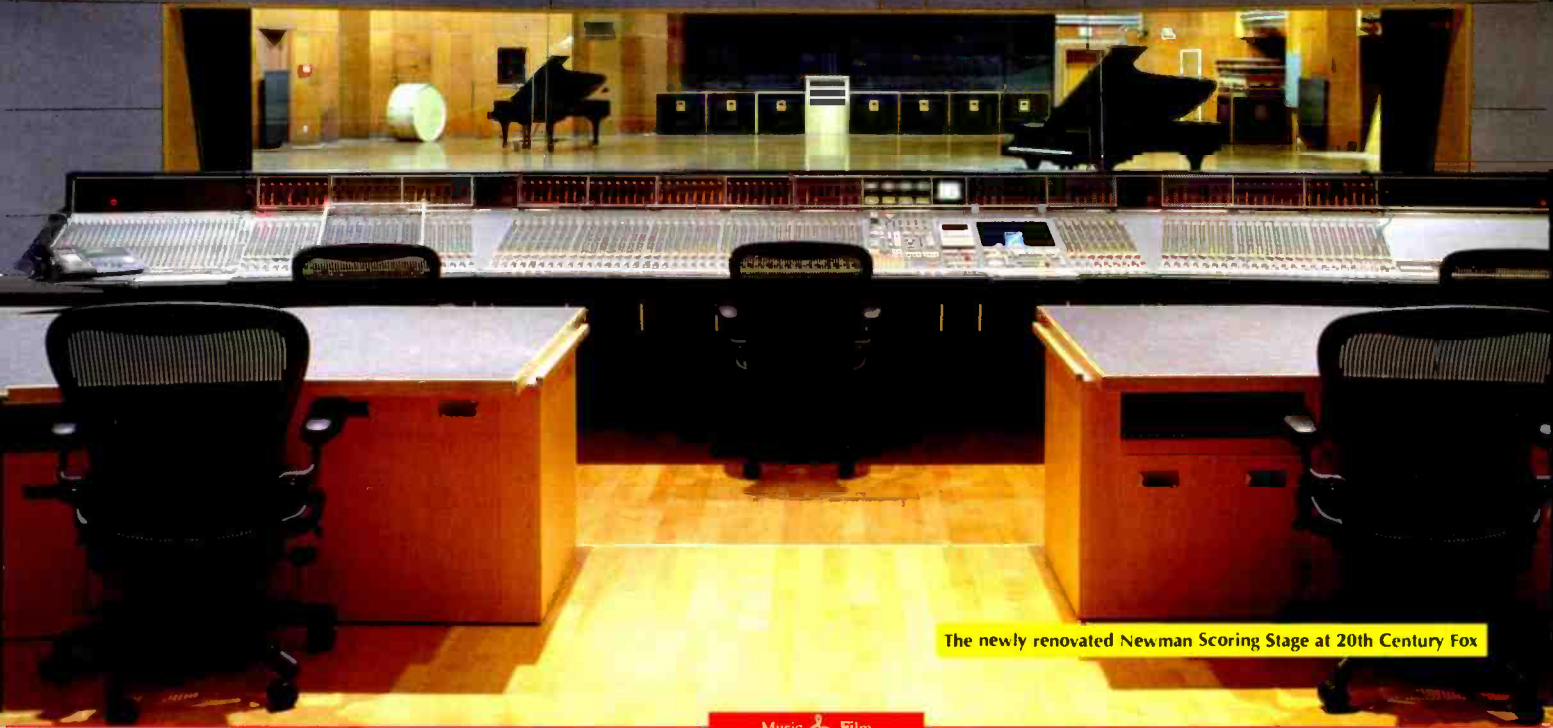
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## Scoring For



The newly renovated Newman Scoring Stage at 20th Century Fox

Music  Film

Producer / engineer Obie O'Brien worked at Quad, Right Track and Sarm West, mixing the Jon Bon Jovi solo album *Destination Anywhere*



## Obie O'Brien Destination J Series

**P**roducer / engineer Obie O'Brien has worked extensively over the years with Bon Jovi, as well as on solo projects with Jon Bon Jovi.

His impressive list of credits ranges from projects with Alice Cooper to the Philadelphia Orchestra and Boys Choir. In 1991, he worked on the soundtrack album for the film *Young Guns II - Blaze of Glory*, which was nominated for an Academy Award for Best Soundtrack. He recently recorded several songs and mixed the entire new Jon Bon Jovi album *Destination Anywhere*, as well as recording,

composing and mixing the soundtrack for the 45 minute film of the same name. The film features an all-star cast including Jon Bon Jovi, Demi Moore, Kevin Bacon and Whoopi Goldberg. All the work completed by Obie was done on the SL 9000 J.

"We were getting ready to cut some stuff for the *Destination Anywhere* album," explains Obie, "and Barry Bongiovi from Right Track Recording in New York called me to say that he'd just installed the 9000, and he invited me to come in and try the new console. So I went in and recorded with it, and I couldn't believe the results. The 9000's microphone pre-amps were absolutely outstanding. We went on to use the 9000 for all our tracking and mixing, working at Quad Recording in New York, and Right Track. We also did some mixing at Sarm West in the UK. We found that mixing the film alongside the album was really easy; switching between formats was painless. That's the thing about the 9000, it's just so easy. Before the 9000, I never liked the results I got when I went

Jon Bon Jovi and Demi Moore in *Destination Anywhere*

Photo: Kevin Nazur



# The 21st Century

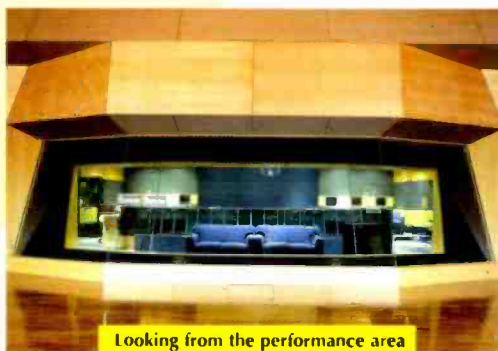
Over the last seventy years, some of the greatest movie soundtracks ever produced have been scored on Stage 1 at 20th Century Fox in Los Angeles, CA. Now, after a three year renovation, the Newman Scoring Stage is set to re-open. Named after the Newman family, famous throughout the history of film scoring, the facility has been built around the SL 9000 J.

"Fox put together a team of engineers and technicians to assess the range of available film scoring equipment," explains Mike Knobloch, Director of Film Music Production at Fox.

"When it came to the console, it seemed to us that SSL was more willing than anyone else to implement the requirements of their clients, and this came around when they developed their J Series Automated Scoring System. We decided that the 9000 was not only best suited to film scoring of today, but also to potential future changes in the discipline."

John Rotondi, Chief Scoring Engineer, explains the physical changes that have been made to the stage. "We wanted to build a brand new control room to house the SSL desk, and to

recover the floor space lost in the previous renovation in 1975." says John. "We knocked out two walls, and the new 1500 square foot control room has a glorious view over the 7500 square foot stage." Fox has specified its SL 9000 J with 96 channels, split LCR busses, and a 32x8x2x2 multi-format monitoring system. The SL 956 J Series Automated Scoring System, developed in conjunction with Fox and leading scoring mixers, is now available for the SL 9000 J Series console. The new facility at Fox opens in autumn 1997.



Looking from the performance area to the Newman Stage control room

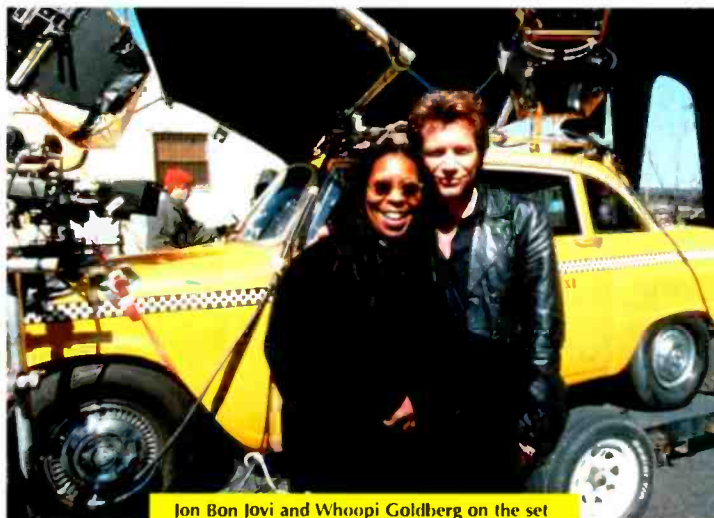
Music & Film

from start to finish on one console. I'd find myself with a ton of outboard gear, twenty mic pres and all the rest of it. Now I can just roll in - I make sure there's a couple of old valve compressors there, a couple of LA2As, maybe the Fairchild and some stuff like that, but with the 9000, I'm amazed just how much of the in-board processing I can use and get good results with."

Obie had to move the project between studios during the production of the album and film score. He explains, "I was waiting to see how well the console's Total Recall™ data would move between studios - I had done a mix at Sarm West in London, and I had to redo just a section of one song to remove a sample I'd mixed in. I was thinking, 'Well, this will tell us'. I loaded the project information, reset the console, and cut it in. It was absolutely seamless. Identical. On other consoles I had always noticed slight differences after a recall,

but the 9000 was absolutely right on."

After a short tour with Jon to promote the new album and film, Obie has his sights set firmly on further projects with the SL 9000 J. "Right now I've been working solid for two years, so I recently took a break, and put some miles on my Harley Davidson! Currently, I'm considering what projects to take, but I'm sticking with the 9000. Solid State Logic really does have a great product there, I'm very impressed with it. Congratulations to SSL."



Jon Bon Jovi and Whoopi Goldberg on the set of Destination Anywhere, scored on the SL 9000 J

An MTV VPH1 release. Photo: Kevin Mazer

## Enterprise<sup>2</sup> Scores 101

The Enterprise Studios in Burbank, CA, has purchased two 101 channel SL 9000 J consoles in 104 channel frames, the largest in the world in a commercial facility. In a major new development across the street from the existing Enterprise premises, a new film scoring facility named Enterprise<sup>2</sup> has been built to house one of the consoles, with the second installed in the facility's successful film mixing room, *The Bridge*. Each console is equipped with SSL's new eight-channel film monitoring system, as well as a 24 channel umbilical sidecar, custom engineered for The Enterprise in response to their desire for spatial flexibility. Enterprise<sup>2</sup> opens in October 1997.

## French Film Studio Finds SL 9000 J 'Formidable'

Studios Davout in Paris, France, has been the inspiration behind French film scoring for over thirty years. Olivier Kowalski, Studio Manager at Davout, explains, "Yves Chamberlain, founder of Studios Davout in 1965, was the first to create an independent studio in France. Thirty years of success has been built upon SSL consoles, and now the choice of the SL 9000 J reflects our continuing faith in their products." More than 2000 film scores have been recorded at Davout, many on the famed 3000m<sup>3</sup> stage and Studio A which will be home to the new 64 channel SL 9000 J (the fifth in France) with surround monitoring system. Olivier concludes, "We surveyed clients, engineers, producers and artists, and we were totally convinced to choose the new future classic console. I believe that the SL 9000 J will be the last great analogue console, and a fine monument to analogue sound."

3



# A-Series - World Class Post

The US post production market is turning to SSL Digital in a big way. At General Television Network (GTN) in Detroit, Michigan, two new Aysis systems with networked DiskTrack™ are combining with SSL's offline audio editors and two VisionTracks™ to create a truly world class facility. And in California, Hollywood based Complete Post is starting from the ground up with three new Axioms incorporating multiple DiskTracks and three APS systems at a brand new audio post facility, Complete Sound.

Aysis offers all the features of Axiom in a frame optimised for space efficiency. For commercials specialists GTN, the role of DiskTrack as a central networkable resource was crucial, as Audio Supervisor Jay Scott explains. "DiskTrack gives us 96 channels that we can distribute among the four rooms as required. If one mix room needs 48 channels and the other 32, with 16 and 16 demanded by the offline editors, we can instantly arrange that without patching. This flexibility, along with the efficiency and sheer sound quality of the system led us to Aysis. SSL is central to the audio plan here at GTN."

For Complete Sound, the decision to go down the Axiom / DiskTrack route was prompted by their talent personnel. "Our mixers liked the centralised approach, flexibility and sound quality of the SSL systems," explains Jeff Klein, co-president of Complete Post. Steve Potter, VP of Technical Operations, elaborates, "Axiom is good for our engineers, because it can be treated just like an analogue console in that it



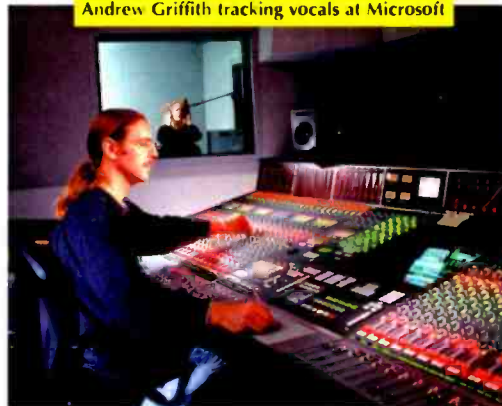
One of three new Axiom suites at Complete Sound

offers dedicated knobs and switches. We can pull in all the normal outboard signal processing we might want to use, or we can take advantage of the console's internal functions."

Broadcast & Post Production

## Microsoft Hits The HiWay

Andrew Griffith tracking vocals at Microsoft



With the addition of two Axioms and four Audio Preparation Stations, Microsoft has created a state-of-the-art production facility at their diverse new MS Studios in Seattle, Washington.

"We have three shooting stages and two production control rooms, each with an Axiom, as well as four mobile APS systems," explains Audio Lead Andrew Griffith. "A typical week at Studios might include a live satellite interview, a live 'webcast', production of sales and training videos, as well as post production for a variety

of projects." Andrew explains why Axiom was the obvious choice for Microsoft. "The range and complexity of our work is so diverse, from recording studio programmes through tracking VO and vocals to DVD surround mixing, so we needed a system with genuine flexibility. As our facility is entirely digital, we needed a console which could handle both production and post production work entirely within the digital domain. We also needed either control room to be able to access any of the three studios - the sharing of I/O resources not only allows this, but makes for a seamless changeover. In addition, we wanted a system where hard disk recording was integrated - so we specified 128 tracks of DiskTrack playback. These factors combined to make Axiom the only logical choice for us." But Andrew explains that I/O sharing is not just about convenience. "I/O sharing is a very cost-effective design concept. We found that we were saving a large chunk of our installation costs by running HiWay throughout the building instead of digital or analogue audio cable. We were able to place our mic amps and analogue and digital RIOs (remote I/Os) exactly where they were required in the facility to feed our control rooms, with a minimum of trouble and expense."

Audio Supervisor Jay Scott specified Aysis for post suites 1 & 2 at GTN

### Seven More For Swedish Radio

Sveriges Radio, Sweden's national radio broadcaster, has ordered seven SL 4000 G consoles. Four will be installed in OB trucks, while three are for installation in recording studios. "We are pleased with the five SL 4000s that we already have," explains Project Lead Anders Stenlund. "Sticking with the same console makes logistic sense. SSL modified our OB consoles by reducing the centre section from 12 to 4 faders wide, and reducing the end trim, to make them fit in our OB trucks." The four 32 channel OB consoles are for use at open-air concerts and music clubs, while the three 40 channel desks are for use in music recording and other studio based events. The new consoles bring the array of SSL systems owned by Sveriges Radio, along with its counterpart Sveriges TV, to an impressive twenty-five



# Germany: Aysis Hits The Mark

Two major broadcasters in Germany have chosen Aysis as the solution to their digital audio broadcast requirements.



The new Aysis at Premiere

Satellite giant Premiere has installed Aysis in its Hamburg facility, while state broadcaster NordDeutscher Rundfunk (NDR) has ordered two Aysis systems, to complement two Axioms currently employed in TV post production.

Premiere's newly refurbished production studio is now home to a 32 channel Aysis which is being used for both live and recorded events. According to Premiere's Bernd Rieger, Aysis' configurability was the key factor. "Pre-broadcast preparation time is only a few minutes with Aysis," explains Bernd. "Configuring an analogue console can take up to two hours. Aysis combines the best of both worlds - being digital, it fits into the modern broadcast environment, while its traditional control surface allows a very fast learning curve."

The sound department at NDR has to be extremely flexible, as do the consoles employed. Post sync, ADR, commentary, and 'big band' music recording are all part of the regular weekly schedule for the SSL consoles. Two 48 fader Axiom systems share a single Hub Router and DiskTrack system, allowing NDR to move projects between control rooms instantly. A 32 channel Aysis (with identical ergonomics and operational facilities as the Axiom), with SSL's remote I/O devices on 300m fibre optic links, is destined for installation into OB truck NDR3. In Schwerin, 100km east of Hamburg, the rebuilt broadcasting centre will house a 40 channel Aysis in the news production studio.

## Altimix 1sts

Following the launch of Altimix at AES Munich in March, NBC Television in Los Angeles and Artisound in Holland have become first in their respective continents to seize the power of the integrated system. Jim Keller, Director of Technical Operations at NBC Entertainment, says, "We found the Altimix to be a very advanced system. We were especially impressed with its DiskTrack technology, which allows the system to work with audio and video to network several systems together. We'll be able to save projects and project information without slowing down or interrupting the sweetening process." The networking issue was also crucial for Artisound, as co-owner Eric van Tijn explains, "For a while I had been convinced that SSL



Jim Keller at NBC's new Altimix

style networking would be the future for post studios. As soon as we saw Altimix, we were very impressed because everything was there, fully integrated in an ergonomic, user friendly package. We can even work on one project in two studios, and if a client wishes to make a minor change to a project, we can take care of it instantly."

## The Rainbow Scene

Scenaria® is at the centre of a major expansion into television sound dubbing by London's high-class technological documentary specialists Rainbow Post Production. "The complexity of our programs often demands that we lay as many as twelve stereo effects tracks, so we wanted to be in charge of our own dubbing," says Facilities Manager Thelma Rumsey, "And we needed a system to read files straight from Avid and Lightworks. I've just heard the final mix of the first episode of Pioneer Productions' current thirteen-part series for Discovery, Extreme Machines II, and it sounds incredible. This is what our clients demand." One of Rainbow Post's major clients, The Discovery Channel, has just joined the growing list of Scenaria owners, having specified the system for its Miami facility.

## Axiom: The Works

After becoming the first Scenaria owner outside London, and upgrading to OmniMix within a year, The Sound Works in Cardiff is combining a new Axiom installation with a move to Mount Stuart Square in Cardiff Bay. With an expanding media village literally on the doorstep, the new development is at the hub of the Cardiff multimedia industry. "If circumstances were the same, I would buy another OmniMix," says owner Simon Jones, "and I think it's amazing to be able to say that after three years. But our business is moving more in the direction of mixing for major outside broadcast events, so Axiom is the obvious choice. We are also adding six-track 35mm facilities, and the new room will achieve Dolby approval, so that we can mix in Dolby Stereo and Dolby Digital."

## OmniMix: New Studios

OmniMix builds on the success of Scenaria by offering full surround mixing capabilities inside a larger feature set, addressing all major mixing formats including SDDS, Dolby Digital, DTS, LCRSS and LCRS.

- World Famous Sony Music Studios in New York, already home to an SL 9000 J, has chosen OmniMix for use in audio post production, mixing and conforming.
- Post production and editing house PPV in Athens, Greece, has chosen OmniMix for a new development which will bring the facility's audio potential into line with an impressive array of high end film and video digital effects equipment.
- RTS in Switzerland, owner already of three networked ScreenSounds, has added OmniMix and an additional ScreenSound for use in TV post production, documentaries and news.
- New Wave Productions and Aspect Ratio are the latest additions to the list of OmniMix studios in LA.





The SL 9000 J is the first SSL at Conway Recording, LA

# World's Top Artists Demand SL 9000 J

Since its launch, the SL 9000 J has become the console of choice for the world's top producers, engineers and artists. The numerous new installations during 1997 include:

- At **Conway Recording** in Hollywood, CA, the new SL 9000 J is proving popular. "We're booked solid for several months with our first booking, tracking for Courtney Love," says Technical Director David Zeller. "The session booked in specifically because of the 9000. Producer Michael Beinhorn would use nothing else."
- Meanwhile, nearby **Record Plant** has installed an SL 9000 J due to client demand. "We were going to move our G+ from the back room," explains Studio Manager Rose Mann-Cherney, "But that room books up solidly with the likes of Barbara Streisand, Mariah Carey, Michael Jackson and Luther Vandross, so we decided not to change it. Instead we knocked out a wall, took out our Neve and put the 9000 in the main tracking room." Producer Ed Cherney holds Record Plant's new SL 9000 J room in high esteem, after working there with Bonnie Raitt on her multiple Grammy

award winning **Nick Of Time** album. "I've been mixing with The Rolling Stones, and I've just mixed Jann Arden's third album in there on the 9000," says Ed. "I thought the console sounds just stunning, I was real happy with the results I got with it."

- In the UK, the SL 9000 J is just as popular. Ian Davidson, Director of Operations for the Virgin Studios Group, says, "Our SL 9000 J at **Olympic Studios** was a total success - Eric Clapton has been delighted with it. When it came to choosing a console for our new room at **The Town House**, there was no contest. It had to be the J Series." Over at **Whitfield Street Studios**, Matthew Villa, Studio Director, enthuses, "Our clients were raving about the 9000. Now, they'll be able to work on ours and we won't lose valuable bookings."

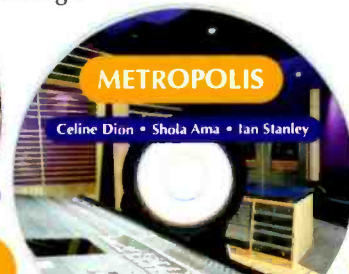
Ed Cherney mixed the latest Jann Arden album at Record Plant in LA



**RIDGE FARM**

Razz Ma Tazz • Vercoquin • The Kangaroo Pockets

"Acquiring the SL 9000 was an inevitable step. The quality is outstanding." Frank Andrews, Managing Director, Ridge Farm



**METROPOLIS**

Celine Dion • Shola Ama • Ian Stanley

"We like to be cutting edge and the SL 9000 permits this." Lorraine Reid, Studio Manager, Metropolis



**TOWN HOUSE**

Brand New Heavies • Hugh Padgham • Louise

"The sonic quality of the SL 9000 left us with no decision to make." Ian Davidson, Director of Operations, The Town House

Pictured (top-bottom): Strongroom, Gina Fant-Saez & Kevin Killen at Blue World, and Crescent Moon



## G+ Continues To Produce Hit Records

The world's G+ studios are as busy as ever. The most popular console in worldwide music recording continues to attract top clients.

**Royaltone Studios** in Hollywood, California, is flourishing. "We've just had Paula Abdul working here with producer Nile Rodgers and engineer Gary Tole," explains Studio Manager Jane Scobie, "And we currently have Tony Visconti working with Christian Lane. Nile, Tony and producer Dave Bianco work with us regularly, with artists such as The Seahorses, Jimmie Vaughn and Addict. The G+ has helped build client loyalty and is a great sounding console."

- At **Blue World Music** in Austin, Texas, the world's first SSL G+ *Special Edition* is now up and running. "It's absolutely incredible," says owner Gina Fant-Saez, "I'm in SSL heaven. Right

now I'm working with Kevin Killen, he's co-producing and mixing my own album. We're just doing the final overdubs. Soon we have Nile Rodgers coming in to work on an album with Jimmie Vaughn."

- Kevin Dillon, Studio Manager at **Crescent Moon**, owned by Gloria Estefan, reports steady business. "We're just wrapping up Alvita's latest album, we had Dr Dré tracking here recently, and we've been working with Placido Domingo. And Gloria is here

working on her latest album."

- Across the Atlantic, London's **Strongroom** has a striking new G+ facility. Managing Director Rob Buckler says, "A recording studio should be an inspirational place to be. We wanted to give the artist something to feed off." Recent projects at Strongroom include Bedlam Ago Go, M People, Mica Paris and Texas.



Producer Nile Rodgers, Paula Abdul, engineer Gary Tole and assistant Jeffrey Thomas at Royaltone Studios





The new SL 9000 J at A-String Studios

# Asia: Music Industry Booms

**A**cross Asia, SSL consoles grow in popularity as the demand for local music products increases. A healthy economy and a huge Chinese speaking market have made Taiwan one of the major forces in the Asian music industry. It is now home to a host of top flight recording facilities.

- In its 12-year lifetime, **A-String Studios** in Taipei has expanded from a single studio to a nine studio complex. To complement its existing 64 channel SL 4000 console, the studio has invested in the best sounding console in the world, the SL 9000 J. Mr Chen, owner of A-String, explains the move, "The SL 9000 J sounds incredible and provides engineers and producers with the familiar SSL console architecture. We needed to install equipment

that international and Taiwanese artists wanted to use."

- **Megaforce** in Taipei, as part of a five studio complex designed by Munro Associates, is installing two new SSL consoles. A 64 channel G+ *Special Edition*, the first in the region, will be joined later this year by a 64 channel SL 9000 J in its flagship recording studio.
- Also adding an SL 9000 J is **Rhythm Studios**, already proud owners of SL 4000 G+ and SL 8000 G+ consoles.
- **Life Recording Studios**, who use their spacious studio to specialise in classical music, big band and jazz, have added a 56 channel SL 4000 G+ console. Mr Hsu, owner of Life, says, "Our clients are very creative and unique. They lead Taiwan's modern music."

Music & Film

# Canada Rocks With Solid State Logic



The new SL 9000 J room at The Warehouse

**A**t Metalworks in Mississauga, Ontario, the largest SL 4000 in Canada has been performing flawlessly since September 1996. Meanwhile in Calgary, Alberta, **Night Deposit Studios** is building a brand new facility with a custom designed SL 4040 G+ at its heart. And out west in Vancouver, **Bryan Adams' studio The Warehouse** has just powered up its brand new SL 9000 J.

- Although **The Warehouse's** console is newly installed, it has been in their possession for some time now. "Before the new room was ready we wanted to mix Bryan's '18 Til I Die' album on the 9000," explains Technical Director Ron Vermeulen, "So we had it delivered to a house in Saint Tropez, France, and set it up temporarily. We then put the

finishing touches to the room here." Ron and his crew have enjoyed the integration offered by the J Series Studio Computer. "We love the latest software version," he elaborates. "It's so user friendly for a 4000 guy, so the transition to the 9000 is simple. The software is so easy to relate to."

- **Gil Moore**, ex-drummer with rock band Triumph and owner of **Metalworks**, is delighted with his purchase of an SL 4080 G+."Everyone who works on the console loves it, it's incredible," says Gil. "Alannah Myles, Sash Jordan, The Headstones and David Bowie have all been in the G+ room this past year. And in September we're proud to welcome The Cranberries to Metalworks."
- **Night Deposit's** Endré Lukacsy needed expandability in his G+ console, part of a major new facility designed by John Vrtacic. "We specified a 4040 G+," explains Endré, "but we arranged for a special modification to be made which will allow for future expansion to 52 channels. My intention is to create a top class facility here and this flexibility will allow us to compete on an international level."



Metalworks is home to the largest G+ in Canada

## To Russia With Love

Television News Service (TSN), a new Russian news agency operating on independent channel TV6, has specified an SL 8000 GB console for live on-air applications. UK based turnkey provider Megahertz Communications Ltd is administering the installation, a large scale operation of which the SL 8000 console is a key element. Martin Dyster of Megahertz explains, "We offered our client a choice of several consoles, and they did not hesitate in choosing the SSL. The reputation for reliability was the key factor." Oleg Klimanov, Technical Director at TSN, says, "We're using the expertise of Megahertz in specifying our equipment, but we knew we wanted the SSL console. That was never in doubt."

## Korean Dream

The Dream Factory in Seoul, Korea, a creative complex owned by recording star Seung Hwan Lee, has installed a new 56 channel SL 4000 G+ console with Total Recall. With an impressive discography of chart successes, including a million selling album, Seung was particularly careful in his selection of a new console. "We examined all the options carefully," he says, "But only the 4000 gave us the vital combination of sound quality, engineer familiarity and the 'must-have' appeal for potential customers. It was the most commercially viable solution."



## Axiom Found On Mars

The latest major event covered by the Axiom at ABC Television, New York, was to televise the landing of the Pathfinder space probe on the surface of Mars, broadcast by The Discovery Channel.



ABC's Axiom

Whenever NASA had progress reports, ABC news would run a live insert into Discovery's programming. This included inserts from NASA HQ, four remotes and guest microphones on the studio floor. The routing capabilities of SSL's Hub Router ensured that signal patching was minimal and operation was very simple.

## President: SSL Inc.

Solid State Logic has announced the arrival of Rick Plushner as President of SSL US. Rick will work from the New York office and will oversee the development of SSL's US recording, film, broadcast and post production sales. "I have always had a great respect for SSL and I have always considered them to be the powerhouse in this industry," says Rick. "I look forward to contributing to the future success of the company. SSL will work very hard to earn the business from both our existing customers and future clients alike."



Rick Plushner

## Brochures & CD-ROM

New brochures are now available for: J Series Multi-Format Monitoring Solutions, G+ Series, and Avant. Also available is an Altimitix product guide CD-ROM. Contact your local SSL office.

## ... IMPORTANT NEW CONSOLE NEWS ...



AYSIS

New from SSL is Aysis Air, a 48 channel digital console specifically configured to meet the requirements of live broadcasters. Aysis Air incorporates its own router for stand-alone operation, and has a dedicated control surface that is optimised for real-time mixing operations. All console controls are fully automated, either dynamically or via snapshots.



AVANT

The Avant film system can be specified in single or multi-operator format with independent motion and monitoring controls for each position. Fully configured processing with up to 96 faders and dual layer operation, automated routing and channel insert switching, joystick panning, and a 6+8 monitor matrix are small subsets of the full feature set. Avant also includes DiskTrack.

## Massenburg Joins MG For Planet Media

The media extravaganza IFA Funkaustellung Berlin ran from 30th August to 7th September 1997.

In commissioning a team of sound designers for their "Planet Media" exhibit, Sony did not hesitate in choosing Austria's MG Sound, home to a new SL 9000 J, who in turn enlisted the help of sound consultant George Massenburg. Martin Böhm, in house producer / engineer at MG, explains, "We created an eleven minute multimedia presentation in nine-channel surround sound. Our new SL 9000 J was used for the recording and multi-channel mixing of all the music and sound effects for the show." George Massenburg, prominent producer and owner of cutting-edge systems design company

George Massenburg Labs (GML), enthuses, "SSL continues to innovate and to respond to a demanding clientele."



The crew at MG Sound (l-r): Ludwig Coss, Martin Böhm, Eva Böhm, George Massenburg (seated), and Chris Stone (President of the World Studio Group)

Photo: David Gungor

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8256FNEW



# Kickin' phat' n punchin' basstasticsoundin'



**ORAM**  
PROFESSIONAL  
AUDIO

Throughout the world, John Oram is known as 'the Father of British EQ'. It's no surprise, Vox amps, Trident consoles and Martin guitar Pre-amps have taken John Oram's EQ and circuit design philosophy to every corner of the globe.

Check out these products and experience the warm, vintage sound of **Oram sonics**® enhanced by ultra low-noise characteristics and reliability of SMT.

**Check it out!**



**BEQ**  
Series 8

- **Oram sonics**® super low noise electronics throughout
- 10 Aux sends per channel, 10 FX Returns with 2 band EQ
- Unique Triple Aux - Allows connection to 30 FX with level control
- 100 mm Main Faders - factory or retro fit any Automation System
- 60 mm Monitor Faders with 2 band EQ - Fader or EQ Flip
- 112 Inputs to Mix bus with 32 Input console
- Fully Modular - 3mm Aluminium panels with Nyloc Fasteners
- Noise gate on every channel
- AFL Solo in Place, Auto-mute group

*There is something special about Oram EQ, its control ranges and response shapes have been so well chosen that corrective and creative adjustments appear effortlessly out of it. It also seems to add gloss and smoothness to everything, apparently drawing comparisons with valve designs. It, too, is extremely quiet and clean, it's very difficult to make it do anything unpleasant at all.* Dave Foister, voted technical journalist of the year 1995.

*The board is so well laid out, easy to use, impossible to distort and the sound, well, the sound is phenomenal! The EQ is smooth and very musical. It sounds like the BIG guys and it's dead quiet. In a word: gorgeous!* Abby Straus and Carl Casella, TRI-MUSIC CORP. New York. BEQ 24.

*The High Definition EQ really came into its own on live recording in Europe and the US. I recently used it for recording a performance with the Hudson Valley Philharmonic. At this moment I'm recording my new album using my BEQ Series 8 board, and it's so quiet.* John Cale, 'Velvet Underground' Project Studio, New York. HD EQ-2, MWS and BEQ Series 8.

*I've been working as a tech for 30 years and in all that time I have never heard a quieter desk.* Gaston Nichols Pro Audio Installation.  
*The Pre-amps sound like a huge Neve, I've never had a better bass drum sound.* Jason Elgin, Synchronesh Studios. BEQ 24.

*The bottom end of the HD EQ-2 is extremely warm and musical, the top end, you can keep piling on and it doesn't crunch up. The sound is definitely British and I also like its fine detail control.* Paul Libson, Profile Studios. Mastering suite, Milan Italy.

*This is the quietest, most inspiring console I've ever used. I've changed my Trident for this board and the Oram Sonics are all there. The EQ magic™ of John Oram is musically most satisfying, it's simply the best. I've ordered a second unit for my new studio.* Uli Jon Roth, 'Scorpions' and Symphonic Musical Director. BEQ 24 Owner. BEQ 24-56 ordered.

**BEQ**  
Series 24





# Symetrix 562E

Symetrix' 562E bears the impressive title 'windowing expander-gate', and threatens to revolutionise gating. **George Shilling** assesses it

**G**ATES HAVE BEEN around for many years, most offering the same features. The popular and fully featured Drawmer DS201, for example, has remained cheap and unchanged in design for many years. There would be no point in a valve gate, and all that more expensive designs bring to the party are digital control and user memories. So what can this new Symetrix gate do for us that cannot be done already? Read on.

The 562E is a dual-channel expander gate. In keeping with other units in the Symetrix range, it comes as a dark blue 1U-high box, with white legending (which is rather poor on this model), and black rubberised knobs with white pointers. There are also six small metal toggles switches.

On the back panel, both XLR and balanced jacks are provided for inputs and outputs. There are TRS jacks for external key inputs and internal key outputs (post filter) for each channel, a helpful plug wiring diagram and an IEC mains socket.



The channels each have identical controls which are laid out with Channel 1 taking the left-hand side and Channel 2 the right. There are no shared controls whatsoever between the two channels: there is no power switch and no facility for any kind of linking of the channels. The latter, I feel, is a major omission. There are plenty of cheaper units on the market which have this vital feature: why else put two mono gates in the same box? Another omission is ducking, which comes as standard on the popular and cheaper Drawmer DS201. I would accept that this feature is not used every day, but it can nevertheless be very useful. It seems that the Symetrix boffins have got so excited about their revolutionary new feature (coming up) that they have forgotten to add standard features that you get on units half the price of this one.

The controls the 562E has run as follows: a toggle switch for In, Bypass or External Key, another for Output Assign with Key Listen, Key Listen post-filter, or Gate-Exp (normal operation). Next are knobs for low and high filters which do not have quite as much overlap as the Drawmer's but work well enough. A further toggle switch is the 562E's trump card: Window Advance Max, Min or OFF. There is a 4-stage LED meter for gain reduction in increments of 3dB, 12dB, 30dB and 60dB. The main gate-expander controls follow the same order as a Drawmer:

THRESHOLD, ATTACK, HOLD and RELEASE. Finally, GATE RANGE operates from 0dB at 12 o'clock to 80dB at full anticlockwise. When turned right it becomes expander ratio: 1:1 at 12 o'clock to 1:3 at full clockwise. However, below 75dB of gain reduction the expansion reverts to 1:1 from then on downwards to avoid choppy sounding signal at low levels. On the review model this knob had a centre detent on the left channel, but not on the right. I thought this might be some hidden feature, but I soon found out that the expander on Channel 2 didn't work properly. Two LEDs were always lit on the gain-reduction meter with no signal going in, so it seems that there was an incorrect or faulty pot fitted. There was also a front-panel screw loose. However, a quick trip back to the distributor fixed the pot and the loose screw.

After which I was able to try out the revolutionary Window Advance feature. This sounded like quadraphonic headphones, negative delay, crop circles and other unlikely stories. You cannot travel in time—or can you? This feature supposedly opens

the gate before the signal gets there. The technical approach is not really explained properly in the manual. Waffle, there is plenty of, but hard facts, few. I surmised that this gate either delays the signal to give itself time to open, or else it cleverly opens in such a way as to emulate the front of the transient's characteristics. No delay is immediately apparent, but comparing a Window-gated signal with its ungated twin (or with the Window Advance switched off) there is an audible phase shift. This suggests the former theory. However, the amount of actual delay caused to the signal is very tiny—seemingly less than a millisecond, so the only concern is when you need phase accuracy between gated and ungated signals. This, unfortunately, is often the case with drums, where the tiniest phase shift of, say, the snare drum signal compared to the overhead microphones can hugely affect the overall tone. Having said that, the feature certainly works well, and the improvement in the front-end characteristics of percussive sounds is immediately noticeable

compared to a conventional gate, especially when heard in solo. Used with care this is valuable technology, and the option of expander instead of gate is welcome. However, the shortcomings of the 562E and its high price may deter you. ■

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## NEW TECHNOLOGIES

< page 34 dome coupled mid-range drivers and a single 25mm silk dome tweeter to deliver 115dB at 1m. Now back in the R&D lab for fine tuning, the prototype AE-2 Pro were well received at Abbey Road.

**Acoustic Energy, UK.**  
**Tel: +44 1285 654432.**

### CD-RW

The Philips CDR870 is claiming to be the first stand-alone CD-R machine to use CD-RW rerecordable technology. Price in the UK is £425.53 plus VAT. Features include SRC, automatic and manual track numbering, auto start recording, a die-cast transport, 1-bit A-D converters and continuous calibrating D-A converters. Digital coaxial and optical inputs are provided.

**SRTL, UK. Tel: +44 1243 379834.**

### AKG Tube

The AKG Solid Tube mic is a single pattern, large diaphragm, pressure-gradient valve condenser (\$1195 US). It includes a bass attenuation switch, 20dB pad, an outboard power supply, shockmount and mic stand adaptor, pushbutton ground lift on the PSU and an integrated pop shield. The mic uses a 12AX7 valve which can be viewed through a 'window' for 'visual monitoring of the internal tube operation and offers ambient light in darkened recording environments.

**AKG, Austria. Tel: +43 1 98 124-0.**

### Soundcraft B400

A derivative of the B800 broadcast desk, Soundcraft's B400 is available in frame sizes from 24 to 56 modules filled with mono, stereo and stereo telco modules. Features



include one stereo and three mono auxes, LED indicators on all switches and flexible clean feed facilities through direct outputs on all channels.

**Soundcraft UK. Tel: +44 1707 565000.**

### Audio-Technica mics

New from Audio-Technica is the ATM89R condenser mic. Part of the Artist series, the ATM89R is a phantom powered hypercardioid vocal mic aimed at the professional recording and broadcast markets. The mic's acceptance angle can be altered between 100° and 360° (cardioid, omni and subcardioid) by the use of interchangeable elements.

Announced at this year's page 38 >

October 1997 **Studio Sound**



# STUDER D950

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# SPL Spectralizer

Forsaking the complicated user-interfaces of some digital processors, SPL has cast the digital Spectralizer as an analogue friendly sort of a box, as **Dave Foister** discovers

**S**PL'S SUCCESSFUL processors have until recently restricted their operation to the analogue domain. But two new additions to the range go to the other extreme and operate entirely digitally—without even the converters to allow analogue signals in or out.

What we have here is the Spectralizer, whose aim is to add chosen harmonics to a signal thereby warming it, fattening it, brightening it or whatever. The surprise is that it does it entirely with DSP, and does nothing else. This is becoming a noticeable trend; the idea that because DSP can do a million things they should all be crammed into one box is losing ground because of the untameable monsters that can be created that way. Instead, dedicated processors are springing up, with single-function controls and displays instead of the usual labyrinth of softkeys and scrolling menus. The result, as typified by the Spectralizer, is a unit

aggressive. The Solo function, while producing a pretty unpleasant sound in itself, allows the balance between the two to be set quite precisely, while a final mix control determines how much of the resulting harmonic blend is added to the original. A subtle twist is the inclusion of a KICK button, which increases the harmonic levels for short transients.

Input gain is adjustable, partly to compensate for low-level sources but primarily to allow the level of full-scale material to be given a little headroom for the harmonic additions. A pair of bright LED meters shows output levels, with the lowest LED showing the presence of a digital signal while the highest indicates clipping.

Ninety-nine presets are available for storage, identified only with numbers. I-O is offered in both AES-EBU and SPDIF, with wordclock sync, and two serial interfaces



which looks more like an old analogue box with 'proper' knobs and switches.

In fact, the knobs on the Spectralizer are rotary encoders, but this is no more than giving us the best of both worlds. In fact it's just as well that the unit has such clear and separate controls, since the functions they adjust are not at all obvious. They are however clearly labelled, and although the use of continuous encoders makes their physical positions irrelevant there is a display which shows all of the parameters all of the time, unless some set-and-forget utility needs changing.

The central idea is the addition of second and/or third harmonics to the input signal, and in common with some of SPL's analogue processors this only takes place above a user-defined cut-off frequency. This frequency is adjustable from 1kHz up to 7kHz, and separate controls add variable amounts of the two harmonics. A fourth control, marked DENSITY, alters the audibility of the harmonics in a way which is not made very clear in the manual; at its lowest it seems simply to boost the chosen upper frequency band, while at its highest it adds, as the manual warns, audible distortion on most types of material. Exactly what is happening may be monitored (if not fully understood) with the aid of a solo button, which removes the input signal leaving just the processor's additions.

This confirms the expected nature of the harmonics as outlined in the manual: the second harmonics, as found in valves, add a smooth upper end, while the third harmonics are more

allow software upgrades to be loaded into the DSP direct from a computer.

Setting the unit up requires a degree of familiarisation before useful results can be obtained, but is helped by the smooth operation of the encoders. These have 2-speed operation depending on how fast they are turned, which I found less predictable than I would have liked. What you end up with is an effect which can be very subtle, very unsubtle, or anything in between: whether it is a worthwhile effect or not depends on the choice of material and personal taste.

Personally I have a problem with a unit whose manual tells me that the key to a natural sounding top end is a good combination of even and odd harmonic distortion—natural to me means doing nothing to it. By all means offer me an effect which may enhance my signal, increase its perceived loudness or help it cut through on the radio, but don't tell me that in the process it's making it more 'natural'.

Grumble over; setting that aside, the increase in edge, sheen, gloss and sparkle that the Spectralizer can give is quite distinctive, and unlike anything that could be achieved with EQ. It's less prone to exaggerating noise levels than analogue enhancers, and while it's quite easy to do fairly nasty things

with it it's also straightforward to add a useful extra lift to a mix without it being obvious what you've done. Enhancers clearly have a place, and the Spectralizer is a good controllable example of the genre. ■

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## NEW TECHNOLOGIES

< page 36 Frankfurt Musikmesse, and now available is the ATM23HE snare mic.

**Audio Technica, US.**  
Tel: +1 216 686 2600.  
**Audio Technica, UK.**  
Tel: +44 1132 771441.

### XTA processor

Building on the DP200 equaliser-processor, XTA's DP226 is a loudspeaker processor using the company's Audiocore DSP technology and features 2 inputs and 8 outputs with an 8-band parametric EQ on each input. Outputs have crossover filters, 5-band parametric EQ, limiter and delay. Metering is provided on inputs and outputs together with mute and access buttons for set up and gain adjustment.

**XTA, UK. Tel: +44 1299 879977.**

### beyer drum mics

Aimed at drummers, the beyerdynamic TGX10 supercardioid dynamic mic is small enough for close miking duties yet robust enough to take the occasional knock. An acoustic shock mount eliminates mechanical noise transmission through the shell of the drum.

The TGX45 neckworn cardioid dynamic mic has a gooseneck support for positioning while ear supports can be moulded for comfort and can be used with the company's wireless system.

**beyerdynamic, Germany.**  
Tel: +49 7131 6170.

### DA20 MkII

Tascam has brought its DA20 DAT machine up to mark II status with an improved error correction system, an error rate detection system which checks tape and head integrity, before recording and a new sampling monitor mode



that prevents head and tape wear when monitoring sources.

Improvements have also been made to the converters, the circuitry layout, and the transport mechanism and software servo control. Start ID sensitivity can be set at four different levels. The price has also been reduced over the original machine.

Meanwhile the MD501 MD recorder-player has balanced and unbalanced analogue I-Os, a front panel PC keyboard port, a port for fader or event starts, an onboard SRC and a front panel TOS digital input in addition to the rear panel digital input. Other features include editing, programmable fade in-out, a remote, and auto ready and program play modes.

**Tascam, US. Tel: +1 213 726 0303.**  
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# Oram Professional Octasonic

The right preamp at the right price could improve your recordings tomorrow. **Tim Goodyer** checks out the Octasonic today

**T**HE APPEARANCE of the modular digital multitrack recorder has prompted some rather surprising developments. Apart from, but facilitated by, changes in recording practices there has been a rash of equipment quite clearly inspired by the ADAT and DA-88. Unity gain boxes containing eight channels of valve amplification, for example, present a solution to those worried about digital's 'harshness'. A more conventionally practical development is that of packaging outboard in 'boxes of eight'. The latest subscriber to this

recent work with Michael Jackson. The bandwidth on all channels is quoted as better than 18Hz–73kHz, and the noise is quoted as being down at -125dBu at +70dB gain. Whether you're setting up the Hot Channels or their cooler brethren, the peak LED lights at 6dB below clipping with output levels being set to deliver +28dBu.

Output connections are on 1/4-inch jacks partly due to the limited panel space on a single rack unit but also to integrate with the forthcoming Octamix 8:2 mixing module which interconnection tails will be supplied. Using Octasonic and Octamix together will allow XLR mic inputs to appear mixed to stereo plus a stereo submix on XLRs

—with the prospect of an Oram EQ block not far off.

In service, Octasonic performs creditably well. The circuitry is the same tried, tested and liked stuff of Oram's BEQ Series 24 console and incorporates a feature Oram calls 'group delay' where the LF content up to around 50Hz–60Hz is delayed with respect to the HF. This obviously represents character rather than accuracy but John Oram seems happy with this. In fact, Oram is eager to see other mic amp manufacturers publish similar details of their designs.

The cost of the unit (around £155+VAT per channel in the UK) suggests that it should defer to the majority of professional preamps currently on the market, but the reality is somewhat different. The Octasonic is likely to be a better performer in its field than the linear digital recorders it is likely to serve are in theirs. And as an 'upgrade' to even a respectable console—and there are plenty that are outside of the big league—it makes a worthy option.

Oram also casts Octasonic in the role of a digital 'smoothing device' along the lines of the unity gain valve boxes mentioned earlier. Better than this, it appears that Alesis are prepared to concede that the amps used to raise the individual outputs of the ADAT to the pro +4dB standard are readily bettered, and that appreciably better results can be obtained by feeding the -10dB outputs into Octasonic.

With Octamix and an MDM, Octasonic should provide a convenient location recording package in a similar vein to that offered by the American Audio Toys Inc Pro<sup>®</sup>. True, it will be a bulkier package but then it will be cheaper and give you the options that accompany a modular system.

It's good to have options and Oram's Octasonic is an option that should appeal—if not to purists, then certainly to those who craft the sound of their recordings. ■

practice is John Oram's Octasonic.

Finished in house blue, Octasonic is a tidy package of eight mic preamps in a 1U-high rackmount. Along with mains switching, the front panel offers eight 41-step knurled gain pots, individual switching for phase reversal and 48V phantom power, and LEDs to indicate the presence of a signal peak and phantom. The final now familiar touch is the placing of the on-off LED in the 'O' of the Oram Sonics logo. The rear panel carries eight balanced female XLR inputs and eight balanced 1/4-inch jack outputs. There is no ground lift.

Returning to the front panel, it's worth commenting that while the white PHASE pushbuttons stand proud of the panel, those for phantom power are heavily recessed—obviously to help prevent accidental operation. I found these easy to operate using my little finger, but many of the rest of you will have to resort to the use of a willow wand or something similar. Both the peak and phantom LEDs are also deeply recessed. Although this limits to a small extent the angle from which they can be viewed, it also has the effect of making it very easy to see when they are lit.

In operation, everything is as you might expect with a couple of qualifications. First of all, the unit runs fairly hot. Second off, Channels 7 and 8 differ slightly in their setup from Channels 1–6. Where the gain on the first six channels can be set between 0dB

and 70dB (with a maximum input level of +22dBu), the last two offer -12dB to 35dB (+34dBu max). While all will accept line-level inputs, these 'Hot Channels' are specifically intended to accommodate more lively mic feeds and high level line inputs. The facility is credited to NYC producer Bob Rosa after his



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**US:** Sweetwater Sound.  
**Tel:** +1 219 432 8176.

## NEW TECHNOLOGIES

### Compact tester

Lindos has shown the LD500 compact, portable and battery powered audio analyser with capabilities for digital and analogue signals. The LDM digital meter provides the established LA100 audio analyser with AES-EBU and SPDIF connections and also performs as a calibrated A-D and D-A.

**Lindos, UK. Tel: +44 1394 380307.**

### FAR active

A loudspeaker manufacturer FAR has released the AV5 active monitors which boast 6.5-inch polykevlar woofers with a 1-inch soft dome tweeter. Two separate 70W amps and a fully active 24dB/octave Bessel crossover achieve levels of up to 110dB with a claimed response down to 50Hz. Fifteen tuning patterns add versatility to listening environments together with a 4-position low frequency control and 6-position high-frequency control. A switchable limiter protects the drivers and a remote is planned to provide control over balance, level, mono sum and mute.

**FAR, Belgium. Tel: +32 4 367 65 10.**

### Meyer HM1S

Meyer has a new self-powered monitor in the HM1S coaxial with a phase response that is electronically corrected and a true single-point source. The cabinets are magnetically shielded, have a wide coverage pattern and can be augmented by a sub-woofer. It features a 7-inch graphite cone low frequency driver and a concentrically



mounted 1-inch soft dome with a constant directivity horn affording 100° beamwidth in a vented cabinet.

Biamps delivering 400W are built into the enclosure which has a claimed response of 42Hz to 20kHz.

**Meyer Sound, US. Tel: +1 510 486 1166.**

### LA Bass

LA Audio's Classic Bass instrument preamp combines the company's Classic Compressor with a FET DI input stage and 4-band EQ targeted at bass players. The box also includes a transformer balanced mic input.

Controls for the unit include [page 42 >](#)

October 1997 **Studio Sound**



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# Roland AP-700, SN-700

Problem-solving can be stressful at any time, and especially so live.

**George Shilling** investigates Roland's feedback and hum killers

**A** LONGSIDE ITS HIGH PROFILE lines in synthesisers, samplers and pianos, Roland has consistently explored a variety of less widely recognised avenues. Its work with MIDI guitars and the RSS sound processor, for example, sit well with less glamorous problem solving units in commending the company's R&D efforts. The two units reviewed here fall into the last category as problem solving boxes for live sound applications.

The AP-700 is an 'Advanced Equalising Processor' that works in a choice of three modes: AFB Feedback Elimination, PEQ Parametric Equaliser and GEQ Graphic Equaliser.



SN700 Noise-Hum Eliminator



AP700 Advanced Equalising Processor

The SN-700 is a 'Noise-Hum Eliminator' that features auto and manual operation for the two processes. Both units feature balanced jack and XLR connectors, although the AP-700 is wired XLR Pin 3 hot, unlike the SN-700 and most of the rest of the world which is Pin 2 hot. Operating level, for both units is +4dBm with maximum output level quoted as +24dBm. MIDI In and Out connections are provided for programme changes relating to stored patches (up to 16 on each unit), SysEx and Control Changes. The AP-700 additionally includes XLR AES-EBU connections.

All processing takes place in the digital domain. With the SN-700 and the AP-700's analogue inputs, audio passes through a sigma-delta 20-bit 64x oversampling A-D converter and then through a 20-bit 8x oversampling D-A converter on output. Sampling frequency is 48kHz, with 44.1kHz also available on the AP-700.

Both units are black and 1U-high, not dissimilar in appearance to Roland's SDE330 delay unit, with green-lit LCD (larger on the AP-700 for graphic displays), square pushbuttons, and dual-concentric INPUT LEVEL pots with centre detent. The SN-700 has a data wheel, which can be rotated, pushed, or pushed and rotated, to access different functions. The AP-700, meanwhile, makes do with nudge buttons for parameter adjustment and arrow cursor buttons for display navigation.

Both units use a menu-driven operating sys-

tem with separate sections for editing settings and adjusting system parameters, where you can end up several levels below the main menu. Absolutely all parameters can be accessed via MIDI which is comprehensively implemented.

The AP-700's AFB mode senses feedback frequencies at the input and will notch back those frequencies with narrow bandwidth EQ at a user-selected rate, stepped down between user-selected gaps of 0.5dB to 40dB. There is no method of continuous smooth reduction. Auto mode is used during a sound check to eliminate problems, then during the gig a Dynamic Function can work on sudden problems caused by, say, microphone movement. Manual function is used to switch filters on and off. A Diffuse function applies modulation to suppress feedback and coloration. The Mute function with definable parameters lowers the output level in emergencies. High-pass and low-pass filters allow the AFB mode to be used more effectively by cutting unnecessary frequency hands. In Edit mode you can adjust settings on any of the 18 Auto and 18 Manual filters. Parameters such as filter type, frequency, Q, level can be adjusted, as well as detailed settings for Auto, Dynamic and Diffuse functions. The channels can be linked for faster setup and editing, and the display shows a frequency response graph where you can display a 91-band spectrum analyser or see EQ functions. Here you can zoom and scroll to see it in greater detail.

PEQ mode gives you up to 18 bands of fully-parametric EQ per channel. GEQ mode gives you a 91-band graphic EQ. The SN-700 features two distinct sections which may be used independently: the first deals with noise cancelling and utilises seven frequency-conscious noise gates with frequencies centred from 175Hz to 11.2kHz. The second section deals with hum and uses a comb filter to act on a fundamental frequency chosen to be either the mains supply (AC), a frequency detected at the input, or a manually set number, and its integer multiples (harmonics).

Both sections feature separate AUTO buttons for each channel, as well as channel ON-OFF buttons. The Auto functions sense the input noise or hum for a few seconds, then activate the necessary cancellation functions. All parameters are fully editable: you can fine-adjust such settings as threshold, suppress depth, attack, release and hold times for the noise cancelling. For hum cancelling you can adjust such settings as frequency, high and low-frequency limits; threshold; suppress depth and filter width; attack; and hold and release times. Both functions include a channel linking option for stereo use. The display shows with a series of bars when noise or hum cancelling is in operation. ■

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## NEW TECHNOLOGIES

< page 40 ratio, attack, release and gain make-up, plus a variable low-cut filter, fixed high cut filter, EQ to compressor side chain switching, vu meters and a 20-bit digital output option.

Also new is the PS-1 single channel strip which combines a mic-line preamp with DI, noise reduction, variable frequency de-esser, variable mode auto compressor and 4-band EQ.

**LA Audio UK. Tel: 171 923 1892.**

### DK matrix

DK Audio's 16x16 digital audio matrix synchronises incoming digital signals automatically, accepts AES-EBU and SPDIF formats and switches any input to any output regardless of the format. Switching is 'click free', operation is from the front panel but there's an optional remote and the unit holds 32 banks of presets.

**DK Audio, Denmark. Tel: +45 44 530255.**

### Gallo's Bassballs

Anthony Gallo Acoustics has introduced a range of round aluminium speaker enclosures with a proprietary tweeter that claims a 330° soundstage and 24 inches of driven



surface area. The enclosures claim light weight but ultra-rigid construction.

The Nucleus Minor is a Bassball spherical cabinet with a 6.5-inch coaxial driver while the Nucleus Solo model is a Bassball with a CDT tweeter mounted on the top for deeper bass, higher output, and greater power handling than the Minor and no crossover.

Top of the range is the Nucleus Reference which comprises two Bassballs and one CDT tweeter per channel, with no crossover but claiming greater air coupling and lower frequency response.

**AGA, US. Tel: +1 718 237 1000. page 44 >**



# OTARI

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### PD-20



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# DACS Micamp

With a recent move into mic preamp manufacture, British company DACS has opened with a spec-beater. **Dave Foister** reports

I'VE SEEN SOME ambitious specifications in my time, but those for the DACS Micamp take the prize for nerve. Microphone preamps being one of the few things you can sell on performance figures alone, we're used to seeing bold claims, but 'negligible' is a word normally only seen in the context of digital wow and flutter, not for the three most important characteristics of an analogue signal path. That, however, is how Digital Audio and Computer Systems describes the noise, distortion and crosstalk of its preamp; add a frequency response from DC to 45kHz and you have something that is effectively claiming to be perfect.

Clearly perfection is what DACS aims to achieve, with super matched transistors, minimal controls and special microphone power

claim to have taken special care with the filter design to avoid noticeable coloration above the cut-off frequency, not always something to be taken for granted. The only remaining control is a toggle switch for phase reverse.

The obvious omission, you will have noted, is a switch for phantom power; has the Micamp then no phantom facility? Of course it has, but it boasts a feature I cannot recall seeing before—separate inputs for those microphones which require phantom and those which, like valve models and others with their own dedicated supplies, do not. The reason for this is that the latter inputs can dispense with the DC blocking capacitors normally needed on phantom powered inputs and therefore extend the LF response literally down to DC. Even the phantom inputs go



arrangements aimed at producing the cleanest signal path possible. The R&D budget has clearly gone on this kind of expertise rather than to an image consultant, as the styling is odd to say the least, with the cheap knobs in particular doing little to inspire confidence. Everything else does, however, from the choice of facilities to the thoughtful ideas, all of which show a single-mindedness towards sheer sonic quality with little time for fripperies.

The Micamp has two independent channels, each carrying the bare minimum of controls. The all-important gain is handled by an 8-position switch plus a trim pot; the switch has 6dB increments while the pot has a 10dB range with repeatable 0.5dB scale markings. Level monitoring is novel, with a circular window containing three coloured LEDs arranged like a Mercedes-Benz sign; the bottom one lights green to show signal present, the left one yellow to show healthy signals above +5dBm, and the final red one shows peaks above +13dBm. In addition a spectacularly bright red light comes on to warn of clipping (above +25dBm) and stays on for a few seconds just in case you miss it. The whole lot ties in so well with what the meters elsewhere in the system are showing that you start to wonder why you need anything more.

A 3-position bass roll-off switch is provided, whose settings are lower than normal and reflect the extended low end of the preamp. Its two frequencies are set at 30Hz and 80Hz, giving an unusual facility to remove extreme LF with minimal effect on the wanted signal. This is backed up by DACS'

down flat to 20Hz with a 6dB/octave roll off below. The other benefit of this arrangement is the removal of any switching from the microphone-level signal path with the risk of degradation it would bring.

At the other end of the spectrum, DACS has made a judgement as to how far to extend it, tailoring the frequency response above its flat-line limit of 45kHz. Even beyond, the roll off is only around 6dB/octave, giving 3dB down at 65kHz and 6dB at 100kHz. Since the whole 96kHz sampling thing is about the importance of that extra octave, it's good to know that you haven't lost it even before the signal reaches the console—can you be sure that's always true?

Noise and CMRR performance is in the same league, with hand-trimming of the CMRR at two separate frequencies. The result is that DACS claims not to have found a microphone with as little noise as the Micamp, and after listening to it I would not like to argue. In every sonic respect this is surely on a par with the best preamps I have heard: open and complete, with an integrity that inspires confidence in the circuit's refusal to put anything in the way of the microphone.

This is the kind of preamp that can make all your microphones deliver more than you thought they were capable of, giving new insights into the potential of even old favourites. This is even more surprising in view of

the asking price, which I have to confess is less than half what I would have expected given the unit's quality. Coupled with a 3-year warranty, this makes the DACS Micamp an extraordinarily attractive buy. ■

### Contact

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## NEW TECHNOLOGIES

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Zapex, US. Tel: +1 650 254 2380.

### Pyramix Portable

Based on the Pyramix Virtual Studio DAW, the Pyramix Portable has an LCD, 64Mbyte RAM, 180MHz Pentium Pro CPU, Adaptec wide SCSI adaptor, external monitor connector and a 9Gbyte drive in a 'lunchbox' sized package. The system is capable of uninterrupted recordings to the full capacity of the recording medium and supports optical disks, Jaz and Syjet media.

Enhancements introduced with v1.2 for Pyramix adds 4-channel 24-96 recording, punch in/out directly to the Project and support for the TDIF-1 interface. The AudioExpress option adds workgroup functionality to the audio production process by permitting the sending and receipt of email containing audio files, EDLs, news and complete multichannel audio productions. Formats include WAV and BWF.

Audio Magic Ring offers high quality sample rate conversion, wordlength convertor including dither and advanced noise shaping, and a normaliser with DC offset removal.

Merging Technologies, Switzerland.  
Tel: +41 21 9460444.

### Portable AP

Audio Precision's Portable One Dual Domain analogue, digital and interface tester includes high performance analogue and digital hardware. Figures quoted



include -118dBu analogue analyser noise residuals and -130dB digital distortion figures. Digital interface testing and monitoring functions include jitter generation and measurement, audio bit error rate, and sample rate measurement. The unit has save and recall of stored tests and data.

AP, US. Tel: +1 503 627 0832. ■



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And when you also believe, as Al does, that great sound comes from good microphone technique (and not from constant EQ adjustments) you want to use the very best mics you can get. The natural choice for Al is Neumann. And while he has great affection for all his Neumanns, he has grown particularly fond of his new M149 Tube. "Like the original M49, the M149 Tube never lets me down," he says. "It's an extraordinary microphone – clean and crisp."

Being the award-winning professional and sound perfectionist that he is, Al has chosen to record the voices and instruments of so many of our favourite artists – Tony Bennett, Jackson Browne, Willie Nelson, Quincy Jones, Dr. John, Michael Bolton, and many, many others – through his favourite mics.

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# Digital film consoles



It's been a long, slow struggle for digital audio to infiltrate the heart of the motion picture industry, but it's finally happening. **Zenon Schoepe** sits back and enjoys a change to the scheduled

**O**F ALL THE VARIED disciplines of audio, film remains the purest and truest to its origins. The reason is simple: music recording developed from an original premise and towed its technology along with it while audio post for video took technology and applied it to the task in response to economic and timing pressures and invented itself along the way. Perhaps because of the scale, ambition and the amount of money involved, film got itself well and truly organised many years ago and operators today enjoy pigeon-holed job descriptions that were defined before many of them were born. This has not precluded the introduction of more refined roles and functions as technology has moved along, but it always seems that any new directive or piece of kit has to, above all else, fit in with the established mode of practice.

The term 'conservative' is often used when describing the audio branch of film production, and technology champions frequently enjoy pointing the finger at its operators' reluctance to embrace new ideas. Thus we find many Hollywood blockbusters being put together on 35mm mag in defiance of welcoming or even acknowledging DAWs in to the production chain.

However, it is through the pivotal role of its mixing desks that film has become known as

**AMS Neve Logic DFC in use at  
Warner Bros' LA Burbank studio complex**

the last bastion of analogue. For film, there has simply not been a digital alternative, and large analogue desks have become intrinsic and personal to stages the world over as heavily modified, tuned and customised versions of ordinary boards. The theatres have been supported by only a few specialist manufacturers because the relatively small and difficult market has largely been ignored by those interested by volume sales.

It has its champions and favourites, with Harrison most notably applying its digitally controlled analogue expertise in a manner that has captured the imagination of mixers and Otari enjoying success of a different scale with its film-orientated boards.

**T**HE LAUNCH of the AMS Neve DFC (Digital Film Console) was seen only a year ago as an interesting move but a spate of sales in the last three months to some major players suggests that there is a little more to it than that. It's also been vindicated by last month's launch of SSL's Avant digital film desk, the revelation of Otari's digital Advanta with clear film pretensions and the continued promise of Amek's DMS, Soundtracs' DPC-II, Harrison's brewing of a digital back end for its MPC/Series 12 and the poten-

tial for the application of desks like Stage Tec's Cantus and Studer's D950.

The DFC sales—12 in less than a year—suggest a mellowing of mood and increase in appreciation of digital film consoles and may yet be looked back on as the point at which the last stronghold of the analogue desk started to crumble.

The sales are impressive. Warner Brothers, Todd-AO, Magnolia Studios and Sync Sound in the US, dB Post and Videosonics in the UK and Cineberti and GLPIPA in France.

Todd-AO has bought three DFCs and selected AMS Neve as its preferred console supplier as it enters a major expansion phase—The Todd-AO Corporation and Disney Character Voices International (DCVI) have committed to jointly establishing a dubbing and audio postproduction studio in Germany, with possible expansions throughout Europe and Asia. The first studio will be launched in Germany as Todd-AO Germany and additional joint ventures are contemplated for France, Italy, Spain and Asia. Todd-AO will manage all technical and operational functions and DCVI will coordinate the creative services of the studios.

These foreign-language dubbing studios will provide each territory with theatrical and television recording, mixing and editing facilities. Among the services to be provided are: dubbing production management, **page 48 >**



< page 47 casting, directing, translation-adaptation, music and effect augmentation, rerecording-mixing, looping, engineering support, all format transfer, stereo optical soundtrack negatives, climate-controlled storage and work space for creative personnel.

The Todd desks will include the world's first 3-operator DFCs and will be sited on Stage 1 and Stage C at North Seward Street, the latter becoming the world's first digital dialogue premixing room. The third DFC will be based on Stage A at Todd-AO West in West Los Angeles.

**T**WO DFCs ARE already in operation at the Warner Brothers Burbank facility where they are used to produce *ER* among other programmes. 'Over the last year and a half we've had on-going discussions with the major console manufacturers about what we felt we needed,' says Curt Behlmer, senior vice president of Warner Bros. Post

Production Services. 'We're also working much more in the digital editorial environment so it's a natural extension of that because we can avoid a lot of the transfer processes. It also fits in with our facility plan which is to use audio and video file servers and route between our full facility.

Digital consoles give our facility the ability to go straight from editorial prepping to mixing,' he continues. 'Basically, this will omit the physical transferring of elements to the stages.

'We chose to put these consoles in our long-form television mixing environment because we felt we had the most control over the product coming to the stage and we're now looking to put these boards into our larger feature mixing facilities.'

In the UK, Videosonics' DFC will go into a new THX film mixing theatre called Videosonics Cinema Sound slated for a January opening where it will run with two 24-track AudioFiles.

'Film work accounts for almost 50% of our total business,' says Videosonics MD Dennis Weinreich. 'The DFC is an evolution of the Logic 2 which our existing theatre already has—we believe that in terms of how we're using it it is without fault.'

At London's dB Post, the 48-fader frame DFC will be installed as 'the heart of the new all digital theatre' in a new Studio 5 where it will be used for mixing feature films for cinema release, long-form TV feature films and television drama series. The facility is designed with full international capability in mind and can run at any combination of European or US TV and film speeds.

'All tracks will be played from a 24-output AudioFile to a pair of 24-track DASH machines,' explains dB's Richard Daniel. 'The final mixing will be DASH to DASH to Dolby SR-D or DTS on Tascam. We will run 35mm print film, Avid or Beta SP picture and all digital audio fully locked with Rock and Roll capability. SVA masters will also be made to DAT and Tascam.'

What is interesting about the proliferation of the DFC is not just the stature of those adopting it but it gives a first insight into the decision processes involved in making these first choices.

Todd-AO supervising engineer Bill Ritter acknowledges that equating what you get with a digital desk against an analogue one is a complicated business but he's quick to point out immediate benefits.

'From our experiences from visiting Warner Brothers we know the DFCs go in quickly and they work in the analogue domain very well,' he says. 'The specs on the converters on the DFC wouldn't seem spectacular to us except for all the stuff that now gets done in the digital domain, like summing, which would typically kill you in analogue with the sized desks that people are buying. When you put all those inputs up you run a better number than you did on the original analogue.'

There's also the consideration of how much digital the desk is likely to be running with. 'Because most of the source material in some of the larger rooms is primarily analogue—60 to 70% including our recorders—and at this point we're not in the market to replace the rooms outright with sources, recorders, everything,' continues Ritter, 'we looked at the movie soundtracks we were doing and said we should buy 30 to 40% digital. However, in one of the rooms (Stage C) we decided to create a system that was more like the platform that the DFC had been built for—a digital board that would record and source digital.'

The key issues are in the software area because you wouldn't buy a desk based just on its specs,' points out Ritter. 'The DFC is a lot different to a Logic 2. There is a huge software schedule to create the parameters that we need for the film version that we're talking about. The desk seems to be working pretty well in the TV domain at Warners and it's good for us to know that the platform is stable and that there are not too many bugs. We have a whole agenda here of things that we've asked for to get the desk to where we want it to be.'

Analogue still has attractions in **page 50 >**

October 1997 **Studio Sound**

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# Penny + Giles



< page 48 the film mixing world, however, not least because of its complete lack of any I-O complications. With a digital desk there is always the possibility of meeting limitations in this area—usually for financial reasons—which precludes the installation of extra cards simply to cover the eventuality that they may one day be called for. It seems vitally important for digital and analogue to be cost comparable if customers are not to gravitate towards a cheaper analogue alternative that they know rather than amplify the risk factor associated with digital desks that some clearly feel.

**T**HERE'S ALSO the issue of the number of achievable channels, which until relatively recently stuck in the craw of digital desk prospects in film. The DFC can now handle a vast number of channels but Videosonics' Dennis Weinreich takes issue with the relevance of large numbers of physical channels in a modern digital film environment.

'The primary reason why you need lots of channels on a desk is that the dubbing mixer splits up all of his tracks individually and in a given scene each channel may not have any more than one or three pieces of audio on it so he can set his EQ, pan, and compression and leave it,' he says. 'Although he has many tracks running, in terms of bulk audio he probably doesn't have that much going on.'

'On a fully and totally automated console you have to ask if that approach is necessary and of course it's not.'



'It's a time of change and new technology is coming in, but the application of that technology is in a state of flux.'

'A lot of film companies are using the talents of editors who are undoubtedly the right people for the job but they are using fairly antiquated techniques,' he continues. 'I've been at a major Los Angeles-based post facility where even though they were editing their audio on superb hard-disk systems, that material was being presented in to the dub on analogue 24-track. It's a time of change and new technology is coming in but the application of that technology is in a state of flux.'

'In Britain, a lot of companies have got used to the idea that all of their audio is not coming in on mag tracks anymore or DA-88

but in the theatre there is now a Pro Tools, an AudioFile or a Fairlight playing the material out and if you don't like a sound effect you go to the editor and change it.'

'That way of working seems to be uncomfortable in certain territorial environments even though it would seem to be the sensible way to work.'

'In Los Angeles I also saw a facility that was doing all its editing on a hard-disk system, presenting it on 2-inch, the hard-disk system was sitting in the dubbing theatre but it was not interfaced to the desk, it was interfaced to the 24-track. Any changes were implemented



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on the hard-disk system but they were still presented to the console for the mix on the 24-track,' he says.

'The issue is not that it's coming off 24-track, it's that the hard-disk system has DSP capabilities—EQ, levels, ramp in and out. In our facility the track laying process means that when the tracks are presented in to the dub they are very much along the road of being complete,' states Weinreich. 'It's a matter of skill sets—a superb dialogue editor working on 35mm presents his material to the dub in a different way to a superb dialogue editor working on a hard-disk system.'

Weinreich is painting a picture of a film process that can and is already being changed and in his scenario an enormous analogue desk can be replaced by a layered digital console if the operator is prepared to adjust. 'I told our chief dubbing mixer that he could have whatever sized DFC he wanted, as many channels as he wanted because he alone knows the types of film he's handling,' he recalls. 'He asked for 24 faders. I told him he had to have more than that so he suggested 36. Finally we compromised at 64 and he doesn't understand what the other half of the desk is going to be used for when we're

bringing the material into the dub on the editors that are doing the job.'

The point about the DFC is that not only does it integrate well into the existing production 'method' but it can also sit atop of a modernised and digitised production chain and provide a different and arguably more efficient means of working.

**U**LTIMATELY none of this technology replaces the quality of the operator driving the machinery be they mixers or editors and it will be unlikely that a star editor who wants to cut on 35mm will be forbidden to do so and commanded to use digital. By the same token Academy Award winning films will continue to be mixed on analogue desks from the early 1980s in theatres that haven't been tweaked for a good deal longer by operators who could achieve the results on any desk with faders on it.

What is clear is that this first batch of DFCs heralds a change in attitude in film to digital desks which is now unlikely to be reversed. It happily coincides with changes further down the film audio production process and these factors are now combining to rub off some of the conservatism that the film industry is always being accused of.

The arrival of SSL with its own contender and the presence of others waiting in the wings can only strengthen the cause. The message is unambiguous, the last remaining bastion of the analogue desk is now tipped to fall. The progress is relatively slow but it's now unstoppable.

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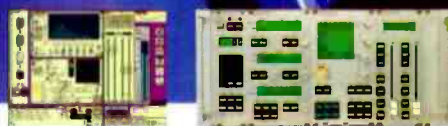
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## SSL Avant

**T**HE APPEARANCE of SSL's Avant digital film desk at the AES in New York has done the digital cause no harm as it introduces a new player, more marketing effort and choice.

Part of the A-series family born from the loins of the Axiom, Avant is a multi-operator system that offers up to three motion control panels, three monitor panels and multiple joy sticks. It boasts compatibility with SSL's digital equipment and can share resources with Axiom, Aysis, Altimix or SL9000j installations within a facility.

Frame sizes include 48, 56, 64, 72, 80, 88, and 96 channels and all offer control surface layering allowing 192 inputs to be controlled from the smallest frame. Control surface channels with fully automated 4-band EQ access a library of different EQ curves; fully automated dynamics section; 48 automated digital delays and 24 reverbs assignable to any channel; automated bus routing; and eight auxes per channel configurable as

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From early music synthesisers through disco and mainstream pop music to film scores, Giorgio Moroder has been recognised as a pioneer. Today, **Richard Buskin** finds him leaving music for computer art

**T**HE NAME Giorgio Moroder is synonymous with sensual disco music and techno-pop. During a career that has spanned nearly three decades the man has worked with an enormous roster of artists and has been hugely successful, amassing a tidy cache of 200 gold and platinum discs, as well as three Oscars and three Golden Globe Awards. Yet while others continue to revere his production work, Moroder himself rarely listens to his old records.

'I don't really have time for them,' he says dismissively. 'It's not that I don't like them, but if I listen for too long I become nervous.'

Since the early 1990s Moroder has been semiretired from the music business. Although he still dabbles, the man who was initially inspired by the Moog synthesiser has become entranced by computer art—an eventuality made less surprising given that one of his brothers is a painter and two others are sculptors.

Among Moroder's ongoing musical projects are the production and scoring of two stage musicals, one of which is *Flashdance* to which he now owns the rights, and for which he is composing a set of brand new songs.

A native of northern Italy, Giorgio Moroder began playing guitar and then bass in a covers outfit touring nightclubs around Europe. By the early 1970s, while dividing his time between Italy and Germany, he began enjoying his first modest hits as a composer, but it was with Donna Summer and a song entitled 'Love To Love You, Baby' that Moroder experienced his worldwide breakthrough.

'At that time I was in Munich with my assistant Pete Bellotte,' the producer recalls. 'Donna Summer was one of the girls in a backing band that we used on a record, and we liked her voice and the way she looked.'



Donna Summer partnered Giorgio Moroder in the disco revolution

Studio Sound October 1997



# Moroder: What a feeling

Summer had relocated to Munich to take a part in the local stage production of *Hair*. Moroder and Bellotte subsequently recorded two singles with her—'The Hostage' and 'Ladies of the Night'. In 1975, came 'Love To Love You, Baby', the then-controversial number that has been widely credited for helping to ignite the disco craze, along with her 'I Feel Love', which launched the foray into techno-pop. Yet Moroder, who produced both records in addition to composing the music and cowriting the lyrics with Summer, never foresaw their impact.

'We thought of 'Love To Love You, Baby' as a bit of fun,' he says. 'At one point I'd suggested doing a sexy song, almost like the Serge Gainsbourg hit 'Je t'aime...', and Donna came to the office and said she'd come up with the title 'Love To Love You, Baby'—that sounded good to me.'

'Back then I had a studio in the basement of my Munich apartment building called Music Land—which later became famous when acts such as The Rolling Stones, Led Zeppelin and Elton John used it—and it just so happened to be empty that afternoon, so I went straight down there and composed the

song. A day or two later, Donna came in and we did a very rough demo.'

'The way that I wrote back then wasn't much different to how I work now. In 1974 the first cheap little drum machines came out, so I would use one of those, and I also had a real-drum loop with several different tempos. I would put up a tape from a 24-track and I would have a mic for the vocal as well as some sort of keyboard; a Fender Rhodes or some synthesiser. Having established the tempo of the song that was required I would just record the rhythm along with a guide vocal, and then go from there.'

A few days after recording the demo of 'Love To Love You, Baby', Moroder was able to play it to people attending the MIDEM (Marche International du Disque de L'edition Musicale et de la Video Musique) show in the South of France.

'The reaction was absolutely incredible,' he recalls, 'so we went back to Germany, rerecorded the song and presented it to Neil Bogart of Casablanca Records. He took it, and a few weeks later he phoned me at 3 o'clock in the morning with the idea of extending the number to cover the whole side of **page 55 >**



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< page 55 an album. So that's what we did, over the course of about two weeks."

Courtesy of Summer's sexy lead vocal—complete with climactic groans and heavy breathing—the record caused a fair amount of controversy on its release. Yet today Moroder claims not to have set out to cause a stir, and also to have been largely unaware of the reaction.

"I wasn't really in touch with what was going on in England and America," he admits. "I got some feedback about how the record was selling through the music papers, but I was never one for going to the discotheques. I maybe visited [New York's] Studio 54 once or twice, but I didn't follow the scene and the trends too much. At the same time, Donna originally didn't want to do dance music at all. I mean, I knew her as a great singer with an incredible voice, and so when we did the demo for 'Love To Love You, Baby' it was very different for her to be singing in that soft, breathy way. She hadn't sung that way for me before, and she wasn't too interested in disco. Ballads and musical numbers were more her style, but then that record took off and we had a bit of a problem.

"For the second album—which was moderately successful—we wanted to record disco tunes and we wanted to use her proper voice, but we also didn't want to change the formula too much. She therefore stayed sexy but a little less so, while using a little more voice, and then for the third album she really sang like we knew she could."

During the late 1970s disco was definitely the way to go, and Donna Summer was nothing if not a willing participant in that respect, cowriting many of the lyrics. On the strength of the success of 'Love To Love You, Baby', she returned to the States and was followed there by Giorgio Moroder, who would eventually base himself full-time on the West Coast. Continuing to produce Summer's albums, Moroder also composed more hit singles in the same vein.

'I Feel Love' attracted the attention of film director Alan Parker, and led to Moroder composing and producing the score for the highly acclaimed 1978 movie, *Midnight Express*, which gained him his first Academy Award for Best Original Score.

Among the other films whose soundtracks



Chaka Khan—one of many collaborations



Janet Jackson 'wasn't ready'

Giorgio Moroder has worked on are *Scarface*, *Superman III*, *American Gigolo* and *Beverly Hills Cop II*. He has won two Best Original Song Academy Awards for Berlin's 'Take My Breath A Way' in *Top Gun* and Irene Cara's 'Flashdance —What A Feeling' in *Flashdance* (each of which garnered him Golden Globes), and Moroder was also responsible for restoring and scoring Fritz Lang's 1926 silent classic, *Metropolis*. This included adding a soundtrack including the hit songs 'Here She Comes' by Bonnie Tyler and Freddie Mercury's 'Love Kills'.

Much of Moroder's reputation was forged on his synth-based sound. However, even though he had discovered the Moog at the start of the 1970s and used it to good effect on his own 'Son of My Father' (which was made a chart topper in the UK by Chicory Tip), he says that throughout the first half of that decade there wasn't a great deal of interest in this style of music.

"In 1970 an engineer named Robbie introduced me to a classical composer in Munich who had this incredible new instrument," he recalls. "It was a humungous machine with cords everywhere, and he played me this composition which consisted of a bass tone that kept changing every half minute: that was his composition. He was using this huge machine to create what was known as 'concrete music' [musique concrète]. There were no rhythms, no effects and it wasn't too interesting, but then, when he wasn't around, Robbie took me aside and said, "Look, with this synthesiser you can create more than just a low note". He showed me a few things and I thought, "Wow, this is great".

"It was the second Moog ever produced—I don't know who bought the first one—and I was immediately fascinated by the possibilities and the different kinds of sounds that it could produce. It was two or three weeks later that 'Son of My Father' became the first of my records to feature a synthesiser, but, although I had several small hits in Europe with other records that used it, I eventually began to lose interest. You see, first of all it was quite a pain in the butt to page 74 >



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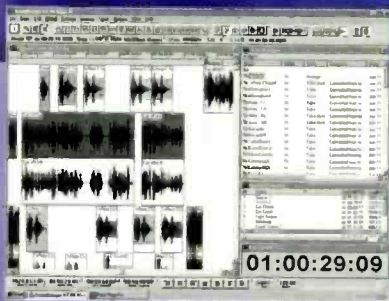
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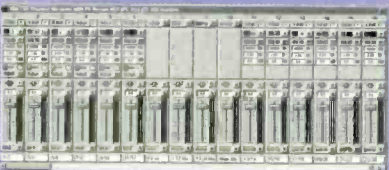
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< page 56 use, because there was only one synthesiser around and the classical composer who owned it wasn't too happy about people using it as a popular instrument. He guarded it jealously, so we kind of had to sneak in when he was away. Robbie would say, "Yeah, maybe I can do a few hours on Thursday", and that was always a bit of a problem.

That's how it was for a couple of years, before several other synthesisers became available. Still, I myself noticed that people didn't want to hear it too much, so I gave up on it for a time. Then, in 1977, Donna and I did an album with some old 1950s and 1960s songs, and there was also a kind of futuristic song which I thought would be ideal for the synthesiser. Donna sang in a high voice and a lot of groups seemed to pick up on that. In fact, quite a few artists—like the guy from Bronski Beat—told me that they became a singer because of Donna and that sound.

Having established a trademark sound in the pop arena and attained a level of diversification through his movie work, Giorgio Moroder gradually began to branch out in terms of his chart-orientated productions. Blondie's 1980 international hit, 'Call Me', while still boasting the electronic dance rhythms that characterise much of Moroder's work, also placed more emphasis on the guitar. From this point onwards he continued to move more into the rock arena while never really betraying his roots.

Over the years there have been collaborations with, among others, David Bowie, Van Halen (with Sammy Hagar), Graham Nash, Kenny Loggins, Chaka Khan, Cher, Pat Benatar, Jon Anderson and, a couple of years ago, the pairing of Elton John and RuPaul on a re-make of 'Don't Go Breaking My Heart'. Still, this last was something of an exception to the general rule, for about 95% of Moroder's workload has comprised his own compositions, not to mention his own mixing efforts at the console.

'During the late 1970s and early 1980s I always worked with great musicians,' he states, 'and I was also assisted by engineers, although I knew how to operate the Harrison desk that I had. Then, until the late-1980s, I also had my own big studio in the San Fernando Valley. It was called Oasis and that's where I recorded the soundtrack for *Top Gun* and so on. When I sold it, I kept the E-series SSL and the 24-track digital machine, so I know my way around and, although I'm not a great engineer, I still do all of the mixes by myself.

The engineers get me the great sounds with the delays and all of that stuff, but then the final mix is definitely down to me. The only thing I don't do, unfortunately, is automated mixes. Until the mid 1980s there was no automation, and then, when I got the SSL with automation in about 1984, it was so complicated that I never got into it. So, up until today I do everything manually.'

And, as per the distinctive sound of his productions, Moroder also does it precisely. Still, that's not to say that there isn't the occasional hitch-up.

'In 1986 I worked with Roger Daltrey on the title song of the movie *Quicksilver*,' he recalls. 'I really love Roger's singing, he's a great guy and a great artist, but in that case I made a little mistake. Unfortunately, the key



Debbie Harry

that I chose for the song was too high and in the end he sounded a little strained. I can't remember if he told me which key he wanted to sing in or if I just picked it from listening to his songs, but, by the time that he came to sing, the tracks had all been recorded. They were about half a step too high, and we couldn't really slow the 24-track tape down because the voice would change. So, that was how it had to stay.'

In the case of Janet Jackson's debut album, on the other hand, the vocal shortcomings Moroder concedes weren't the sole responsibility of the coproducer.

At that time she wasn't a good singer like she is now. She was about 16, and my big mistake was that I was so busy working on movies and so on that I didn't really give all of my attention to the project, and it didn't turn out that great.

'I regretted that later. I mean, there was some pressure from A&M to record everything fast, but we could also possibly have chosen some better songs and been more careful with regard to how we recorded the voice. After that album she took vocal lessons and she was singing everyday, but, in hindsight, when I worked with her she probably wasn't ready. In fact, I have to say that the second album wasn't much better than the first, so maybe that vindicates me a little bit. Overall, however, the whole production wasn't that great, and so basically it was my fault. I didn't do a good job.'

As a producer who doesn't like to do much compiling of vocals, Moroder wasn't about to start punching in syllables in order to patch up the young JJ's singing deficiencies. 'I once worked with a singer who wanted to do precisely that and I hated it,' he asserts.

It doesn't get any easier with the passing of time, yet these days there are a couple of provisos before Giorgio Moroder finds himself appraising what he should and shouldn't have done on his old records. For one thing he has to listen to them (which he doesn't do very often), and for another there's the little matter of how successful a particular song was.

'The major hits I don't worry about,' he says. 'With other songs, however, it's a different story. Oh, some of them are terrible—absolute throwaways. I prefer to think about 'Flashdance' or 'Take My Breath Away'...'

So does the record-buying public. ■



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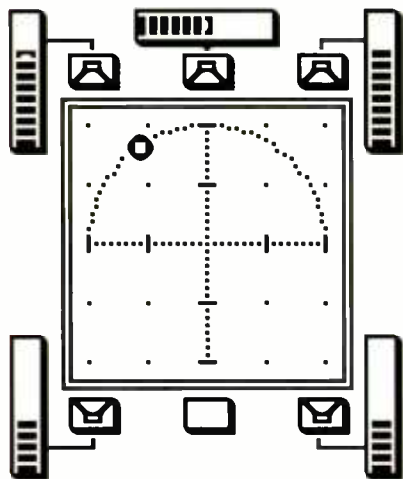


# Art, science and politics

Surround sound was around before DVD, but the new medium is set to make it big in audio recording. **Dan Daley** studies the art, science and politics of surround sound

**A** LOT OF PEOPLE are betting on the future of surround audio as a viable replacement for stereo. But it's a crowded race, with few odds-on favourites, and the racing analogy does not do justice to the complexity of the issue.

Born out of the evolution of film sound, surround audio's first uncertain steps have produced a lot of enthusiasm. Major record labels are slowly preparing to address it, hoping that it might recreate some of the



Once the domain of post, multichannel sound has arrived for music

economic thunder that the introduction of the CD did when it induced millions of people to go out and buy their entire record collections all over again. New labels have emerged from the mist surrounding surround audio. Both parties hope that the new format will provide the edge needed to introduce new recording artists' careers and kick-start extant, but economically morbid ones in a crowded entertainment market. Engineers and producers, meantime, see surround as, perhaps, the greatest innovation in audio since the introduction of stereo, or the introduction of records, for that matter, and new careers that

might otherwise not have come about will be launched for those who prove themselves artistically and technically adept.

Yet things aren't always what they appear. While these forces propel surround audio on the surface, beneath the format a very high-stakes business game is being played out, with its own strategies and tactics that rival actual wars. Corporations large and small have made significant investments in surround, and are jockeying for their piece of what many consider to be the last real audio gold mine of the 20th century.

'This is a whole new world for music. Once people hear this, they'll never settle for stereo again,' pronounces Robert Margouleff, whose long and notable oeuvre as an engineer and producer ranges from Stevie Wonder to Boyz II Men.

'This is a great medium for music, far more special than stereo,' says Chuck Ainley, an engineer now Nashville-based but whose roster of clients there and in Los Angeles is long and eclectic, and includes Mark Knopfler solo and with Dire Straits. 'It opens up the creative palette of musical colours a zillion-fold.'

'It makes music sound the way it sounds when you first hear it in your head,' observes Tony Brown, producer for Wynonna, Reba McEntire, Vince Gill and who also heads MCA Records' Nashville division. The endorsements for surround mixing—and the soon-to-come surround music recording—are growing plentiful and they are quite sincere. But those who have played with the surround format—either the various matrixes and discrete technologies of Dolby or the discrete six channels of DTS—quickly become aware that they are working in what is essentially a new medium.

'There are no rules—yet,' says Ainley. If there are to be rules for surround audio mixing, they are being made up as it goes along. Where

stereo offered the illusion of left-centre-right via placing information into both speakers to form a phantom centre, surround can deliver a true centre as well as the surround channels themselves. Where to put what has become an artistic and aesthetic question of far larger proportions than it was when it was fettered by the constraints of mere stereo.

'I mix for the song,' says Ainley, who along with Tony Brown remixed Vince Gill's *High Lonesome Sound* recording in Nashville using DTS for that company's own label (or, alternatively, part of its marketing strategy). Ainley stresses that he is aware that the use of six channels requires as much constraint as it does imagination.

One song off the record seems to have a lot of centre-channel information; on another, in Ainley's own words, 'The guitars are flying across the speakers'.

'Each song is a learning experience,' he explains. 'I came into the remix with certain preconceived notions of which songs would get more of the surround treatment, and those proved pretty much correct as we **page 62 >**



Marvin Gaye's *Forever Yours* has been remixed for 5.1 surround





**Boyz II Men recently remixed for DTS surround by Robert Margouleff and Brant Biles**

< page 61 went along. But that also tells me that surround mixing is something that requires both analysis and intuition. You have to resist the temptation to use surround as a toy rather than as a tool.

Much of the art of surround, Ainley believes, will lie in where it's not used, much the same as what any good musician knows: the notes you don't play are as important as the ones you do. If Ainley mixes for the song, Tony Brown produces for the genre, but his comparisons of country and pop music illuminate both.

'Country music is about the lead vocal, not about a big wall of sound,' he states. 'Lately, country producers have been trying to move up the level of the track like it is in pop records, and the promotion guys are pushing it back, saying it sounds too much like a pop record for country radio stations. Surround mixing offers a whole new set of possibilities for country music. If keeping the track away from the vocal is what works on radio, but keeps you from making a punchier-sounding record, then surround can let you build an entirely different environment in which the vocal has its own channel. It gives you a space for all the instruments that you wish you had in stereo. You can make the record the way it sounds in your head.'

'The rules for surround mixing are radically different from those that had assembled themselves over the last 40 years of stereo,' says Robert Margouleff. 'But you also have to ask why, and when you realise the answer, it puts it in perspective. The technology is now at a point of convergence where you get everything from one box—television, computer, Internet, audio, and so on. Ten years ago, we had a box for each, and we still do—but that's changing. As a result, so is the way we mix records.'

Margouleff thinks that, aesthetically, sur-

round mixes will break down into two main types: the documentary or objective and the subjective.

'We mixed Pavarotti in *Concert For War Child*,' he explains, 'which was recorded by John Pellowe and produced by Phil Ramone. We got 96 tracks on six stereo stems and we placed the orchestra out in front and the audience ambience around that. It's a report on the real world. Documentary mixes are the way I think that orchestral types of recordings will be approached.'

Pop records, on the other hand, Margouleff believes, were never intended to be recreations of a live event. 'Pop records are done serially, with overlubbing,' he explains. On a recent surround remix of Boyz II Men's second record, *II*, Margouleff and partner Brant Biles gave each of the group's vocalists their own channel.

'If you want to hear more of Nate Morris, you simply stand closer to his channel. In that sense, surround's going to be very interactive with listeners.'

Robert Margouleff is about to start his first surround-audio tracking session this fall, for recording artist Bruce Roberts, and he is finding the same frontier-style rules of engagement as in mixing—they are few and are based on common-sense guided by restraint.

'Up 'til now, we've been adapting the stuff from the past by remixing existing tracks,' he says. 'As artists get used to the idea of surround records, we'll have to start creating techniques not only for mixing it, but for recording with six channels in mind.'

He'll be feeling his way through the process but he says that it will likely start with a lot of mic placement experimentation.

'The artistic part will be in filling the fields differently as we track,' he says. 'Also, most of the signal processing out there is designed for stereo. But there is some gear that's intended for this or which can be easily adapted. For instance, te electronic's M5000 which is set up for 4-channel operation and the EMT 250 plate has one input and four outputs; it was designed in the 1970s for quad.'

Margouleff, who has worked in both the matrixed Dolby 4-channel and the DTS discrete 6-channel formats, has developed his own proprietary techniques for converting 4-channel audio to discrete 5.1, and, although he is reluctant to discuss it at the moment for fear of revealing too much, he did say that its primary function is to create coherent centre and subwoofer channels.

As for mixing techniques, Margouleff says, 'You have to consider all the speakers as equals. Surround audio comes from film, and in film mixing you tend to load the front channels to support picture. That's not the case with audio-only surround mixing. And know that the performance and the listener occupy the same space, so the image changes as the listener moves inside the performance.'

Those who work in multichannel audio have an increasingly bewildering array of technologies to choose from. In addition to Dolby and DTS, the two main ones in terms of presence and marketing aggressiveness at the moment, there are other systems, notably Circle Surround from RSP Technologies, a 5-channel stereo-compatible matrix system that offers separate left and right rear channels (see *Studio Sound*, September 1997). Sony's cinematic sound system, SDDS, has not yet chosen to become a player in the audio-only wars, but when, and if, it does, it will bring a fully discrete 8-channel (seven plus a sub channel) to the game, much to the **page 64 >**



**Tom Petty—being 'dragged around' in surround by Keith Olsen**



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< page 62 delight of speaker manufacturers, who are already gearing up for a trend that could ultimately triple their sales. The advantage of a matrixed system is that it does not require decoding to play a programme back in stereo—but with a decoder, such as Dolby's Surround decoder which is found in an increasing number of home music systems and virtually all home theatre systems, the programme will unfold in all its 4-channel glory. DTS, on the other hand, requires a dedicated decoder to output anything but noise, which is to say it is not stereo-compatible, but when decoded offers 5.1 discrete sound.

Dolby touts 30 million as the number of home and theatre systems that are equipped with Dolby Pro Logic or Surround matrix decoders; DTS asserts 10,000 decoders in the market, and expects that number to increase five-fold by the end of this year. A number of new players are jumping up in recent months, some touting surround audio, others, like Sound Archaeology (SA) in Stony Brook, New York, offering new ways of encoding audio information to a Red Book CD and enhancing the sound lost on old masters by interpolating data from the original tracks and restoring it in the final mastering process.

'Sound enhancement' is another kettle of fish that dates back about ten years to Q Sound and several other products which purported to be able to localise sound from just two speakers began to actively court the pro-audio market—and the stock market. While some achieved a degree of success, at least when the listener was bolted down within a very narrowly defined listening area, outside of which the aural images usually collapsed, the 2-speaker approach was relying essentially on the smoke and mirrors of the ear-brain combination's ability to fool itself. It apparently takes multiple speakers to consistently recreate multiple sound source locations. And even though the movement of the listener will change the perspective of the final mix (now we're back on art ground), it does not affect the technical integrity of the final

mix (and now back to science). SA's interpolative or additive approach is the opposite found in most of the surround audio programs, which use data compression to some degree. Dolby's is generally regarded at being at about 12:1, while DTS comes in at about 3:1. Data compression is necessary to get a reasonable amount of programme material onto a disc. A Red Book CD holds about 650Gb of information, translating into up to 74 minutes of stereo music. Multiply that by three for creating six channels and the need for data compression becomes quickly apparent.

Another contender, one that has had some limited success in the cinematic field, is True Dimensional Sound (TDS), which was used in the soundtrack to the Tom Cruise film *Jerry Maguire*, but which more recently was utilised to enhance reissues of much of the old Capricorn Records roster, including the Allman Brothers, Wet Willie, Dixie Dregs and Sea Level, on a compilation disc on White Clay Records.

While not a multichannel process, TDS 'restores energy to the harmonics that are already in the recording,' says Capricorn Studios chief engineer Skip Slaughter. 'That's what they tell us. All we know is it works. It's one of a lot of new ways to deal with audio out there on the market.'

The streaming rates of the systems vary, according to the system and according to the intended media, with Red Book CD having a slower streaming rate than either film or DVD. Both Dolby and DTS can work in the currently conventional digital environment of 44.1kHz at 16 bits, and both can accommodate higher rates, including the projected—but not ratified—DVD-audio-only standard of 96kHz at 24 bits. (Both also assert that their systems are fully scalable.)

Both Margouleff and Biles have been working on their 5.1 mixes and mastering, including Marvin Gaye's *Forever Yours* and The Eagles' *Hell Freezes Over* (Elliot Scheiner's mixes), at Enterprise Studios in Los Angeles, using a Neve Capricorn with an optional 5.1 output



**Vince Gill teamed with Tony Brown and Chuck Ainley for remixes**

bus system, although Margouleff says he will at times also use a Euphonix, whose latest CS3000 version is equipped with the Cube add-on for surround mixing. Keith Olsen, at his 20-year-old personal studio, Goodnight LA, uses a modified 96-input Trident Dian console. The mixes in Nashville for Vince Gill's record were done at Masterfonies' The Tracking Room on an SSL 9000j console, the same studio the stereo version was originally recorded in.

While the choice of desk is important, most high-end consoles can accommodate surround mixing either via optional equipment or by tinkering with the board's output bus structure.

Speakers, on the other hand, need as much art as science in terms of their compatibility with each other, with the programme material and in their placement.

Keith Olsen has made recordings of new artists for his multichannel audio-dedicated label, the KORE Group, which he owns with Dallas studio owner and entrepreneur Gordon Perry, as well as remixes of classic records. One such recording was 'Stop Draggin' My Heart Around' by Stevie Nicks and Tom Petty. Although Olsen produced and engineered such vintage classics as Foreigner and Pat Benatar, his personal friendship with Nicks enabled him to quickly make the calls that got him both the permission and the masters from Modern Records to do a surround remix. Using the Dolby Pro Logic matrixed system, Olsen tried to keep the vibe of the original recording but expanded the plane of it for the listener.

'I moved Vivian Campbell's guitar and some of the background vocals to the rear channels, as well as some of the reverb effects,' he says. 'One thing I've learned to do is to print the stereo master of the original mix onto two of the tracks of the recording system that you're working with for the surround remix. This way, you have something to A-B it with that's exactly in synch with the track you're remixing. You can spot problems a lot more quickly that way and it really helps if you're trying to stay true to the vibe of the original mix.'

Audio has become a corporate political thicket in recent years. DVD's audio specifications were supposed to have been agreed upon by December 1997, delayed **page 66 >**



**Tony Brown—bringing surround to country artists**



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Keith Olsen's KORE Group aims to bring surround audio to the mainstream

< page 64 by both technical and corporate reasons and thus making it virtually the last of the DVD subformats to be defined. The grand alliance that is the DVD Consortium has always been a fragile affair, born of a tenuous technical compromise on the physical aspects of the DVD disc, and the coalition's hollowness was demonstrated in mid-August when two of the members, Sony and Philips, announced that they would break away and establish their own specification for DVD-RAM. Surround audio's introduction will be replete with its own share

of intriguing alliances.

As mentioned earlier, Keith Olsen and partner Gordon Perry are collaborating technically and financially on their-KORE Group surround-only label. Dolby and classical music record company Telos International jointly created and released last August what they assert to be the first audio-only DVD, using Dolby Digital, Dolby's own 5.1 discrete system. DTS was originally introduced for film on the movie *Jurassic Park*, directed by Steven Spielberg. Both Spielberg, who is part

owner of multimedia venture Dreamworks, and Universal Pictures, which also owns MCA Records, are partners in DTS. The company has spent millions of dollars in the last 12 months, taking licenses for modern and classic recordings, and, when feasible, pairing them with their original producers and engineers for surround remix versions, such as Ainley and Brown on the Vince Gill record and Margouloff on the Boyz II Men recording. These are generally mixed to some digital 8-track tape or hard-disk format, and then encoded (data compressed) to fit on a Red Book-standard CD. The surround CDs, on DTS Records, retail for about \$25 (US), twice as much as normal CDs. DTS has been barnstorming in the last 12 months, securing licenses on recordings for surround remix, hiring the producers, engineers and studios—often at rate card or premium rates: Georgetown Masters owner Denny Purcell, where the Vince Gill project was mastered, said that was the case in his instance and, he believes, most others.

The scenario appears to be one in which DTS is evangelising its approach to surround audio to the point where most consumer hardware manufacturers will have to include a DTS decoding chip, and DTS will benefit from the licensing fees associated with that, just as Dolby has done for years, first with its noise-reduction schemes, and later with Dolby Pro Logic and Surround. David Del-Grosso, director of marketing for DTS, shrugs off estimates of the cost of the series of remixes by stating the situation as an issue of

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quality versus quantity. Dolby's highly compressed surround approach was dictated by the amount of space on a DVD disc when allocation for services like foreign language versions and closed-captioning were taken into account, DelGrosso states; DTS' approach is to use considerably less compression in order to achieve transparency with the original recording, an approach which mirrors its cinematic methodology, which is to put the sound on a separate optical disc that runs in synch with the picture on film. Dolby's audio information, on the other hand, is encoded between the sprocket holes of the film. DelGrosso stresses that DTS is not at war with Dolby, and that both methodologies have their champions and can co-exist. (The real war, many believe, is shaping up between Dolby and the Philips backed MPEG2 data compression scheme, which has been putatively chosen as the primary audio carrier for DVD in Europe.)

One Dolby spokesman said: 'As usual, Philips wants to be part of the specification, but has yet to produce a working encoder-decoder system yet.'

The problem is not in getting engineers and producers excited; rather, he says, it's in getting the consumer to understand the nuances of all this technology. Hence, DTS' decision to start its own record label and make its own software in the form of licensed surround remixes. As with the contest between Beta and VHS video back in the 1970s, says DelGrosso, the consumers now make the ultimate choices for the professional side of the equation.

Dolby, which has been the king of the hill in terms of consumer audio processing for decades and has been the dominant player in multichannel cinema and broadcast sound for years, starting with its introduction of cassette noise reduction systems in the late 1960s and the Pro Logic matrixed system in the late 1980s, is not taking the challenges to its putative hegemony of surround audio lying down.

In July, the company announced it was opening a Multichannel Music Production division, headed by John Kellogg, who first worked for Dolby during the period when Pro Logic was being introduced to consumer video systems and who has returned to marshal Dolby's strategies in this somewhat more confrontational age of multichannel sound. Kellogg is feisty in his assertion of Dolby's advantages versus DTS, specifically stating that Dolby's lower bit-streaming rate is preferential to that of DTS because it allows Dolby's scheme to be used in more applications, including broadcast. Kellogg acknowledges that less-than-completely-objective points of view have been hurtling back and forth between Dolby and DTS like missiles, each accusing the other of manipulating statistics to their own advantage.

The exchanges, though reveal two distinct approaches to multichannel audio as a commodity rather than a technology. Dolby perceives itself as the market leader based first and most obviously on market share—over 30 million Pro Logic decoders in place—and secondly on an asserted and more subjective technical superiority. Kellogg says Dolby is limiting itself to production with its new division, not creating an actual record label, as

DTS has done.

'With all the Dolby decoders out there now, we can offer existing record labels a market; all DTS can offer them is cash,' he says of the tactic of licensing masters to build market share. But at the same time, Kellogg acknowledges that that is a legitimate and possibly effective tactic on DTS' part in what is as much about business as it is about technology. The hyperbole is flying. Kellogg concedes, but even though it may be generating more heat than light at the moment, in the end it produces an effect ultimately beneficial to all in what is not a zero-sum game.

'It's accurate to say it's a kind of war going on out there in multichannel audio,' he observes, 'but in the end, DTS and Dolby both offer comparable levels of sound quality, although with significant distinctions as to how we each do it, and we actually applaud the noise this competition is making because it draws more attention to multichannel audio,

and that's good for everyone involved.'

There are too many people and corporate entities counting on surround audio for it not to happen. But its introduction could be erratic, possibly the domain of independent record labels until the majors make their moves. (Tony Brown states that MCA Records is not expected to have a set policy on surround mixes for some time to come, and he said once they do, it will likely be on an artist-by-artist basis.)

For engineers and producers, surround audio will likely be a tremendous boon, not only as technically challenging and fun to do, but also as door-opener to other career paths in audio, particularly film and television audio, both of which already use plenty of surround audio, and which will certainly use more of in the future. One thing to keep in mind, though, is that a Machiavellian complex of corporate tactics and strategies are rumbling away beneath the floor. ■

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The visual appeal of the *Baywatch* TV series belies the problems implicit in capturing audio against a backdrop of surf and traffic.

**Richard Buskin** asks where they put the radio mics

**B**EING ASSIGNED TO WRITE about *Baywatch* from the perspective of sound recording and postproduction is practically like being born a triplet to Pamela Anderson—and ending up as the one on the bottle. Such is the lot of the audio journalist.

Shot almost entirely on the beach at Temescal Canyon, where the surf comes crashing on one side and Pacific Coast Highway vehicles come close to crashing on the other, *Baywatch* represents a potential nightmare for any sound crew. In reality, however, it comprises a slick and fairly straightforward operation.

'When 200 hours of a show have been produced over the course of eight seasons, there are not a whole lot of surprises,' says supervising producer, David Hagar. 'If I was going to start a new series tomorrow I would take more time looping, pay more attention to the performances and spend more time mixing in order to find the right sound. *Baywatch* found that sound in its first season of syndication.'

Hagar has been with the show ever since its inception nine years ago, when, alongside Greg Bonnan, he helped sell it to the American NBC. As the initial script about California lifeguards hadn't exactly set the networks on fire, they had decided to shoot what amounted to a music video in order to sell the concept. And it worked.

Some 22 episodes later, NBC dropped *Baywatch* and British London Weekend Television—keen to please its viewers—put up enough money to keep the show in production. Although sufficient, the budget wasn't enormous, and so this meant the tightening of belts, doubling-up of jobs and setting up of a small independent studio.

'If anything, being away from NBC gave us more freedom,' Hagar recalls. 'We were totally responsible for the look of the show and there was no outside influence controlling us. In terms of the sound, for instance, when we were at NBC we had to deal with what is known as the studio mix. That's where your associate producer mixes it, then another producer comes in and mixes it, and then another producer over him comes in and mixes it again, and then the studio mixes it. As a result, by the time you get done you end up with a flat, totally predictable soundtrack which is all perfectly balanced, nothing sticks out and no statement is made.'

'On the other hand, when we went into our first year of syndication I was the only person who I had to please. I was responsible for mixing the sound, and I like to experiment a little bit. I like the music and effects to be a little louder, instead of going for a safe mix. I want to push the storyline as you would normally do with a movie, and I feel that being independent has allowed us to set the stan-



# Beach Party

dard in that way. The only thing is, because of the time slot when *Baywatch* is shown in England, we have to refrain from the sort of mainstream violence that is now popular in this country.'

Hagar produces, does some of the editing and, along with show producers Doug Schwartz and Greg Bonnan, is one of a team of five people who take turns at directing. His wife Cathy, who came onboard during the

first season, is a producer and she oversees all of the post audio work. Given the joke that *Baywatch* is just as enjoyable with the sound turned down, how much emphasis is actually placed on this aspect of the production?

'We've always maintained that, if the dollars are going to be put anywhere, they should go into the quality of the picture and the audio,' says Hagar. 'That way, instead of everything being spent on expensive actors, writers or



directors, the finished product looks and sounds like a network show, and that's paid off for us big time. In fact, we've had people from the networks poke their noses in to see how we do what we do, because, whether you like *Baywatch* or not, the show is of an impeccable quality.'

'There are two music montages in every show, and it takes quite a big budget to secure great contemporary music for that,' Cathy Hagar points out. 'It's pretty unusual to devote so much money in that respect, but David really created that whole style.'

'We have a special team devoted to picking, preparing and editing the music for the video sequences in *Baywatch*,' David Hagar adds. 'That was the concept that grabbed NBC, and when we tried to drop it halfway through the first season NBC said that, if there were no music videos in the shows, they didn't want them. That's how important it became, and now it's carried over into the syndicated version and been copied by other shows.'

In fact, according to Cathy Dwyer-Hagar, the songs are picked based on the storylines, and sometimes the stories are even based on the songs. The first unit shooting for each show usually takes about five days, with another two afforded for second unit filming of the music video and water-related action sequences. From all of this, about 75% of the production dialogue is retained, which is good going considering the mainly outdoor locations. Nevertheless, given that there are 13 cast members, the remaining 25% still amounts to about ten hours of looping—quite a lot of work.

'For the past couple of years we've used NoNoise, and that's been a lifesaver for us,' says Cathy (with no pun intended). 'We can take scenes that we either used to have to loop or live with and NoNoise them, and I've really been surprised at how well that has worked. We use between three and five hours of NoNoise per episode, and I think the success associated with it has a lot to do with the technician operating it.'

'I mean, if the NoNoise works you're just amazed, because it will turn around a scene that you really couldn't hear before. You see, a lot of times we shoot inside towers, so we've got the ocean coming into the tower, the Pacific Coast Highway behind us, and it all kind of bounces around on three walls. Now, it's very hard to loop a dramatic or emotional scene, but we've taken some of those and, with the NoNoise, just made them wonderful. Sometimes if the NoNoise isn't good it sounds a little tinny, so often we'll do both—loop and use NoNoise—and then go with what sounds best.'

Actually, one of the advantages of working mainly outdoors is that there aren't a lot of creaking sets. At the same time, working on *Baywatch*, there aren't too many heavy costumes either, which is both a blessing and a potential curse. After all, where do you put the radio mics?

'It's a tough show to do, but our production sound mixer, Hal Whitby, is really exceptional,' says David Hagar. 'If you think about it, when all of the cast members are wearing bathing suits he's got to capture most of his sound with an overhead boom. On the other hand, while the lifeguard uniforms permit

miking on the body, the white noise from the ocean on one side and the PCH traffic on the other, together with someone speaking very softly, don't help to make his life any easier. It's therefore amazing what he does get.'

'Hal's a great guy,' adds Cathy. 'He's very untanned.'

'It's true,' says David. 'When you think about it, the crew spend the entire summer, ten to 14 hours a day, outside on the sand, so they look like a bunch of hippy surfers. They push a 50-foot crane around out there, and these guys are experts at getting the show done out there on the beach. They're on schedule every time.'

Their annual schedule amounts to 22 shows which are filmed from July through to the end of November.

'With his Nagra, Hal tends to record the dialogue pretty hot, and occasionally we have some distortion,' says Cathy. 'However, it's much better to loop some distortion every now and again or to live with it and still have more to work with.'

'At the same time, to save on overheads, almost everything that the second unit shoots is without sound. Sometimes these are huge scenes, with boats racing and various other types of action, and it's really amazing to see these come in silent. They once shot this 6-minute or 7-minute roller hockey sequence with no sound at all. It was incredible.'

'We have two sound supervisors, Mark and Bob, and they go through everything frame, by frame, by frame to make sure that we add all that we need to add in looping. I split up the shows between them, and in the past I've even used two separate studios; Sony for half of the shows and Modern Sound for the other half. The whole reason for this is that they want six days to re-edit the sound and prepare for the mix, and the longer that you go with that 6-day turnaround then the further it pushes your postproduction. Now, I've been asked over the years as to how we can deliver shows faster. We're a syndicated show and, unlike at a network, we get paid when we deliver. However, we certainly didn't want to turn things around in five days because then we'd end up with a show that doesn't sound so good.'

'So we decided to use the two separate facilities, and although I had to rush back and forth like a crazy person, mixing and looping, at each place that I went I had a person who was dedicated to the show and who wasn't rushed. This year we kept the whole thing here at Sony, but we've still got the two guys working separately on the show.'

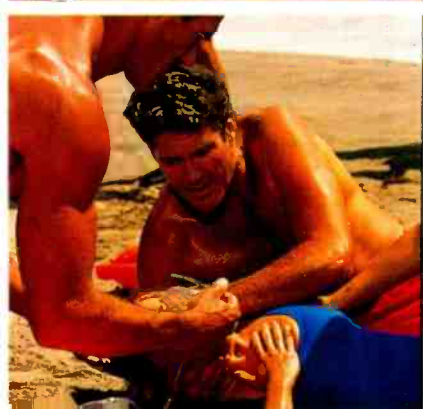
For between five to eight hours each week The *Baywatch* Production Company uses The Loop Group, comprising the services of six people who take care of much of the ADR. Then there is the looping trailer—an idea of Cathy's—which the *Baywatch* team pulls up into its studio parking lot so that, while the actors are on a break, they can do some on-the-spot dubbing.

'It's spectacular,' says David Hagar with regard to the trailer. 'You cannot tell the difference between what is done at the studio or in the parking lot.'

The trailer is generally utilised **page 70 >**

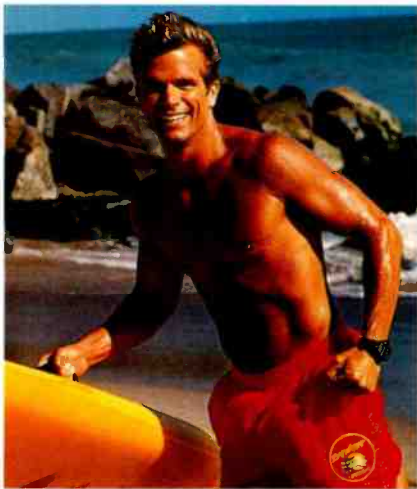


**Right: Cathy Dwyer-Hagar and David Hagar (centre) at the producers' console**



# Postproduction





< page 69 one day a week, while another day is allotted to The Loop Group whose six-strong team can't be fitted into said trailer.

'We have a flat rate that we pay for sound work and we never exceed that,' says Cathy. 'In that way we're able to make money. We loop hourly but we keep it within range, and the people have always come through for us. Every time we've delivered a sequence with no sound they've always made it sound great. I don't know how they do it but I've never been unhappy.'

As mentioned, the sound for *Baywatch* has been pretty much nailed down since the first season that it went into syndication. Aside from the advent of NoNoise the other major advancement has been with regard to the switch from analogue to digital.

'I love the ability to move effects and music cues faster,' says David Hagar. 'It's been marvellous for us.'

For the past 2 1/2 years the audio post work on *Baywatch* has taken place at Sony Studios, on the legendary Culver City lot that once belonged to MGM. Dubbing Stage 6 houses a Harrison MPC console with 76 inputs on the A side, 76 on the B side and 12 8-channel gain faders. For recording there are two 24-track Otari's, while for playback there's a pair of ATR 24s in addition to five DA-88s.

*Baywatch* is mixed in surround format, but it isn't mixed to Surround. Taking care of music in this regard is Tony D'Amico; John Taylor is the dialogue mixer; and Carlos de Larios 'He puts all of the loud noises in,' jokes Taylor.

'Obviously it's really great to have the automation,' says Cathy Hagar, 'but, having mixed on a whole bunch of different stages with lots of different consoles, we've found that what you end up with really has to do with the talent; the people you have working on the music and dialogue. We've mixed with two and three mixers—it was great when we worked with two, but it was a little more hectic. Nevertheless, we still got the show done and it still sounded great.

'We usually spend two days, or 18 hours, on the looping and ADR, and then we mix the show in one day, which is pretty unusual for an hour of action and adventure. The next day we do a temporary layback and take that to the executive producers who make some changes, and then a couple of days after that we usually do fixes for about two hours, and shortly afterwards we're out.

In all, it takes us four to six weeks from the time that we begin shooting until we online, and then it's another three weeks until deliv-

ery. Both processes could be shortened, but the four to six weeks until we online gives us time to look at the episodes, make adjustments and change scenes. So metimes we'll

even take a storyline out of one show and put it in another, so it really gives us time to tinker with it and make sure we're happy. Because the thing we don't want to do is spend money after the fact or spend money poorly.

'You hear about a lot of shows that start fooling around with onlines after they've onlined them, or they go to the mix and they decide they want to change a scene, but we don't do that. Once we online a show it's live.

It goes to sound, we spot it with the sound supervisor immediately the day after it onlines, we loop the very next week, we mix the week after that, and then I always allow myself six days from when I do the mix until I have to deliver the episode. A lot of shows mix an episode and satellite it out the next day, but I'd have a heart attack if I had to do that! When you do it faster I don't think you really gain anything in terms of creativity. Instead I think you lose in terms of creativity, because you don't have an opportunity to look at it with perspective.'

Going back to the looping, much of this is necessitated by the producers' philosophy of having water in nearly every shot. 'When you're on the beach you want to see water,' asserts David Hagar. 'Sometimes, as much as I yell and holler, they'll go right down to where the waves crash on the sands and do dialogue scenes. So, you can rest assured that pretty much every scene where the characters walk and talk down by the shoreline is looped.'

In terms of the Foley and effects, there are helicopters and boats, as well as plenty of running and heavy panting, and some extra sounds of the surf in order to help smooth out the dialogue.

'Basically, it's such a noisy show,' says Cathy. 'We've got music, we've got waves, we've got boats, we've got helicopters, we've got cars, and in the mix we really try to find what works and allow that to breathe for a moment. It's very tempting to bring everything up, but all of it together doesn't work. You really have to make some kind of choices all the way through, and you have a lot of choices because there's a lot of stuff.'

'The question that I always ask is, "Are there any backgrounds that we can lose?", and the answer is always "No, we want that". All of the people who work on the show really work hard, and I think they all want to hear their stuff. I mean, the music guys want to hear their music, the effects people want to hear their effects, and logistically it can be difficult sometimes giving everyone a moment in which to show what they've done.'

'So, you see, the sound on *Baywatch* is really a big deal. We're really conscientious about producing a good show without over-producing it. Especially when there are new cast members, what we don't want to do is reloop everything for the sake of performance. That doesn't make things a whole lot better. We want to give them an opportunity to grow and to only loop out of necessity.'

'Getting the actors to speak properly is the major objective,' adds David Hagar. 'David [Hasselhoff] is no problem, because he's professional and he cuts through, and he's a father-figure on the set, coaching the other cast members. Most of them learn something pretty quick: If you mumble you're going to find yourself in front of a screen with beeps. Well, they're not crazy on having to drive back and forth for the looping at the studio, so they learn to project a little differently.'

Talking of which, as we come to the end of our interview sitting in the Rita Hayworth restaurant on the Sony studio lot, who should walk up to our table but Pamela Anderson. A pleasant coincidence. There again, as she left the show at the end of last season I don't think it's fair to ask her about the sound... ■

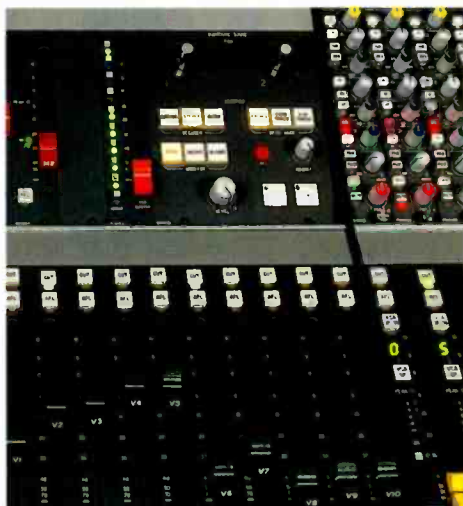
Left: At the console (left to right) Tony D'Amico, John Taylor and Carlos de Larios



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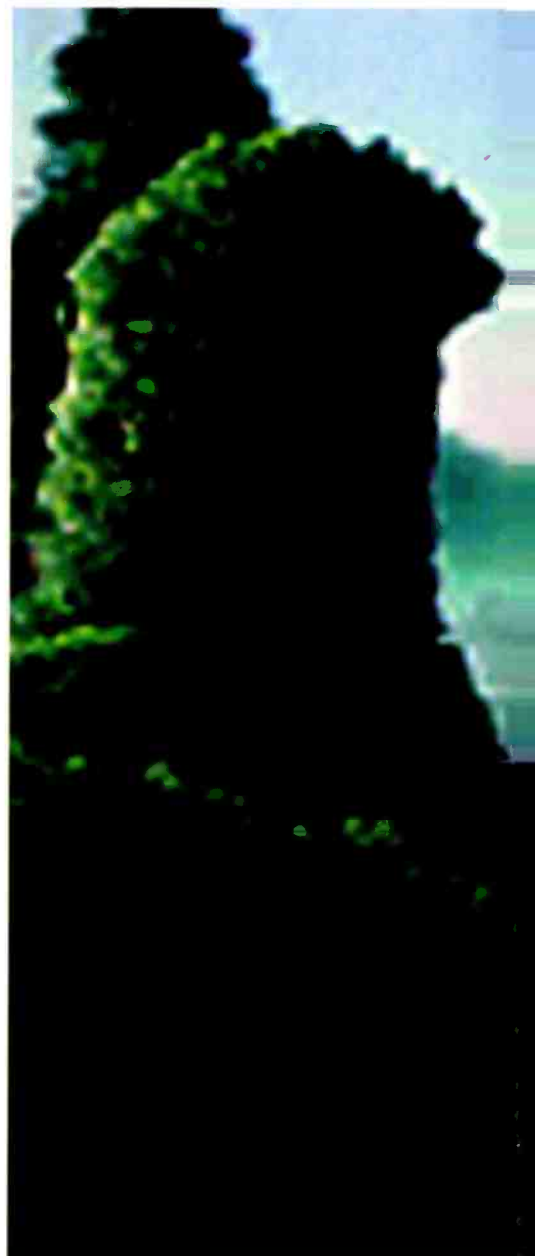
## Surround

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





Artists in order of appearance: Lou Reed ... Bono (U2) ... Skye (Morcheeba) ... David Bowie ... Suzanne Vega ... Elton John ... Boyzone ... Lesley Garrett ... Burning Spear ... Bono ... Thomas Allen ... Brodsky Quartet ... Heather Small (M People) ... Emmylou Harris ... Tammy Wynette ... Shane MacGowan ... Sheona White (BBC Young Musician of the Year) ... Dr John ... David Bowie ...



# Product perfect

It's being billed as the biggest recording session of '97: the BBC's remarkable and ambitious production of Lou Reed's 'Perfect Day'. **Kevin Hilton** sees the sights and hears the sounds of a galaxy of stars

**W**ITH A HUM and a whirr, an old-fashioned slide projector starts up, directing a beam of white light onto a screen. A transparency is slid into position and a picture of a garden, heavily stylised in greens and blues, comes into view. A close-up of this scene reveals a vaguely familiar figure dressed in a black leather jacket—gaunt and heavily shaded, it is Lou Reed, older certainly but still with the presence and cool of his hey-day. Impassively he croaks out the classic line: 'Just a perfect day/drink sangria in the park'. But before he can continue, in cuts U2 lead singer Bono with 'And then later when it gets dark', kicking off a procession of artists, both established and up-coming, from every conceivable musical genre, making for an eclectic and star-packed four minutes of music and images.

A cast that is unprecedented outside all-star charity records, makes this new video version of Reed's 1972 melancholy tale of snatched

moments of happiness remarkable. Not just remarkable for the list of talent appearing in it, but for how it was put together—logistically and technically—and for the fact that it is a promotional film for the BBC.

Over the past few years the UK public service broadcaster has run a series of promotions demonstrating how the way it is largely financed—through a licence fee paid by everyone owning a television set—is able to produce the kind of programming that the Corporation is famed for with its BBC1 and BBC2 TV channels and the five national radio networks.

These have covered the areas of documentary, radio drama, overseas sales of programmes and innovative comedy. In this, the BBC's 75th anniversary year, the focus turns to music and, specifically, the diversity of styles that can be heard and seen. Explaining the corporate strategy behind the film, BBC executive producer Steve Kelynack says. 'The idea was to communicate the concept of music for

everybody and allowing people to reflect on happy thoughts through music. The view of the director [Gregory Rood of the Paul Weiland Film Company] was that the video should be like someone looking back over their life and thinking of those perfect moments, the musical moments'.

Rood had the idea of using 'Perfect Day' and—in the spirit of the adage 'If you don't ask, they can't say no'—Lou Reed was approached to see if the song could be used for this purpose. Reed, who has had much of his success in the UK and recorded many of his albums in London (including *Transformer*, on which the original version of 'Perfect Day' appeared), agreed and gave the BBC the song and his blessing. 'He said that he believed in the principles of the BBC,' explains Kelynack, 'and liked the values and the lack of commercialism.'

From this starting point, Kelynack's in-house BBC team, its design agency Leagas Delaney, Rood and audio producers the Music



Robert Cray ... Huey (Fun Lovin' Criminals) ... Ian Broudie (Lightning Seeds) ... Gabrielle ... Evan Dando (Lemonheads) ... Emmylou Harris... Andrew Davis and the BBC Symphony Orchestra ... Courtney Pine ... Brett Anderson (Suede) ... Visual Ministry Choir ... Joan Armatrading ... Laurie Anderson ... Heather Small ... Tom Jones ... Heather Small ... Visual Ministry Choir ... Lou Reed



**The opening scenes of 'Perfect Day' define a new benchmark in music video production**

Sculptors began to put together the framework and the list of artists. In April this year the garden backgrounds were prepared, with the artists recorded and filmed over the period from June to August. Kelynack says that his role in the project was to make sure that it happened, that everything came together. 'After getting the agreement to go ahead in principle, we had to find the recording studios and make sure that we could do both the voice track and the filming at one session. You can't expect someone like David Bowie to come in twice, so we chose studios that it would be convenient for people to get to. They sang their line, or, in some cases, the whole song, and then they would move to another part of the building, where the film crew had created a small set, and mimed to the track they'd just recorded.'

The majority of these sessions took place in

London; 'Everybody comes to London sooner or later,' says Kelynack—but some schedules meant that certain artists, including Bono, Suzanne Vega and Lou Reed in New York, were recorded remotely. 'We knew the people we wanted to get and we couldn't wait forever,' Kelynack observes. For these US recordings, Kelynack assumed the role of music producer, although the Music Sculptors' overall vision had already been communicated to the artists by letter.

**T**HE MUSIC Sculptors are Mark Sayer Wade and Tolga Kashif, although Wade says that the umbrella name is used as the credit on 'Perfect Day' because the whole of their organisation was involved and played crucial parts in the production. The main engineer, Simon Hanhart, is acknowledged by Wade as being a third producer, while a large number of other engineers were used for the various individual sessions. The Music Sculptors were contracted for this project

partly due to their long-standing relationship with the BBC, having composed and produced music for a number of documentaries, dramas and promotional campaigns shown on the network.

'Neither Tolga or I had done much music production for several years,' admits Wade, 'but it was not our recording skills that were needed, it was our ability to liaise.'

Wade explains that 'Perfect Day' fits in with the bulk of the team's work, being sound-to-picture, while Kashif's orchestral arrangement experience was also seen as central to the production. Before recording began, the BBC presented the Music Sculptors with the list of artists, which the producers approved.

'There were certain people, like Elton, David Bowie and Tom Jones, who obviously had to be on the track to give it credibility,' says Wade. From this start, the BBC had then looked at the breadth of music that it transmits and picked performers who fitted into as many categories as possible: blues, **page 74 >**







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< page 74 while back-lit. The problem here was that the orchestra was not used to working with a click track, something that was crucial to the project if everything was to be kept to the same tempo. In the end Davis was fed the click through headphones, although Wade doubts whether the conductor was anymore used to working with time-code than his musicians.

Since 'Perfect Day' has appeared on BBC TV, usually as a precursor to music programmes or as a filler later in the schedules, many viewers and commentators have questioned the wisdom of a promotional film that

explains how the licence fee is spent, while that film ostensibly looks as though it took a huge amount of that money to make it. In this the BBC has been very careful to say that everything was done to strict budgets and at minimum rates. The artists each received a nominal fee of £250 (in the case of the Brodskies and the Choir, this covered all the members), while, given that they are BBC employees, the Symphony Orchestra made their contribution for free. Some newspapers in the UK quoted figures of £2m, to which Steve Kelynack replies, 'It would have been if everything had been on rate card.' Mark Sayer

Ward adds, 'If there was a big budget on this, I never saw it. Neither did anyone else on the music production team.'

A crucial part of keeping the costs down was in negotiating basic rates with the recording studios, which were still the most expensive component. Wade mentions in passing that he overheard some of the BBC production team calling studios and playing very hard in getting the lowest price possible for the sessions. The studios that survived this lesson in public service broadcast dealing were: CTS, Whitfield Street, The Church, Master Rock, Metropolis, The Townhouse, where the original final mix was produced, and Abbey Road, where the final final mix took place. The audio-to-picture dub was carried out at The Mill.

In an effort to keep within the tight budget, the majority of sessions were recorded onto time-coded DAT (although those coming from the US did not have a separate time-code track, instead having the performance on the right track and the click on the left). The only exceptions were Lou Reed's DA-88, an ADAT of the orchestra and a few analogue recordings, including those of Tom Jones, which broke the all-digital concept of the project.

'There was some analogue 24-track,' says Wade, who admits that it had been a long time since he had worked with this format. 'I'd forgotten about the bleed that you get with analogue tape, especially when someone sings as powerfully as Tom Jones does. It's like getting an extra echo.'

**F**ROM THESE various sources, the performances were loaded into a Macintosh computer running Logic Audio software, including the Factory tools facility, at the Music Sculptors' own two studio complex in the West End of London. With the amount of material that the producers had to work with, the Logic file took up a huge 1.7Gb of space. Mixes and settings were run on a Yamaha 02R digital console.

'All the putting together was done on the Logic,' says Wade, 'because we knew that we may need some time-stretching and shifting and we could go anywhere in the mix. Also, all the voices had to be treated in the studio, levelled and equalised to have consistency and make sure that all the words could be heard. The lyric is very important.' Wade adds that modern digital technology made everything happen. 'We probably could have done it using older techniques but it wouldn't have sounded as good. This is clear and concise. And the 02R was essential, it's worth its weight in gold because we really needed the total recall facility. It was a necessity, not a luxury.'

Using the Logic software, the Music Sculptors could easily move the various performances of certain lines around, deciding which they wanted to use. However, the very diversity of talent did pose some **page 78 >**



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< page 76 problems, in that, because of the message that the film was designed to deliver, different types of voices and styles of music had to be juxtaposed, rather than grouped in little stylistic ghettos.

Steve Kelynack comments, "We decided what makes a good film and initially gave the Music Sculptors a brief for the best music track possible. They came back with something very beautiful but because of the message of diversity that needed to be got across, having Boyzone next to Lesley Garrett was not going to be as beautiful as perhaps it could be. However, it does help communicate the sentimental message and it is more interesting."

Mark Sayer Ward acknowledges that incorporating such opera stars as Lesley Garrett and Thomas Allen was one of the toughest elements of the production. "It was the most challenging task, how to get the opera singers into the mix."

After the guest vocal and instrumental contributions had been treated and assembled, with extra care taken to ensure that the end of each line was clear before the next slotted in, a final version of the backing track was recorded. The majority of this was at Whitfield Street, with the main guitar parts laid down at the Townhouse. Aside from the backing musicians—Paul Cuddeford, Gary Liedeman, Mike Sturgis and Tolga Kashif—some of the star artists also contributed to the instrumental track. Tenor horn player Sheona White, who won the 1996 BBC Young Musician of the Year Award, plays one line, while

jazz saxophonist Courtney Pine improvised several sections, one of which became the middle eight.

"Courtney was at the first session, at the Church," says Wade, "and just blew over the track, giving us reams and reams."

In addition, Dr John played piano in the middle section, while Robert Cray plays guitar in the segment he appears in.

**T**HE COMPLETED track was laid back onto the original 3348, from which the final mixes were assembled. The master mix took place at Abbey Road Studio 3, with Simon Hanhart engineering at the SSL G-series console. Work on the mix for the final film took two days, while 'B-sides' for a proposed CD release (which is intended to coincide with the BBC's annual Children In Need charity event but is still waiting for final copyright clearance) took another two days. These are of an all-female version and an all-male version. In addition to the four-minute video version, which is getting a cinema distribution as well as TV exposure, there are a number of one minute edit cuts, intended to be slotted into short spaces but carry the same message.

With no sense of hyperbole, Wade says that 'Perfect Day' is probably the most involved recording project to take place this year. Despite all the logistical difficulties, he said that it had to work.

"There were times when we had doubts," he admits, "because of the availability or not of artists and the fact that we didn't have some of them for as long as we would have

liked. There was a question of some artists not being used but the BBC was insistent that all those shot had to be used."

Although the artists themselves pretty much directed their performances, Wade does not accept that he and his music production colleagues were merely acquisition technicians and editors.

"Any good producer surrounds themselves with very good people," he says, "and it is said that the very best producers have very big telephone books. But just having an artist onboard is not enough, you've got to steer the project. We had the vision of how we wanted the track to sound but didn't want it to get in the way of the artists. In that sense it was a very technical task but it had to have an artistic end. We also had to have respect for Lou Reed's original song and then follow Steve Kelynack's lead, based on the BBC's message."

Lou Reed has proclaimed himself satisfied with the finished product, saying, "I have never been more impressed with a performance of one of my songs. I would like to thank the BBC for making this Perfect Day' perfect."

More compelling is original co-producer David Bowie's reason for taking part in the project. With no identifiable irony he has said, "It's a way of saying thank you for the Flower Pot Men." It is interesting to consider that a black-and-white children's programme from the 1950s, centring on two belligerent puppets and their friend Little Weed, has inspired one of the Thin White Duke's better vocal performances of recent years. ■

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As you will no doubt be aware, the nature of most equaliser designs ensures that actually using equalisation in any creative, musical way will introduce significant amounts of phase shift and distortion, evident in the hard, edgy sound that accompanies an equalised signal. Because of this, engineers and producers are forced to use equalisation sparingly, no matter how much it is needed, in order to avoid the unwanted by-products that accompany the process.

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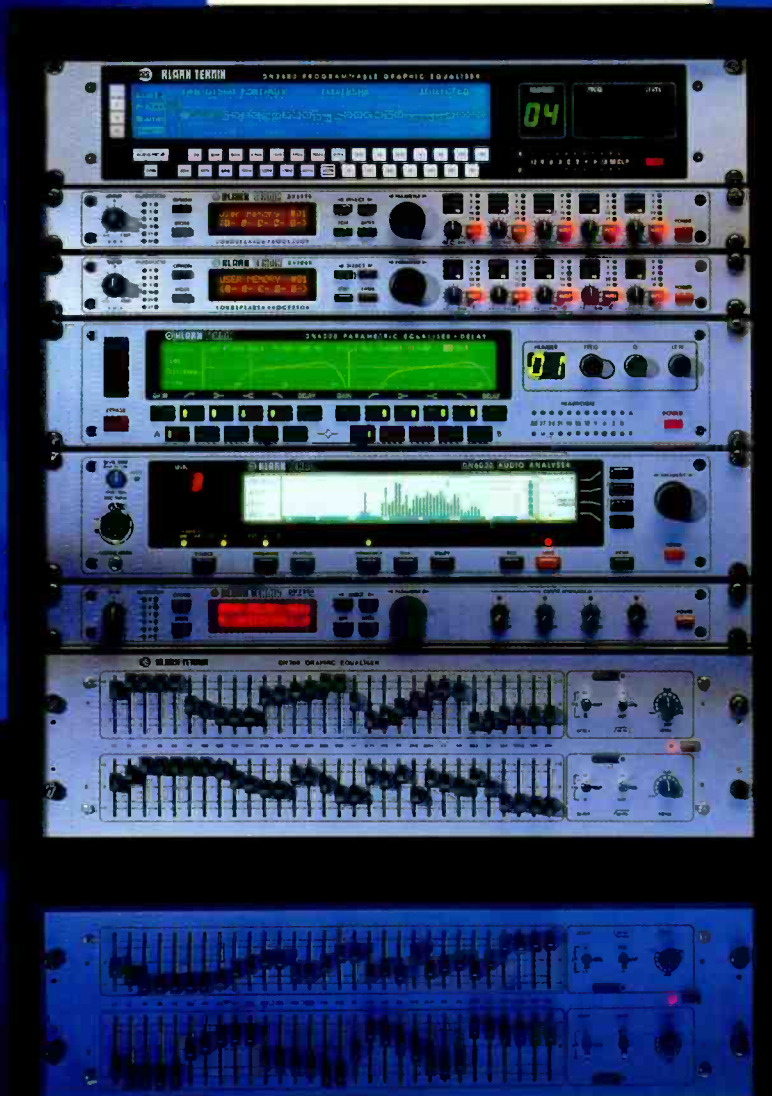
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# Sound Studio N

TECHNICAL



**D**ESPITE BEING BESIEGED by fans of the Kelly Family outside and overrun by the Kelly Family inside, Sound Studio N has managed the transition of installing Germany's first Sony Oxford console.

To those who do not know, the Kelly Family is particularly big in Europe with a member of the enormous and seemingly unfeasibly talented clan to suit all tastes and inclinations as they hang out an endless stream of emotion ridden hard-core MOR. That they chose to colonise Cologne's Sound Studio N for much of their latest project says much about the facility's stature in the recording community of the country. Studio N is right up there in the German superleague and it has a reputation for leading the way.

Built in to a former cinema from the 1920s, which curiously is positioned right in the middle of a quiet residential area that is currently groaning under the weight of the adolescent girl appreciation society of the younger Kelly boys, it's effectively a 5-room complex although the smallest of these is rented on a near-permanent basis to a production company.

The Oxford purchase occurred within months of the arrival of Germany's first SSL

With a reputation for both risk taking and success, Cologne's Sound Studio N offers a valuable indication of German studio development. **Zenon Schoepe** visits to check on the new Sony Oxford console

9000j-series in Studio A but then the studio has had a long association with the original Oxford-area brand and has filled its remaining rooms with a variety of SL4000 desks including a G Plus in Studio D. Studio N has a policy of not wasting anything and it has achieved expansion over the years by housing replaced desks in to new rooms or upgrading existing ones—which is how the G Plus formerly in Studio B, now home to the Oxford, got to Studio D. There's an old 4000E that has at one time or another held court in every room in the house.

A mastering suite running Sonic Solutions

was added a few years ago although premastering is performed in the control rooms on a floating Sonic system and this concept of sharing resources within the complex is taken to the natural conclusion of a central machine room. Actually it's more of a machine corridor that presents an impressive display of all the formats you could want including 2-inches, 48-track DASH and no less than three ProDigi machines (two Otaris, one Mitsubishi). Sharing is extended to the live areas with the assurance that every room can connect with any other and this has proved useful particularly with the regard to the complex's main 60-musician live area which is about the only place that reminds you of the building's cinema origins.

**H**OWEVER, the biggest shared resource according to chief engineer Gunther Kasper is three Fairlight MFX3s that were bought originally to perform the role that a RADAR system now does as a chasing slave. Now they are central to the track management and manipulation needs of the rooms. The Fairlight and 48-track DASH combination is described as a wonderful joining of complementary technologies.

You can arrange, create page 82 >



# SCHOEPS

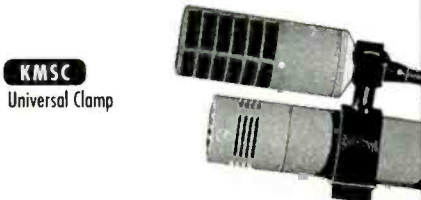
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< page 83 sounds, move things around and try things—and what is music recording anyway? It is about trying things,' enthuses owner Georgi Nedeltshev. 'We now couldn't work without them. The step up to 24-bit will be the next achievement.'

Acoustics and design are predominantly of an in-house design although Nedeltshev has been working with the input of Neil Grant for some 15 years and it was Grant who came in to put together the 'Oxford blue' new digital room Studio B. Coastal Acoustics Boxer monitors are piped in only a few rooms by Genelecs.

**S**OUND STUDIO N specialises in not specialising and is as happy to do classical recordings as it is handling rock, a bit of Stockhausen or even, for that matter, the Kelly Family. The reason is simple in that Germany has no one single style market

strong enough to support a place like Studio N on its own.

While the function of the building as a studio can be traced back to 1958, when what was to become BMG made recordings there, Nedeltshev bought the site in 1973 and unleashed his passion for planning, building and then building some more studios.

'I liked the idea of having a studio complex in what I thought was an enormous building at the time even though we're now short of space,' HE remembers. 'It was a fortunate decision; if you want to stay in this business then there are two extremes that work—doing the work all by yourself as the big man or putting together a complex with a good team. I know that I couldn't even attempt this if I was starting now, we are the only private stu-

**Nedeltshev (below centre) with 9000j:**  
'You have to put yourself under pressure'



## Tape wars

CHIEF ENGINEER Gunther Kasper (above right) bemoans the enormous selection of mics, mic preamps and recording media that now have to be put on the menu in order to entice the best from a voice—adding dryly that 20 years ago you used your best mic, the console and you recorded with them. 'You were worried about the music and not a 1/4dB here or there,' he says.

Studio N is always improving itself and and Kasper says that he's been at the studio for 25 years and that there has always been building work going on—he laughs that it has never been, and will never be, finished.

One of the historical characteristics of the place is that it has always liked to be first with technology and this stretched to the purchase of a prototype 32-track ProDigi Mitsubishi. Why the risk taking?

'It's something of a studio philosophy, perhaps the only way we can see to survive in this business is to take risks,' replies Kasper. 'It has to be said that we have a good nose

for what we choose. We did the first recording on the Mitsubishi here and it was a good sounding machine and it's still running. That was our first experience with digital and you could cut edit it just like analogue. A couple of weeks ago we had a call to do a copy of a ProDigi tape that we did more than ten years ago and it was still perfect.'

Studio N investigated DASH early on and Kasper admits that they were substantially less impressed by it compared to ProDigi.

'It is a very robust format and you can redeem things in ProDigi that would be lost forever on DASH. We were the first people in the world to change heads on a Mitsubishi,' he continues. 'We were told that we'd have to ship the machine to Japan for the head change but said that would be impossible because we were working with the machine at the time. They then said they would come to us but that it would take two or three days to do, we told them they had an afternoon and in the end they did it in 20 minutes, checked it out and it was perfect.'

They also run two Otari machine ProDigi variants—the DTR900II was undoubtedly the



dio in Germany that works at this high level.'

The original strong selling point was Studio N's ability to handle orchestral sessions and the first studio was quickly complemented by another small one that could earn its keep dealing with the overcapacity of the big room. That principle persists and the complex grew guided by the underlying intent that it should always try and better itself.

'If you stay on track with your original idea and react when ever you think the time is right—every time you can foresee an evolution or revolution—the you're doing your best,' says its owner. 'Studio N doesn't just survive it

goes forward. Every three or five years you have to reassess the situation because even a really good studio is an old one after five years. You have to update and you have to invest. On one occasion I once waited a few years too long—my first big console was an API and after five years it wasn't big enough and many studios were turning to MCI and I ended up keeping the API for almost nine years. That was a mistake and eventually I ended up buying an SSL and a Mitsubishi

MX800 and started to think about the business professionally.

'You have to put yourself under pressure,'

he continues. 'You buy what you think is the next technology and like all the people in this business my clients love new things and they expect them. But you have to do things correctly and what a lot of people overlook is that when you change to, say, a high end digital recorder you really have to be looking at changing your monitoring, the acoustics and many other things in the chain.'

One of Nedeltshev's policies is that the studio is a place to work and not a playground or meeting place for the fabulous and influential. Similarly he believes the year-long block booking is the kiss of death.

'There's no accommodation here, no kitchen, the client comes to work and then the next one arrives. The message is clear that we can work fast and to a high standard but the studio is too expensive to stay longer than you need to. We want our clients to survive so they can come back again and **page 84 >**



**'If you stay on track with your original idea and react when ever you think the time is right—every time you can foresee an evolution or revolution—the you're doing your best'**



finest hour of the format—and held out against DASH for some time until they bought a Studer 48-track three years ago. However, Kasper says that they are now working less and less with tape and more with the Fairlight.

'The first session we did with DASH we ran out of tracks and ended up slaving two ProDigi machines and they were so slow that we almost died waiting for them to lock. We bought the Studer because of the better sound performance compared with the Sony although Sony now has a switch on its machine that allows you to select an approximation of the Studer filter characteristic.'

Interestingly Kasper has also had experience with the early 3M multitrack machine which he describes as fixable with a Swiss Army knife and very dependable.

'You could always depend on a batch of transistors blowing up at 1 o'clock at night. I would phone up the maintenance engineer and he would tell me how to use my Swiss Army knife to open the machine and repair it.'

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< page 83 that then is our success. That also means that the client is free to move to other studios which I'm happy about because it means that when they come to us it's because they want to be here and that the results are good and not because we have a particular machine."

It's a good attitude but the installation of the Oxford currently does give them that 'particular machine' in Germany. He agrees but points out that a similar situation occurred when Studio N bought its first API and its first SSL. These he says were decisions that paid off in the long run and any original uniqueness was quickly followed by many more similar desks in the country. More Oxfords also wouldn't be a bad idea for market awareness and Nedeltshev estimates that perhaps ten will find their way into the country in the next three years.

"The Oxford is like a Porsche—you have to love it—but it's still a very easy decision. All you have to do is find the money," he laughs. "If you're spending 1 million, 800,000 or 1.1 million it doesn't really matter because whichever way you look at it you're still spending a

lot of money.

"But what else would you buy? I came to the conclusion that digital desks were ready. In honesty I never thought I would be buying a Sony desk but after playing with it I was convinced. I don't consider it to be any sort of risk because it's the type of thing I've done many times before. Of course I thought about buying another analogue desk but it didn't really make the blood run through my veins."

**"In honesty I never thought I would be buying a Sony desk but after playing with it I was convinced. I don't consider it to be any sort of risk because it's the type of thing I've done many times before. Of course I thought about buying another analogue desk but it didn't really make the blood run through my veins"**

A big consideration on a new concept desk like the Oxford is that the acceptance of the desk by engineers and producers is essential if confidence is to be built in the product. To this end Nedeltshev says that the reaction of producers and engineers to the board has to be seen to be believed and says it's good for business to have some excitement and enthusiasm back.

"The long term problem is how to get the money back from the console because studio rates in Germany have gone down and we can't get DM 500 per hour for the Oxford or the 9000j. But they'll pay DM300," he says adding that it's a reality of working in the business. It's a similar scenario to the studio's experimentation with higher bit rates and sampling frequencies—a Sony 3348 HR is on order—even though none of his clients are asking for higher resolution audio. He believes it is the responsibility of studios to investigate these sorts of avenue, to draw conclusions and then present them to their clients.

And how reliable has the console been in the first eight weeks of full-blown use? "Totally reliable and I was sure that we would be in for big trouble," Nedeltshev replies. "Mind you, we've bought a full production console; Guillaume Tell bought their desk almost two years ago and I would say that that was risky. If I'm honest, Sony has never been the right sort of company for me in the past but I don't really think of the desk as a Sony."

"I feel very comfortable about my choice, yet three years ago I was finding it very hard to decide which way we should go," he says. "I never felt this confident before and that's down to how easy it is to work with the new console. I can concentrate on other things, the creativity, things that are much more important than the type of desk you're using. That communicates to your clients."

"I don't think it was a good decision I think it was a great decision," he says. ■

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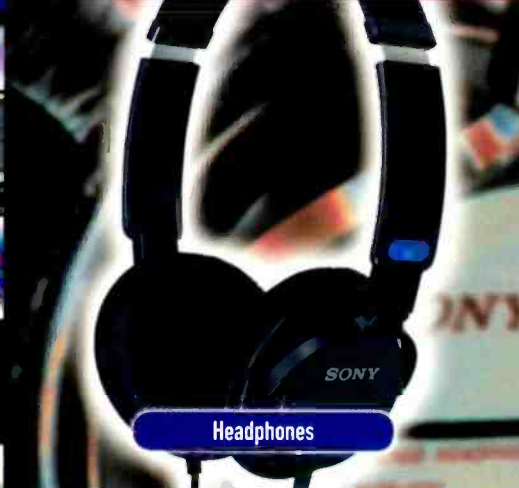
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**E**C=EC IS AN EQUATION you'd be hard pushed to fault. So distinctive is Eric Clapton's playing, you can tell his touch whether the guitar in his hands is a Fender Strat or a Martin acoustic. But what is the sum of EC + Pro Tools 4? It seems we're all about to find out.

A year in the making and set for December release, Eric Clapton's latest album looks like another milestone in the artist's career. Arguably his most diverse offering to date, the as-yet unnamed album blends Clapton's blues-tinged guitar and voice with orchestra, band and even the occasional hard-core looped groove. At the time of writing, the track selection had yet to be finalised and the material was tightly under wraps but the inside story is that this album could contain some of the best performances the man has ever recorded.

The project also contrasts with Clapton's more recent recordings in that virtually all the material is self-penned, or co-written with producer Simon Climie. By all accounts, it was a spot of song writing in Climie's studio that introduced Clapton to the joys of nonlinear recording.

'Because we weren't in an album situation, we were doing a lot of guitars direct to Pro Tools. Climie explains. 'We were able to do things like take a guitar loop. If he'd played something really brilliant, we could loop it and a few minutes later he could be playing to that loop. I think he really enjoyed doing that. So that led to us trying it on a few tracks on the album and pretty much the whole album has now been done like that.'

Climie is an experienced Pro Tools operator and a musician as well as a producer, songwriter and programmer, which gives him a pretty broad perspective on the process of making music.

'The thing is, I've done a lot of live stuff as well,' he muses, 'I'm in the middle. I like to write a song as a song but sometimes a song comes out of a piece of music, so any way it can happen. Either he may write something on the guitar—or anyone else might—and then you turn it into something. I've been in music for quite a while and I still like a lot of live music but I also appreciate what's going on the drums, programming and loops. All the other things that have come in are basically like colours in a palette that can make your painting with.'

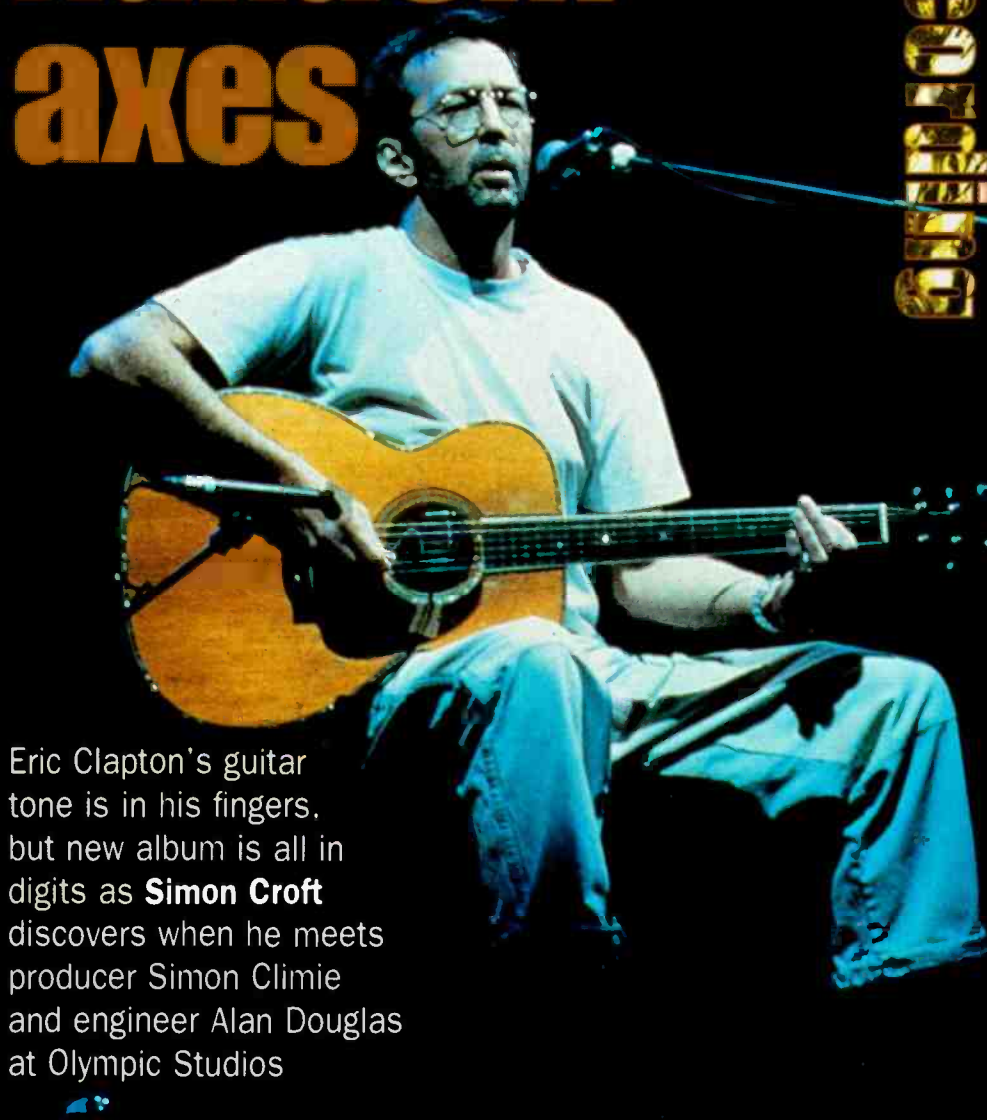
That palette for the album included the superb acoustics of Olympic's Studio One, designed by Sam Toyashima, its sonically superior SSL SL9000j-series console and Sony 48-track DASH recorder, as well as nonlinear and MIDI-based technology. In many ways, it was the best of all worlds.

'We're not going "here's a techno album". It's nothing to do with that really,' Climie emphasises. 'It's really making full use of all the available technology to get the music as good as it can possibly be. The Sony is obviously great for recording but in terms of editing, it's almost more like working on a film now because you can record everything and then re-edit it. Pro Tools 4 in particular gives you that facility.'

Recording engineer Alan Douglas agrees that the combination of tape and nonlinear multitrack has been productive. 'Eric has explored every avenue there is to explore in

Studio Sound October 1997

# Random axes



Eric Clapton's guitar tone is in his fingers, but new album is all in digits as **Simon Croft** discovers when he meets producer Simon Climie and engineer Alan Douglas at Olympic Studios

this record, with ways of recording, ways of dealing with those recordings, rearranging things... We worked 48-track digital from day one, which has made transfers really easy. You don't have to worry about A-Ds or level changes, so it's made it incredibly simple to do anything at any time,' Douglas reckons.

The setup at Olympic accommodates almost any way of working but it is this free-flowing approach that contrasts so markedly with the way many albums are made. Climie, who has been based at Olympic for some years, has a room right next to Studio One, so there was no need to schedule X number of months in programming, followed by Y number of months in 'the studio'.

'Music doesn't happen like that,' Climie asserts. 'You're working on something and you suddenly decide "this would be brilliant if this sample was moved into here" and stuff like that. So to run the rooms simultaneously is a very effective way of doing it'.

In order for this to work in practice, Studio One and Climie's room are both equipped with Pro Tools systems.

Climie explains in more detail: 'I've got a

32-track Pro Tools system in the main room when we are recording, so we can do multi-track offsets. A few times on Eric's album, we've worked on a track which has come from a groove and he'll get an idea, "Wouldn't it be great if...". The whole Sony 48 track gets digitally transferred onto Pro Tools via a UFC-24. That will transfer 24 tracks at a time, digitally. In two passes, you've got the whole multitrack in there.'

**O**NCE THE audio is in Pro Tools, Climie has all the power of nonlinear working. Transferring the files to the system in his own room is simply a question of copying them onto a Jaz disc and taking next door.

'It might be that we are in the big room overdubbing drums and guitars, while a drum programmer such as Paul Waller, who I use a lot, might go in my room and try some alternative loops against what we've got there already,' says Climie. 'You can do it as almost a research and development thing—you've always got something going on. To be honest it doesn't always work but you don't have the whole band sitting around while **page 89 >**



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Olympic's Studio One, home to most of Eric Clapton's latest recording

< page 87 you're finding out. In a few hours time you might suddenly have something really inspiring to work with.'

'We're not limited in any way,' says Douglas. 'We can get any guitar sound we want and then do anything we want with it in Pro Tools. We couldn't have made this record analogue. It would be impossible. You would be so many generations down. What it's given Eric is the ability to explore the songs in every sense. So it's been a really valuable tool in that respect. But this album could only have been made in a big studio with Pro Tools.'

'All of this is a slave to the music, it's not the other way round,' says Climie of the combination. 'But it's made it possible to do things that would barely have been imaginable. It's also very creative. For instance, on this album, you're maybe listening to some guitar overdubs and think, it would be great if that guitar faded out and another one came in. Well I can draw those fades into Pro Tools, so it's playing them back without having to automate a mix—I can premix as I go.'

'A sensitive musician will play to the surroundings. You're building a picture right from the beginning, rather than throwing a load of things on tape and trying to sort them out afterwards.'

The Pro Tools 4 system in Climie's room runs on an Apple 9600 with a 9Gb Tomahawk hard drive. It is about to be upgraded to 24 track and is packed with productivity enhancing functions (see *Edited highlights*, page 92). But there is more to the room than editing and programming. For one thing, it has its own overdub booth.

'In this room here I could have a backing track and decide to do some vocals, so we just go straight into record, straight to disk,' Climie reveals. 'I'm fully confident in doing that now, where I probably wouldn't have been in the past. We could make a whole record on it and I know some people do. The only limitation really is the amount of disk space you've got.'

Even geographical location is no longer a problem as the room is equipped with ISDN. Mick Guzauski has been mixing some of the tracks in New York and then link-

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Engineer Alan Douglas—a recent 24-96 convert

< page 89 ing his desk direct to Climie's room for approval on the results.

'It's unbelievable and the quality is astonishing. It's as good as MiniDisc for listening. He could send us the DAT by Fed-Ex, which would arrive a day or two later, by which time he could be in the middle of another record. So if you ever have a mix like that going on—and you need another opinion—this is the way to do it,' says Climie.

'Mick is also a Pro Tools man which is quite fun because when he came over here we were able to compare notes,' Climie remembers, relating a story about Guzauski's innovative use of computer technology. 'He did Michael Jackson's *Blood on the Dance Floor*. He was in Switzerland, recorded it and decided he'd rather mix it at his home studio.'

**R**ATHER THAN go through the time-consuming hassle of getting the multitrack masters back to the US, Guzauski downloaded from the Pro Tools system to CD-ROM, took the silver disc home, loaded into his own system and created the released mix. Climie points out that the process could work with US artists mixed at Olympic.

'The idea is that this is the ultimate bedroom studio in here, taken to a sci-fi degree. Next door, we've got the ultimate recording studio really. The room in Studio One is exceptional for any kind of live recording. You can put a full band in or an orchestra but it's not so big that it's ridiculous. It's very controllable acoustically and there are different areas you can use to get more intimate sounds,' Climie considers.

Olympic has three main studios, two of which have a significant live area. The third is the almost permanent home of remix engineer Spike Drake (see *Studio Sound*, July 1996) and there is also an extensive programming room in the basement.

Alan Douglas was Olympic's chief engineer for 'more years than I care to remember', although he is now freelance. It was in the former role that he went to Japan and evaluated the work of studio designer Sam Toyashima.

The designer's hand is immediately apparent in Studio One, which features his trademark revolving panels with an absorber on one side

Studio Sound October 1997

and a cylindrical wooden face on the other.

'He had a similar thing in the JVC classical studios but they were enormous,' Douglas recalls. 'They were about a metre-and-a-half across. There were four of them at the end of the studio. On that scale, you turned them round and there was a radical change in the sound of the room.'

The arrangement in Studio One is more modestly proportioned but the baffles in the ceiling can also be raised and lowered to change the characteristic of the sound. 'The thing about the baffles in the ceiling that come down is that it produces a less pure, dirty sound,' Douglas reveals. 'You get more early reflections. It doesn't change the RT of the room but it changes the colour.'

Since Toyashima's designs were implemented, more than a decade ago, very little has been altered beyond cosmetic refurbishment to the cloth. 'I think it's a testimony to the studio that 11 years down the line, it's

pretty state of the art,' Douglas considers.

Working with Eric Clapton has been keeping Alan Douglas pretty busy: 'To be perfectly honest, since we started this just over a year ago, I've recorded a Will Dowling single, done some string sessions for people and I've mixed an album by a Swedish girl called Camilla. That's it really. Otherwise it's been Eric, Eric and more Eric.'

Douglas likes to 'keep his hand in' with string sessions, because they offer limited scope for a second shot at the recording. 'I do quite a lot of string sessions, which is funny because when I started the string sessions were always done by the old guys. I suppose that makes me "the old guy".'

Unlike some engineers of his generation, Douglas has kept pace with contemporary recording techniques and technology. 'Pro Tools is fantastic. It's also great for studio owners because you spend a lot more time that you would otherwise,' he says page 93 >

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Clapton—it's in the fingers

< page 91 with a certain amount of relish. He is also a convert to 96kHz, 24-bit recording, for which the Clapton sessions have been using a Genex M-O recorder with dCS converters.

"A-B testing it against DAT, you would never master to DAT again," Douglas cautions. "The difference is just frightening. I'm never going to use DAT to master ever again. I think 24-bit/96kHz sounds as good as half-inch—but without the anomaly of the bottom end. I'm absolutely convinced by it."

Right now, the master will still end up on a 16-bit, 44.1kHz CD but Douglas believes there is an element of future-proofing the recordings. Not a bad move when you consider the state of some of the analogue material which was subsequently transferred to CD.

"The problem we face at the moment is that there is nowhere to go with the format but my thinking is that if a 24-bit/96kHz format is ratified for DVD, it's there and waiting to go," he confirms.

On the other hand, Douglas is not sold on new technology just for the sake of it. Although he can see that digital desks will come of age, he says, "I'm not really convinced that we're there yet." He adds, "If you're talking about 16-bit recording, then the SSL 9000j is probably as quiet as any currently available digital desk. Sonically, it's really transparent. If you swop studios and put the digital multitrack through it, it's like, "Wow, that's how it's supposed to sound!"

"The only thing I think digital and assignable designs have is the ability to instantly reset all the controls. That would save so much time. I also like the idea that you can tailor a desk to a particular session."

On Eric Clapton's sessions, traditional recording values were certainly not abandoned and Douglas points out that Olympic carries Neve and Summit valve preamps, Pultecs and other classic outboard for their distinctive sound.

Out on the studio floor, sit the tanned frames of Tolex-clad guitar combos and tucked away in a rack are some of EC's favourite guitars. Things might have changed since John Mayall was calling the shots but no-one can accuse Climie of throwing the baby out with the bath water.

"Great guitars, great amps but the thing is, it's all in the fingers," says Climie, who for

some reason hasn't touched a guitar in the last 12 months or so. "The times we've plugged things in which we didn't think would work and they've sounded amazing. It's just astonishing what you can do when you're a virtuoso musician," he adds with a certain, justifiable awe.

"Eric's got such a strong musical personality, whatever genre he goes into and the beauty of it is, over the years he has risen to different challenges. Working with Baby Face on *Change the World* was probably not what some other people would have done. Doing the Unplugged album. Whatever he does, he does brilliantly," says Climie. "He's singing and playing brilliantly within it and I think people will love it. Ultimately, the strength of the material is what will carry it through."

Even the 'old guy' continues to be impressed. "He's written 99% of the material, which he hasn't done for a long time," considers Douglas. "His singing is fantastic, the

best he's ever sung. So much attention has been paid to every detail, he had to sing out of his skin because everything else is notched up a level.

"Of course, he's an outstanding guitarist," Douglas concludes. "It's still a great buzz to sit in the control room when he takes a solo. It's like a master class."

## Edited highlights

**S**IMON CLIMIE'S first introductions to recording technology were the analogue Fostex A8 and B16 recorders he used during his days as half of Climie Fisher. Although the recorders were valuable tools for songwriting, Climie found himself frustrated by the demo-master division that forced artists to recreate their initial idea in a commercial studio.

An experienced musician and songwriter, Climie is now an experienced **page 95 >**

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Producer Simon Climie—digital audio is going into a world of its own

< page 93 Digidesign user. He describes the PCI based Pro Tools 4 as 'astonishingly faster' than earlier releases and is particularly appreciative that the waveform and time manipulation capabilities of Sound Designer are now integral to Pro Tools. Climie says there are 'millions of things' he likes about Pro Tools but picks out one that is really simple as a particular favourite.

'You can zoom in on any track,' he enthuses. 'Let's say you are monitoring 48 tracks and you want to edit the vocal. You can keep all the other tracks small and then zoom in on at jumbo size. Before, you used to have everything at that size, which meant scrolling through for ages just to get to where you want.'

'The mixer is much more like a real mixer,' is the next point to gain the Climie seal of approval. 'They've added Autotouch automation which is absolutely brilliant. You can set defaults for the faders to run back to where they were. As soon as you touch the fader it starts to record what you're doing and then you let go and it smoothly catches up to where it was.'

Climie also makes use of the Copy function to ensure that he can still go back to the previous version of a group of tracks if further edits don't work out. In general, he finds the ability to group faders while mixing and tracks while editing 'phenomenally useful'.

In common with Spike Drake, another producer almost permanently based at Olympic, Climie is a big fan of plug-ins, of which he says, 'This is where digital audio is going into a world of its own.'

Climie has a stack of Plug-ins on his Pro Tools including Reverb and Chorus from tc electronic, D2 equaliser from Focusrite and Digidesign's own D-Verb. One aspect that appeals greatly to him is the dynamic automation. He points out that by automating an equaliser, you can notch a frequency at a specific point in time, removing unwanted peaks or vocal sibilances without altering the rest of the track: 'That's just problem solving, you can also do much more creative things. If you had a synth bass played on a Super Jupiter, you could start messing about with the sound as it goes. But you could never do that with real sounds on tape—but now you can. Sci-Fi is a plug-in that can do ring modulation, resonate, the most bizarre things. If you were doing a

remix you could take a guitar or anything that's "real" and start doing things you could only do on an analogue synthesiser before.'

**T**HEN THERE is the power to use the same processor more than once on the same mix. 'Suppose I had Focusrite Red,' says Climie. 'It would be a case of "I've used it on the bass so I can't use it on anything else", whereas if I've got enough DSP Farm power in here, I can use that plug-in again and again, doing different things.'

'There are quite a few mixers I know who are now getting simple Pro Tools systems. They don't do as much editing and recording as me but they use one of these (I-O boxes) so they've got eight ins and outs and a DSP Farm, so they can run the system as automated effects machines.'

It has to be said that Digidesign's plug-ins system makes additional processing very affordable but does the quality really compete with the outboard it emulates?

'The tc Reverb sounds fantastic,' says Climie. 'Not only can you hear it, you can very easily choose large halls, tunnels... You can see the characteristics. When you are working at the computer instead of being away at the other side of the room, you can see and hear at the same time.'


With its pictorial representations of the acoustic spaces and on-screen controls, the Reverb and other plug-ins seem easy enough to use.

'I've got to be honest,' Climie adds. 'Most of the time with these things I never read the manuals, I just play until I find something I like and then I record it. What's great about this is that you can automate them and then bounce what you like to another track, and then use the same effect for something else.' ■



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## US: Multichannel madness

Multichannel work may give a recording studio an 'in' as well as giving traditional post houses a breather writes **Dan Daley**

**F**EVER WONDERED WHO put the fins on a Cadillac? I don't cover the automotive business so I don't know for sure, but I'd guess it was some guy at General Motors in Detroit back around 1952 who was bored silly one afternoon in his office. But thank God he did—Elvis needed them.

But fins on a Cadillac is an apt metaphor for what's coming down the line in our business. What the fins did in, say, 1955, was to make a perfectly good 1954 Cadillac look dowdy. The salesmanship was clear and unabashed: you were supposed to want the fins, not the car. And it worked. Now recording studios in the US are gearing up with a combination of anticipation and trepidation for what may turn out to be the greatest audio marketing move since the CD itself, or what may turn out to be the biggest orphan since Quad: multichannel audio.

Multichannel sound has proven itself in the cinema. When Hollywood had pretty much shot its wad on visual special effects, it turned to sound to add another of bombast to its productions, and it worked. Surround audio is standard-issue on any blockbuster film these days and while the number of channels seems

to be topping out at around seven, what Hollywood can't physically exceed it will surpass aurally—Try *Batman Forever* mixed at 112dB. Thus, surround audio was a Hollywood phenomenon for most of its existence.

But the advent of DVD has made putting the massive amounts of data needed to store 4-channel, 5-channel and 6-channel mixes onto one disc possible. However, the record industry isn't waiting for that, or for the base of home theatre owners to increase. There are several small companies out there specialising in multichannel music mixes on Red Book CD using one of a growing number of data compression schemes available. Dolby's supremacy is being challenged by upstart DTS, which has been licensing masters of classic records and pairing them with their original engineers and/or producers in some cases and issuing versions remixed in 5.1 audio.

At a time when US record buying is down—prerecorded CD sales were off by over 7% as of mid-year—novelty has enhanced allure to record companies and anyone in the entertainment industry. While no one reasonably expects the world to rush out and repurchase

its entire collection in multichannel sound the way they replaced vinyl with CDs, it's not unreasonable to hope that multichannel records will give new bands the hook they need to be noticed in a very crowded independent record market, and that it could also reinvigorate old and new recordings by established artists. The data compression issue is no longer the bogeyman it once was when formats like Sony's MiniDisc were first floated; compression has become a fact of life in most sectors of the pro-audio industry in the wake of digital audio. The battle now is still over numbers—some compression scheme marketers trumpeting their lower ratios versus their competitors' higher ones. But as with what happened with CDs recently, I suspect that at some point people will realise that the numbers don't tell it all and then more arcane debates and comparisons of various compression programs will blossom. Once that happens, reality is going to be pretty hard to ascertain and we'll be left with the same subjective arguments that we have in the analogue-versus-digital debate. Assuming all that, and assuming the groundswell among record companies continues to grow, what does all this mean for recording studios?

At a time when profit margins are thinner than ever in the States, and the pressure persists for commercial facilities to differentiate themselves from personal studios and each other via leading-edge (and very expensive) equipment, it probably means another technological arms race for those who choose to

## Europe: DVD courts disaster

Far from finding reconciliation, the conflicting regional requirements for DVD's audio are drifting apart writes **Barry Fox**

**B**ERLIN'S IFA, the Internationale Funkausstellung, dates back to the 1920s. Then it was just a radio show, now it covers all areas of consumer electronics.

This year's IFA—held at the beginning of September—had been earmarked for the grand launch of DVD in Europe, with the first PAL software. But the plan was stalled by a muddle over multichannel sound, with Philips holding out for the European system called MPEG2, while Panasonic launched PAL players which can connect only to a Dolby Digital AC-3 decoder, along with discs (*Twelve Monkeys*, *Queen Flix*) with AC-3 multichannel. Audio-only multichannel discs from Delos and Denon are AC-3.

Thomson sells the Panasonic AC-3 player in Europe, and Samsung has announced its own AC-3 model, along with AC-3 discs. Even before IFA, Philips, Panasonic and Sony were hedging bets with the promise of players with dual-standard multichannel surround decoders on board.

A few days before the show opened, Warner and Philips brokered a deal to use MPEG2 sound in Europe. One good reason is that it reinforces the Regional Coding system that seeks to stop people in Europe playing

American discs. This deal was made public at IFA, with the new promise of a consolidated DVD launch in Europe with MPEG2, some time in Spring 1998. Completely misjudging the mood, Warner arranged a press conference which clashed with other previously scheduled events and then let 14 speakers bore the pants off busy journalists who had broken other appointments to hear the MPEG news. The speakers spoke for over an hour-and-a-half without ever mentioning MPEG or AC-3.

When they were finally thrown open to questioning, Warner's Warren Lieberfarb pleaded that there was no time left for questions. But we persisted and like blood from a stone, squeezed out the key commitment to launch DVD in Europe with MPEG2 soundtracks.

But will the commitment stick?

Joe Tsujimoto, President of Panasonic in Germany, quite literally fled the room before anyone had the chance to ask where the

software industry's pledge to use MPEG2 left Europeans who have bought Panasonic's AC-3 player.

Within hours, Ray Dolby was saying that he was 'convinced and confident' that the Dolby Digital AC-3 system would eventually become the *de facto* standard for PAL, as well as NTSC. Dolby's engineers were soon reminding that the PAL disc could carry two soundtracks, one in MPEG2 and one in AC-3, and each gobbling 384kbits/second. Some DVD discs in North America already have two separate AC-3 tracks in English and French (for Canada).

Ray Dolby's view is that the cinema industry will eventually shake down to a single standard, with Universal's DTS and Sony's SDDS fading away, while the DVD system shakes down to AC-3.

'It has all happened before,' he said, reminding of how Dolby B and C audio tape noise reduction were once in competition with similar systems from JVC (ANRS), dbx, Sony and others. They all just faded away.

Philips argues against this, reminding that when the sound soaks up the bit budget, the picture quality suffers unless disc capacity is doubled by making it a 2-layer recording. The extra production cost of making a double-layer disc, says Warren Lieberfarb is 'considerable'. But Panasonic's pressing plant in Japan is a world leader in double-layer discs and

Completely misjudging the mood, Warner arranged a press conference and then let 14 speakers bore the pants off busy journalists who had broken other appointments to hear the MPEG news



participate in it. Surround sound requires extensive console modifications, if not a new console outright; it will increase the need for redundant outboard signal processing and specialised processors like surround compressors; and it's going to have speaker manufacturers thinking it's Christmas all year long when studios start installing LCRS combinations in their soffits. In fact, it's the manufacturers—and the studio designers who will help facilities accommodate surround—that will likely make out best in the beginning. Kind of like General Motors did until everyone decided to put fins on their cars. But it's going to be a chancy time for the studios themselves, who will have to make the investments in technology and talent if they want to be players in this particular version of the Brave New World. However, the real beauty of it is that a lot of studios in the US have been choosing not to dance every dance, but instead to retrench themselves financially before embarking in new directions.

For those that decide to enter the multi-channel arena, some will reap the benefits of early adoption; others will be left with an awful lot of speakers. But over here, the possibilities of multichannel audio have gotten studios as excited as they once were about postproduction, the most recent supposed panacea for static rates. And if multi-channel audio can divert their attention for a while, there'll be some very relieved Hollywood post houses in the next year or so.

downplays the cost factor. Many DVD discs already on sale in Japan and the US are double layered, at no extra cost to the customer.

So far the double capacity has been used to store two versions of the same movie, one widescreen and one in 4:3 TV aspect ratio. The same technique can be used to split a movie into two consecutive halves with two soundtracks.

Panasonic has a strong controlling share in Universal, so Universal could well put two soundtracks on its European PAL discs. Much of the mastering work will already have been done for Japan and the US. Sony owns Columbia.

Both Europe and Japan have the same Regional Code (2), so Japanese discs will play on a European player. The player can cope either with NTSC pictures, as used for Japanese discs, or PAL pictures, for European discs. Japanese discs will continue to use Dolby Digital AC-3 soundtracks and often have English sound for movies.

Making a dual-standard decoder is not difficult. The first models will use a DSP chip which performs whatever decoding functions it is preprogrammed to do. Dedicated MPEG2 chips will follow, and inevitably dedicated AC-3/MPEG2 chips. Philips is already working on one called Duet. It could soon cost peanuts to make a dual-sound standard player. The real cost is in mastering hassle.

If discs and players use dual-standard sound, there will be an open market shake-down—and any talk of a standards battle confuses consumers and undermines sales. The bottom line: the DVD launch in Europe can still be a monumental mess.

## Showtime: IBC meets IPCRESS

As if by mutual consent, this year's IBC press presentations abandoned information in favour of evangelism. But if manufacturers can indoctrinate the press, who defends the purchasers asks **Kevin Hilton**

**O**VER THE YEARS, journalists have tried to convince lesser mortals of how hard their job is—the information gathering, the interviewing, the running from one press conference to the next, the research, the insane deadlines and the long, lonely nights spent sifting through all this information, pounding on the Remington to produce pristine copy ready for the next edition, all for little financial recompense and even less appreciation. Everyone else just sees a bunch of hacks rushing around having a good time, drinking and eating too much, writing a few things down and getting paid lots of money to do it.

The truth, as always, is somewhere between these two extremes. This year's IBC was a good example of the reality. It was hard work, with much to see and many people to talk to and some very tight deadlines to hit. It was also good fun; there were a number of parties and receptions and, if you did not want to attend these, always a gang of like-minded people to go around with. One fact that affected both the work and the play was the number of press conferences—it seemed that there were more than at previous shows, running one after the other for the first two days, with the occasional clash, forcing journalists to either make a judgement call or divvy the receptions up with colleagues.

It wasn't just the number of press calls that was noticeable this year, it was their nature. We are all used to the bullish presentation; it is natural that if an organisation has gone to the trouble of putting together a press conference, they are going to put over the best possible picture of themselves that they can. We are all used to this and can filter out the hyperbole to get the stories lurking behind.

This year, it seemed different: the word propaganda was used—a strong word with some very sinister connotations. The way to counter this very directed and controlled form of information is to make sure that those who will carry the story to a wider audience recognise the presentation for what it is and ask relevant questions to get to something approximating the truth. The problem arises from the fact that this is trade journalism and many companies do not expect publications to ask awkward questions, just in case they upset their advertisers.

Which is probably where the belief that everyone will swallow the stories being presented in the new, evangelical style of press conference comes from. The terrible thing is

that it appears that some magazines and journalists are quite prepared to sit there and take what they are fed. In his analysis of the New Journalism 27 years ago, Tom Wolfe highlighted the kind of apathy that abounded before the likes of Hunter S Thompson, Gay Talese and Joe Eszterhas. 'The only form of reporting [some writers engaged in] was the occasional red-carpet visit to a head of state, during which [they] had the opportunity of sitting on braided chairs in wainscotted offices and swallowing the exalted one's official lies in person.'

There were several occasions that fitted this bill during IBC '97. Avid announced its new product, mentioning in passing that it had suffered financial troubles and appointed new executives. When it came to questions, journalists seemed more interested in spare battery packs for the products than how the company had effected this remarkable recovery. It was the same with Euphonix, whose staff spent 40 minutes telling everyone what they already knew about a new console and demonstrating their ignorance of press initiatives.

The new style even infiltrated the key note speeches, which have traditionally attempted to point the way ahead for broadcasting. There was some of that but in between, both Craig Mundie of Microsoft and NDS's Dr Abe

Peled blatantly and shamelessly promoted their new products and innovations.

Perhaps it is a meeting of two cultures, the slick evangelicalism of the US and the more staid, amateurish European approach. It works both ways of course: one of the most American, Billy Graham-style presentations came from a European, Chris Daubney of Panasonic, who is obviously fired up by the all-conquering success of DVCPRO.

The only reassuring thing is that we have not yet eradicated the Murphy's law element of press conferences and product demos. If anything can go wrong, it will and, specifically, if anything involves audio, you will not be able to hear anything, and if it involves visuals, then you will not be able to see anything. Perhaps the biggest laugh of the show came when Abe Peled tried to bring up his logo. The screen crashed, accompanied by the script: 'This program has performed an illegal operation and will be shut down.' Peled recovered well by saying, 'See, we are all dependent on Microsoft!'

Sure, the question may be 'Where do you want to go today?' but do we really want to go there?



# Analogue Tape Recording

Once tape recording meant only one thing but since digital technology has appeared, we have to call it analogue. **John Watkinson** explains how the old stuff works

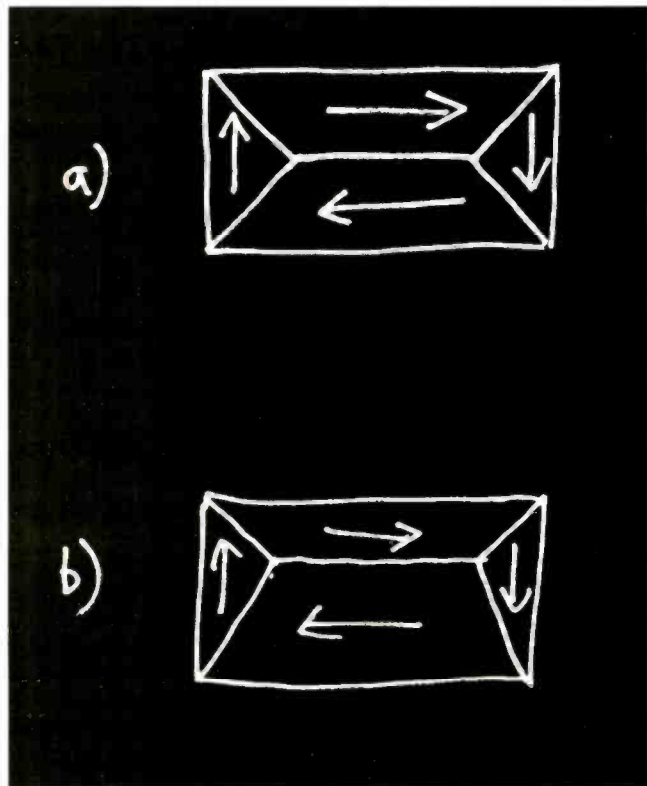


Fig.1a: Equal and opposite domains cancel out.  
 Fig.1b: Net magnetisation when domains are unequal

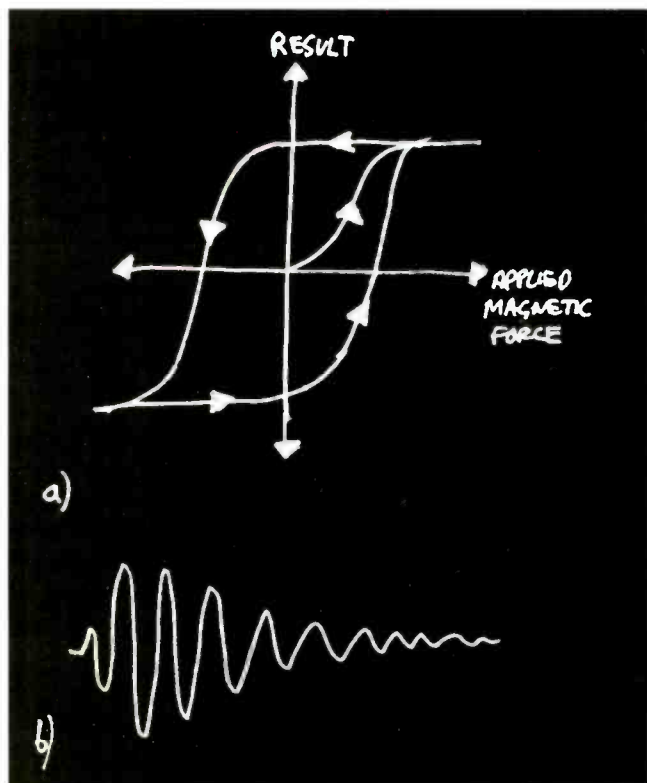


Fig.2a: Hysteresis loop follows arrows.  
 Fig.2b: Diminishing field as tape leaves head

**T**HE ESSENTIAL ELEMENTS of the traditional tape recorder were first combined during World War II. With the notable exception of Ray Dolby's efforts, there has been no fundamental change since, only a process of continual refinement. After all that time it would be surprising if good results were not obtained.

It all starts with the recording tape as the characteristics of this determine everything else. The tape recorder is a machine that is designed solely to maximise the benefits of, and minimise the drawbacks, of tape.

The analogue of time is the distance along the tape. The tape has to move at an exactly constant speed otherwise the time axis is disturbed. Slow disturbances, perhaps due to an out-of-round part in the drive, cause audible pitch variation that we call 'wow'. The effect of more rapid speed changes is called 'flutter'. Flutter can be caused by nonlinear friction as the tape passes through the machine. It's the same effect that makes your hand squeal when it's slid along a polished handrail. The tape manufacturer will incorporate a lubricant in the tape coating to prevent it.

The tape itself is a polyester film that acts as a support for the magnetic coating and as a spacer between the magnetic layers when wound on a spool. Professional tape is thick to reduce the magnetic interference between adjacent turns of tape this is called print-through. Consumer tape is thin so longer playing time can be obtained.

The tape coating contains a mixture of magnetic material, filler, lubricant and abrasive all glued together in a binder. It's not unlike paint, in fact the first magnetic coatings were developed from the red oxide paint used on farm buildings. Tape is a mucky medium and it dumps debris on everything it slides over. The abrasive content of the tape coating is carefully designed to clean the heads at about the same speed as they are getting dirty. Rule number one of successful tape use is to clean the tape path regularly.

The plasticisers and lubricants

in the tape and its coating are volatile and poor storage allows them to evaporate. And light causes the polymers to decompose. Consequently, tape must be kept in a dark, sealed container to prevent degradation

—those flashy tape enclosures with rubber gaskets and locking mechanisms are there for a reason, but a humble plastic bag in a cardboard box also does the job.

Rule number two of tape use is that a tape should be in one of two places, travelling through a tape deck or in a sealed box.

The magnetic nature of tape is due to uneven numbers of spinning electrons in the atomic structure. Even numbers of electrons contra-rotate and cancel each other's fields, but an odd number must result in an overall magnetic field. Clearly an individual atom can't be demagnetised. Atoms spinning on similar axes form domains which also can't be demagnetised. Fig.1a shows that it is possible to have a piece of magnetic material which is apparently demagnetised, but in fact it simply contains domains which oppose each other and cancel out.

Fig.1b shows that a material can be partially magnetised if one domain increases while another shrinks. The domain wall can only move if the spin of an atom is reversed and this takes energy. The amount of energy needed varies from one material to another. A magnetically soft material needs hardly any energy, so if an external field is applied, the material easily responds to the new state. Equally however, when the field is removed, the material goes back to its original state. The material is nearly linear in its response to an external field. This is great for making tape heads and transformer cores, but no good for recording or permanent magnets.

Recording requires a magnetically hard material that needs a lot of energy to move a domain wall. The recording process provides the energy, after which the domain wall stays put. A permanent recording is made because the energy needed to flip the atomic spin isn't avail- > page 106



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  - 3 TC 2290
  - 1 EMT 245
  - 2 Yamaha SPX90
  - 1 Yamaha SPX 1000
  - 1 Yamaha SPX 990
  - 2 Belli Delay
  - 1 TC M2000
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  - 2 Tube-Tech PE1B
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  - 6 AKG D130
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  - 1 AKG D112
  - 2 AKG D3500

Lundgaard Studios offer a well-established, first-class studio complex at the countryside in Vejlen, in the southern part of Jutland. It is close to the border of Germany, half an hour from Billund Airport and about 3 hours from Copenhagen. The complex is established at an old farm. It has been renovated with state-of-the-art facilities and features 4 studios equipped to manage every step of modern music production. The highly qualified staff at Lundgaard ensures a successful recording session and a pleasant stay. Clients are major Danish artists and bands from all over Scandinavia, England, Ireland, Germany, Russia and USA.



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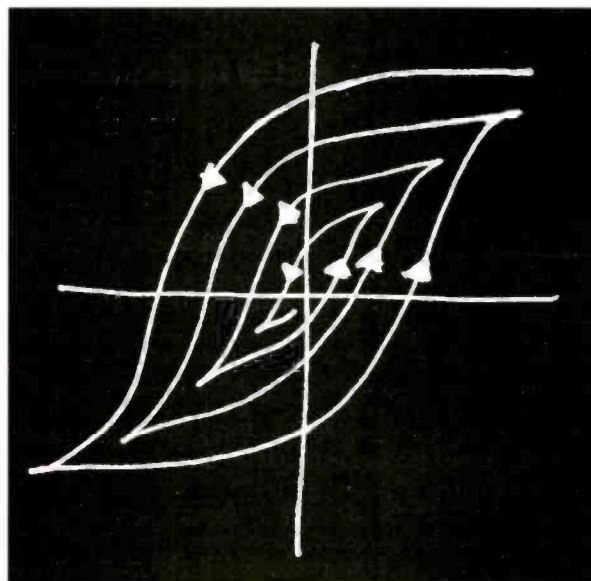


Fig. 3: Decaying AC field results in diminishing loop until erasure

< page 104 able. Loudspeaker magnets rely on the same characteristic.

The trouble with any type of memory device like this is that it's nonlinear. Magnetic tape is like a toggle switch. It takes a minimum amount of energy to operate. Below that, nothing happens, above that, the switch operates fully. So tape isn't analogue at all. What we record is the average of a large number of magnetic switches which can only be in one of two states. It's a pity for all those who swear that digital recording will never be as good as analogue, since a head-tape interface is effectively an analogue-to-digital converter. That being the case it's fairly obvious that tape has finite resolution and a noise floor.

The more tape area the recording is spread over, the better the resolution and the lower the noise. This is why professional machines use wide tracks and high tape speeds and sound pretty good. It's the analogue equivalent of a higher sampling rate and longer wordlength. On the other hand Compact Cassette uses such a small amount of tape that it lacks resolution and no matter what you do it always sounds like a cassette.

The technical term for magnetic memory is hysteresis. Hysteresis is about as popular in an audio waveform as a hole in a space station. It causes massive distortion. The Catch 22 is that we can get rid of the distortion by using a soft magnetic material, but that won't record.

Fig.2 shows a hysteresis curve. When the applied field is increased the magnetisation moves up the curve, but when it is reduced it doesn't retrace the curve because energy is needed to flip the atomic spins back. The material can't be erased by applying a steady field.

Tape recorders use an alternating erase current. As the tape leaves the erase head, the strength of the alternating field seen by the tape diminishes as in Fig.2b. The result is that the tape is swept around a diminishing series of hysteresis loops until it is erased.

A demagnetiser works in the same way. The coil is connected to the AC supply with a switch to immerse the tape heads and guides

in an alternating field. The demagnetiser is then moved away while still switched on to produce the reducing field of Fig.2b. Rule number three of tape recording is that the tape path should regularly be demagnetised in this way.

The above gives an idea of how tape bias works. Bias is the addition of a high-frequency waveform to the audio waveform as shown in Fig.3. The high frequency sweeps the tape material through many cycles of bias as the tape leaves the head gap area. The diminishing hysteresis loops don't erase the tape, but

leave it magnetised according to the audio waveform. Effectively the bias linearises the recording process, largely eliminating the distortion due to hysteresis.

The recording takes place as the tape leaves the gap, so the gap can be made conveniently large so that the recorded signal is projected into the tape instead of just bridging the gap.

With a permanent noise floor waiting to produce audible hiss the user of an analogue recorder tries to record at the highest possible signal level. Unfortunately, the level cannot be increased indefinitely. When a magnetic material is fully magnetised it is said to be saturated. Saturation limits the signal level that can be recorded. The presence of bias means that the peaks of the bias waveform start to saturate before the audio waveform itself. This results in a soft clipping characteristic where there is a gradual onset of distortion rather than the hard clip of digital. The range of levels between the onset of distortion and total saturation is called the headroom.

Continuous tones cannot be recorded in the headroom as the distortion will be audible, but transient peaks can be recorded as the ear is too slow to respond to brief distortion.

The frequency response of a basic analogue tape recorder mechanism is pretty awful because of the large number of frequency dependent losses involved. This has to be compensated by various equalisation stages. If the whole recorder is treated as a black box it would be possible to build a single frequency response equaliser to put in series. It wouldn't matter if the equaliser went before or after. In practice, however, the use of a boost to counteract a loss might cause premature clipping.

In a practical tape recorder the equalisation has to be distributed between the record and reproduce processes so that a flat overall response is achieved without sacrificing dynamic range. Standards for the on-tape response have been set such that tapes recorded on one machine will play with a flat response on another. In this context CCIR, NAB and IEC refer to the different standardised on-tape responses. ■



# 160s.

## The heir transparent.



Studios and facilities throughout the world such as Abbey Road, Westlake Audio and Skywalker Sound own and still use the original dbx 160. Now in 1997, we are proud to release the 160S, a most worthy successor in a long line of world class dbx compressors.

### Designed and built in the USA

All dbx products including the 160S are engineered and manufactured in the US. Every dbx product is performance tested and specification verified using Audio Precision® System One.

### V8™ VCA

The heart of any dynamics processor is its VCA. The dbx 160S features dual proprietary V8™ VCA modules.

This state-of-the-art implementation of dbx's original Blackmer declinear VCA boasts an unheard-of 127dB dynamic range and ultra-low distortion. Encased in a specially designed aluminum-zinc housing for shielding and thermal characteristics, the V8™ maintains its superior performance in harsh environments.

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High-voltage 24V supply rails and wide dynamic range active components in the signal path allow the 160S to cleanly process audio while providing a huge 20dB of headroom. Patented high current transformer isolated outputs feature >100dB common-mode rejection and distortion so low



it's immeasurable. Designed for extreme conditions these outputs will drive 1000 feet of Belden™ 8541 cable at +30dBm. dbx Type IV Digital output is also available as an option.

### Over-engineered Power Supply

The 160S power supply features a massive toroidal transformer chosen for its low stray flux characteristics and mounted in a mu-metal can designed to attenuate stray field by 30dB. The can is then isolated, along with the AC power circuitry, inside a shielded power supply cover providing even more noise attenuation. Only clean DC power exits the isolated supply.



### Discriminating Component Selection

The new 160S takes full advantage of the most technologically superior components available today. Premium active electronics, precision 0.1% and 1% metal film resistors, great sounding temperature stable polypropylene capacitors, high-reliability board-to-board connectors with gold-palladium-nickel contacts, Jensen® transformers, gold plated Neutrik® XLRs, rare earth magnet relays with gold contacts in a hermetically sealed nitrogen environment, military grade glass epoxy circuit boards, to mention a few, contribute to the most technologically advanced compressor in the world.

### Distinctive Craftsmanship

The craftsmanship of the 160S is as stunning as the engineering is innovative.



OVEREASY

A striking blue front panel machined from 1/4" aircraft aluminum, hand-crafted solid aluminum knobs, LEDs mounted individually in machined stainless steel housings, custom VU meters with peak indicators, and heavy gauge chassis solidify the 160S as the benchmark compressor for decades to come.

### Ultimate Flexibility

The 160S combines the best features of all the great dbx compressors, past and present. In addition to having the auto attack and release as well as the hard knee threshold characteristics of the classic dbx 160, the 160S is also switchable to OverEasy® mode, made standard by the classic dbx 165A. And speaking of the 165A, all of its features, including variable attack and release controls, as well as dbx's latest limiting algorithm PeakStopPlus™, are included in the 160S. Not to mention new features such as hardwire relay bypass and external sidechain input, switchable from the front panel.



PLUS

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*dbx Blue Series – Twenty-five Years of Experience. Visionary Technology. and Impeccable Craftsmanship.*



### 704 Type IV A/D Conversion system

Patent pending type IV conversion system, with the equivalent of 27 bit performance. The A/D is upgradable and AES/EBU, S/PDIF Inputs and Outputs are fitted as standard.



### 786 Stereo Microphone Pre-amp

Solid State Mic Pre designed to provide the purest reproduction of microphonic source possible, with a dynamic range of 130dB and signal to noise ratio of 104dB.



# INTRODUCING THE HR824 ACTIVE MONITOR.

If you've been trusting the quality of your creative product to passive monitors, there's an astonishing revelation waiting for you.

In our opinion, the active, bi-amplified HR824 is the most accurate near-field monitor available — so accurate that it essentially has no "sound" of its own. Rather, Mackie Designs' High Resolution Series™ HR824 is the first small monitor with power response so flat that it can serve as a completely neutral conductor for whatever signal you send it.

## SCIENCE, NOT SNAKE OIL.

Internally-bi-amplified, servo-controlled speakers aren't a new concept. But to keep the cost of such monitors reasonable, it's taken advances in measurement instrumentation, transducers, and electronics technology. In developing the HR Series, Mackie Designs sought out the most talented acoustic engineers and then made an enormous commitment to exotic technology. The HR824 is the result of painstaking research and money-is-no-object components, not to mention thousands of hours of listening tests and tens of thousands of dollars in tooling.

## FLAT RESPONSE... ON OR OFF-AXIS.

One of the first things you notice about the HR824 is the gigantic "sweet spot." The detailed sound field stays with you as you move back and forth across the console — and extends far enough behind you that musicians and producers can hear the same accurate playback.

The reason is our proprietary exponential high frequency wave guide. Without it, a monitor speaker tends to project critical high frequencies in a narrow beam (Fig. A) — while creating undesirable edge diffraction as sound waves interact with the edges of the speaker.



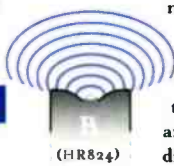
Mackie acoustic engineer David Bie uses scanning laser vibrometry to map HR824 tweeter dome vibrations.

Imaging and definition are compromised. The "sweet spot" gets very small.



Like biamped speakers, wave guides aren't a new concept. But it takes optimized internal electronics

and a systems approach to make them work in near-field applications.



The HR824's wave guide (Fig. B) maximizes dispersion, time aligns the acoustic center of the HF transducer to the LF transducer's center, and avoids enclosure diffraction (notice that the monitor's face is perfectly smooth.) The exponential guide also increases low treble sensitivity, enabling the HF transducer to handle more power and produce flat response at high SPLs.

## CLEAN, ARTICULATED BASS.

Seasoned recording engineers can't believe the HR824's controlled low bass extension. They hear low frequency accuracy that simply can't be achieved with passive speakers using external amplifiers. Why?

First, the HR824's FR Series 150-watt bass amplifier is directly coupled in a servo loop to the 8.75-inch mineral-filled polypropylene low frequency transducer.

It constantly monitors the LF unit's motional parameters and applies appropriate control and damping. An oversized magnet structure and extra-long voice coil lets the woofer achieve over 16 mm of cone excursion. Bass notes start and stop instantly, without "tubiness."

Second, the HR824's low frequency driver is coupled to a pair of aluminum mass-loaded, acoustic-insulated 6.5-inch passive drivers. These ultra-rigid drivers eliminate problems like vent noise, power compression, and low frequency distortion — and couple much more effectively with the control room's air mass. They achieve the equivalent radiating area of a 12-inch woofer cone, allowing the HR824 to deliver FLAT response to 42Hz with a 38Hz, 3dB-down point.

Third, the woofer enclosure is air-displaced with high-density adiabatic foam. It damps internal midrange reflections so they can't bleed back through the LF trans-

ducer cone and reach your ears. The typical problem of small-monitor midrange "boxiness" is eliminated.

## A TRUE PISTONIC HIGH-FREQUENCY RADIATOR.

We scoured the earth for the finest high frequency transducers and then subjected them to rigorous evaluation. One test, scanning laser vibrometry, gives a true picture of surface vibration patterns. Two test results are shown in

Fig. C: Uneven fabric dome tweeter motion distorts high frequencies.

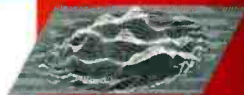


Fig. D: HR824 alloy dome's uniform, accurate pistonic motion.



Mackie is one of the few active monitor manufacturers that also has experience building stand-alone professional power amps. Our HR824 employs two smaller versions of our FR Series M-1200 power amplifier — 100 watts (with 150W bursts) for high frequencies, and 150 watts (200W peak output) for low frequencies. Both amps make use of high-speed, latch-proof Fast Recovery design using extremely low negative feedback.

## TAILOR THEM TO YOUR SPACE.

Because control rooms come in all shapes, sizes and cubic volumes, each HR824 has a three-position Low Frequency Acoustic Space control. It maintains flat bass response whether you place your monitors away from walls (whole space), against the wall (half space) or in corners (quarter space). A low frequency Roll-Off switch at 80Hz lets you emulate small home stereo speakers or popular small studio monitors.

## CONFRONT REALITY AT YOUR MACKIE DESIGNS DEALER.

We've made some pretty audacious claims in this ad. But hearing is believing. So bring your favorite demo material and put our High Resolution Series monitors through their paces.

If you've never experienced active monitors before, you're going to love the unflinching accuracy of Mackie Designs' HR824s.

If you've priced other 2-way active monitors, you're going to love the HR824's price AND its accuracy.



The Mackie HR824 Active Monitor.  $\pm 1.5$ dB from 42 to 20kHz.

the upper right hand corner of this ad. Figure C is a conventional fabric dome tweeter in motion. You needn't be an acoustic engineer to see that the dome is NOT behaving as a true piston.

Figure D shows our High Resolution metal alloy dome at the same frequency. It acts as a rigid piston up to 22kHz, delivering pristine, uncolored treble output that reproduces exactly what you're recording.

## INDIVIDUALLY OPTIMIZED.

We precisely match each transducer's actual output via electronic adjustments. During final assembly, each HR824 is carefully hand-trimmed to  $\pm 1.5$ dB, 42Hz-20kHz. As proof, each monitor comes certified with its own serialized, guaranteed frequency response printout.

The HR824's front board has "radiused" edges to further eliminate diffraction; an "H" brace bisects the enclosure for extra rigidity.



HR824 Active Monitors accept balanced or unbalanced 1/4" and XLR inputs. Jacks & removable IEC

power cord face downward so that the speaker can be placed close to rear wall surfaces.

# MACKIE™



# The going rate

Are you confident that your CD-R machine passes digital audio without adding components of its own? **Francis Rumsey** examines the technical facts relating to CD-Rs and the process of conversion

**I**N A LETTER published in the August issue of *Studio Sound*, John Barnes raises an important issue concerning the use of sample-rate converters in CD-R machines. His point is that many such machines routinely pass incoming digital audio through a sample-rate convertor, even when the input sampling frequency is nominally the same as that of the CD—44.1 kHz. The result of this is that the data burned onto the CD-R is not identical to that presented to the digital input of the recorder.

Mr Barnes' biggest difficulty with this lies in the effect on the noise floor of the resulting audio signal, especially when the original master has been processed using Super Bit Mapping or a similar algorithm for psychoacoustically shaping the noise floor.

As most users are almost certainly aware, the CD-Audio (Red Book CD) only operates at a sampling frequency of 44.1kHz. And 44.1kHz means exactly 44.1kHz, within quite strict limits. Sources of digital audio are commonly encountered at both 48kHz and 44.1kHz, and there are cases of pulled-up and pulled-down rates, particularly in the US where drop-frame SMPTE time code and hangovers from the days of 44.056kHz create numerous opportunities for sample-rate anomalies.

Sample-rate converters have now reached the point where they can be implemented cheaply enough to be incorporated within digital-audio equipment such as mixers and recorders, often on every input, whereas previously they would have been large, expensive rackmounted units.

For reasons of operator convenience more than anything else, CD recorder manufacturers have been putting sample-rate converters on the digital inputs to their equipment. This makes it possible to connect either consumer (IEC 958 Type 2) or professional (AES-EBU) digital inputs from a wide range of equipment operating at various rates, and for the connection to function straightforwardly.

The other reason why a sample-rate convertor might be needed on the input of a CD recorder is to convert a signal with a nominal sampling frequency of 44.1kHz to one with an actual sampling frequency of 44.1kHz. This may seem unusual unless you are aware that there are all sorts of signals out there claiming to be at a particular frequency, when in fact they are quite a long way off. This is either because they originate from cheap equipment whose master oscillators are running slow or fast in an absolute sense, or because they are not stable—in other words, the frequency jitters around a nominally correct frequency. For example, the IEC 958 sampling frequency specification for the consumer interface specifies 'normal accuracy' as 11000ppm (parts per million) which is quite a wide tolerance. Professional equipment should operate to a much

tighter tolerance of less than 50ppm. Equipment operating in pitch-shifted or varispeed modes may also produce an output at a shifted sample rate. Jittery or offset digital inputs to CD-R machines may not be recordable directly, so they need to be sample-rate converted to resample the signal at a more stable, more correct rate.

The incorporation of a convertor to handle all these situations is all very well, and most convenient in a lot of operational situations, but what of specific cases when one is in control of all the equipment and processes involved, is able to guarantee that the input sampling frequency is accurate, and wants to ensure that the data presented to the digital input is exactly what gets stored on the CD?

**The other reason why a sample-rate convertor might be needed on the input of a CD recorder is to convert a signal with a nominal sampling frequency of 44.1kHz to one with an actual sampling frequency of 44.1kHz. This may seem unusual unless you are aware that there are all sorts of signals out there claiming to be at a particular frequency, when in fact they are quite a long way off. This is either because they originate from cheap equipment whose master oscillators are running slow or fast in an absolute sense, or because they are not stable**

Unfortunately, it seems, an operational convenience may turn into a considerable inconvenience, especially if it cannot be bypassed.

The strict answer to the question, 'do sample rate converters affect sound quality?' is yes, because the numbers that come out of such a convertor are not the same as those which were put in, unless the equipment has some means of detecting when the input rate is so close to the output rate that no processing is required, and automatically bypasses the signal processor.

The practical answer to the question, though, requires us to assess whether the

changes made by the sample-rate convertor are audible. Of course, it is quite reasonable to insist that any change to the carefully mastered data is unacceptable, and in such cases one would have to avoid any digital process that might modify the data after mastering—an increasingly difficult thing to ensure.

Sample-rate conversion involves a resampling process that calculates new samples at the new sampling rate, based on the values of the original samples. It does so by using digital filters that calculate the impulse response of each sample when low-pass filtered to half the new sampling frequency, adding the combined impulse responses of all the samples within a range of the one in question to obtain the new sample value at that point in time. It is the accuracy with which this resampling process is carried out that determines the noise floor of the new signal.

All digital filtering processes rely on repeated delays and multiplications of sample values by coefficients, with additions and subtractions at various stages. The maths involved in this process can result in considerably longer numbers than those one started with, requiring that they are shortened before the output. Arbitrary truncation of long numbers to 16 bits for use on CD results in low-level distortion, so dithering must be employed to randomise the quantising error. The process is almost identical to that which takes place in A-D conversion, or at any requantising stage in the production chain (such as that employed in mastering 20-bit recordings for release on 16-bit media). The problem is that redithering adds noise, but this is considered preferable to low level distortion artefacts.

The original point made by John Barnes concerned the use of noise-shaping processes—such as Super Bit Mapping—which aim to map as much as possible of the dynamic range of high-resolution master recordings onto the 16-bit medium of CD. They do this by requantising the original recording to 16 bits using a dithering process that shifts much of the quantising noise into less audible parts of the spectrum, giving a subjective dynamic range much greater than that of an ordinary 16-bit recording dithered with gaussian or TPDF noise. The danger is that this improved noise floor may be wiped out by the noise floor of the sample-rate convertor.

So what noise floor can we expect from a sample rate convertor? In theory it could get close to the performance of the best A-D converters, but the performance of a sample-rate convertor depends a lot on the ratio between the input and output sampling frequencies and the sophistication of the filters employed in the conversion. Where the ratio is simple and fixed—say between 96kHz and 48kHz—the calculations are much more straightforward than when the **page 110 >**



< page 109 ratio is fractional and/or varying, and it is easier to get a low noise floor when the ratio is fixed. Much longer coefficients and much more careful processing are required to obtain, say, the equivalent of a 20-bit noise floor when the two sampling frequencies are related in a non-simple fashion. Typically, variable sample-rate converters such as those employed at the inputs to CD-R machines will be capable of noise floors roughly equivalent to that of an 18-bit A-D converter, although these things are notoriously difficult to compare and depend a lot on the exact relationship between input and output signals. It is not really a good idea to compare dynamic ranges in terms of bits, but people like to do so. This means that when copying conventional 16-bit recordings with normal dither to a CD-R, the sample-rate converter should make no appreciable difference to the sound quality (although the numbers on the CD will almost certainly be different to those on the original recording). But we no longer live in a 16-bit world, and recordings using specially shaped dithers with very low subjective noise may indeed be noticeably affected by the sample-rate converter.

The problem here mainly applies to stand-alone CD-Audio recorders that take in a digital audio input from an external source via consumer or pro digital interfaces. In cases where the sample-rate converter can be bypassed, such as in the case of the Marantz-HHB configuration mentioned by John Barnes, one can ensure that the CD is an exact copy of the master tape. But, as he points out,

The audio world is now full of digital signal processors which handle signals at different stages in the chain, and transparent passing of digital audio signals from one stage to another is becoming difficult to ensure. Detecting what has been done to the signal is not always easy, and the only way to be certain is to compare the absolute values of the numbers on the CD with those of the original recording

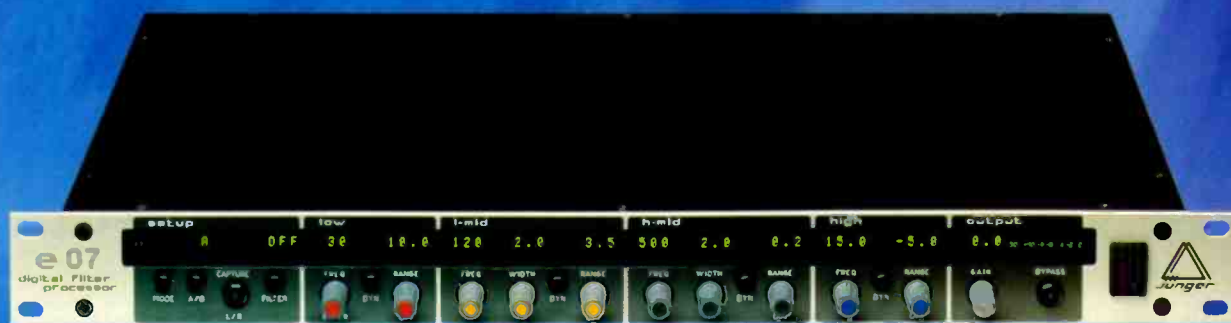
the software will only allow this bypass in cases of a very stable source clock frequency—otherwise the converter will be forced to sample-rate-convert the digital input. If the machine does not have this automatic bypass detection process, one is stuck with accepting the sample-rate converter.

It is unlikely that the problem would arise when burning CDs on a general-purpose CD

recorder drive attached to a digital-audio workstation via a SCSI or other peripheral interface. Here the transfer of data to the CD is carried out in non-real-time (possibly faster than real time) and sample-rate conversion may only be applied by the workstation if the original files to be used in the download are at nominal frequencies other than 44.1kHz. Indeed, not all workstations allow real-time sample-rate conversion anyway. With workstation burning of CD-Rs, any 44.1kHz material is likely to be transferred intact, with whatever final dither and noise-shaping is specified in the menus of the software concerned.

A final word relates to CD masters processed by duplication plants. Even here, there have been cases in recent years where people have discovered that the audio data they sent to be duplicated is not what ends up on the CD. The audio world is now full of digital signal processors which handle signals at different stages in the chain, and transparent passing of digital audio signals from one stage to another is becoming difficult to ensure. Detecting what has been done to the signal is not always easy, and the only way to be certain is to compare the absolute values of the numbers on the CD with those of the original recording. To many who produce cheap CDs for an indiscriminating audience, none of these things will matter much as the effects are undoubtedly quite small. But for those who have invested in the highest quality professional equipment, and who care about their audio signals, it is good to be aware of what may be going on. ■

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# The twilight zone

The changing fashions in equipment earthing conventions seem to have rendered many of the old wiring standards and practices obsolete. **Philip Newell** finds grounds for complaint

**A**SAD DAY has dawned. It now seems that I, Philip Newell, no longer know how best to interface the equipment in a recording studio. In 1970, I did; in 1980, I did. Even in 1990, I thought I did, but now, in 1997, I don't.

Is it a case of senile dementia? Perhaps not, as in other aspects of my design and development work, I'm having more success than ever before. Perhaps then, could it be that equipment is becoming so fiendishly complicated that it has left me behind. Well, equipment has advanced internally, of that there is little doubt, but as its audio inputs and outputs, not too much has appeared to change. Or has it? In fact it has, and I'm afraid that much of it has actually gone backwards.

Installing a Series 80 Neve mixing console into a studio around 1970 seemed to be simplicity itself. The manufacturer wired the consoles, to what was already an old standard, with all external (and much internal) wiring of the balanced, floated variety, and with chassis ground and audio ground kept separate at all but one, carefully chosen point. There were never problems with earth (ground) loops, because the screens of the cables never carried any audio. They were all connected to chassis ground only, as was Pin 1 of all the XLR connectors. When these consoles needed up-rating to 16 or 24 tracks, the addition of further input channels or group modules was a mechanical engineering exercise in fitting the extra modules. The wiring side of things was virtually foolproof.

The June 1995 issue of the *Journal of the Audio Engineering Society* was exclusively dedicated to grounding (earthing) problems. If such could be made the case, then this issue should be made obligatory reading for the entire audio equipment manufacturing and interfacing industries. All seven of the papers and engineering reports were addressing serious aspects of safety and noise susceptibility, and all were excellent in their contents. Two, however, *Noise Susceptibility in Analogue and Digital Signal Processing Systems*, by Neil Muncey, and *Considerations in Grounding and*

*Shielding Audio Devices*, by Stephen Macatee, formed a damning pair of indictments against the audio equipment manufacturing industry.

Some of the higher echelon of the industry remain relatively exempt from criticism, but the great majority of manufacturers should take heed of the comments made. Their gross disrespect for grounding protocols has led to a situation where Macatee identified 16 different situations involving unbalanced and balanced interfaces. None of this, incidentally, took into account the added nonsenses of the Pin 2, or Pin 3, hot situation. These 16 possibilities assumed a standardised wiring code.

The whole situation related only to whether the inputs or outputs were balanced or unbalanced, and had their signal connector ground connected to chassis ground or signal ground. Only three of the 16 interconnect situations could be ideally addressed using 'off-the-shelf' twin cable, screened (hot, cold and shield) cable, connected conventionally at both ends. All of the other situations required screens to be cut, or joined to the cold connectors, at one end or

another. How the typical project studio assembler is supposed to know all this, I have no idea.

Many people involved in the wiring of the greatest proportion of studio equipment have adopted 'one end only' shield grounding, but exactly which policy to apply, and when, is not generally understood. I first remember falling foul of these rules in 1982 when faced with the interconnection of two pieces of equipment where the manuals were entirely contradictory in their approaches to the problem. This left me having to draw my own conclusions as to the best way to deal with the situation. I got lucky; it worked. Fifteen years later, however, the situation has degenerated into absolute chaos. In Stephen Macatee's report he outlines the optimum interface wiring for most combinations of different circuit arrangements for balanced and unbalanced inputs and outputs, but suggests that, 'if both units involved have signal grounded shields, you have entered the twilight zone'. If such an expert as Stephen Macatee (from the Rane Corporation) cannot find a solution, and I, with 30-odd years of recording experience behind me, find myself scratching my head (so that's where my hair went), then what hope is there for the poor souls who find themselves trying to wire up their first—or 50th, for that matter—project studio, with its less than top-of-the-line equipment?

The current situation is a disgrace, especially as it could so easily be solved by a little concerted effort from the equipment manufacturers. But so many of these only seem to be interested in 'moving product' in the largest quantities possible, and appear to have scant regard for the problems of the purchasers. Ironically, the situation now seems to exist whereby a relative novice at wiring could successfully interface a studio full of the finest and most expensive equipment, but the optimal interfacing of mid-range and cheaper equipment has reached a degree of complexity which has left even the experts baffled. ■

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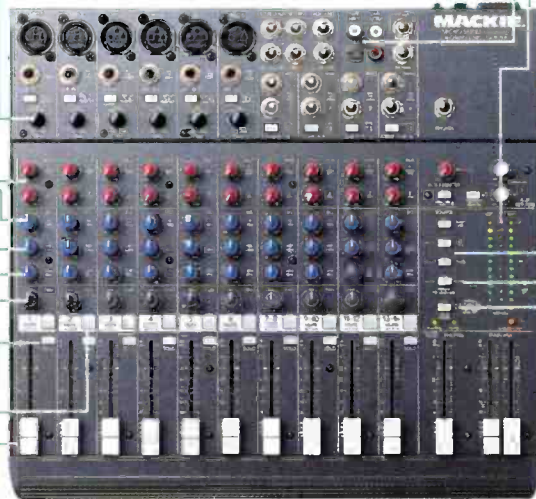
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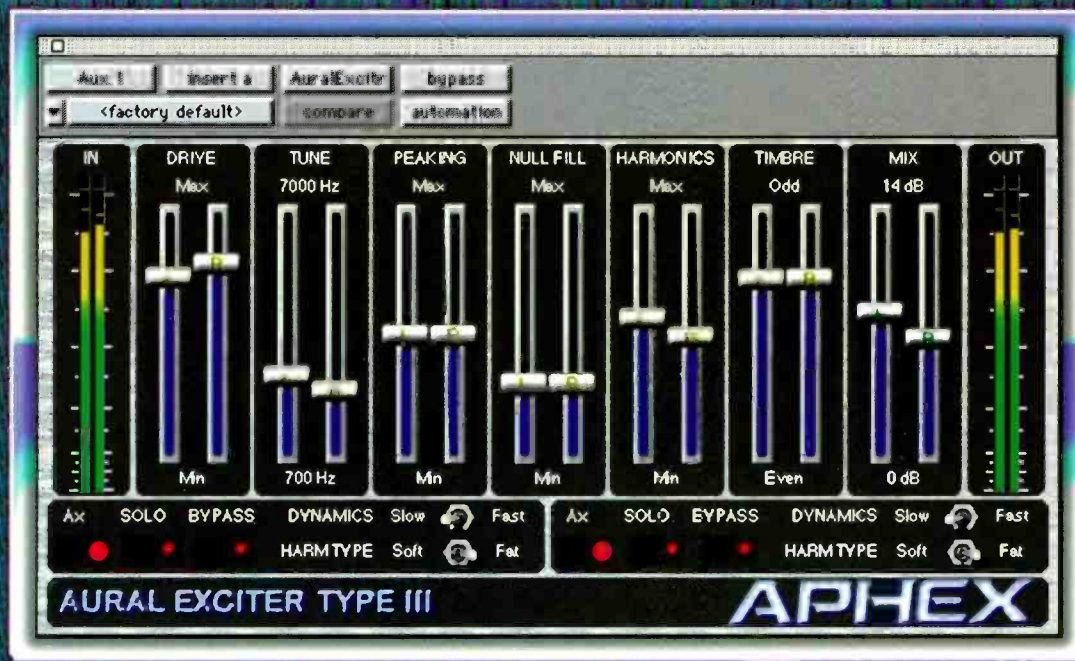
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