

November 1997

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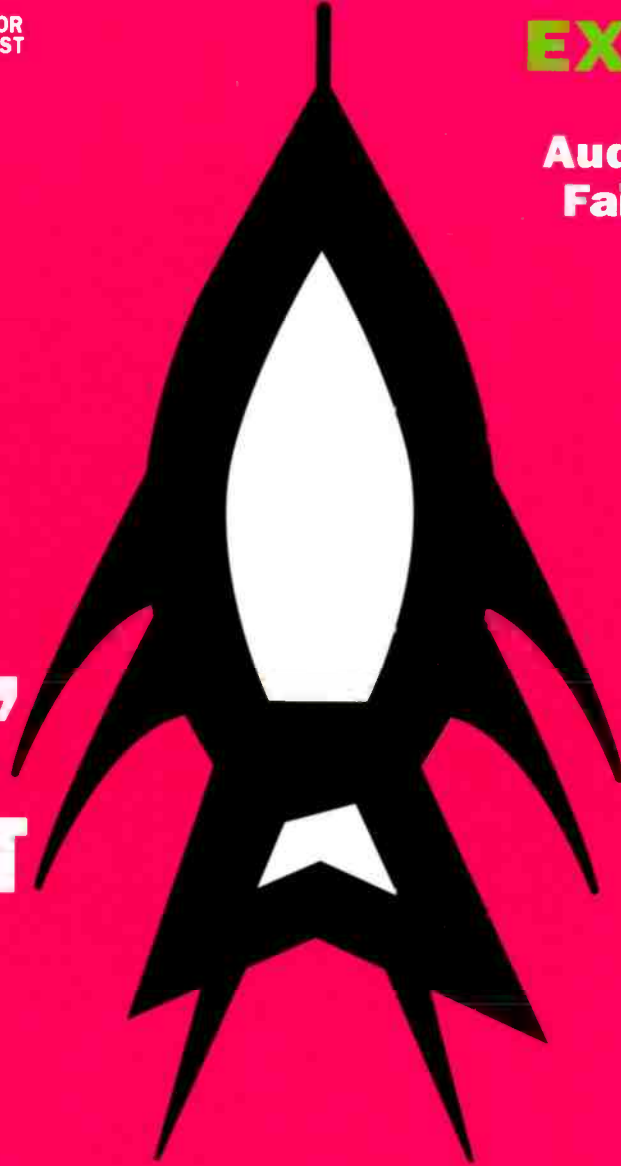
Studio Sound

THE INTERNATIONAL TECHNICAL MAGAZINE FOR
PRO AUDIO, POSTPRODUCTION & BROADCAST



EXCLUSIVES

Amek Soho
Audio Design AD149
Fairlight MFX3 Plus
Cadac mic amps
TL Audio 0-2031
AKG SolidTube
Korg DL8000R
Joemeek VC6
Sound Forge
Aphex 661



JAMMIN' ON THE NET

Virtual global
music strategies



The
ED
CHERNEY
Interview

SHOOTING FISH SOUND PRODUCTION
MULTICHANNEL CODING SYSTEMS
LONDON'S RECORDING HERITAGE
ROYALTONE STUDIOS



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e-mail: enquiry@ams-neve.com - <http://www.ams-neve.com>

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Working around

I CAN STILL remember my first personal computer: how I treated it with reverence, wrapped it up with a cover at night, paused to let it catch its breath between major events, treated every 5 1/4-inch disk with the dignity of a master and how I nursed it home like a car with a broken gearbox and no brakes in the snow.

When it let me down—it did so regularly despite almost obsessive frequent saving—my overwhelming feeling was one of disappointment. Disappointment because it could do something for me that I couldn't achieve easily without it and because I desperately wanted it to work.

When a computer system crashes or hangs up on me now, I am swept with feelings of anger, resentment and indignation. How dare it? When the network hangs up momentarily in the office you can hear the groan go around the floor punctuated by keyboards being hammered to the desk and chairs being pushed over in disgust. Such is our expectation of all manner of computer that every thing must now happen instantaneously and preferably also simultaneously. Computers are thrashed by anyone and have to be forgiving enough to cope with any user misdemeanour. Yet there are those who pride themselves on their ability to crash software and for these this seems to have replaced the challenge of producing the end result.

User-tolerance fell through the floor around the same time as expectations were raised leading to an attitude that allows for no practical operational headroom even though common sense tells you that you have to allow for some.

Dodgy, unfinished beta software aside, the problem lies with the user and the expectation of flawless light-speed performance from anything sporting a mouse and a monitor. It's so unrealistic. You treat that old mic collection with reverence, coil the cables away neatly at night, pause to let the analogue machine lock up, and know how to get the best results from the desk yet the computer is left to fend for itself and is treated with disregard only to be shouted at in moments of crisis.

What ever happened to working around equipment's shortcomings? Wasn't that a skill?

Zenon Schoepe, executive editor

The accidental tour

NASHVILLE'S Music Trail offers to guide you around the city via a multitude of musical milestones. Somewhere there must be a map that details the Trail—I've never seen a copy, but it must be out there. What I have seen, however, is some of the little signs that adorn the street lights highlighting places of interest. Yes, The Music Trail is a neat idea, and one that deserves to have come from a City with such a rich musical heritage as that of Nashville.

But it could have happened elsewhere—Harlem could take you on a tour of the Apollo club that played such an important part in establishing Billie Holiday's career, the Cotton Club, the Onyx and Ryan's. New Orleans could have had you touring Tom Anderson's restaurant and ballroom, Pete Lala's Café, Loulou White's Saloon and the Mahogany Hall brothel next door. And then there is London.

It will remain one of my privileges to have spent a sunny autumn day touring London's early recording studios with ex-Abbey Road, ex-Air, Ex-Decca and enduring industry figure Dave Harries. Dave knows a lot about the London recording scene, and having him point out the locations to my camera while sharing stories and memories with me is the kind of conducted tour money can't buy. Additionally, Dave had just turned in 45,000 words gleaned from other industry stalwarts to accompany my pictures (the full transcriptions of which will be included in the *Studio Sound* website soon), so he was in fine form.

Our first call saw English National Opera props being moved through the same door that had accommodated the likes of Bing Crosby. Afterwards we passed Alan Parsons house before arriving Abbey Road's freshly-painted wall. Later, the crucible that was once IBC but is now just another business address was eclipsed by the Chris Eubank's custom tractor.

It's a shame that it took an assignment to prompt me to do something that I could, and should, have done a long time ago—sure, I'd seen some of the places and heard some of the stories before, but to put it all together in such a tangible way gave the experience particular weight. I invite you all to look at your local recording scene with a fresh eye.

Tim Goodyer, editor

Studio Sound

Incorporating Broadcast Engineering
November 1997 Vol 39, No 11. ISSN 0144 5944

Miller Freeman plc, 4th Floor, 8 Montague Close,
London Bridge, London SE1 9UR, UK.
Tel: +44 171 620 3636.
Fax: +44 171 401 8036.
Email: cz73@cityscape.co.uk
Net: http://prostudio.com/studiosound

Editorial

Executive Editor: **Zenon Schoepe**
Editor: **Tim Goodyer**
Production Editor: **Peter Stanbury**
Editorial Secretary: **Jenny Skelton**
Consultants: **Francis Rumsey; John Watkinson**
Columnists: **Dan Daley; Barry Fox; Kevin Hilton**
Design Consultant: **Ben Mallalieu**
Regular Contributors: **Jim Betteridge; Simon Croft; Ben Duncan; Dave Foister; Bill Foster; Tim Frost; Yasmin Hashmi; Rob James; Caroline Moss; Philip Newell; Terry Nelson; Stella Plumbridge; Martin Polon; George Shilling; Sue Sillitoe; Patrick Stapley; Simon Trask**
Publishing Editor: **Joe Hosken**

Advertisement Sales

Group Sales Manager: **Chris Baillie**
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PA to the Publisher: **Lianne Davey**
Managing Director: **Doug Shuard**
Publisher: **Steve Haysom**

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Subscription Rates. UK annual: £36.00. Europe: £50.00/US\$80.00. Overseas airmail. American continent: £62.50/US\$100.00. Rest of the World: £62.50/US\$100.00. Refunds on cancelled subscriptions will only be provided at the publisher's discretion, unless specifically guaranteed within the terms of the subscription offer. Circulation and subscription, Circulation Manager: Caroline Sharpe, UK: Miller Freeman Entertainment Ltd, Royal Sovereign House, 40 Beresford Street, London SE18 6BQ. Tel: 0181 855 7777. Fax: 0181-317 3938. US: Studio Sound and Broadcast Engineering Magazine, 2 Park Avenue, 18th Floor, New York NY 10016. US Postmaster Please send address corrections to: Studio Sound and Broadcast Engineering Magazine, c/o Mercury Airfreight International Ltd Inc, 2323 Randolph Avenue, Avenel, New Jersey NJ 07001. US second class periodicals postage paid at Rahway, NJ. Originated by Craftsmen Colour Reproductions Ltd, Unit 1, James Street, Maidstone, Kent ME14 2UR, UK. Printed in the UK by E T Heron, The Bentall Complex, Colchester Road, Heybridge, Maldon, Essex CM9 4NW, UK. Newstrade Distribution (UK) UMD, 1 Benwell Road, London N7 7AX, UK. Tel: 0171-700 4600. Fax: 0171-607 3352.

ABC
AUDIT BUREAU OF CIRCULATIONS
BUSINESS PRESS

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Total average international circulation:
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Tokyo +81 (3) 54 74 11 44 · New York +1 (212) 315 1111 · Los Angeles +1 (213) 463 4444
Toronto +1 (416) 431 9131 · Singapore +65 285 9300

Vision & Audio 97

UK: HHB Communications has won the first annual *Studio Sound*-sponsored Technical Achievement Award. As part of the APRS' 50th anniversary celebrations, the presentation was made at a ceremony held on the evening of the first day of London's Vision & Audio 97 show and accompanied awards for Lifetime Service to the industry and for the year's Most Exciting New Production, along with a Producers Guild Fellowship.

Recognising 22-year-old HHB's contribution to the industry as retailer, distributor and manufacturer and how it has influenced the adoption of digital audio on a broad scale. Special mention was made of its spearheading of FI, DAT, CD-R, raising awareness to the special requirements of audio from digital media, and its investment in technical servicing and support.

Sir George Martin received a Lifetime's Service Award and RePro recognised the production team of Clive Langer and Alan Winstanley with a Producer's Guild Fellowship, The Most Exciting New Production Award sponsored by SSL was received by producer Jim Abbiss for his work with the band Sneaker Pimps.

The Vision & Audio show, with its former APRS-show contingent, was held for the first time at the more ambitious venue of Earls Court 2 in early November. Impressive to behold and undoubtedly well organised, attendance, at just under 9,000, seemed healthy at times but spread very thinly over the expanse of the exhibition floor. It was the UK's premiere combined audio and video-picture technology extravaganza although only those blinkered by political correctness could have failed to notice that the audio representation among the exhibitors was not strong. Despite the return to an APRS-associated exhibition of SSL for the first time in many years, this



was not a rebirth of the APRS exhibitions of old, but more an assimilation of an ailing show into one that is healthier and altogether glossier.

Time will tell how well the partnership will prosper and while the logic behind the marriage of the two disciplines feels right, audio exhibitors will probably need to be wooed all over again for next year's event.

Product-wise it was something of a best-of of this year's Munich and New York shows and gratefully received by the audio attendees, the majority of which had not had the opportunity to even glimpse much of it outside the pages of a magazine. This has to underline the importance of having a healthy pro-audio show in the UK.

Zenon Schoepe

22nd SBES

UK: This month's Sound and Broadcast Engineering Show marked several important changes to an event that has proved itself increasingly popular over its 21 years. The move to the larger venue of Birmingham's NEC certainly helped make the show more friendly to this year's visitors but holding it over two

days as opposed to one was not as well received. While exhibitors welcomed the layout afforded by the NEC's Hall 7 and the high level of attendance of Day 1, the markedly lower turnout of Day 2 had many questioning its value—the official overall attendance figure as been given at a shade under 1,500.

Among the equipment launches seen this year were Harbeth Acoustics' HL Monitor 40 and Monitor 30, which follow the earlier replacement for the LS3/5a, the Harbeth HL-P3. In fact, the official withdrawal of the KEF woofer and tweeter found in the LS3/5a took place this month. Harbeth's Monitor 30 represents a 'ground up' redesign of the LS5/8 and LS5/9, while the new Monitor 40 is the company's first 3-way design. Also new from Harbeth is the active version of the Xpression! monitor.

Audionics, meanwhile launched a powerful ISDN audio routing control system and a new version of its MCX1 Audio Switcher which adds an RS232 data link and allows user reprogramming, PC control and mixing operation. Billed as 'the world's first software-only codec, Mayah Communications' SendIt will handle real-time audio and supports MPEG1, 2 and 2.5, Layer 3 and 2, GSM, ADPCM, Musifile and BWF without the need for any coding hardware. The system runs on a Pentium-Windows 95 and NT platforms and provides for recording, transmission and editing (with Mayah's EditPro software) of audio. Dalet Digital Media Systems' Dalet5 newsroom system was also in evidence, now offering multi-site management and exchange of audio. It, too, requires a Pentium-NT platform.

The friendly atmosphere, usual high standard of attendee and the appearance of new broadcast-

related items ensures that SBES remains an important part of the UK show calendar for 1998.

Tim Goodyer

Marantz winner

UK: The recent SBES show in Birmingham provided an ideal opportunity to judge the Marantz competition run in *Studio Sound*'s July issue. For the trouble of answering five questions regarding the Marantz CDR620 CD recorder, Bruno Putzeys of Belgium has secured a CDR620 for himself.

While the response to the competition proves the interest in CD-R is high, the number of correct entries demonstrated a worrying lack of understanding of its working. For the benefit of those who entered as well as those who did not, the correct answers are:

- (1) The laser in a CD recorder changes the properties of a cyanine or phthalocyanine-based dye on the CD blank.
- (2) The CDR620 has a variable sample-rate convertor, a digital audio delay, auto-indexing from CD, DAT MD and DCC, a SCSI-II interface but no S-ID renumbering facility.
- (3) CD-R discs cannot be erased after recording.
- (4) The first Marantz CD-R machine was the CDRI.
- (5) The sample rate of a recordable compact disc is 44.1kHz.

Short circuit

US: An interesting development in the ongoing esoteric outdoor equipment race finds American solid-state specialist Millennium Media acquiring American valve specialist Forssell Technologies. In acknowledging the relative merits of both circuit topologies, Millennium main-man John La Grou identified Forssell as kindred spirits in a contrasting field and sought to put the ante in

UK: The service department at HHB (winners of *Studio Sound*-sponsored Technical Achievement Award, see story) recently reported that of the 4,000 Portadat recorders now in worldwide use, none has been returned with a worn head—even though early units are reckoned to have clocked up over 3,000 hours use. HHB puts the performance down to head makeup and the use of separate reel motors to give optimum tape tension. HHB, UK. Tel: +44 181 962 5000



Germany: A series of Michael Jackson's concerts recently staged at Munich's Olympic Stadium were captured by the Dutch-German Eurosound mobile recording company. Mobile 4 took the honours with the assistance of engineers Ulli Poessel and Peter Brandt. Video direction was handled by Paul Becher and worldwide broadcast was via Germany's SAT 1. Eurosound, The Netherlands. Tel: +31 488 45 10 48

specialised outboard. The first results from this fascinating marriage are eagerly awaited.

Spice trail

UK: The Spice Girls tour relies on more than high-power marketing and sex appeal for its success—the Litton Veam connectors used extensively for multicore connection are every bit as important (if not aesthetically pleasing) as Ginger Spice and her mates. Specified by FOH engineer Mike Dolling and supplied by Wigwam, the same kit can also be found playing its part in US and world tours of Lord of the Dance.

VDC, UK. Tel: +44 171 700 2777.

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

representing most of the major local studios and distributors 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 results of the session showed no clear preference for either Dolby Digital or MPEG Multichannel coding—arguably raising more questions than the exercise answered given the intensely political situation now surrounding the DVD Audio specification.

Coincidentally, the New York AES Convention was to have seen the announcement of the ratified DVD Audio specification, only to have the announcement become a further deferral. Subsequent show-floor discussion found opinion divided between those who are eager to see the uncertainties surrounding the new format resolved and those who regard the whole issue of DVD to be unnecessarily rushed.

US-UK: Backing the world-beating Thrust supersonic car has given UK-based Protape an incontrovertible claim to being the fastest tape distributor in the world. Driver Andy Green and the rest of Richard Noble's ThrustSSC team has triumphed British automotive engineering in the face of stiff competition from the Spirit of America team and offered renewed inspiration to Protape who have talked about using 'an adapted Halfords caravan hook' as a means of achieving a sub-96 second delivery time within London's M25—although not all spectators are treating the claim too seriously. What is not open to debate, however, is Protape's participation in the record breaking event, as reports and interviews have been recorded using FX Rentals equipment running its donation of Quantegy 1/4-inch 456, Apogee DATs and TDK cassettes—the harsh climate of Nevada's Black Rock desert being a key element in the performance of both recorders and media. Protape. UK. Tel: +44 171 323 0277. FX Rentals, UK. Tel: +44 181 746 2121



Japan's Winter Olympic extravaganza has opted to use apt NLX256 Broadcast Network Transceivers for its audio coverage. Over 100 of the apt-X coding units have been supplied to accommodate the Nagano event, following the 250 units purchased by British Telecom for its new MusicLine One point-to-point mono audio delivery service—and using the same proprietary coding system. apt, UK. Tel: +44 1232 371110.

The BBC's Resources Post Production facility is to take delivery of a Soundtracs Virtua digital console for programme dubbing. The Virtua will run alongside an AMS Neve AudioFile and its workload will include drama, light entertainment and childrens' programmes. BBC Television Centre, UK. Tel: +44 181 743 8000.

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

Florida's Palm Beach is the location of a private studio being built by Ron Last—son of cult German orchestra leader James Last. Designed by LA-based studio bau:ton, and equipped with a 72-input Euphonix CS3000 console and Quedest Q412C, H108 and QSB121 monitors, the room is to be fully 5.1-channel surround capable. Also in Florida. The Discovery Channel Television Centre has ordered an SSL Scenaria with Vision-Track. The new broadcast and production facility is the first to be owned by Discovery Networks, and will be used for programme creation and sweetening. The facility will include seven audio post suites and will be integrated into the Network's server-based post and broadcast operation. studio bau:ton, US. Tel: +1 213 251 9791.

Euphonix, US. Tel: +1 415 855 0400.

Quedest, UK. Tel: +44 181 566 2488.

Discovery Networks, US. Tel: +1 301 986 0444.

London's Pearson Television has purchased Sennheiser UHF RF microphone systems. Pearson's Studio 2 has been equipped with a 6-channel EM1046 system, six SK50 belt transmitters and two SKM5000 hand-held transmitters. One of the company's regular associates, Flextech, has been equipped by Pearson with a 4-channel EM3000 system comprising two EM3032-U receivers and four SK50 miniature belt transmitters. Pearson Television, UK. Tel: +44 171 691 6000.

Sennheiser, UK. Tel: +44 1494 551531.

Hollywood-based Enterprise Studios has built a new living-room style postproduction room, equipped with Miller & Kreisel loudspeakers. The new room is the latest interpretation of a professional representation of a 'typical domestic' listening environment, and a reaction to the more normal theatre-style rooms. Elsewhere in California, NBC has ordered America's first SSL Altimax digital post system for use on

movie openings, promotional spots and affiliate presentations.

Miller & Kreisel, US. Tel: +1 310 204 2854.

SSL, US. Tel: +1 212 315 1111.

British post house Anvil Post Production has committed to two new SSL Avant digital film dubbing consoles. The Denham-based facility is to equip two new digital theatres with 192-input, 72-fader consoles complete with a Hub Router and DiskTrack recorder. An Audio Preparation Station is set to follow the two Avants.

Anvil Post Production, UK. Tel: +44 1895 833522.

SSL, UK. Tel: +44 1865 842300.

Nashville's Omni Sound Studios has installed an API Legacy console. Resident in Studio A, the Legacy is equipped with 40 Input channels, 38 returns and Flying Fader automation. Billed as one of Nashville's leading recording venues, Omni Sound specialises in nothing less than country music.

Omni Sound Studios, US. Tel: +1 615 321 5526.

API, US. Tel: +1 708 653 4544.

British broadcaster Channel 4's subsidiary, 124 Facilities, has opened a new sound suite. Built around a DAR SoundStation Gold, Soundscape system and Yamaha O2R desk, 124 operates Dolby Surround and a CEDAR audio restoration system.

124 Facilities, UK. Tel: +44 171 306 8063.

DAR, UK. Tel: +44 1372 742648.

Soundscape, UK. Tel: +44 1222 450120.

London has a new post facility in China Blue which has equipped two digital preparation suites with AMS Neve AudioFile Prolog editing systems. Located on the site of Josiah Wedgwood's London show-room and due to open in 1st December, China Blue has three feature films, a 1/2-hour opera and a promo video for PolyGram already commissioned.

London's Videosonics has purchased a 24-fader AMS Neve Libra console to join its Logic DFC, Logic2, Logic 3 and 13 AudioFiles. Displacing an SSL SL6056 console in Studio 1, the Libra will serve music recording and mix-to-picture duties.

AMS Neve, UK. Tel: +44 1282 457011.

Recording Architecture, UK. Tel: +44 181 8586883.

Videosonics, UK. Tel: +44 171 482 2855.

The Philippines has nine University sites newly equipped with XTA RT1 spectrum analysers. The common factor is the Science of Acoustics course, for which the RT1 provides sound level and RT60 measurement as well as spectrum analysis. The order included beyerdynamic Blueprint reference amplifiers. The course serves sound architects, consultants and engineers studying frequency and delay time analysis.

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

beyerdynamic, Germany. Tel: +49 7131 6170.

November

1-15

5th Vintage Electric Musical Instrument Auction

Devon, UK
 Tel: +44 1363 774627.
 Fax: +44 1363 777872.
 Email: vemia@mail.eclipse.co.uk
 Net: www.eclipse.co.uk/vemia

4

AES UK Annual Dinner

London
 Tel: +44 1628 663725.
 Email: AESUK@aol.com

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: +44 181 240 5055.
 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.
 Email: gsgm@exponor.mailpac.pt
 Net: www.exponor.pt

11

18.30 lecture:

Processing I-bit Audio

Peter Eastty, Christopher Sleight and Peter Thorpe, Sony Broadcast & Professional Europe.
 Conference Room, Baden-Powell House, South Kensington, London SW7.
 Tel: +44 1628 663725.
 Fax: +44 1628 667002.
 Email: AESUK@aol.com

18-20

Digital Media World 97

Wembley Conference & Exhibition Centre, London, UK.
 Tel: +44 181 995 3632.
 Fax: +44 181 995 3633.
 Email: dmadmin@atlas.co.uk
 Net: www.digmedia.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: +62 21 4204300.
 Fax: +62 21 4201151.
 Email: ib97@mmp-net.com.
 Net: www.mmp-net.com/ib97

December

9

18.30 lecture:

Can Industrial Design Improve Loudspeaker Performance?

Richard Salter & John Watkinson, Celtic Audio.
 Conference Room, Baden-Powell House, South Kensington, London SW7.
 Tel: +44 1628 663725.
 Fax: +44 1628 667002.
 Email: AESUK@aol.com

9-11

BCS India 97

New Delhi, India.
 Tel: +91 11 462 2710.
 Fax: +91 11 462 3320.
 Email: exhibind@viasdl01.vsnl.net.in.
 Net: www.exhibitionsindia.com

February 1998

5-6

98 Live!

The Roundhouse, London, UK
 Contact: Justine Smart
 Tel: +44 1322 660070.
 Fax: +44 1322 615636.

17-19

Integrated Communications 98

Level 2, Olympia 2, London.
 Contact: Turret RAI
 Tel: +44 1895 454438.
 Fax: +44 1895 454588
 Email: 100730.1313@compuserve.com

March

11-15

Musikmesse, Frankfurt, Germany

Contact: Anke Witte.
 Tel: +49 69 7575 6596

16-19

Technology India 98

Bombay Exhibition Centre, Mumbai (Bombay), India
 Contact: Above & Beyond Exhibitors
 Tel: +91 11 651 0205
 Email: vikas.gulaty@gems.vsnl.net.in

23-27

4th BTV China 98 and 3rd COMMTEL China 98

Contact: Business & Industrial Trade Fairs.
 Tel: +852 2865 2633.
 Fax: +852 2866 1770.

April

14-16

PLASA: Light and Sound Shanghai

Intex Centre, Shanghai, China.
 Contact: P&O Events
 Tel: +44 171 370 8837
 Email: shanghai@eco.co.uk

May

16-19

104th AES Convention

RAI Conference Centre Amsterdam, The Netherlands.
 Tel/Fax: +31 35 541 1892.
 Email: 104th-chairman@aes.org.

jünger audio

the e07 "high sampling mode" digital equaliser



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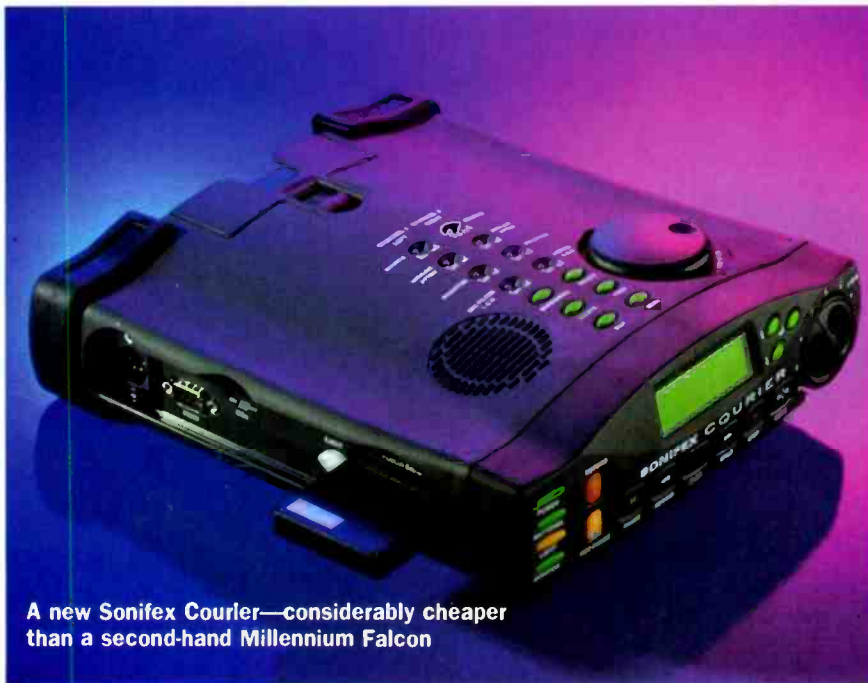


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TEL: +44 (0)1223 424988
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A new Sonifex Courier—considerably cheaper than a second-hand Millennium Falcon

Courier price

After reading Neil Hillman's review of the Sonifex Courier portable recorder (*Studio Sound*, October 1997), it seems that Neil has actually inadvertently quoted the price of the Millennium Falcon in the article instead of the Courier portable recorder. The entry level price of the unit is £1,925 which includes a battery, universal power supply-battery charger and carry case and not £31,925 as quoted.

I think that maybe when Neil's intergalactic review email hit the *Studio Sound* mail server it translated the '£' sign as a '3'—something to watch out for in future reviews.

Still if someone wants to pay £31,925 for a Courier then they're quite welcome to...

**Darth Vader (aka Marcus Brooke),
Sonifex**

In the ring

I have just finished reading Dave Foister's review of the RSP Technologies Circle Sound process. In it he quotes from an officer of Circle Sound: 'According to Circle Sound's Henry Root, comparison was made between CS 5:2:5 decoding of the optical track and conventional playback of the AC-3 5.1-channel digital track, and the Circle System won'.

If this is indeed what Mr Foister wrote, then he is guilty of irresponsible journalism. How could the Circle Sound system 'win'? 'Win' is usually taken to mean better.

The AC-3 soundtrack should be a very close match to the original tracks, with changes only being any artistic ones introduced in the final transfer. Monitoring while recording the track (a standard practice, of course) proves this.

There is no way a matrix system, Dolby or Circle or any other, can accurately match the original at all times. Such systems do a good or bad job of approaching close depending on their design. In general, the

deficiencies are more apparent when the signals in all four (or five) source channels become loud and different.

It may well be due to these differences that Circle Sound was preferred to a Dolby matrix-decoded version—but that wasn't the situation described.

It may also well be that those listening to the test 'preferred' the sound from Circle decoder to that of the AC-3 decoding; but there is no way that it would have been closer to the original—which is surely how most people would interpret 'win'. If such a preference is actually what happened, that's a valid statement indeed—but Mr Foister should have taken steps to find out exactly what was being compared before baldly writing something which, on the face of it, is absurd.

**David P Robinson, Senior VP,
Technology, Dolby Laboratories**

On behalf of Dave Foister and maligned journalists everywhere, I feel that I should point out that the comment attributed to Henry Root is just that: Henry Root's comment. In relaying it, Dave is guilty of reportage, not sabotage. Certainly, to 'win' is to come out on top, but neither Henry nor Dave in his report, claim that the competition is an objective exercise. It would, indeed, seem that Henry's panel *preferred* the RSP system, as opposed to *judged* it to be technically superior—and I am confident that this would have been inferred by the vast majority of readers.

There is, however, no question that your comments regarding the properties of coding systems are correct. And similar issues of accuracy apply all down the audio chain, to a variety of technologies and without any universally agreed method of measurement.

So please don't shoot the messenger, otherwise I'll feel obliged to take issue with your misidentification of the Circle Surround system as Circle Sound...

Tim Goodyer, editor

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ULTIMATE SOUND MACHINES

International Head Office

Sindalsvej 34, 8240 Risskov, Denmark

Phone:(+45) 86 21 75 99 • Fax:(+45) 86 21 75 98

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Amek Soho

A derivative of the DMS, Amek's Soho will make its case to the post market next year armed with Stargate, great looks and keen price. **Zenon Schoepe** takes to Soho

THE APPEARANCE of Amek's Soho post-orientated digital console at this year's IBC was a move that many expected the company to make as soon as it was ready. The desk represents a natural development downmarket of the DMS technology allied to a common-sense platform for Amek's Stargate connectivity protocol previewed at the Munich AES. Given the positive response to the Stargate concept, any DAW from any participating manufacturer can be paired with the DMS with varying degrees of completeness—giving any DAW manufacturer access to a digital console. That the idea was welcomed for the flagship DMS was one thing, but the principle also applies to the Soho with a price

floating arrangement of the DMS, and this predictably reduces the amount of hardware required. Amek has also taken a slightly different angle on the I-O and instead of having dedicated I-O racks with dedicated input cards, there is an onboard breakout panel with 84 inputs with multiplex routing feeding down to a 48-channel mix.

Soho comes in three configurations: the base model has 8 faders with 32 digital inputs, 8 analogue inputs and 20 derived inputs; a second 8-fader model has 32 digital, 24 analogue and 20 derived inputs; and the full-blown version has 16 faders, 32 digital, 24 analogue and 20 derived inputs.

Stargate is standard on the 16-fader version,

would miss out on with this method is the higher levels of promised integration and functionality between the machinery in question.

Another point worth mentioning is that there is, of course, interchangeability of data between a Soho and a DMS allowing a multi-Amek digital-equipped complex to pass things around.

SOHO HAS a pool of 16 buses and what the company terms Dual Mode Operation to give a tracking and mixing mode. For tracking you're given more sub buses and fewer auxes, while the mix mode has fewer sub buses and more auxes and it's these auxes that are pulled off to work in LCRS or 5.1.

As can be seen from the pictures, you are presented with LCD-equipped, stripped-down 'channel strips' above touch-sensitive fader blocks with an assignable controller and a delicate sprinkling of switches per 'channel'. The centre section contains all the various master-style and automation controls plus aux masters, monitoring and comms functions while a touchscreen up-top facing the operator has a column of rotary controllers that adjust what ever set of parameters you have displayed. It's not a tough desk and many of the principles have already been seen in the DMS.

Screens can be called up on a button press to correspond to such things as the input section of the channels offering input selection, input metering, phase reverse, insert, as well as the order in which the signal path will pass through the blocks of EQ, dynamics and so on. There are control groups and up to 12 auxes, remember depending on the mode, and for tracking you can have 8 buses, 4 auxes and a main mix bus.

EQ, aux and dynamics buttons assign the controllers near the screen to the selected function and the screen shows what you're doing. EQ is 4-band with swept mids and high-pass and low-pass filters with classic, modern and fine algorithms for different degrees of resolution which can be chosen on a per-channel basis.

Channels are flipped to the control surface physical faders by using FADER SET buttons that access the banks and you can configure a set to give you what you want to see in any order—and yes, you can include the same channel in more than one set.

A channel is selected for tweaking on its INTERROGATE button and the EQ and dynamics can be assembled in to libraries. The physical 'channel' controllers can be programmed to perform a variety of functions such as gain trims or aux sends either globally or locally.

The strip also has a MUTE and a SELECT button for the automation the latter benefiting from tricolouring to reflect read, write and update status. Automation is essentially the same as the DMS—SuperTrue with everything



Amek Soho: a potential partner to any DAW

that starts at around £30,000 and rises to some £40,000 (UK, depending on configuration). Price-wise Soho occupies its own space and promises to be extremely attractive to a broad range of postproduction users.

It's important to point out that the Soho is not so much a repackaged DMS as a re-engineered DMS. Amek touts the DMS as 'probably the most flexible piece of hardware and software in a console currently available', and those who have been following its progress will have spotted that it can be configured in almost any way you wish, with small or expanded work surfaces for a near custom job. Soho has a tighter and more preset structure that is aimed specifically at post and this focusing has permitted the technology to be given a lean pricing structure. The chassis is fixed in size and you're offered a base model with 8 faders and the rest blanked off, or a bigger version has extra faders. It looks extremely handsome.

Soho is purely assignable unlike the 'fully

and we're told that a number of DAW manufacturers are interested in incorporating it—there have been no formal declarations, although it has been seen in the company of Akai, DAR and Fairlight DAWs. There's even a Soho-style add-on pod available to house DAW controllers so the whole thing looks like an integrated piece of furniture.

A brief and rudimentary recap of what Stargate aims to achieve would not go amiss. The first level is simply connecting the DAW I-O to the desk and connecting the machine control ports. The next level takes in EDLs and tracks event-based automation while level three combines the time-lines of the two machines to realise off-line editing. Harder and more specific news is expected by Soho's launch time of January but it's worth pointing out that you don't have to have Stargate to plug up a DAW to a Soho, or a DMS for that matter, because you can connect the two items in the more traditional manner that you would use with MIDMs, for example. However, what you



else dynamically automated as well—plus snapshot automation which is a derivative of the Showtime live package. Machine control is handled via MMC, RS232 and RS422.

You can have a maximum of 48 channels coming into the desk simultaneously but in its unexpanded form you only have 32 DSP resources which can be EQ or dynamics. However, there will soon be an option to slot in another DSP card which will enable you to achieve 48 channels of EQ or dynamics. Part of the skillset of this extra DSP board is the inclusion of onboard effects for reverb, delay, chorus, flanging, 5-band EQ, 12-band graphic and de-noising. At the moment these are Amek developed effects but you don't have to be a rocket scientist to suggest that Amek's recent complete embrace in to the Harman fold could lead to the inclusion of algorithms from other family members that are perhaps better known for this sort of stuff.

VFX—Amek's remote control package for running well-known external outboard devices—is also included.

A cool touch is that while metering is selected and defined by the user for on-screen display, Soho will be able to support external monitors that can be dedicated to showing metering continually.

One of the unusual claims that Amek is making is that future updates to the software of Soho will release more efficiency in the hardware and this has already been borne out by the latest DMS upgrade which uses some

15% less processing allowing you to achieve more in hardware terms.

About my only reservation about the Soho concerns the arrangement of the screen and its associated rotary encoders which are among the most commonly used knobs on the surface. Positioned as they are, near vertically, at the far edge of the board when you tweak them you do so with an extended arm. It's not a great stretch but I just wonder what that will do to the muscles in your shoulder and your forearm at the end of a 12-hour day.

It has to be said that the Soho I saw was not completely finished, otherwise this article would have gone into far more detail. But even some three months prior to its official release, which is when I saw it, there was a good solid feel about this console. It feels to be about there.

The styling of Soho was critical and a marvellous job has been done on how this thing looks. One of the common criticisms of cheaper digital desks is that they can look a little unimposing within the context of a glitzy post suite that is asking a lot of money. Soho addresses this by looking like it ought to ask the hourly rate. Curves and furniture are everything to those who don't understand the technology and are already convinced

that their chosen operator is the right one for the job. Clients want to be reassured that they're buying in to something good.

Stargate, while not unique to Soho, does open up the product to a world of potentially interested users. Here is an affordable digital desk that intends to interface with any DAW that would listen. This Henry Kissinger non-brand partisan approach certainly hits the mark as an idea but it is now up to manufacturers to act and exploit the promise.

The 'preset', or rather preset-ish, nature of the desk avoids much of the trauma that can be associated with specifying a first digital desk. You know what Soho is, what it will do and how much it will cost and there's none of that 'anything you want it to be, sir' line that only confuses the issue. One of the attractions of the new breed of affordable digital desks is their ability to be defined in terms of an analogue desk.

As it stands the abilities promise to be extraordinary value for money and well honed to the task. Two distinct operational modes fit the post bill well—tracking and mixing—and it really is as simple as that.

Soho and Soundtracs' DPCII are currently the two most exciting digital products pending. ■

Contact

Amek Systems & Controls,
New Islington Mill, Regent
Trading Estate, Oldfield Road,
Salford M5 4SX.
Tel: +44 161 834 6747.
Fax: +44 161 834 0593.
US: 7051 Highway 70 South
307, Nashville, TN 37221.
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Fairlight MFX3 Plus

Already well established with sound-for-picture houses, Fairlight's upmarket MFX3 has recently seen some useful updates. **Rob James** checks out its current standing in the market

THE LATEST INCARNATION of Fairlight's MFX3 workstation is the MFX3 Plus—effectively a contemporary update of one of the first DAWs to appear. But it hasn't all been plain sailing from Sydney. In spite of the success Fairlight enjoyed with the CMI (the Computer Musical Instrument on which I can still remember a dog barking 'Happy Birthday') the succeeding Computer Video Instrument found only tardy and fleeting popularity in Acid House video circles. Subsequently, the Australian innovators fell into turbulent times, but a change of ownership and the introduction of the MFX has seen the company established at the top end of the DAW market. Today, the machines are to be found worldwide in various roles but perhaps most notably in sound-for-picture.

The MFX3 Plus comes in a variety of configurations from 4 inputs and outputs to 24 in increments of four. Even a 4 I-O machine can be used to prepare 24-track projects, but only 4 tracks can be recorded or heard at one time. Storage capacity is now up to 1.4Tb (Tera bytes) using currently available disk-array technology.

On the rear panel of the mainframe are audio connections, analogue and digital, all on D-connectors which saves panel space and cost when installing the machine, and allows the digital connectors to do double duty as AES and SPDIF. Two 9-pin (Sony P-2 Protocol) machine control ports are provided together with a serial printer port for cue sheet printing, MIDI time code, wordclock and video sync are all here together with a D-connector for the GPIs, and, of course, for the VGA display, A-D and D-A converters are 18-bit, digital I-O is up to 24 bits (currently 16-bit recording, with 24-bit slated for early 1998). Internal processing is to 40 bits. The eight GPIs can be used to switch external kit when assigned events occur in MFX. If a GPI is used for ADR, audio beeps may be sent from an audio output.

The system is operated using the hardware console, a solid, heavy, device that resembles an overgrown PC keyboard with significant additions. There are no rodents here.

The MFX3 Plus is considerably more compact than its predecessors—a good thing since the earlier version was very profligate with horizontal surface real estate. There are a lot of keys on this controller, 161 according to my arithmetic, but despite this apparent generosity, many of the keys have several functions depending on mode or when used in conjunction with other keys. The keys are divided into blocks according to function and considerable thought has obviously gone into the placing of keys where they will fall to hand when carrying out various operations.

Across the top of the console are the Macro Master key and 15 Macro keys. Below this on

the left are a block of Track keys, all with internal red LEDs. To the right of this is a block of ten keys with SOLO, MUTE and ARM keys at the top together with various other menu keys. At the bottom left is a QWERTY keyboard. The system makes naming things easy and this brings benefits in library and project management not to mention cue sheet printing.

The right of the console is dominated by a window with two recessed LCDs and a chunky jog-shuttle-parameter entry wheel. Below the display are five soft keys. The last block, top right, contains Transport Mode keys and Menu keys.

The MFX3 Plus offers 24 tracks with real-time crossfades from one suitable SCSI hard drive. The emphasis is on speed of operation. In addition to the usual editing functions there are specific modes for ADR recording and destructive recording in addition to non-destructive recording.

The Gate function can be used when recording or on existing clips to 'strip silence'. The gating parameters are variable and disk space can be recovered, destructively, by using the Commit function. EQ is clip based, operates in real time, and is elegantly executed. EQ settings are fixed within a clip—if a change is required within a clip you simply split it and treat each part separately, if necessary crossfading between the new clips. Clips can be EQ'd individually or a Range of clips can be dealt with together. Each band can be shelving or peaking with frequency from 20Hz–20kHz. Maximum boost is +20dB, cut -99dB; Q is variable 1–99 plus shelf. Clip gain can be adjusted from the EQ section to compensate for the EQ applied and settings can be copied from one clip to another or a range of clips. Any band can be toggled on or off when copying. The graphic display is very clever. Individual coloured plots are used to denote the effect of each band and the combined effect of all of them.

Time-domain functions include Pitch Shift and Time Stretch with a choice of 6 algorithms, and varispeed. These processes are non-real-time operations and produce a new clip or clips with the processing applied which are placed 'over' the existing clip or clips.

AudioBase gives the MFX powerful library functions to allow access to vast numbers of clips—such as sound effects across several disks—and provides a search engine to aid location of the required clips. Any clips used in a project can be 'published' to AudioBase. Autoconform is catered for by using a software package on a PC that is used to control the MFX that, in turn, controls the source machine.

The operating model for the Fairlight is an endless loop 24 tracks wide and 24 hours long. Master recordings are always made onto

(mono or stereo) Tracks against time. Stereo pairs are always on consecutive pairs of tracks, but displayed on the lower numbered track. If a stereo recording is overlapped by a mono the right-hand side of the stereo clip will not be heard. This can take a little getting used to if you have spent a lot of time working with machines that use the alternative of a pile of disembodied recordings which are then placed onto tracks. I don't believe either model offers any significant advantage in a well developed machine, which the MFX certainly is.

Because of this model it is easy to record over existing clips. This is not destructive (unless you want it to be, in which there is a Record Over mode) and means you can have several clips 'stacked' which are not visible in the Track display. Entering any edit mode replaces the meter display with a Takes screen. This lists all the clips on the currently selected track, including the hidden ones. The Takes menu allows control over which clip will be heard when there are multiple clips 'behind' the one on the Track display. The POP softkey puts the selected clip on the top layer.

Work is undertaken in Projects, one Project containing a maximum of 4,096 clips which must all share the same sampling rate. Clips may be easily auditioned and Borrowed from another project for inclusion in the 'live' Project. If you want to physically copy the audio data into the current Project, you must use the Keep function. If you want to play about with an existing project without changing it, or the drive you are working on is full, the Project can be 'Extended'—this makes a copy of the existing Project data (not audio data) which can then be added to, or changed, without affecting the original. Projects can be backed up to optical disc, hard disk or tape streamers with all of the audio and edit data.

The screen display is clear and relatively uncluttered. Pastel shades have been deliberately chosen to be easy on the eyes after long periods of intensive use. Scrolling is smooth and the Zoom function has 16 levels which display from 6 frames to 8 hours per screen. The zoom level also affects the jog wheel gearing.

The Track display is present in all modes except when managing Projects and Devices (on the Device and File pages) or patching. Any input may be patched to any Track or Tracks, however if an input is patched to several Tracks, only one may be armed for recording at a time. Stereo recording is not explicitly selected. Patching two inputs to one Track makes the track stereo for that recording. The current input is shown by a number in a small red block at the bottom of the relevant meter ladder whenever a track is armed.

The waveform display is interesting—to manage the trick of extracting 24 tracks from one drive the MFX uses buffers which need to

be loaded before audio can be played out. As buffers are loaded the waveform is drawn on screen. The downside of this technique is there is a finite and variable time taken to load the buffers depending on what you have done before invoking play or jog and how many Tracks contain audio. In real-world use this is much improved over earlier versions and the wait is usually almost unnoticeable and in worst case around 2s.

Tracks can be soloed, muted, made safe from further changes or armed for recording using the Track keys in conjunction with the relevant adjacent menu key. Tracks can also be disabled, which differs from muting in that the audio is not fetched from disk.

Editing functions are comprehensive. When editing, only clips on the selected Track(s) are affected. Some edit functions affect only clips touching the cursor, others require a Range to be constructed between two time codes—say, to edit the middle of a clip. This is achieved using the FROM and TO keys. Editing takes place by cutting or copying material to the clipboard and pasting it somewhere else, or if you simply wish to remove a clip or part of a clip use Erase. The Fill command allows a clip or section to be looped to fit a range. The crossfade can be adjusted and there is a backwards-forwards fill function that does as it says and can work wonders on difficult material. The Slip and Trim modes allow clips to be moved in time or the head or tail of a clip to be trimmed. Clips can be 'trimmed out' to the full extent of the original recording. The catch is you have to go beyond the visible clip, guessing where the start or end might lie, and press enter. The graphic representation of the clip does not 'unreel' and you cannot hear audio while moving the transport.

Block editing is used for working on a number of Tracks and requires a range. It has two modes—Razor and Dubber. In Razor Time is cut as well as audio, Dubber simply affects the audio. Track bouncing can be done from here—a bounce clip can be created on the same Track as one of the source clips. If the bounce results in digital overload the software automatically repeats the bounce at reduced level.

Inter-track operations such as swapping audio between Tracks, are accessed from the



Track menu. You can also swap the numbers of two Tracks and hence their position in the display, move audio from one Track to another, and Shadow which can automate the process of replacing sync audio with ADR by using the ADR track as a 'mask': wherever there is ADR the sync is erased.

The Fade menu allows fades to be easily set at the head, tail or both. Crossfades are more confusing since only the top clip displays a fade although it is possible to move the mid point of the crossfade, a highly desirable feature. The level at the mid point can also be set. There are also comprehensive macro facilities to automate sequences of keystrokes for repetitive operations.

For many applications hard copy cue sheets are required. This may be a contractual requirement or simply an operational one. In either case, producing cue sheets manually is a time consuming and tedious exercise. Fairlight has seen fit to include intel-

ligent, autoscaling, cue sheet printing on the machine which saves messing about with third-party software or doing it by hand.

I was pleased to learn Fairlight is an enthusiastic supporter of file interchange and MFX3 supports Mac drives (read only) and can play OMF1 sequences live from disk. In addition, the company will support the AES initiative.

The MFX3 manages to be reasonably easy to learn without restricting the requirements of 'power users'. It is a well sorted system that is highly productive in capable hands. When used in conjunction with the DaD dubber, Fairlight has a viable system for large scale sound-for-picture facilities. The compromises (like buffer loading necessitated by the

24 tracks on one disk philosophy) are now well managed and, as far as I can see, the main barrier to a very wide acceptance of the machine is its relatively high cost which currently restricts it to high-end facilities. ■

Contact:

Fairlight, Unit B, 5 Skyline Place, Frenchs Forest, Sydney, NSW 2086, Australia.
Tel: +61 2 975 1230.
Fax: +61 2 975 1368.
UK: Fairlight.
Tel: +44 171 267 3323.
Fax: +44 171 267 0919.
US: Fairlight.
Tel: +1 213 460 4884.
Fax: +1 213 460 6120.
Sweden: STV Video Data.
Tel: +46 8 714 0020.
Fax: +46 8 640 1637.
Egypt: Penta Electronics.
Tel: +20 2 299 0478.
Fax: +20 2 299 2617.

Audio Developments AD 149

The latest in AD's respected line of location mixers is their best. **Neil Hillman** puts it to the test by driving it hard alongside his own trusty older AD desk at a corporate shoot

ONCE UPON A TIME, in a wood, there lived three little mixers. A blue one, a grey one and a red one. The blue one was the baby and it was an entry-level mixer that offered the simplicity of two outputs, undaunting but effective equaliser modules as well as auxiliaries. It was called the AD 147. The grey one was mother mixer, with four outputs and was really for edit suites. It had comprehensive left and right monitor modules and the ability to change its Input Gain switch to a potentiometer if an individual mic-line module was included for commentary or voice-over purposes. It was found though that this way of working could reduce headroom or compromise the mixer's noise performance. This one was called the AD 148. But the red one was the Big Daddy of the AD family. It was called the AD 149. It carried some of the family characteristics with it—like being built around the principle of combining audio transparency with the strength of a brick out-house with a pitch-tiled roof and tin bath suspended on a nail; and then some.

If you go down to Walsall Wood today, you're in for a big surprise, because here is a



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mixer manufacturer who has listened very carefully to the feedback of location recordists, and attempted to design the most flexible and friendly mixer on the market. And do you know what? They might, just might, have achieved it.

The question that faces manufacturers is 'When does a field mixer cease to be a field mixer and become a small studio mixer?' The answer is not as simple as: 'When it can be battery powered?' So what features do you reasonably put in or leave out?

The AD 149 boasts channel insert points, channel direct outputs, adjustable limiters on each input, two pre or post fade switchable auxiliaries, two communications channels with balanced return, unbalanced output for DAT machines, remote start, multiway connectors for outputs and returns and the most flexible manipulation of M-S signals ever seen. There is even a private circuit available for the sound mixer to talk to the boom operator and to hear the reply through the boom channel without all and sundry listening in on the obligatory radio headphones to the kind of technical conversations that can transpire between sound professionals: 'Have the caterers put out the lunch menu yet?' 'Well can you see it from there if you stand on a bigger box?'

There are five modules available to be fitted to the AD 149: Microphone-Line, Mono Line, Stereo Line, Output Module and Monitor Module with only the Output and Monitor modules needing to be sited at specific parts in the mixer frame.

Give six recordists the same task, and the

Give six recordists the same task, and the same mixer to do it with, and you would certainly get more than two ways of doing the job

same mixer to do it with, and you would certainly get more than two ways of doing the job—this becomes apparent over the choice of a continuously variable input gain pot. The preferred working method of many film-sound recordists is apparently to have the linear channel faders full up against the end stop and then vary the course gain of the input pot for a given input signal—it works, and certainly maximises the dynamic range of the input amplifier, but at the cost of headroom. My preference would be for a microphone input stepped in 10dB increments; without that, it's like driving your car around town in first gear. The car is at its most responsive, and you can get up to 30mph, but it's not operating how it was designed to. Still, when I've mixed some of the quality drama that these folk have, maybe I'll feel better placed to offer advice. For now, let's just look at some of the innovative features built in to the AD 149.

There is a passive high-pass filter before the transformer on the microphone input to prevent saturation from wind noise and an active filter after the transformer; equalisation is 3-band HF, MF and LF.

After the EQ section is the channel **page 20 >**

Studio Sound November 1997



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Grandpa and Big Daddy work together

< page 19 insert point with its ON-OFF switch. With the insert switched out, the insert 1/4-inch socket becomes a direct output—providing the 1/4-inch plug carries the machine's input and output signals. an 8-track recorder would sit very happily at this point with the opportunity to create a monitor mix when the insert point is switched on. with the system robust

enough not to suffer breakthrough.

The Auxiliaries have a common ON switch but are pre-fade or post-fade switchable individually; with the ST switch on they become a stereo pair with Aux 1 becoming gain and Aux 2 the pan pot; making the AD 149 a 2-stereo discrete output mixer.

The first opportunity to manipulate an M-S

signal is when the S (SIDE) button is switched in, making the next channel along the second half of the matrix, converting an M-S signal into L-R stereo or vice versa if required. The channel output is routed through a pan pot to the monitor module and on to pre-fade listen.

There is a limiter on each channel, and the controls for attack, release and threshold are brought out as small screwdriver adjustments on the left-hand side of the fader strip, capped to prevent any ingress of dirt, dust or biscuit crumbs. LED's indicate channel overload 3dB before clipping, limiter operation and that PFL has been selected.

The output module provides the opportunity again to encode-decode the output to, or from, M-S to L-R stereo and limit the output, as well as carrying the main output faders and the Aux 1 & 2 master controls, their stereo link and M+S matrix.

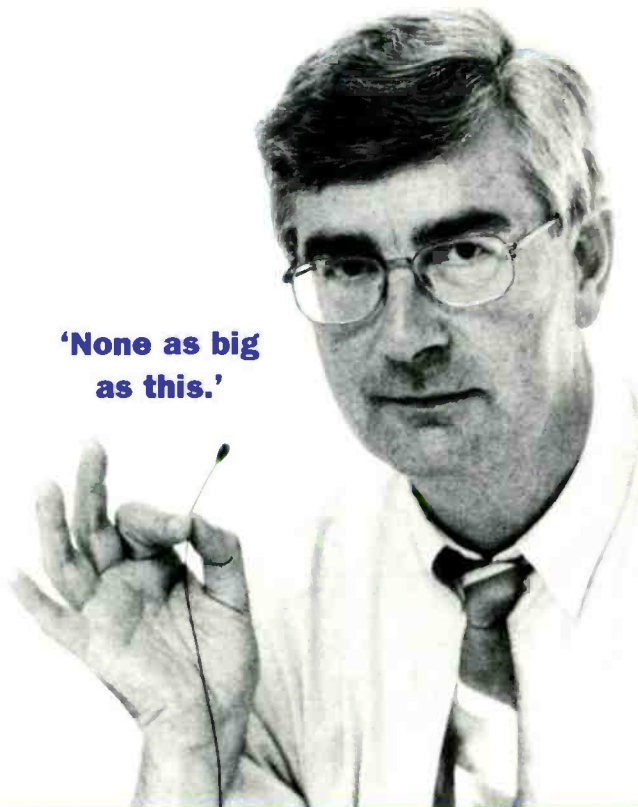
Line-up tone may be selected to the main L-R output and-or to the two Auxes and is selectable between 1kHz or 10kHz and may be broken on the left output by the INT switch.

The meters can be switched between main output, Aux 1 & 2 output, monitor or PFL, and a battery indication can be switched in on Meter 1. The remote start-stop function can also be arranged to provide a marker of a few seconds duration of low-frequency tone at the start and end of each recording.

A perfect opportunity to test the new mixer came with a call for a dramatised corporate shoot at the prestigious new showroom of a certain German car manufacturer. The opening 6-page scene was to run with continuous action

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and dialogue on Steadicam and involved 12 speaking artistes, all to be radio miked as the action around gleaming new lumps of polished and painted metal prevented any possibility of the boom not being seen. A multiple radio mic setup often has the potential to be a handful at the best of times, and this number now required me to feed the output of my light and dark-blue Grandpa AD 062 8-channel desk as a submixer into the 8-channel AD 149. The immediate difference between old and new became apparent with the limiter on each channel of the AD 149, a welcome safety net without the chance of one rogue loud signal shutting down the whole output, and the fact that the monitoring and distribution is now much more flexible enabling discrete courtesy feeds to be easily arranged for Continuity and the Director. The ability to take a signal in M-S, mix in L-R and then output in M-S, but monitor in decoded L-R or revert back to M-S on either of the monitor feeds is simply the ultimate in flexibility; pick any permutation and it seems it

The ability to take a signal in M-S, mix in L-R and then output in M-S, but monitor in decoded L-R or revert back to M-S on either of the monitor feeds is simply the ultimate in flexibility

can be done.

It really is difficult to find fault with the mixer, but in the quest for objectivity we must find something for goodness sake.

Having gone to this much trouble over input design, it would be useful to have a noise gate at the front of each input; the sound mixer needs to monitor through Mon 1 if they are not to have the levels ridden through the daisy chaining of Mon 1 to Mon 2; and a small anomaly exists if INT is selected and then de-selected while not sending tone, whereby an LF tone is introduced across the output for a couple of seconds.

So, is this the ultimate location mixer? Clearly not, because that one would have a cappuccino machine fitted after the main output, but before the doughnut maker, and a GPS plotter with every Little Chef entered on to it as a function of the send and return buses. Let me put it this way: there was a man whose incandescent brilliance has influenced so much of the philosophy and technology of recording sound, a man whose life was extinguished

agonisingly early by a WWII air-crash; and if a single one of you is thinking of Glen Miller, hang your head in deep, deep shame.

The genius that was Alan Blumlein has a fitting testament now in this mixer.

If only, sir, you could be right here, right now... D'you know what I mean? ■

Studio Sound November 1997

Contact:

Audio Developments,
Hall Lane, Walsall Wood,
Walsall, West Midlands
WS9 9AU, UK.
Tel: +44 1543 375351.
Fax: +44 1543 361051.
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Soho is the latest addition to Amek's range of fully specified digital mixing consoles. Developed specifically for audio post production applications, Soho is designed to be integrated with any existing or favoured Digital Audio Workstation. The sleek and ergonomic design and highly impressive specification makes it ideal for companies who require a cost-effective digital console, while maintaining the quality, professional image and functionality of their post production operation.

Sound Forge v4.0a

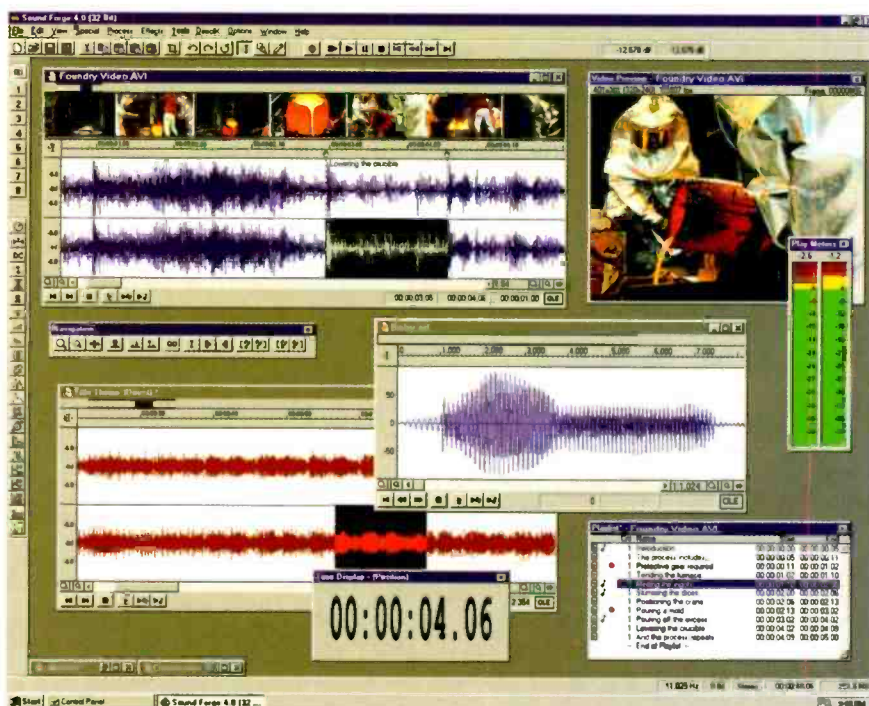
In the land of the workstation a big price tag doesn't automatically mean big features. **Rob James** checks out a modest digital audio editor with some impressive facilities

SOUND FORGE has hammered out a considerable reputation for itself in the PC audio editing market. Version 4.0a brings speed enhancements, a nondestructive playlist, and algorithm and interface improvements. Also new is support for Microsoft's ActiveMovie, a subset of the ActiveX technology and NetShow. Microsoft's live and on-demand platform for multimedia content development.

ActiveMovie was designed as a high quality replacement for Video-for-Windows but the underlying technology reveals interfaces that can be used as a plug-in architecture for video and audio applications. By adopting ActiveMovie as the Sound Forge standard for plug-ins, Sonic Foundry has opened the door to third-party developers to create plug-ins which will work with any application that supports ActiveMovie technology as well as Sound Forge.

Sound Forge 4.0a supports the Active Streaming Format (ASF) used by NetShow and RealAudio 3.0, one of the most popular codecs for Internet sound.

Plug-ins already available for Sound Forge from Sonic Foundry handle noise reduction, batch conversion and spectrum analysis. These can be obtained as individual plug-ins or as one pack. Also available are The CD Architect (*Studio Sound*, August 1997) and an Acoustics Modeller that 'imprints acoustic responses onto sound files'. This comes with a library of acoustic signatures including concert halls and vintage mics and so on, or you can collect and save your own. Third-party plug-ins include offerings from Qsound (Qtools) and Waves (L1 UltraMaximiser and AudioTrack and the



Native Power Pack bundle). I used the main Sound Forge v4.0a software and the plug-in pack for evaluation.

The software is supplied on CD-ROM with good, clear printed manuals. Installation is straightforward and should pose no problems to any PC literate person. Once installed there is comprehensive, contextual, on screen help, and 'ToolTips' which, if you keep the mouse pointer over a button for one second or more, pops up a small box with explanatory text.

Sound Forge will work with virtually any Windows-compatible sound card. I tried four, for fun—a Zefiro ZA2, TripleDAT, SoundBlaster 64 and an Ensoniq. They all worked as well as their particular hardware limitations would allow with no incompatibility problems. The package is, essentially, a stereo sound editing and manipulation software package. It can also be used to edit and manipulate sound for use in samplers from a variety of manufacturers including Akai, Digidesign, Kurzweil and Peavey and can be driven by MIDI hardware controllers, synchronised to MTC or SMPTE time code and file playback can be MIDI triggered.

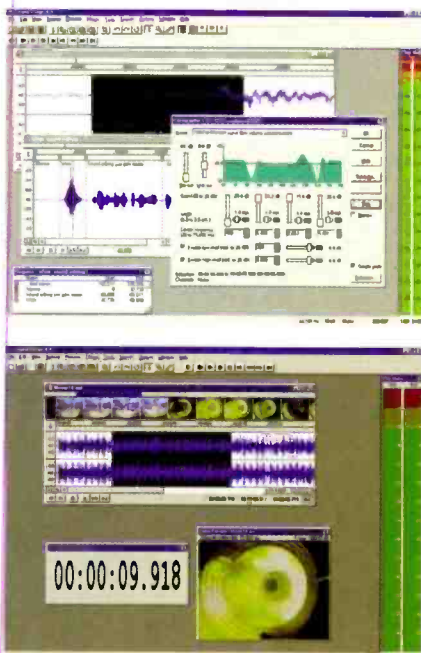
File types supported include: Microsoft-IBM .WAV, AVI, NeXT-Sun (Java), Sound Designer 1 and so on, Mono or Stereo. If the specific file type you wish to open is not directly supported there is a RAW file option that can cope with virtually any form of 8-bit or 16-bit uncompressed audio data or the G.711 compressed formats used for telecommunications in Europe and the US.

Files may be opened in normal, read only or Direct Edit mode. Normal opening creates

a temporary file so all subsequent operations are non-destructive until you save your work. Direct Edit mode makes opening files quicker since no temp file is created. In most cases this will not cause a problem since edit operations can always be undone but it does offer less security. Undo levels are limited only by disk capacity.

Opening a sound file prompts a data window with a waveform representation of the sound. A particularly good feature of the Open Dialogue is Autoplay—simply highlighting a file in the list causes it to play. This is useful when you're searching for something in a list of similarly named or unknown files. Multiple data windows can be opened, but only one can be active at a time. A set of buttons in the data window allow location to the start and end of the file and play the file either as a whole, looped or as it would be played by a sampler complete with sustaining and decay loops if present. A selection here affects the action of the PLAY button on the main transport controls (there's also a PLAY ALL button). The usual zoom controls and locator markers make it easy to navigate through large files.

Pressing the RECORD button on the transport controls opens Record Dialogue which allows recording to either a new or existing window. New recordings can be made at 8-bit or 16-bit resolution at sampling rates from 8kHz to 96kHz. There are several recording modes including recording initiated from MTC or SMPTE time code. Automatic Retake allows instant review or rerecording. Punch-in may be used to record over specific **page 24 >**



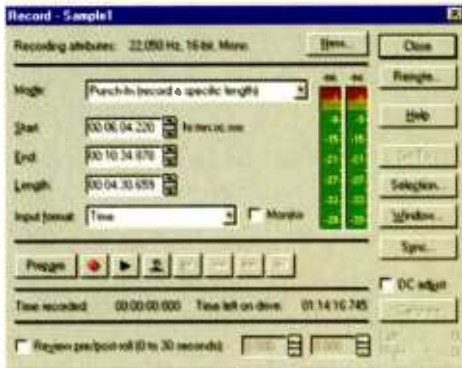
< page 23 areas in a file. If Multiple Takes Creating Regions is selected recording can be started and stopped many times to create one file with each recording defined as a region. Similarly, Create A New Window For Each Take does exactly what it says.

Common edit operations employ the word processor model of using a 'clipboard' temporary holding area. All the functions are the same as a word processor with the exception of Trim-Crop which removes everything apart from the highlighted section. Material can be Cut or Copied and Inserted into another window. Mixing and Crossfading are special cases of this using Paste Special. The selection on the clipboard will be mixed or crossfaded with the audio in the current window, starting at the cursor position and the relative level of the two sounds can be adjusted with a couple of on-screen faders, either adjusting the whole of each sound or just the overlap. These operations can also be carried out 'drag-and-drop' style: dragging a section from one window to another will open Mix Dialogue; holding the CTRL key while dropping opens Crossfade dialogue; and holding the ALT key Pastes. Snapping, if enabled, will make it easier to paste to specific points in the target window. You can also create a new window by dropping a section on a vacant bit of workspace.

Mix and Crossfade have a preview option, as do all other operations which require 'crunching', that allows the effect to be auditioned before committing. The preview can be set from 1s to 30s. All these operations are destructive in the sense that actual audio data is manipulated. The alternative possibility is to use defined Regions and the Playlist. The Playlist is simply a list of instructions of which region to play and when to play it. Regions can be moved in the list, altered or looped, and can be generated manually, automatically when recording or automatically on a file using fast attacks or musical intervals.

Sound Forge excels in what it calls Processes. The number of processes and adjustable parameters within them is huge and that's before you start adding plug-ins. Stereo files can be converted to mono and vice-versa with various options using the Channel Converter process. M-S (Middle and Side or Sum and Difference) recordings may be decoded to L-R with control over width of the result. 16-bit files can be converted to 8-bit files. This will be more successful if other processes such as Noise Gate, Dynamics-Multi-band (compressor in this case) and Normalise are used beforehand to minimise the effects of quantisation error. Files may also be saved in alternative formats and resampled to other sampling rates including anti-alias filtering.

Time-domain effects include simple and multi-tap (up to 8) delay, chorus, flange, pitch change and timestretch. Dynamics can be simple or multiband useful, among other things, for de-essing and de-popping. Filtering gives the choice of a 6-band parametric EQ with low and high shelf and 4 parametric bands giving 25dB of boost and cut and vari-



able Q expressed as 0.3-octave to 2.5-octave range centre frequencies adjustable from 20Hz to 15kHz. Other options are a 10-band graphic and a 4-band parametric.

Distortion, amplitude modulation, phase modulation or reverb can be added to regions or whole files. In addition to a load of presets all parameters may be user-defined. There are even synthesis functions, 4-operator FM, simple waveform and telephone tones.

The Batch Converter plug-in allows single or multiple processes to be applied to many files. This is a wonderful labour-saving tool if you have to convert whole projects from one format to another including, say, normalising, dynamics and resampling. Using the Preview Conversion function up to 5 different clips can be built from different files to check the processes.

Spectrum Analysis uses Fast Fourier Transform (FFT) to produce simple spectrum graph snapshots of frequency versus amplitude or the more complex Sonogram which is another way of displaying spectral variations over time. The Sonogram display will, with experience, allow identification of the characteristic patterns of particular sounds.

Perhaps the most interesting plug-in I used is the Noise Reduction module. This uses the noise-print method as a basis for broad-band noise reduction. As with the other Sound Forge functions there are a large number of user-adjustable parameters which can be tweaked to achieve the optimum result. Impulse noise, clicks, and so on, are dealt with using either manual or automatic interpolate or replace functions. The other option is waveform drawing which, although time-consuming can give excellent results on suitable waveforms. The final function is a combination of click and broad-band noise reduction optimised for vinyl recordings. This has fewer controls than the individual processes and is easier to use for good results.

Sound Forge should be a weapon in every engineers arsenal. Even if you have a serious (expensive) DAW, Sound Forge gives you a huge toolkit for the things the big DAWs can't do. More plug-ins are becoming available all the time. It is also a very quick editor for mono or stereo material. For those involved in games, multi-media or audio for the Internet Sound Forge offers some salvation for many of the horribly complex problems that beset such activities. ■

Contact:
Sonic Foundry, 754 Williamson Street, Madison, Wisconsin 53703, US.
Tel: +1 608 256 3133.
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AKG SolidTube

Taking an alternative approach to the 'classic' microphone game, AKG has delivered a modern valve mic. **Dave Foister** reports

AT THE HEART of the valve microphone revival is an enthusiasm verging on reverence for certain vintage models. The funny thing is that we're only talking about a handful of models from two or three companies that have stood the test of time, and prominent among the few is AKG's legendary C12. A few years ago AKG responded positively to the renewed interest with the C12VR; rather than let people part with huge sums for dodgy old specimens, sell them a new one, that probably sounds better, for less money. Nevertheless it remained an expensive microphone, out of the reach of many smaller studios, and AKG has decided to give more people access to its renowned valve character with the introduction of the SolidTube.

Here there is no attempt to reproduce an earlier model, and yet the need to house a valve and a large capsule gives the casing a distinctly period character. This is helped by the weight of the heavy metal body, although the inside is quite lightweight and makes extensive use of plastics. The grille is completely opaque, bucking the trend of showing us our capsules in all their delicate glory; this is rather a shame since the diaphragm is virtually transparent and the capsule is quite a

work of art. However, emphasising this might draw the eye away from the sight of the valve glowing through a special red window in the front of the microphone—no fake incandescence this, but genuinely the heater doing its stuff. The valve itself is not some esoteric Russian military special, but an ECC83 12AX7, so it should be easy to get replacements and the matching is not critical. It actually sits in the body base up, with the envelope supported by a flexible cushioning collar. The circuitry is not totally dependent on the valve; this is a hybrid design, as the name suggests, allowing low noise solid state components to be used where appropriate while the valve adds the required character.

The microphone comes as standard with a substantial suspension mount, easy and positive in fit, and sturdy enough to support without drooping. There's also a mounting bush on the base of the microphone body itself; although the manual asks that this only be used if the suspension mount gets lost or broken, both of which eventualities seem highly unlikely given its size and evident strength.

The power supply is connected with a 10-metre 6-pin XLR cable, and is much simpler than some since the SolidTube is a single-

NEW TECHNOLOGIES



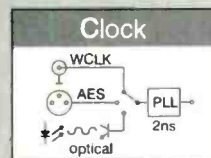
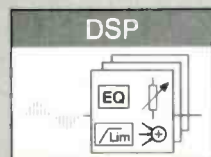
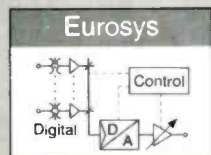
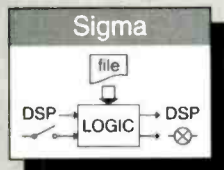
Lex cards

Lexicon's Studio System is described as audio hardware that is compatible with popular audio software and provides I-O options, DSP, signal routing and synchronisation for PC or Mac-based audio production systems like Steinberg's Cubase VST.

Studio System incorporates proprietary LexiPowerCore technology to accelerate the host computer while Core 32 PCI bus master implementation makes it able to support 32 simultaneous voices as sources or destinations from the host system via the PCI bus with 24-bit resolution. Core 32 can be used as either clock master or clock slave and this clock can be distributed within the system.

The LDI-12T interface provides 20-bit A-D and D-A conversion with stereo analogue I-Os and a Toslink optical input while the LDI-16S interface allows integration with workstations. A basic [page 27](#) >

Signal matrix == Flexibility



Every client has special requirements for his „dream“ mixing console, but most of the consoles you can buy will not meet your requirements in one way or another. Instead of getting used to such deficiencies take a look at the LAWO „Signal matrix“ – a perfect tool to create your personal console. No customized software needed and open for future adaptations! The signal matrix will manage anything you need in the studio – including the coffeemaker, if required... The signal matrix is a programming language for mixing consoles which not only can handle control I/O like pushbuttons and relays but also directly has access to all the DSP settings and matrix setups. Therefore the system will easily give you all the **faderstart** and **signalling** features you may ever need. And there is more ...16 **stopwatches** ...automatic **talkback systems** ...**machine control** with parallel and serial interfaces ...**custom monitoring systems** for digital and analog audio ...**surround monitoring systems** ...you just have to drink the coffee yourself. If you are interested to learn about the world of „Sigma“ – ask the experts at LAWO !

```

Faderstart;
OR   INPUT A01   INPUT   == „CD 1“
AND  INPUT A01   PEGEL_OPEN == 1
TRUE  RELAIS    CD1   ON   == 1
FALSE RELAIS    CD1   ON   == 0
Sigma_end
        
```

MC 50 - Digital On-air console

MC 80 - Digital mixing console

MC 82 - Production console

LAWO

LAWO Gerätebau GmbH
D-76437 Rastatt, Germany
Tel. +49 (0) 7222-1002-0
Fax +49 (0) 7222-1002-24

NEW TECHNOLOGIES

version has 8 analogue I-Os and TDIF I-O and can be used with a maximum of 32 simultaneous channels of I-O. An 8-channel AES-EBU option can also handle SPDIF and includes a real-time SRC.

Lexicon, US. Tel: +1 617 280 0300.
Stirling, UK. Tel: +44 171 624 6000.

PMC IB1S

The IB1S 3-way mid-field monitor has a 10-inch flat piston woofer, 3-inch soft dome mid range and 1-inch silk soft dome tweeter mounted in a transmission line enclosure. The flat piston driver is loaded by a 9-foot transmission line system and is constructed from a sandwich of carbon fibre and Nomex honeycomb. The IB1S features PMC's large turbulence-free port radiator that claims to extend response down to 25Hz. All three drivers are integrated by a 4th-order crossover filter. Self-powering electronics from Bryston are available.

PMC, UK. Tel: +44 1707 393002.

Peavey Tube comp

Peavey's dual channel VC/L2 all valve compressor-limiter contains no solid-state devices in the audio chain with an EL84 valve and an electroluminescent panel at its heart. The latter is claimed to offer the best aspects of bulbs and LEDs. There are two 12AX7s for each channel while their output stages use a two-stage 12AT7 valve for a +20dBm output. Inputs and outputs are transformer balanced with 1/4-inch jacks provided for instrument and line inputs.

Peavey, US. Tel: +1 601 483 5365.

Doremi V1D/2M

Fourth member in its V1M family of products the V1D/2M random-access video recorder-player is 2-U high and has front-panel controls for jog-shuttle, autolocator, audio input level and a LCD. It is intended as a drop-in replacement for VTRs.

The unit claims compliance with CCIR-601 in 4:2:2 with one channel of **page 28 >**



diaphragm cardioid only microphone. Since the 20dB pad switch is on the microphone body itself, that only leaves a bass-cut filter on the power supply, rolling off 12dB per octave below 100Hz. Unusually, there is also an earth lift switch round the back—a thoughtful addition since it is likely to be plugged into the mains remotely from the console with all the attendant hum risks. This has given me problems in the past with other models, which is annoying when the earth is dispensable. The kit is completed by a huge bright yellow windshield, and it all fits neatly into the

increasingly familiar aluminium carrying case.

The resulting impression is of quality and class, even though the styling is quite a departure for AKG. The SolidTube will attract just as much comment as any other big valve microphone old or new, and raise expectations before the faders are opened. It's at this point that some reveal themselves as charlatans hitching a ride on a handwagon, but that's certainly not the case here.

The specifications for the SolidTube are surprisingly modest, particularly in the areas of noise and frequency response: clearly these are very conservative, as I've heard many microphones which claim much more, but don't sound nearly as good. The AKG is quiet, smooth and clean, but with the valve making its presence felt in all the right ways. This makes for a sound with both depth and immediacy, neither of which detracts from an overall naturalness and musicality. The best valve microphones manage a fine balance between character and coloration, offering slight flattery without deviating too far from flat, and the SolidTube has this flavour in abundance. It immediately suggests itself for all the classic big valve jobs, particularly vocals, and the 145dB SPL handling with the pad in, means you can shove it down a saxophone bell as well.

The SolidTube offers a genuine opportunity to get into quality valve microphones without remortgaging the studio. It looks the part—its little red window is a real conversation piece—and delivers everything you have a right to expect with a price tag that looks as if it ought to be a conversion

from roubles. There are a lot of people who would like to put a toe in the valve mic water but can't afford the big-buck models and are wary of the 'cheap' imitations: this could well be the microphone for them, offering a genuine valve sound and genuine AKG quality at a seriously bargain basement price. And you could be investing in tomorrow's classic. ■

Contact:

AKG, Lembockgasse 21-25
A-1230 Vienna, Austria.
Tel: +43 1 866 540.
Fax: +43 1 866 54 205.
UK: Arbiter Group,
Wilberforce Road,
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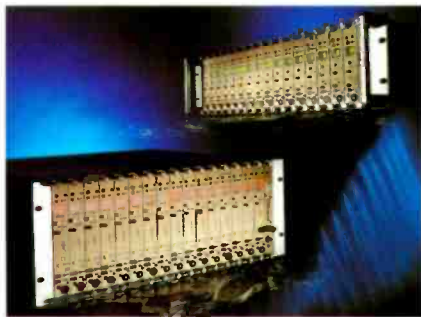
Cadac remote mic amps

The quality and thoroughness that marks Cadac's live consoles makes these mic amps world beaters says **Dave Foister**

FEW PEOPLE have cornered a market quite so successfully as Cadac. Worldwide there are probably more major musicals running on Cadacs than all other consoles combined, and now the advantages that put them in that enviable position are coming to the notice of the big touring rig operators.

This in turn has led Cadac to explore the live sound applications of a comparatively recent idea, the remote-controlled mic amp. Several of these have appeared from various companies for recording applications, but with typical thoroughness Cadac has identified the specific requirements and difficulties of the live situation and produced a characteristically over-engineered bomb-proof solution.

The main advantage for recording work of siting the preamp close to the microphones is the ability to drive robust line levels over the



bulk of the cable run. This advantage is even more applicable to the longer, more hostile runs found in large-scale PA rigs; add in a single phantom power source and multiple buffered line-level outputs to eliminate microphone splitters, and the wonder is that everyone isn't doing it already.

The Cadac system comprises two main elements, the mic amps themselves and the control modules. The amps are relatively frill-free, having only Phantom, Mute and Gain controls, with gain switchable silently in 5dB steps using nudge buttons and a 2-digit LED read-out. Two versions are available, one with all these controls on the front panel and one dumb version only operable from the remote. In either case, no less than six independent line-level outputs are available: three of these are always electronically balanced while any or all of the others can have a Lundahl transformer fitted. Three LEDs on the front panel light to show the presence of these transformers.

Sixteen preamps can be accommodated in a 4U-high rack along with a 17th module that contains the control processor and monitoring facilities. Inputs and outputs are on EDACs—the new EMC-worthy shrouded type—with all 16 inputs on one big one and outputs in groups of two or three channels' worth—96 balanced signals in all across six EDACs. The monitor module carries a LED meter and headphone output, and signals are routed to it via

monitor buttons on the modules; multiple channels can be selected and will be summed.

The key, of course, is the remote control rack that carries 16 corresponding control panels duplicating or replacing the controls on the amps themselves. It, too, has a 17th module, although as there is no audio present in the rack it can't monitor; this one handles some global functions and again houses the control processor. From here all 16 channels can be muted, and all can have their gains reset to zero, but for safety both functions only respond after the relevant button has been held down for some time—the gain reset in particular performs a pretty routine on the module's display before carrying out the instruction.

An important addition on the control modules is a Lock function, disabling the local controls on the preamps if fitted. The idea is that the monitor mixer will probably want to set levels locally first, and then the FOH mixer can lock out the preamps' controls to prevent unauthorised fiddling. Lock status is shown on LEDs both ends and can only be overridden from the control rack.

Communication between the two is via an RS485 serial link, but there is also a parallel data bus for linking multiple nearby racks. Up to six control racks can be linked together via this bus, and have separate IDs set on rear-panel rotary switches. These can then control six preamp racks with corresponding IDs via the same serial link; nearby clusters of racks are joined with the parallel bus while the serial link can be daisy-chained on to further clusters elsewhere. Each cluster of either amp racks or control module racks constitutes a node, and only requires one command module, which can reduce the cost of a large setup.

The whole thing can be taken a stage further by using Cadac's assignable central controller, that can store several preset configurations along with console and other setups. When used like this, the control racks themselves can be locked out, and the Isolate function allows faults to be worked around by swapping modules and disconnecting from the control signals. In common with all Cadac equipment, the system's modules can be removed and replaced while everything's running without damage or excessively nasty noises.

This thumbnail sketch barely does the system justice: the enormous military-looking power supplies, the obsessive attention to earthing and EMC considerations and the general over-the-top quality of design and construction will come as no surprise to those who rely on just these attributes to keep their shows running. The result is a system in which the audio quality can effectively be taken for granted (it is, by the way, as good as you'll find anywhere) and which will stay that way through thick and through thin. ■

Contact:

**Clive Green & Co, 1 New Street,
Luton, Beds LU1 5DX, UK.
Tel: +44 1582 404202.
Fax: +44 1582 412799.**

NEW TECHNOLOGIES

< page 27 270Mb/s serial digital video I-O and analogue video I-O in composite and Y-C plus analogue video component output YUV, two channels of serial digital audio I-O and analogue audio I-O for full-screen NTSC and PAL resolutions. Additionally, time code (LTC, VITC, biphasic) is recorded and enables the machine to be run from an edit controller or from the jog wheel. MIDI I-O and two RS422 serial ports enable the VID/2M to follow an audio or video workstation.

**Doremi Labs, Europe.
Tel: +33 4 93004330.**

32-channel diversity

The RMS2020 diversity system from Audio Ltd has a transmitter and receiver capable of storing 32 switchable frequencies. The receiver is pocket-sized and can run from internal or external power sources and is compatible with the company's 2-way and 4-way rack systems.

Audio Ltd, UK. Tel: +44 1494 511711.

Battery preamp

The MD-1 is a compact battery-powered mic preamp line driver with built-in headphones monitoring and line input capability. The input stage has a transformer isolated studio quality preamp with gain control over 40dB and phantom power. The output stage is also



transformer isolated and the entire device can be bypassed in a Loop Thru mode while still permitting headphones monitoring.

Whirlwind insert snakes are targeted at desks that use 1/4-inch jacks for their inserts. Available in 4-channel and 8-channel versions IT and XLR connectors are optional at the processor end of the snakes.

Whirlwind, US. Tel: +1 716 663 8820.

Dump and log

CD Fastlink is an audio dump facility that permits the direct transfer of audio tracks from CDs on to a PC hard disk in .WAV or MPEG layer I and II format. Transfers are made at 12 times playback speed and it is targeted at radio stations wanting to setup a digital record library and multimedia, and website developers looking to employ audio in their products. It can work with single CD-ROM drives, 6 CD changers or juke boxes. Running under Windows 95 and NT it can handle 8 host adaptors and works with up to 14 SCSI device controllers.

Also from the company is the Audiospy multitrack logging system that stores on 4mm DAT compressed MPEG audio for programme archiving and rebroad- page 30 >

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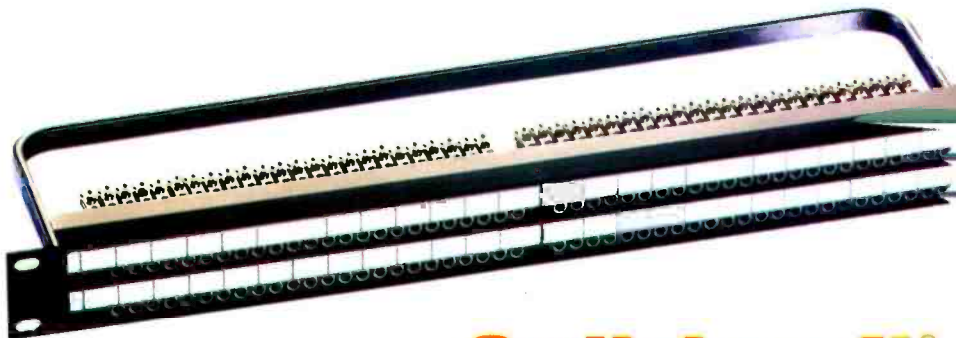
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Aphex 661

Aphex' innovations in circuitry makes the 661 tube compressor-limiter an interesting prospect. **George Shilling** weighs it up

A FRIEND OF MINE has a theory that any audio equipment is guaranteed to be good if it is American and has an 'x' in its name. Well, Lexicon, dbx and MXR all satisfy the criterion, but, perhaps, less common in recording studios are units by Aphex. Many major studios have an old Aural Exciter somewhere in the rack, but that technology is no longer the buzz word it once was. Today, Aphex is more popular with broadcast folk—in the recording studio, valve or tube gear is what most aspire to. It is no surprise then that Aphex, always an innovator, have pitched in with a valve design with a difference.

This unit is essentially a mono compressor, although it boasts some features not found on other units. Build quality is high: a 1U-high case bears a smart metallic finish and

with two linked 661s when wanting to compress bass or bass-drum heavy mixes without pronounced pumping. Two rows of large LEDs provide an In-Out level meter and a very good visual indication of compression. Interactive with the compression circuitry is the patented HFX circuitry which is high-frequency expansion that only works when the compression threshold is passed. This is a smooth, pleasant effect designed to eliminate compression 'dulling' and is controlled by RATIO and FREQUENCY controls giving up to 6dB of treble lift or 'decompression'. Yet another patented feature is the Spectral Phase Refractor (SPR). This effectively delays mid and high frequencies to bring forward low frequencies in the signal, with a huge list of promised benefits—according to the manual. This is a subtle psychoacoustic effect such as those of the Aural Exciter or BBE Sonic Maximiser, and can be used on individual instruments or the whole mix (with two 661s). As a confirmed sceptic and one who is underwhelmed by the BBE effect, this took me by surprise. It immediately pulled together the bass and bass drum of a mix and allowed them to punch through with a coherent

pleasantly damped black knobs. Legending is small yet neat, switches are of the very tiny plastic variety, and there are plenty of LEDs to tell you what is happening. The front panel includes a BYPASS switch and a rocker power switch. Connections are on TRS jacks and XLRs with a switch for +4/-10dB operation. Additionally, there are unbalanced jacks for Send and Return, and a Link socket for connecting two 661s, which is configurable from the front panel.

The manual is very slickly put together with plenty of smart graphics and a lot of what could be unkindly described as good ol' American bull. Firstly, there is a Message From The President, but before I'd read that, a leaflet fell out promoting merchandise—you really can buy the Aphex tee-shirt, sweatshirt, leather jacket...

The 661's most proudly proclaimed feature is, of course, its valve circuit—Tubessence. This is genuinely different from other tube designs, however, utilising a 12AT7 dual triode using an unusually low-plate supply voltage with a Reflected Plate Amplifier circuit. This overcomes several 'problems' associated with tube circuits, including the Miller Effect (high frequency attenuation), high power dissipation, and microphonics. It is certainly the coolest running valve equipment I have ever encountered.

Next, Easyrider mode apparently 'eliminates the nasty artefacts that are the by-product of nearly all other compressors'. Excuse me, but I rather like some other compressors and their 'artefacts'. I can only presume that the Aphex is overly proud of its designs—no bad thing, even if, perhaps, it has sometimes missed the point slightly. In reality, Easyrider is very smooth auto attack-release compres-

sion. In this mode you simply set Input and Output levels and Threshold for transparent compression using Aphex' patented No-Knee circuitry. The Fast setting is suited to percussive sounds, whereas the Slow mode is intended for use on vocals. This is much like older Aphex designs that aimed to compress without the compression being audible (Express, don't Compress). It works well but often, I like to hear my compression. So when Easyrider mode is defeated, Manual mode gives you control additionally over Ratio, Attack and Release and enables a SOFT-HARD KNEE switch. These controls give a wide range of compression characteristics, including Peak and Program Limiting, which will be popular with broadcasters. Additionally, there is a switchable side chain low-cut filter, for use

with two linked 661s when wanting to compress bass or bass-drum heavy mixes without pronounced pumping. Two rows of large LEDs provide an In-Out level meter and a very good visual indication of compression. Interactive with the compression circuitry is the patented HFX circuitry which is high-frequency expansion that only works when the compression threshold is passed. This is a smooth, pleasant effect designed to eliminate compression 'dulling' and is controlled by RATIO and FREQUENCY controls giving up to 6dB of treble lift or 'decompression'.

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Overall this is a very useable compressor, the Tubessence circuit works so well, and the limiter is so fast, that you could almost believe this is a completely solid-state design—however, it's one with a definite hint of valve to its character. The 661 is different from the norm, and certainly much thought has gone into the design. The only downside is that if you want one of these, then you undoubtedly want two to make a stereo pair. ■

Contact

Aphex Systems, 11068
Randall Street, Sun Valley,
CA 91352, US.
Tel: +1 818 767 2929.
UK: Stirling Audio
Systems, Kimberley Road,
London NW6 7SF.
Tel: +44 171 624 6000.

NEW TECHNOLOGIES

< page 28 casting purposes. In addition to providing continuous or programmed start recordings, the system has an extensive database environment and keeps track of all sound-file locations along with individual DAT tapes associated with each session. OPNS claims that a specific location on a tape can be found in less than a minute and previewing of a chosen sound is possible while Audiospy continues to record.

OPNS, Belgium. Tel: +32 2 542 8787.

RH amps

The P2400 and P2700 are dual channel amps delivering 350W and 500W per channel in to 4Ω respectively. Both have provision for plug-in controller modules which eliminate the need for separate controllers or electronic crossovers, compressors and limiters.

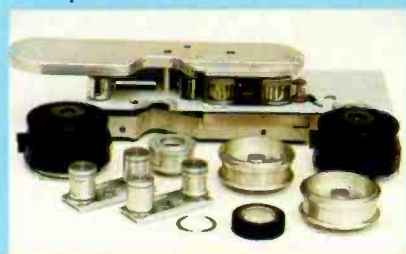
Self-restoring protective circuitry safeguards against damage from overheating, short circuits, subsonic and ultrasonic signals and DC appearing in the output. Status LEDs give a visual indication of each channel's operating condition and of any problems.

The CDT1 driver used in the CDT350 series large-format horns combines the output of an 8-inch mid range and 1-inch high frequency driver in a single 350W, 2-way device. The horns are available in 40' x 20', 60' x 40' and 90' x 40' versions and include hanging points and a weather-resistant cover.

Renkus-Heinz, US. Tel: +1 714 250 0166.

A80 conversion

JRF Magnetic Sciences has introduced a complete kit of all the parts required to convert a 1/4-inch Studer A80 to 1/2-inch 2-track format including heads, pinch roller, tape reel hubs and all roller-guide assemblies. Customers may choose Flux Magnetics Extended Performance heads or JRF's own PLX replacement heads.



The company offers similar conversions for Ampex ATR102, Otari MTR10 and MTR12, MCI JH110 and Sony APR5000 machines and some kits are also available for those who wish to convert a 4-track 1/2-inch machine to 2-track operation.

JRF, US. Tel: +1 973 579 5773.

128-track Pentium

Methalithis Systems' Digital Wings for Audio v1.4 amounts to a 128-track hard-disk recording system with sound card and a CD-ROM that includes the first plug-in, Way Cool Edit by Syntrellium Corporation, that offers a suite of signal processing. **page 32 >**

November 1997 **Studio Sound**



PreSonus
Audio Electronics

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Korg DL8000R

The dedicated-delay effects box has been spotted around the edge of town again. **Zenon Schoepe** invites them back to his house

JUST WHEN I was bemoaning the lack of choice in modern dedicated digital delay lines and heralding the Symetrix 606 as something of a comeback for the genre, along comes Korg with its own contender. Korg has been a little quiet in the outboard department for some years, despite having created some of the most overlooked and plain good all-round reverb units in the past. The DL8000R deals exclusively with the business of generating delay taps in many and varied flavours and it achieves this with an operating system that is distinctly different from anything you will have encountered in a while.

The fact that the rear panel includes jack sockets for a control switch, trigger, hold and bypass is reassuring, as is the MIDI 5-pin triplet, but the external power supply and unbalanced jacks for the 2-channel I-Os suggests that the box does nod in acknowledgement towards MI. Still, if you want a unit of this type, then your choice is limited.

Getting around the DL8000R is simple,

regards presets there are 256, half of which are user-programmable.

Switches are provided for Bypass, Hold, Trigger (also used for front-panel tap tempo entry) and Tempo-Time mode selection.

For all intents and purposes you run this box on two pots—FUNCTION and VALUE—positioned on either side of the display, both of these can be pushed to perform selections. You turn the first to select the parameter group and press it to access submenus within it and turn the second to alter the parameter and press it to write the patch or confirm adjustments to the Utilities menu. And my, how there are many parameters to deal with in this way—including 3-band EQ, pre-delay time (up to 400ms), tap time (up to 4800ms) for the three taps and their modulation, feedback tap delay and modulation, low and high damping on the feedback, LFO parameters and a host of mixing functions for the resulting constituents.

Interacting with parameters in real time can be achieved via MIDI, but significantly there is

although not speedy, but only after you grasp some basic operating principles. Central to affairs is the large display that, unusually in this day and age, employs a large 12-character LED display to communicate parameters and values, rather than the, now, more common LCD. This is accompanied by twin-channel bar-graph input meters (driven by dual-concentric input-level pots) and a block of nine solid indicators that light to alert the user to the activation of various functions and the current mode of operation.

While this display is large it shows only one line of information per screen, and for this reason a Shift indicator is provided that tells you, when editing, that there are sub-menus beneath and associated with the current display that are yet to be explored. I'm not so sure whether the, now, more traditional LCD approach would have avoided this business of paging altogether as there are quite a few parameters to get through, but as it stands the DL8000R's method could be described as old-fashioned.

Other indicators tell of editing and utility mode selection, the reception of MIDI, and the activation of Time (for manual setting of tape delays in ms) and Tempo (for automatic tempo-related setting of delays) modes. Indicators will also light for Hold function, and the selection of seamless 'hanging over' of the previous preset when selecting a new one. As

a front-panel knob labelled WARP that can be assigned to a particular parameter on a per-preset basis for convenient tweaking. Press WARP, and its assigned value is reset to its original. A nice touch, and very handy especially as you can hang all types of parameter on this pot allowing you to, for example, darken the repeats, or push and pull them.

It's really not a bad package with enough variation available on the delayed signals to qualify it as a real pure-effects box. I can't pretend that the editing routine is not laborious, but it is at least consistent provided that you commit the menu substructure to memory. You eventually gravitate to a method that concerns itself only with the tap and feedback aspect of sound creation and you forsake the rest.

Despite this almost painful editing routine, I still love the DL8000R, but then I've always been a sucker for clever dedicated delay lines because the ambiances they can create are so distinct and stark from the complexity of reverb. Less is more here, and it's the perfect foil to reverb.

There are enough possibilities in this box to create some intimate and lively first reflection approximations, but the DL8000R also makes it extremely easy to tempo match repeats for all the old establishment tricks which will, perhaps, be of more immediate appeal to more people. On balance, a nice box. ■

Contact:
UK: Korg UK, 9 Newmarket Court, Kingston, Milton Keynes MK10 0AU. Tel: +44 1908 857100. Fax: +44 1908 857199.
US: Korg, 316 South Service Road, Melville, NY 11747-3201. Tel: +1 516 393 8520. Email: soundtracs@korgusa.com

NEW TECHNOLOGIES

< page 30 The system claims 128-tracks of simultaneous recording and playback on a Pentium PC under Windows 95 with 16Mb of RAM. The card is reconfigurable via software with upgrades available over the Internet. **Serious Audio, UK. Tel: +44 1923 442121.**

Phantom valve

Microtech Gefell's UM900 studio condenser valve mic has 48V phantom powering via an internal switching power supply that generates voltage for the valve and the capsule's polarising voltage.

The M7 capsule is mounted in a 75mm diameter headgrill that is different from the usual cylinder or wedge-shaped arrangement and helps shape the mic's sound which is said to be different from the company's valve UM92.1S. It has omni, fig-8, cardioid, wide cardioid and hyper cardioid patterns.

Microtech Gefell, Germany. Tel: +49 3 6649 82262.

Quested F11

The F11 is a compact, magnetically shielded, 2-way design with 165mm bass driver and 28mm soft-dome HF. Electronics are housed in a pod at the rear of the cabinet and can deliver 100W and 25W into the two units respectively.

Built-in mountings in the moulded cabi-



nets allow fixing to walls or ceilings and the monitor has been designed for installations and surround-sound applications. **Quested, UK. Tel: +44 181 566 2488.**

Soft codec

Described as a software only audio codec, the Mayah Sendit supports real time transfer with MPEG 1/2 Layer 2 and 3 and connects to conventional audio codecs and to PC-based systems such as PCX cards. No special MPEG hardware is required but it needs sound and telcoms cards under Windows 95 or NT on a Pentium. Communications via ISDN is at up to 128kps, modem with 8 to 33.6kbps for stereo or mono signals.

An editing tool, EditPro, facilitates cue in, cue out, copy, paste, and **page 34 >**

Hand it over!

EURODESK

MX2442
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Console



MX8000
24/48 Channel 8 Bus
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dbx 1046

Pro audio manufacturers are cutting corners as well as costs, but **Dave Foister** finds this compressor limiter a welcome exception

QUARTS INTO PINT POTS usually don't go. All too often an attempt to squeeze several processors into an unfeasibly small package entails so many compromises that it ends up as a last-resort fall-back—like the stuff in my rack that only gets used when the grown-up boxes are all tied up. If anyone could be expected to make the trick work it's dbx, home of the VCA and creator of some of the simplest, most effective compressors around.

The offering is the 1046, four compressors in 1U: this is a package that's been tried elsewhere with varying degrees of success, but dbx's knack of making compressors work properly with only half the number of knobs anybody else gives it a head start. The first striking thing is how uncluttered the front panel is, with a simple elegance that leaves you wondering how it can possibly do everything properly. The second thing is that when first powered up it looks dead—with uncharacteristic modesty, no lights come on at all even though the thing bristles with LEDs.

The four compressors are identical, and are arranged in two pairs which can be linked for

stereo operation. Each has only four knobs, and since one is for the Limiter threshold that only leaves three for the compressor. Of these one is for Threshold, one for Ratio, and one for Gain Makeup, all with click-stop action and a generous range of settings. There is no manual control for time constants (despite what the cardboard box says), meaning that attack and release times are automatic and programme-dependent. This, of course, is the usual short cut for a miniaturised compressor, and it is the effectiveness and musical tolerance of the automatic circuitry that makes or breaks the final product. Again, since dbx has also produced full-size compressors which operate entirely automatically this could be expected to do this more successfully than some. The other key factor on a unit like this is its knee characteristic, and again dbx has years of experience with its established OverEasy feature to make this work. The main pushbutton on the unit switches between hard knee and OverEasy, which is dbx' trademarked soft-knee curve famed for unobtrusive operation.

dbx never underuses a good idea, so another familiar feature appears here in the form of the PeakStopPlus limiting function. This is a 2-stage limiter, using fast clamping for short transients and longer-term overall gain reduction (which dbx terms Intelligent Predictive Limiting) when levels remain above threshold for any length of time. This makes the limiter as simple to use as it could possibly

be, with only a Threshold control to adjust; a single red LED shows its action. Despite the initial impression, the 1046 looks like a Christmas tree when it's going flat out. The pushbuttons for KNEE, meter selection, BYPASS and STEREO LINKING all light various colours when active, and there are two meters, one for level (input or output) and one for gain reduction, showing the overall effect of the compressor and the limiter combined.

Inputs and outputs are balanced on both XLRs and TRS jacks, apparently happy with unbalanced wiring. The absence of side-chain access is about the only obvious omission necessitated by the small size, but there is still room for individual level switches to select -10dB or +4dB.

In my experience, the thing most likely to catch an automatic compressor out is bass guitar. I was mixing a jazz piece that had four bass tracks on it—one bass line plus three overdubbed solos to be comped to one—and, of course, I stuck all four through the 1046. Not once did it show any of the all-too-common symptoms of insufficiently flexible attack

times, and the control available with the combination of the usual controls and the knee options was everything I needed. Hard knee helped the solos drive through while OverEasy made the other part sing smoothly underneath, and the thoughtful meters and control ranges made it easy to see what was happening and set things up fast.

The acid test passed, the 1046 sailed through vocals, piano, guitars and saxophone without breaking sweat. Nothing surprised it, and time and again the flexibility with which it could be adapted to the job in hand belied its apparent simplicity. At the other extreme, a complete stereo mix presented no problems either, and again the ease with which different degrees and characters of compression could be applied was surprising. This was helped hugely by the true stereo nature of the linking, where Channel 1's controls are in complete command of Channel 2: unlike some links, where things like gain makeup and limiter thresholds can be left separate, the 1046 completely disables Channel 2's controls, with the exception of the BYPASS switch, although its meters still operate.

This package is hard to fault. It shows little sign of the corner-cutting usually necessary to squeeze this much functionality into this small a box, and offers four first-class compressors which would be worth having even if they occupied a whole rack unit each. ■

Contact
dbx, 8760 South Sandy Parkway,
 Sandy, Utah 84070, US.
Tel: +1 801 568 7660.
Fax: +1 801 566 3565.
UK: Arbiter Group, Wilberforce
 Road, London NW9 6AX.
Tel: +44 181 202 1199.
Fax: +44 181 202 7076.



NEW TECHNOLOGIES

< page 32 take list manipulation.
 CCS, Europe. Tel: +49 811 55160.

Azimuth correction

Win5: Azimuth Corrector is the fifth CEDAR process to run on the CEDAR for Windows platform. The new module has improved autodetection algorithms, Lissajous and balance metering, 18 output modes and auto-correction to within 0.25 samples. A manual control allows the sliding of channels against each other with a precision of 0.01 samples. Benefits include the recovery of high frequencies, bass response improvement, mono compatibility restoration and image clarification.

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

2-channel meter

The Genesis Pro Systems DPM101 2-channel digital audio peak programme meter combines analogue 100-segment LED bar graph and digital numeric displays with an accuracy of 0.1dB. It accepts AES-EBU and SPDIF inputs with all inputs buffered for insertion into existing digital-audio links. It employs over-sampling filters and ultra-fast peak detectors on both channels. A freestanding unit with a rackmount option, the DPM101 includes an integral power supply that accepts all mains supply voltages.

Aspen Media, UK. Tel: +44 1442 255405.

Aphex plug-in

Aphex has joined the band of manufacturers producing TDM plug-ins with the Aural Exciter Type IIIpi, which is modelled on the 250 exciter. Features include drive, tune, peaking, null fill, harmonics, timbre and mix plus new harmonics density.

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

Convertor box

Zulu is a 4-input/8-output digital convertor that combines 20-bit A-D and D-A with ADAT optical I-O and is mounted in a shielded external half rack-width chassis



with an independent power supply. Bicolour LEDs monitor signal level and clipping while unbalanced 1/4-inch jack connectors are provided.

Frontier Design Group, US.
Tel: +1 603 448 6283.

Three-colour knobs

The Re'an P3 three-colour knobs claim the ability to add a range of colour combinations never possible before with separate colours for the body, cap and pointer moulded together in a single process. The knobs are manufactured from the com-

November 1997 **Studio Sound**

*no other microphone
listens like
a SoundField*

*The new SoundField
SPS422 Studio
Microphone System*



Conventional studio microphones use one or sometimes two capsules - the SoundField SPS422 uses four. These are arranged in a precise tetrahedral array, collecting sound from a three-dimensional field at a single point in space.

Reaching far beyond the capabilities of normal microphones, the SPS422 is a complete system in its own right. From the control room - the optimum listening position - all microphone parameters can be adjusted via the 1U processor to create 'wide image' effects.

Neither the microphone or musician need move whilst you produce the ultimate 'big' vocal sound, spread a piano across the whole stereo picture, or create 'wrap around' acoustic guitars - the accuracy of response is breathtaking.



*CHARLOTTE STREET BUSINESS CENTRE CHARLOTTE STREET
WAKEFIELD WEST YORKS WF1 1UH ENGLAND
TELEPHONE: (0) 1924 201089 FACSIMILE: (0) 1924 201618
E-MAIL: sales@soundfield.co.uk WEB SITE: <http://www.proaudio.co.uk/sndfield.htm>*

Audix D-series

The addition of the D-4 completes Audix' range of studio dynamic mics. **Dave Foister** grants them a session

IT MAY NOT BE the first name you think of when considering studio microphones, but Audix has been quietly building up a series of high-grade dynamic mics specifically for recording use. The range now numbers four with the introduction of what is possibly the top model.

With commendable simplicity, the range is known as the D-series, and the models are numbered from D-1 to D-4. All share the same general shape and appearance, being remarkably compact and unobtrusive. Each measures around 3 inches in length including connector, weighs 4/10oz, and seems to consist of nothing more than a capsule assembly shock-mounted on to the XLR with a protective basket around it. This is not to suggest that there is anything crude about them, as the finish and materials are all high quality

and there is no doubt they are robust. The review samples were provided with alternative grilles which appeared to have more metal in them and to improve capsule protection even further. The only disappointment was the stand mounts, all of which needed tightening up (on one the nut and bolt weren't even attached) and were supplied without 1/8-inch thread adaptors. Same old litany I know, but I find this standard of presentation unacceptable. One day a microphone will droop when I put it on a stand and it will go straight back in the box and back where it came from.

The capsules all use Audix's VLM Technology (used in the successful stage vocal microphones), which is not elaborated on in the paperwork, but I suspect it stands for Very Low Mass, the main feature of the diaphragm construction. This comes in various types—designated VLM Type B, C and D—and it seems that it is the various versions of capsule used that determine the application of the microphone. As is common with dynamics, Audix suggests specific uses for each model where the individual character of the capsule complements the instrumental sound. Thus the catalogue descriptions of the original three models has a good old-fashioned pictorial chart of various instruments showing which microphones

to use where. The surprise is how little the specs differ between models; the D-1 and D-2 appear technically identical, sharing the same capsule, frequency response, sensitivity and SPL handling. The D-3 is slightly less sensitive

for use in high SPL situations, but still has the same upper SPL limit.

The truth is that the sonic behaviour of the microphones varies far less than is often the case with dynamics, approaching the level of interchangeability more usually associated with condensers. Although the claimed frequency range of 38Hz–21kHz is not supported with any tolerances or graphs, it sounds much flatter, brighter and more open than a dynamic on this scale has a right to be. This is coupled with a helpful enthusiasm for dealing with high levels without strain, giving a strikingly impressive overall performance. These microphones have a combination rare in a dynamic of warmth and bite, making them particularly useful in the obvious application of close drum work where the small size helps with positioning. The D-2 is suggested for bass drum and the D-1 for snare, and they give a surprisingly complete, clean and desirable sound on these and other parts of the kit. Their effectiveness here is helped by the hypercardioid polar pattern all four share, minimising spill in a way that would make them equally useful on stage.

The same characteristics are on display in the latest addition to the range, the D-4, although the intended use is made clearer still by some slight deviations in the figures. The new model uses a new capsule type, and although its upper limit is down as quoted to 19kHz its strength is at the other end. Here particular attention has been paid not just to the amount of bass but the linearity and accuracy with which it is presented; it claims to be flat down to 63Hz, quite a feat for this type of microphone. This makes it an obvious candidate for (again) bass drum, as well as anything else whose character is defined in its low frequencies. I was particularly impressed with the results on string bass in a jazz quartet, where its warmth and low-end detail were complemented by what remains a full and complete upper end. Once again the tight polar pattern gave me a clarity off the bass even in close proximity to a kit that vastly reduced my dependence on the bass's mediocre bug and gave the kind of natural sound my studio normally can't manage under these circumstances. Even the bass player (a notoriously difficult lot to please) liked it.

The Audix D-series deserves to be heard and to become popular. The promotional literature may be full of woolly hype, but the performance and quality (with the exception of those stand mounts) speaks for itself. Apparently built to last, they can hold their own with some well-established favourites, and their small size and big sound could even see them usurping some of them. ■

Contact:
Audix, 9730 SW Hillman Court,
 Suite 620, Wilsonville,
 OR 97070, US.
Tel: +1 714 588 8072.
Fax: +1 714 588 8172.
Net: www.audixusa.com
UK: SCV, 6–24 Southgate
 Road, London N1 3JJ.
Tel: +44 171 923 1892.
Fax: +44 171 241 3644.



NEW TECHNOLOGIES

< page 34 pany's soft-touch material.
 Re'an, UK. Tel: +44 1474 328807.

Presonus ACP22

The ACP22 stereo compressor/limiter with spectral gates provides full control over compression threshold, ratio from 1:1 to 20:1, variable attack and release times and switchable hard-soft knee characteristics. An auto mode selects programme-dependent attack and release times while a stereo-link function links both channels together.

Onboard metering is provided for gain reduction and input-output metering. LEDs show soft-hard knee, auto in-out selection and channel bypass while de-essing, ducking and other forms of spectral processing can be accessed by using the side chains.

The noise gate hands over control of threshold, variable attack and release, and switchable gate range, and the unit also has a low-pass gate filter for eliminating gate triggering from high frequency signals. An independent gate key side chain is included for external triggering.

Connectors are XLR and unbalanced 1/4-inch jack selectable from the rear panel. **PreSonus, US. Tel: +1 504 344 7887.**

Battery cab

Klein & Hummel has introduced the TRA60/NA mobile active loudspeaker that is targeted at outside applications such as television productions, open-air performances and promotional presentations.

The active PA loudspeaker has a HD



rechargeable battery and built-in channel amplifier for the 2-way system. A unique touch is the inclusion of a receiver for wireless microphones that renders the unit independent of any power or microphone cables for a maximum operating time of 18 hours at full volume. The speaker can achieve a sound-pressure level of 113dB, a coverage angle of 90°, and a claimed frequency response of 75Hz to 18kHz.

The charging device is built in and the box comes with a convenient carrying handle for transportation of the 13kg unit.

Klein & Hummel, Germany.
Tel: +49 711 4689335.

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Romance

[but calculated]

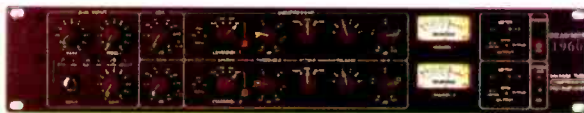


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DRAWMER
master of the gentle art

Joemeek VC6

Building on the legend Joemeek reveals another green processor. **George Shilling** prepares to tell of a subtle Fletcher rethink

SINCE THE INTRODUCTION of the Joemeek Compressor a few years ago, Joemeek has been steadily increasing its range, finding a particular niche with the all-in-one box for use as a direct-to-tape microphone processor. Joe himself was a pioneer of direct-inject recording, but nevertheless these are unmistakably 1990s fad gadgets. From the budget VC3 Voice Channel, through the VC1 up to the VC2 high-end valve-based design, there is something in the range for every pocket.

I was, therefore, somewhat mystified by the VC6. It is more expensive than the VC3, but somewhat cheaper than the VC1—why bring out a fourth box that does pretty much the same job as the three already in existence?

The mystery was solved by a quick call to

circuit board in front of the photoelectric cell. One knob sets Compression on a range of 1–11, sustaining the perennial Spinal Tap gag. This knob increases the side chain gain to the compressor as it is turned up, thus increasing compression. A RATIO knob can be set between 1.2:1 and 6:1. There are no marks on the scale between these extremes, which makes noting settings difficult. It is the same with the ATTACK and RELEASE pots. The Compressor is very similar to that found in the Joemeek Compressor.

Next comes the Enhancer section, which is identical to that on the VC1. Controls comprise DRIVE, Q and ENHANCE. There is no bypass, you just have to turn the ENHANCE knob to zero. A dimly glowing LED brightens as the enhancer adds sparkle to the signal. I found it a bit edgy sounding, but used with



Ted Fletcher, Joemeek founder and designer. The VC6 replaces the VC3, with enhancements made to the old Voice Channel design which were requested by users.

The most obvious change is that the unit is housed in a standard 1U-high rackmount case, as opposed to the VC3's half-width 1U. This extra space has enabled the power supply to be moved to an internal location instead of the inconvenient external type of the VC3. The unit is nevertheless very light and shallow. Fletcher has carefully positioned the little transformer as far away as possible from the mic amp.

On the back of the unit is an XLR mic input, and unbalanced jack sockets for line input, mix input, and, usefully, two identical outputs. There is also a TRS jack insert socket, that is particularly intended for hooking up the new VC5 Meequalizer EQ introduced at the Vision and Audio 97 Show in London in November.

On the front panel there is an instrument jack that, like the line input on the back, has priority over the Mic input. This has been optimised for instruments such as electric guitars, and was designed by plugging in a Fender Jazz Bass and experimenting to find the best matching. This turned out to be 180kΩ—exactly the same as an Ampeg bass amplifier input. Great minds...

A GAIN pot is accompanied by a small phantom power switch with a LED to indicate that the unit is powered up. Adjacent to the compressor section's ON button is an LED that disconcertingly does not light when you press the button, but instead glows when the compression threshold is crossed, as no doubt do the two on the

care it is good although I preferred it on instruments rather than vocals. The OUTPUT knob is accompanied by 5 LEDs that indicate level before the pot, to help you set input gain. The first one lights all the time to indicate power on. Personally, I would have preferred the LEDs to indicate gain reduction for the compressor rather than level: one overload light would have sufficed.

I found the front panel legending nearly impossible to read: the labelling of the knobs is tiny, and black on fairly dark green is not the best contrast. However, it is easy to see the position of the black rubbery knobs with their green insert pointers.

The manual is written in Ted Fletcher's inimitable assertive yet charming style. It could, perhaps, do with a few diagrams, but is otherwise a delightful read.

The sound quality is very high for a budget unit. The overload margin is very high, and the compression is unusual. In terms of character it is slow, and sounds more like axle grease than WD40. This suits some vocalists more than others: for some it is perfect, but for others does not work as well. You won't be able to achieve the vicious graininess of some competing compressors, but this is not what Joemeek is about. Ted Fletcher places great importance on phase linearity right down to 5Hz and this pays off with a great solidity in the sound. Costs have

been kept down—for example by not using balanced connections, but there are a few cheaper competitors. However, this is quite different from the competition, and while ergonomics design is not its strong point, its foibles are probably part of its charm. ■

Contact:

UK: Sound Valley Distribution, The Briars, North Road, Amersham, Bucks HP6 5NA.
Tel: +44 1494 434738.
Fax: +44 1494 727896.
International: Joemeek Ltd, Swillett House, Heronsgate Road, Chorleywood, Herts WD3 5BB, UK.
Tel: +44 1923 284545.
Fax: +44 1923 285168.

NEW TECHNOLOGIES

ART EQ

ART's 2-U-high 355 dual channel 31-band equaliser has constant Q circuitry with a 3% centre frequency accuracy, 20mm centre detent slider, selectable boost-cut range of 6dB or 12dB, balanced and unbalanced input and output connections, adjustable high-pass filter, adjustable low-pass filter, variable input level control, clip level indicators, ground lift and an internal power supply.

The device coincides with the release of the 310 stereo 2-way or mono 3-way audio crossover that employs 24dB/octave state-variable fourth order Linkwitz-Riley filters. Access to each channel's input level, high and low output level and filter frequency is available from the front panel rotary controls. The 310 has balanced and unbalanced connectors with a filter tuning range of 80Hz–920Hz which can be switched to operate from 800Hz–9.2kHz.

ART, US. Tel: +1 716 436 2720.

Soft vocoder

Vocode launches Opcode's line of cross-platform DSP plug-ins and brings the classic analogue vocoder effect on to the desktop.

The Fusion Effects platform currently supports plug-in formats including Adobe Premiere, Audiosuite and Direct X media allowing all Fusion plug-ins to be compatible with the most popular music recording and sequencing software. A TDM version of Vocode is currently being designed.

Opcode, US. Tel: +1 650 856 3333.

Digital portables

Marantz will launch its new portable digital recorders in the new year using solid-state PCMCIA flash ROM cards or PCMCIA hard drives.



The mono PMD680 and stereo PMD690 are targeted at ENG and location recording and are expected to retail for under £1,000. Users can choose between MPEG I, MPEG II or linear PCM formats and nondestructive editing via an EDL will be included. Data can also be accessed from a PC through a parallel remote interface and a built-in monitor speaker and SPDIF and analogue I-Os are provided.

Marantz, Holland. Tel: +31 40 273 2241.
AVT, UK. Tel: +44 1932 854544.

Neumann TLM103

A large diaphragm microphone with a cardioid polar pattern equipped **page 40 >**

November 1997 **Studio Sound**

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 digital proprietary V8™ VCA modules.

This state-of-the-art implementation of dbx's original Blackmer decilinear 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.

Premium Signal Path

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 26dB 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.

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The craftsmanship of the 160S is a 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 to 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 hardware relay bypass and external sidechain input, switchable from the front panel.



PEAKSTOP

The 160S has been designed to feature in your creative process well into the next Millennium.

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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

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TL Audio Indigo 0-2031

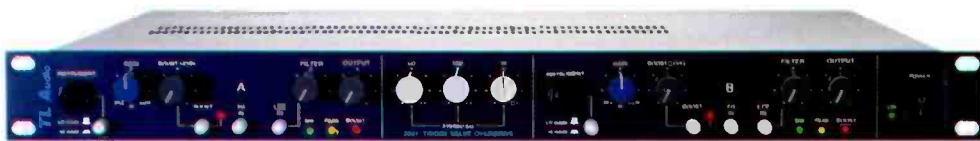
Latest in the popular Indigo valve series, this Overdrive Processor makes an impressive entrance. **George Shilling** observes

THE HUGE RANGE of studio outboard equipment so rapidly built up by TL Audio has been well received. The high-end Classic Valve series is keenly priced and loved by industry professionals, the Crimson transistor range provides good value at the budget end, and in between the Indigo range provides valve gear at bargain prices. Enter the 0-2031.

The Indigo Valve Overdrive Processor fills a well-researched gap in the market, that I hope will succeed the current trend for all-in-one 'voice channel' processors introduced by almost every outboard manufacturer at every price range. There have been too many occasions when I've wanted to add a bit of 'crunch' to a signal and found myself staring forlornly at an equipment rack in a very expensive recording studio. In the case of guitar processing, of course, it is preferable to use a miked valve guitar amp—but that option is not always available. This is particularly true in this age of home studios and mix rooms which have no studio area. Also, the real thing is time consuming: it is frustrating to have to pause while mixing to set it all up, choose a mic and so on. Another problem is that guitar amps do not always interface particularly well with mixing consoles and are often noisy, both in terms of signal-to-noise and neighbours. Both my neighbours and I have been

familiar to TL Audio users. Each channel also includes a footswitch socket to kick in the boost circuit—although one footswitch for both channels might have been better for a stereo setup.

First I reached for my Les Paul and discovered that the gain has to be switched to Hi even for a high-output guitar such as this. Without Boost switched in, the unit worked well as a preamp, with the valves adding a subtle warmth. The LOW-PASS FILTER knob ranges from 500Hz to 10kHz. With it set around the 1kHz mark it approximates the rolloff you get with guitar amp speakers. With Boost inactive I was able to emulate the sound of a clean channel on a valve amp. Indeed, overcooking this slightly produced similar results to turning up a clean valve guitar amp fairly loud. Switch in the Boost and a great overdrive sound is achievable with a bit of twiddling. My Strat sounded equally convincing—the 3-band EQ, with 80Hz and 5kHz low and high shelves and 800Hz mid band, is a vital part of this. It is very powerful and can change the entire timbre when used in combination with the filter. However, I found that with too much Input Gain and Boost, it was possible for a nasty sibilant distortion to appear when the Mid Boost was increased past 3 o'clock. This was probably the sound of the EQ or output section overloading in a very 'un-valve manner—horrible. The EQ comes



waiting for this unit for some time.

The Valve Overdrive, then, is a 1U-high, 2-channel design. It is very heavy, and opening it up revealed a large toroidal mains transformer. The crunch (sic) comes courtesy of two Chinese-made 12AX7A-ECC83s per channel. Several chips are attached to heat sinks and the case provides ventilation at the top and sides. Build quality is high, legending is good, although the knobs are of the type that can lose their pointer caps. The manual is very British: clear and straightforward, if a little strait-laced.

Both channels have the same controls, and share a central stereo EQ section. The central EQ section features three cut-boost knobs at well-chosen preset frequencies with centre-detent stops. On the rear panel, XLR connectors operate at +4dBu and jacks at -10dBu (not the more usual -10dBv) enabling you to convert between pro and semipro levels with this box—a welcome inclusion in a confusing age of pro and semi-pro gear, and a feature now

after the Boost and Filter sections, so this is not surprising, but it did mar the experience for me, as you do need the Gain and Boost at high settings for a really crunchy guitar sound.

Inserted across keyboard and percussion sounds the 0-2031 adds useful crunch and warmth to sterile sample-based sounds, and is particularly useful in mildly dirtying up an already distorted recorded guitar sound. When your project recording setup makes things overly clean, this is just the job. You can use it off a send or on an insert: although there is no mix or bypass control as such on the unit. The output overload problem occurred with all signals I tried: sometimes just opening up the filter a little allowed level to increase enough for unpleasant clipping to start. At

least if the filter was right at the end of the chain you would be able to take some of the fizz out. This is not always a problem and only occurs if you go a bit overboard with the settings. It's a very minor irritation on an otherwise excellent unit. ■

Contact

Tony Larking Professional Sales, Letchworth, Herts SG6 1AN, UK.

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NEW TECHNOLOGIES

< page 38 with a new capsule and circuit boards, the TLM103 has an equivalent SPL of only 7dBA that represents an improvement of 5dBA over the U87Ai and thus makes it suitable for applications where low noise is essential.

The claimed dynamic range of 131dB and the maximum SPL of 138dB is said to make the mic a good bet for vocals and instruments while the competitive price will make it appeal to home recording.

Neumann, Germany. Tel: +49 30 4177240.

dbx pre/dynamics

The 1086 single channel mic preamp and dynamics processor uses dbx's new V2 VCA. The preamp section has a variable frequency low-cut filter and low and high EQ plus phantom power, 20dB pad and phase invert. Levels are shown on a backlit vu meter and the preamp and dynamics sections can be used independently.



Dynamics processing includes a compressor, de-esser, expander-gate and limiter. Compression includes selectable hard knee or OverEasy characteristics plus de-essing with variable controls for threshold and frequency settings. The unit can be optionally fitted with the company's Type IV digital output similar to that found in the Blue series 704 device.

dbx, US. Tel: +1 801 568 7660.

Maselec compressor

Latest in the Maselec Master Series of outboard is the MLA2 2-channel compressor with input control of compression depth, output gain makeup, adjustable compression ratio from gentle to limiting, and adjustable attack and release times which can also be auto-adjusted.

Additionally, the unit boasts electronically balanced I-Os, switchable gain reduction or programme level vu metering, stereo linking of the two channels, and precision stepped controls for accuracy and repeatability.

Prism, UK. Tel: +44 1223 424988.

Prism, US. Tel: +1 973 299 7790.

Sondelux U195

The U195 is a large diaphragm FET cardioid condenser with 'fat' and 'norm' operation—the former resembling the tonal character of older designs the latter operating as a traditional FET.

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Sondelux, US. Tel: +1 516 249 1399. ■



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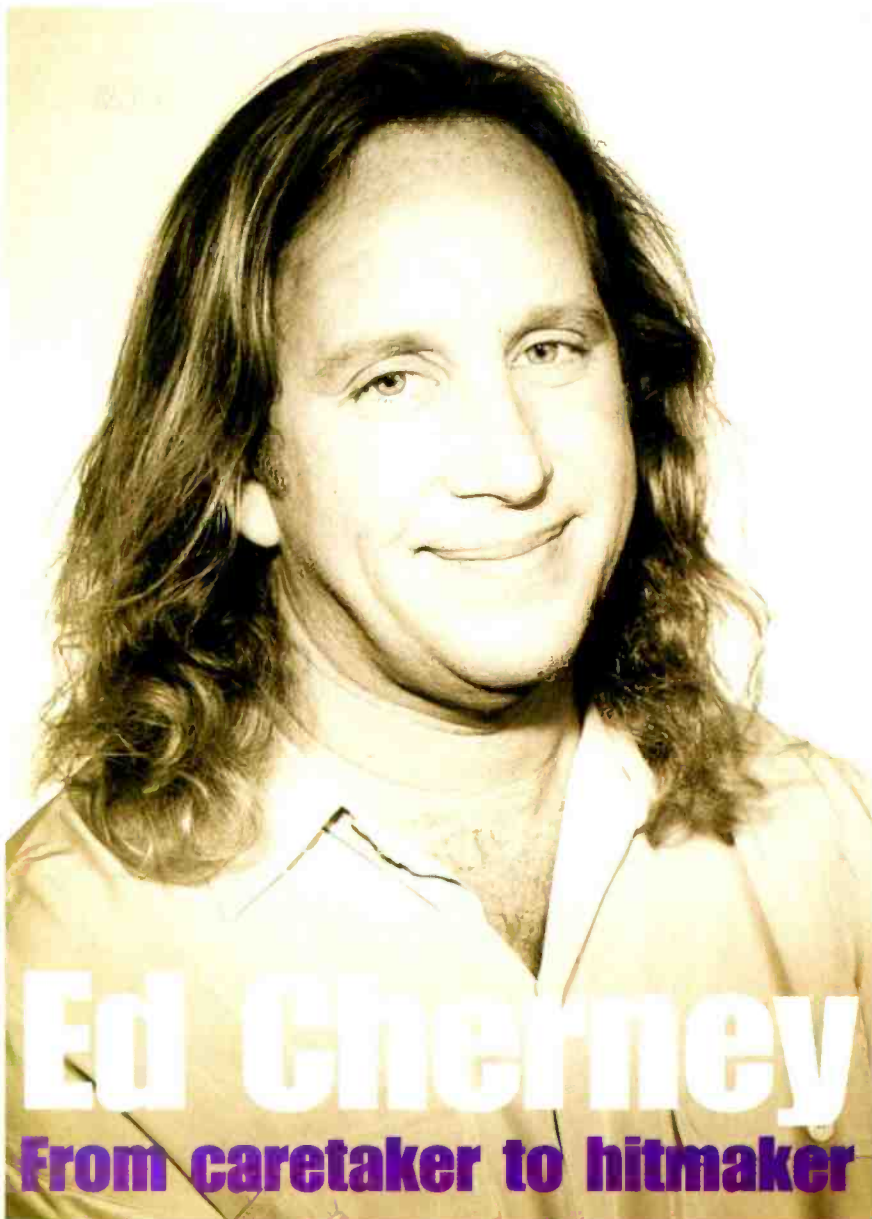


Ed Cherney retains a refreshingly matter-of-fact attitude to studio work despite a credit list that reads like the 'history of popular music' cliché.

Dan Daley talks to an engineer, producer and analogue junkie

IF PETER SELLERS ever had a real-life counterpart to the incorruptible innocent Chauncey Gardener he played in the film *Being There*, it is Ed Cherney. Engineer on countless classic records for Bonnie Raitt (including the comeback record of perhaps the century, 1989's 4-Grammy winner *Nick of Time*), the Rolling Stones, Bob Dylan, Eric Clapton, Ry Cooder, Iggy Pop, Jackson Browne and the B-52s, and producer for Little Feat, Jann Arden, Marc Curry, and Kevin Montgomery, Cherney's early years are those of a kid looking to have a lot of fun with minimal capital investment.

Born and raised in the Chicagoland neighbourhood of Evanston, Cherney grew up in a musical family headed by his theatrically inclined father, who acted in local productions and did commercial voice-overs. Classical piano lessons, starting at age five, were almost aborted both because Cherney's living room window faced the park where his friends were out playing ball while he was practising scales, and because his strict German piano teacher tended to spray toxic residue from his not-so-expensive cigars as he coached. So it seems quite in character for Cherney to describe his later collegiate experience as determined by things less than academic: after two years of pre-law studies in the cold climes of Wisconsin, he visited a friend at the University of Arizona and discovered that the hot sun and hotter blondes that attended there were every reason to have his transcripts sent south. If college was a blur of beer and babes, so were the next few years



back in Chicago, where Cherney hooked up with some friends who had a band for which he did general-purpose roadie work.

'The bass player used to do the sound, and when he stopped I ended up mixing sound,' recalls Cherney, sitting on the patio of the Los Angeles area home that he shares with wife Rose Mann-Cherney, president of Record Plant Studios and now Cherney's manager as well. 'It was something to do and a good reason to drink beer, travel and a great way to meet girls.'

After this less-than-auspicious start to an audio engineering career, Cherney started getting serious. He realised he had an affinity for sound and electronics, and enrolled in a local technical college in the mid-1970s, which provided some theoretical foundation for an otherwise decidedly empirical apprenticeship.

'I figured knowing Ohm's Law couldn't hurt if I wanted to be an engineer,' he deadpans. 'And I also learned how to figure things like decay times, which helped when I started getting jobs with larger PA companies in the Midwest.'

The live sound industry was still in its infancy, though; Cherney remembers working on a state-of-the-art Tapco 6-channel mixer that had such mind-boggling technical

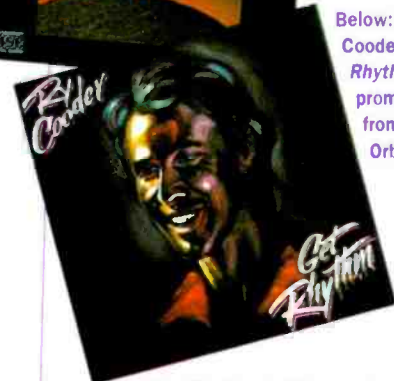
advances as both high-frequency and low-frequency EQ and a reverb send. (But no reverb to send it to.) But he learned a lot. 'In the clubs you could always get the drums and guitars up loud enough; the real art was learning how to get the vocals to where you could hear them,' he says. 'I developed a real affinity for vocal harmonies and mixing them in with the band during that period.'

Until this point, records were something that you bought in the store; their actual creation was a sort of hazy mystery to Cherney. Chicago had already passed through its brief period of pop glory, with acts like the Buckingham, the band of Chicago and Corky Laing already relics in the larger picture of music culture, and the city didn't have what could be called a thriving infrastructure of recording. Cherney did discover PS Recording on Chicago's bluesy South Side, though, a single-room facility run by locally noted jazz trumpeter Paul Serrano, where a lot of blues and R&B records were being done and which had occasional visits from touring bands, including the Rolling Stones once. This provided Cherney's first in-person studio experience.

Before that, studios were just a rumour to me,' he says. 'People seemed to **page 43 >**



Top: Quincy Jones's *The Dude*. Credits read: 'Recorded and mixed by Bruce Swedlen, assisted by Ed 'Big Jule' Cherney.'



Below: Ry Cooder's *Get Rhythm* which prompted tears from Roy Orbison



The Stones provided part of Ed Cherney's first studio experience

< page 43 spend most of their time under the console with soldering irons trying to make sound come out, but it was the music, not so much the gear, that grabbed me."

Hooked, Cherney made the abbreviated rounds of Chicago art studios in search of a job but was continually turned down, including at Paragon Studios, where he knocked on the door once a month literally for two years. In the meantime, he took a recording techniques course taught by Chicago freelance engineer Bruce Swedien, who had been making some classic records, such as Gene Chandler's 'Duke

of Earl', and the Chi-Lites' 'Oh, Girl', as well as Count Basie and Dinah Washington out of the city's studios for some years. 'We became friendly and I started carrying his briefcase around to his sessions,' recalls Cherney.

Cherney's persistence at Paragon finally paid off when, in 1976, he was given the equivalent of a janitorial gig there, after taking, and failing, a somewhat ludicrous entry examination.

'I was sitting there in the reception area writing on this test, and Bruce was there doing a Kentucky Fried Chicken jingle, and I whispered the questions to him and he whispered back answers, all of which were wrong, and he walked away laughing and I failed the test but got the job anyway. It was a pretty low-level job: when they gave me a brush to clean the toilets with it was considered a promotion,' he laughs. But Swedien and engineer-producer the late Barry Mraz (Styx and Ohio Players) were working there on the studio's 20-input Flickinger console, 3M M-16 multitrack and Ampex 440 and Scully 280B 2-track decks. Cherney spent days on end there, soaking it all up. What had been an adolescent pastime had by now become a very adult passion.

Cherney was lead engineer on his first session some time later, at another studio, doing a self-produced record for the band he had started out doing live sound work for. But Paragon owner Marty Feldman was working Cherney to the breaking point: the straw on the camel's back was when Feldman asked Cherney to pay for a hamburger after he had gone three days straight assisting on a session.

He quit and moved with his then-girlfriend to California, following his parents there after his father went to Hollywood to further his acting career. It was the heyday of what was known as the Syndicate: producers and engineers like Peter Asher, George Massenburg and Val Garay doing records for a circle of artists including Linda Ronstadt, the Eagles and Warren Zevon and using an even smaller cadre of session players like Waddy Wachtel, Russ Kunkel and Lee Sklar.

'The records in Chicago were the great old blues and R&B records from Chess,' says Cherney. 'But they were dry-sounding. These California records had ambience; you could hear the hardware on the snare rattle and hear the harmonics.'

Cherney got an assistant gig at Westlake Studios, which via its client roster and the fact that owner Glenn Phoenix also ran a pro-audio sales company from there exposed Cherney to the big time, in terms of both celebrity and technology. The studios were equipped with Harrison and API consoles, with VCA automation just coming into play in the late 1970s. Cherney's first assisting job was with his mentor Swedien on Michael Jackson's 1979 *Off The Wall* album. He went on to become a favourite of Quincy Jones and did Rufus-Chaka Khan, James Ingram and Patty Austin records there with him, as well as Jones' own Grammy-winning *The Dude* recording.

'I was spending a lot of time documenting the console using a camera to record the EQ settings. If Michael wanted to change page 46 >

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Bonnie Raitt with Ed Cherney and Don Was

< page 44 something in another mix. I had it. I was watching every move that Quincy and Bruce were making.

Cherney had a self-admitted long gestation period as an assistant engineer, but spending years as a second were much more common then than today. When impatient apprentices often leave internships after a few months and buy their own recording equipment. Cherney says the fastidiousness that he acquired borne of a long apprenticeship was worth the wait and stood him in good stead when, after a few assisting sessions with producer John Boylan (Charlie Daniels Band, Commander Cody, Boston) and engineer Paul Grupp, the latter's incipient burn-out caused the former to move Cherney up to the first engineer slot. His first major record mix was Johnny Lee's 'Looking For Love', the biggest hit from the Boylan-produced soundtrack to 1980's highly

successful ersatz-country film *Urban Cowboy*.

Cherney then started widening his network, assisting for engineer Mick Guzauski, whom Cherney remembers as a mischievous electronics genius.

He once took a woofer and put it into the sewer line of his house and pumped low frequencies throughout the neighbourhood,' Cherney says. 'It drove people nuts. He could also do eight things at once: do punches on a Chuck Mangione session and at the same time be designing and soldering a new compressor.'

But the breakthrough session came after a stint engineering commercials, which the fast moves he acquired in Chicago were perfectly suited for. Slide guitar artist Ry Cooder was doing a bit on a car battery commercial one morning in 1983 at The Complex, a studio then owned by George Massenburg and the group Earth, Wind & Fire. Cherney did a spoken slate to tape ('Take One, AC Delco') into the talkback mic, which drew withering stares for such blatant un-Californian unhippness from Cooder and other musicians on the session, including drummer Jim Keltner.

'Ry said, "Don't ever do that again",' recalls Cherney. But Cooder noticed him, and subsequently recommended Cherney to Linda Ron-

stadt, who was about to produce slide guitarist and Jackson Browne sideman David Lindley's second record, *Very Greasy*. The true launching pad for Cherney, though, was Bonnie Raitt's comeback record, *Nick of Time*, released in 1989. Raitt had lost her Warner Bros record deal in 1983 and had spent the intervening years unable to channel herself onto tape in a meaningful way. The Artist Formerly Known As, then simply known as Prince, had produced a few random sides with her but otherwise her career had stalled completely. Cherney and producer **page 48 >**

Eric Clapton

Rush: 1992 Grammy Record of The Year

'I got a call from Becky Mancuso, one of the first music supervisors in Hollywood, to work on a movie called *Rush* that Eric was the composer for, with Russ Titelman producing. They wanted someone who knew how to get guitar sounds fast and had experience in film. Eric liked to work in the control room, often right behind me, where he could see the picture and listen. We were in Village Recorders, Studio D.

I was taking the guitar direct and had also set up an amp in a small but very live room at the rear of the studio, away from the rest of the band. I put a 57 in close and a AKG 414 a little further out and then some omni mic a littler further than that and then just messed with the balances for each scene depending upon what that scene seemed to need.'

PHOTOGRAPH: DAVID GOGGIN

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3 4

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Iggy's *Brick By Brick* sold Ed Cherney on the merits of the EV RE-20 mic

< page 46 Don Was were at about the same point in their respective careers: long self-imposed apprenticeships waiting for the right opportunity to come along. Raitt's woodshedding had resulted in exceptional new songs and a new attitude. She took a chance on Was, who in turn called Cherney to engineer. 'We met for lunch at [Hollywood Boulevard

eatory] Musso & Frank's, and the chemistry seemed right between us,' says Cherney. 'It turned out that that was what made that record so great—the chemistry was right between everyone involved.'

The result was a rare and coveted example of an R&B record that worked on pop radio.

'I was used to working fast and Bonnie was used to working slow. Her last few records had taken a long time but still didn't let the essence of Bonnie through. I did my homework; I listened to those records. Then we—Bonnie, me, Don, [drummer] Ricky Fataar, bassist Hutch Hutchinson and guitarist Johnny Lee Schell—went into into Ocean Way Two and set up and just started playing. In five or ten minutes I had all the sounds up. I was

drawing on my jingle experience and working fast, going for what felt right. The only thing Don asked was that I brighten up the snare a little. We had a lot of clarity and depth to the sound, and we didn't go crazy looking for separation. We cut that record in three or four weeks on a \$100,000 budget. It was real fast and real easy.'

It also won four Grammy Awards that year and sold over a million units in a matter of weeks, despite Capitol Records' initial misgivings about the record; when the master was turned in, Cherney recalls, the label asked them to go back and cut some Motown covers. 'Bonnie and Don stood up to them, and they obviously were right,' he says.

Once the Grammys kicked in, **page 50 >**

Iggy Pop

Brick By Brick

'This was my first opportunity to make a real hard rock record as first engineer. It was literally almost a punk record, really. A lot of Iggy screaming live while we tracked. When I was recording Bonnie I discovered the virtues of the EV RE-20 as a vocal microphone. She liked to be in the room with the band while they were recording and I wound up keeping a lot of those vocals, so I needed a mic that I could easily match performance with later for fixes and overdubs, and that could take high SPL and had enough rear rejection. I found it through trial and error. That's what I wound up using on Iggy after going through a few others like a Shure 57, which was sucking in all the high frequencies like the cymbals in that same application. It's not like a great tube microphone or anything, but the RE-20 worked for what I needed it to do, and that's what I really have learned about making records: I've figured out that the sounds don't have to be great if the performance is great. You can get away with murder if the feel is right. I found that by going back to the old records and listening. They didn't really sound all that great, but the feel was great. And the other thing about making the record work is to do the homework and go back and listen to the artist's previous work, which I did with Bonnie and Iggy and others. It gives you a sense of the artist.'

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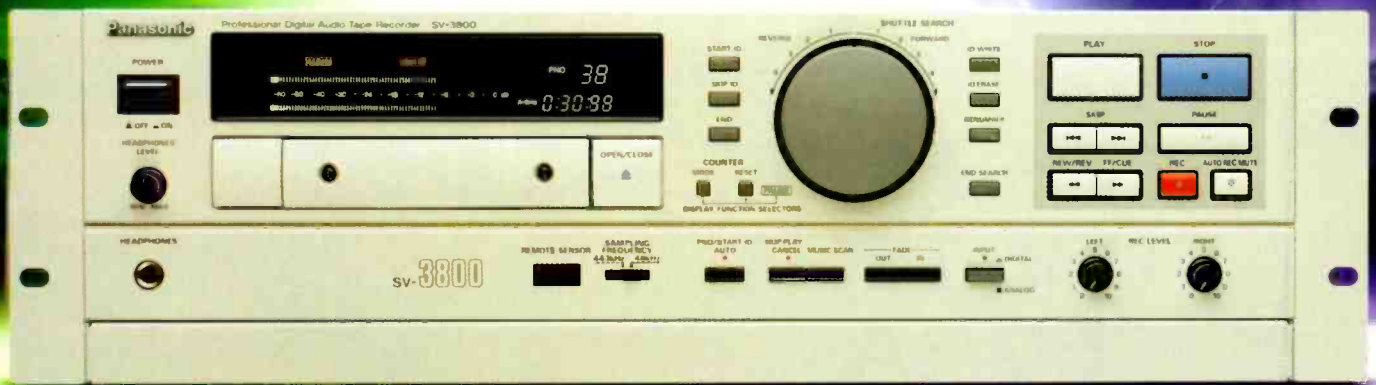
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< page 48 so did Cherney's career. Among the highlights are Iggy Pop's *Brick by Brick* album for Virgin Records, Van Dyke Parks & Brian Wilson's *Orange Crate Art* album for Warner Bros. and Eric Clapton's work for the Grammy Award winning (Record of the Year, 1992) film *Rush* and 'Tears in Heaven' track. But perhaps the most poignant moment, though, was when Cherney was working with Ry Cooder at Ocean Way, who had played a particularly beautiful and emotional slide solo on a track called 'Across the Borderline'. Standing in the doorway, Cherney noticed a figure listening intently, tears slowly trailing from behind square dark glasses. It was Roy Orbison, who was working in an adjacent studio. Orbison, who died shortly thereafter in 1988, asked Cooder to play on his record, and Cherney eventually wound up working on a posthumous Orbison track, at the request of Orbison's widow, Barbara: a remix of a track called 'We'll take The Night'.

Cherney's most recent projects take him even further afield. Starting late this year, he'll begin coproducing tracks with Melissa Etheridge, who will portray and sing the role of Janis Joplin in the forthcoming film *Piece of My Heart*. This after doing the live simulcast mixes on the Rolling Stones' current US tour (which are also being recorded to Sony 3348s for possible later release. And Cherney cautiously took on the leadership role in establishing the Music Producers Guild of America (MPGA), an organisation similar in nature to RePro in the UK. Interestingly, Cherney was one of those producers who had shown initial reluctance to become involved in a guild-like organisation of producers. His own conversion to the cause came about from a personal epiphany.

'Years ago one of my friends' grandfather was the director King Vidor,' he recalls. 'I learned a bit about him from that and from UCLA film festivals. Vidor felt directors were

being exploited in the early days of film and he started the DGA. I always wondered why there was nothing like that for producers and engineers. I always thought it could be NARAS, but that was more sharing of information rather than real networking. There's so many things [the MPGA] could do, from giving producers a voice in copyright legislation—people in government and the public don't even know what a producer does—to acting as a networking group and creating more of a dialogue between producers, who tend to be pretty solitary people working long hours in isolated studios.'

He's also looking forward to doing more surround music mixing, having just remixed Raitt's *Road Tested* recording in DTS surround. 'It's a way to get emotion back into the music,' he says. 'Compared to surround, stereo is dry and monochromatic. I'm looking forward to making records that are intended for surround from their inception. And one of the things I like best about that is that in surround, we're making up our own rules as we go along. There should always be an element of that in recording music.' ■

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Van Dyke Parks & Brian Wilson *Orange Crate Art*

'I had met Van Dyke when he was playing keyboards with Ry Cooder. I hung out with him because he had all the best stories—he'd been around for a while. He and Brian had started collaborating on *Smile* years before. It was great stuff but the label and the other Beach Boys hated it. So it stayed on the shelf and Van Dyke went on with his career and Brian went on with his madness. [The legendary *Smile*, started in 1966, was never released. Some of its songs did appear on subsequent Beach Boys records.] But Van Dyke had always hoped to finish it. Van Dyke had composed these songs, encouraged by [Warners head] Lenny Waronker. The songs had been written and recorded over a period of years; often, Brian didn't show up and Van Dyke kept recording more and more tracks on them. He had dozens of tracks and it had gotten to the point where he started to lose perspective on it. He asked me to come in and make sense out of it. I went into Brooklyn Studios in LA and put up all the tapes and just listened for days on end. It was an honour for me for him to have picked me because this project was close to his heart and soul and it had been going on so long. He chose me to "find the pope in the pizza" [a reference to a running gag by comedian Don Novello as Father Guido Sarducci on television comedy sketch show *Saturday Night Live* in the 1970s]. It was a great education. Since most of it was just Brian singing, there were tons of tracks of him doing harmonies with himself. The strange thing I found was that, when you put them together in certain ways, it would create "phantom" harmony tracks—weird harmonics that didn't exist on the tracks but were there when you combined the real tracks. Putting together Brian Wilson harmony tracks, the possibilities were almost endless. I can see why it took forever to make this record.'

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Global music networking

Res Rocket Surfer gets musicians from around the world together while other companies make commercial on-line audio distribution a reality. **Simon Trask** reports from the on-line front-line

INTERNET AUDIO is growing up fast. The rapid expansion and commercialisation of the net over the past couple of so years has brought with it massive amounts of investment geared towards developing technologies and infrastructures to facilitate real-time transmission of audio and video over the net, as well as secure on-line commerce and rights tracking solutions that will allow the investment to be turned into a viable business.

While bandwidth both in the network and at the user end is still less than ideal, new networking technologies are gradually emerging to cater for the seemingly insatiable demand for bandwidth. The dial-up modem standard has moved from 14.4k to 28.8k, and now 56k modems are starting to appear, while significantly faster technologies such as cable modems, xDSL and wireless access are waiting in the wings with bandwidths in the 8Mbps-10Mbps region. At the same time, increasingly sophisticated codecs are providing ever greater compression ratios, while new networking protocols optimised for media streaming such as IP Multicast, Real-time Streaming Protocol (RTSP) and Real-time Transport Protocol (RTP) are emerging to facilitate enhanced network throughput and improved client-server communication.

Until now, unicasting (more properly known as point-to-point unicast) has been

the predominant means of streaming audio and video over the Internet. In this model, multiple streams are sent out over the net from the content source, one for each listener or viewer—a system which can be expensive for the content provider as it requires large bandwidth onto the net to reach large numbers of users, and demanding on network bandwidth as the same content is replicated for each user along the same and multiple paths. Essentially, IP multicasting gets round both these shortcomings by requiring only a single stream to be broadcast, and only replicating the signal at more localised router stages.

Recent IP Multicast initiatives from leading US backbone provider UNet Technologies and from telco multinational MCI in collaboration with audio streaming pioneers RealNetworks are for the first time enabling media providers to reach many thousands of listeners or viewers over the Internet at non-prohibitive costs. UNet has launched its new UCast IP multicasting service, which it claims will allow content providers to send a single audio or video stream to 250,000 simultaneous US subscribers (and up to a million subscribers by early next year). Early UCast adopters include AudioNet,

ing mixture of old and new media companies. Atlantic Record plans to broadcast concerts by its artists in its virtual venue, the Digital Arena.

According to a UNet representative, where 100,000 unicast 28.8k audio streams would require three 45Mbit net connections at a monthly cost of around \$3m, a single multicast 28.8k audio stream to 100,000 users will cost around \$500 a month, plus a \$10,900 monthly multicast service charge from UNet.

On one hand, then, the Internet is moving ever closer to an on-line broadcasting model—the Holy Grail of the existing media conglomerates, who would like to make the Internet in their image. Meanwhile, other companies are championing an on-line sales and distribution model for music which will operate in parallel with, and perhaps one day replace, today's physical music sales and distribution infrastructure. The two companies lead-



Res rocket all fired up

ing the way here in terms of providing the enabling technologies are Cerberus Central and Liquid Audio.

Both of these emerging on-line models, then, are essentially about delivery. However, there is also a third model, which is integral to the concept of networking: the collaboration model. It's a model which, not surprisingly, has particular significance for music making—so also not surprisingly it's a company started by musicians which is pioneering the use of the Internet for real-time musical collaboration. The company is Res Rocket Surfer, and the software they've created is called the Distributed Real-time Groove Network (or DRGN, pronounced 'dragon'). The first release of the system has been up and running since July, following extensive beta testing, and most importantly it works—if you want to jam on-line with musicians from around the world you can do it now.

In the remainder of this article we'll be looking at how DRGN works, how it's being used right now (as you read this there will probably be musicians somewhere in the world jamming away on the system), and at some intriguing new possibilities it offers for forward-thinking recording studios and engineers. We'll also be looking at how these developments can be augmented by the distribution model exemplified by Cerberus and Liquid Audio to produce a new infrastructure for the creation and distribution of music.

The beginnings of Res Rocket Surfer go back to late 1994 and a conversation over a beer between musicians Willie Henshall of LondonBeat and Tim Bran of Dreadzone. Deciding that it would be interesting to set up an Internet band, using e-mail and **page 54 >**



Liquid Audio was used by Capitol Records to premier Duran Duran's *Electric Barbarella* single

Cable News Network and the Microsoft Network (MSN), while among those taking up the MCI/RealNetworks multicast service (called 'RealNetwork') are JAMtv, the Seattle Mariners (the first Major League Baseball team to broadcast its games on the Internet), ABC-News.com, and Atlantic Records—an intriguing

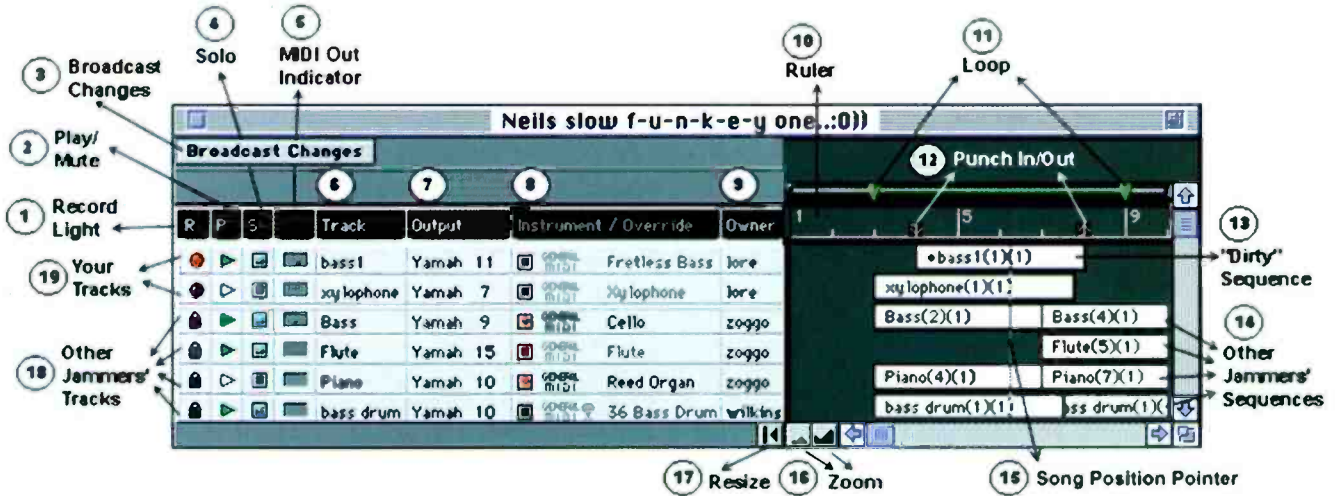
< page an FTP site as a way to circulate samples and MIDI files between collaborators, they went on to post an announcement on Usenet which generated a lot of interest and started the ball rolling. Meanwhile, on the other side of the Atlantic, two music technology students at Chicago's Northwestern University, Canton Becker and Matt Moller, had begun collaborating on an early version of the DRGN system, which had been devised by Moller. Becker had already been working on another collaborative music-making system, the Communal Groove Machine (on which he presented a paper at the International Com-

puter Music Conference in 1994). This was an algorithmic-style music generator which for its raw material used text-based note sequences submitted on-line in CTD-MOO, an on-line text-based multi-user chat system based at the university. Becker was administrating the MOO server, and used his experience to help Moller with the server code that would tie together the various distributed DRGN clients. In the way of global networking, these two pairs of musicians found out what one another were doing, got together to do the first on-line jam using the nascent DRGN software in the Spring of 1995, and decided that they wanted

to work together to develop the on-line jamming concept. Res Rocket's VP of Software for the past year, Aric Rubin, is also a musician and one of the original Res Rocket jammers; before moving to Res Rocket he worked for Macromedia, where among other things he wrote the audio spec for Macromedia's multimedia streaming technology Shockwave.

DRGN, then, is a development which has come from musicians who saw a new way to use the Internet for making music. DRGN takes on-line music-making to a new level by allowing musicians to create music on the net together in real time. Res Rocket **page 56 >**

Res rocket: Arrangement window with jam in progress



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< page Surfer call it 'on-line MIDI jamming'—a first clue to how the system operates. DRGN doesn't transmit any audio, instead it uses MIDI data to trigger notes and sounds on each individual musician's MIDI setup. However, real-time synchronised MIDI streaming is out. According to Becker, even in an ideal world of zero-delay routers and servers what he calls 'streamed multi-point MIDI jamming' wouldn't be possible on a worldwide scale.

In a technical document he wrote on the subject earlier this year, he commented: 'Musicians would find a delay of more than 8ms unbearable (as evidenced by frustrated guitarists using less than optimal MIDI transceivers) and 8ms is how long it takes a speed-of-light signal to go 1,488 miles. If the server were geographically centralised with respect to all the clients, then the farthest any one client could be from the server would be 744 miles (half the distance the data needs to make a round-trip).'

The DRGN software, which runs on both MacOS and Windows95 platforms, can be downloaded free from the Res Rocket Surfer Web site, after which you get one month's free use of the system and then pay a monthly charge of \$4.95. In the DRGN system, musicians gather on-line in virtual rooms, or studios, located on a server in Res Rocket Surfer's San Francisco offices and make music together using a specially-developed multi-track MIDI sequencer. A MOO-based text chat interface built into the DRGN client software allows musicians to communicate with one

another as they're creating music together—or just to hang out on-line and socialise, the social dimension being an essential aspect of the system. Some of the Res Rocket jammers set up CU-SeeMe on-line videoconferencing software so that they can see one another as well (Res Rocket has its own CU-SeeMe 'reflector' site).

However, one of the most fascinating aspects of the DRGN 'virtual world' is that jammers can be anonymous. When you sign up, you select a name for your 'avatar', or virtual personal on-line; this remains fixed, but you can also give yourself a text description and even assign yourself a gender. This means that jammers can mix and play with one another without having any idea of the sex, age, race or 'fame quotient' of their musical partners. It's a big boon for name musicians who just want to jam on-line without attracting attention to themselves.

Steely Dan guitarist Elliot Randall, however, is known to be an enthusiastic user of the system. Comments Bran: 'He's been right through the music business, and he's sitting there at home making music with people on-line, and he's like "This is the way to go". He goes, "This guy's great!", but this guy is an amateur musician or semi-pro in wherever. So he's respecting people without the knowledge that they're not professional. It's a true leveller. In this world you're only as good as your notes.'

The way that Res Rocket has got round the real-time synchronisation problem is to replicate tracks created by individual musicians to

the sequencers of all the musicians in the room—all the tracks play locally on each musician's computer setup. The server handles the organising, distribution and updating of tracks across the Internet. In the DRGN system, you create a track locally while listening to the tracks created by other musicians in the same virtual studio; the other musicians only get to hear what you've played once you hit the BROADCAST CHANGES button in the sequencer—and you only get to hear their tracks when they do the same. Not only this, but you can start and stop the sequencer locally, and drag left and right location pointers to any range of bars and then work within that range in looping fashion. Each musician has sole control over his or her parts, but can mute any parts that they don't want to listen to. Sequences can also be exported as MIDI files at any time for saving locally.

In one sense, the working method will be very familiar to anyone who has used a MIDI sequencer such as Cubase, Logic or Cakewalk. But none of these sequencers allow new parts to appear suddenly, magically, as if out of the ether, played by musicians who could be anywhere in the world where there's an Internet connection. Bran, who works out of the company's London-based recording studio where he coordinates jams and is responsible for the company's musical output, dreams of recording his next album via the net while sitting with a PowerBook on a beach in Hawaii—a possibility which budding tax exiles might want to look into!

The DRGN system uses General **page 58 >**



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< page MIDI as a 'lowest common denominator' sound-set, allowing musicians with a basic PC and sound card or PC and GM module setup to use the system and work with musicians that have a more extensive MIDI setup. Plans are afoot to incorporate MIDI Bank Select capability for compatibility with the Roland GS and Yamaha XG General MIDI 'supersets', so that musicians with GS and XG modules can jam together on-line and take advantage of their instruments' superior capabilities. The DRGN software operates in conjunction with OMS, Opcode's software MIDI patchbay system, allowing individual musicians to easily reroute tracks to any MIDI instrument and channel in their own setup. For instance, if you'd rather have your Mini-moog play a bass track in place of your GM synth bass sound, you simply use OMS to repatch the track to the Minimoog. In a sense, then, General MIDI merely acts as a commonly agreed set of sound-to-patch (and

drum-to-note) assignments.

Becker identifies two main ways in which the existing base of Res Rocket jammers (currently nudging towards the one thousand mark) use the system to make music:

'One way is where you're just looping over the same 16 bars, say, and replacing parts. So at the end of five hours jamming you still would only have 16 bars, but it will have morphed from being first maybe a reggae thing and then later on a jazz tune and then maybe a techno tune. It grows and evolves over time, and that's how you get a live feel out of it—and especially how you do live events. The other way that people work is that they build a song from left to right, with a beginning, a middle and an end, as they would with a traditional sequencer, and maybe in the end it's 500 bars long. The software doesn't look any different, it's actually just a social convention; people agree beforehand which way they're going to be working with one another.'

With individual users' equipment setups ranging from a PC sound card to a full-blown recording studio, there is obviously potentially a tremendous difference in how each musician working on a sequence will actually hear the same notes. The Res Rocket band of original jammers uses the company's London studio for recording all their tracks, with Bran at the helm as engineer and mixer as well as contributor while the other members are scattered around the globe. The studio is also used for broadcasting live MIDI jams out over the net using RealNetworks' RealAudio streaming software, with Bran again providing the mix.

Many jammers don't have a sophisticated recording setup at their disposal, and Becker sees this situation as providing an interesting opening for studios and engineers along the lines of what Bran does.

'There's already about five or six bands on the Res Rocket server,' he says. 'Sometimes they just jam, sometimes they work on songs. One of the possibilities here is for MIDI bands to employ the services of an on-line recording engineer. Bands can work on their songs on-line and then invite an engineer over who just logs in, goes to that [virtual] studio, and plays back the songs and feeds them through his MIDI rig and does a proper mix of them. So there'd be competition between these roving engineers for hire on-line; one could say "I've got all this gear, and I'll give you a RealAudio stream as I'm mixing it."

This could conceivably be a new cottage industry of some sort. It hasn't happened yet, but I think there's a huge possibility for it, especially because there's a lot of studios out there that have a lot of hours that aren't booked, and a lot of weird hours that aren't booked, but if you're willing to stay awake then somewhere in the world it's prime time. The time zones start working to your advantage—and you don't have smelly musicians coming into your studio and mucking up things, you just log on on-line. It's very hygienic! If I had a studio it's something I'd be wanting to do.'

At this stage the Res Rocket collaboration model can start to link into the on-line music distribution model mentioned earlier. In addition to mixing a track and perhaps providing a live RealAudio feed for the band members to hear, the recording studio or roving on-line engineer could offer a further service of mastering the track for on-line distribution and then publishing it to a music commerce server. This is where a company such as California-based Liquid Audio comes into the picture—or rather, its enabling software does. Liquid Audio is currently experiencing a flurry of take-up by record labels, individual artists and 'new media' companies. Among these are the granddaddy of Internet music sites, the Internet Underground Music Archive, New York avant garde music label Knitting Factory Records, rap artist MC Hammer, legendary guitarist Carlos Santana, and record industry major Capitol Records.

Capitol premiered its use of Liquid Audio technology in mid October by making Duran Duran's new single *Electric Barbarella* available for on-line purchase, in full length and Internet-only versions at 99 cents and \$1.99 respectively.


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Comments Liz Heller, executive vice president of Capitol Records: 'It is incumbent upon the music industry to experiment with new technologies that protect our artists' copyrights in the digital era. We've got to try new things, new ways of bringing our artists' music to the public. Liquid Audio's technology represents an entirely new avenue of exposure that the music industry can embrace without fear of losing what we stand for as artists and worldwide music providers.'

'We are committed to using the Net to promote a wide variety of music, and making our partnership with Liquid Audio a long-term success for us, our artists and their fans,' adds Robin Bechtel, senior director of New Media at Capitol.

The Liquid Audio system has three software components. The Liquid MusicServer, which runs on Unix-based platforms with a Windows NT version to come, handles the on-line distribution, commerce and rights tracking aspects of the system. The server can deliver music in two forms: as streamed extracts for auditioning tracks, and as downloadable files for purchasing, both using Dolby Digital format. System pricing starts at £1899 for five concurrent audio streams, 15 songs and unlimited preview clips, and goes up to £38,459 for unlimited streams and songs.

The Liquefier Pro (PC, £1149) or Liquefier Pro Tools Audio Suite Plug-in (Mac, £459) software lets you encode and publish audio to a Liquid MusicServer, as well as attach associated material such as album art, liner notes and lyrics as well as 'watermarked' copyright information. You can also master your audio for different bandwidths, from 14.4k dial-up modems up to 128k ISDN terminal adaptors and beyond, and listen to what it will sound like at those bandwidths. The 'stand-alone' PC version of the software includes a 4-band parametric EQ and a compressor/ limiter/gate/expander module for those who want to go beyond the preset mastering options.

Finally, the Liquid MusicPlayerCD software for Mac and PC is a freely available player, downloadable from the Liquid Audio and other Web sites. This can handle both the streaming and downloadable file formats, display the sleeve art and other associated media material, and let you construct playlists of downloaded songs as well as burn songs onto CD-R. This latter facility allows you to still end up with a physical product that you can stick into a standard CD player, only now you can create your own compilation CDs.

Bill Woods, Liquid Audio's director of marketing and communications, emphasizes the company's background in the pro-audio industry. Company founder and CEO Gerry Kearby worked previously for Studer Editech, where he was responsible for the development of the Studer Dyaxis digital audio workstation, while director of engineering Phil Wiser came to the company from Stanford University's prestigious Centre for Computer Research into Music and Acoustics (CCRMA). Woods himself was previously with Digidesign, and other members of the Liquid Audio team also come from pro-audio backgrounds.

'Gerry had a vision of using the Internet as a music commerce tool,' explains Woods. 'We knew our skillset in digital audio was quite strong, and our abilities there in understand-

ing those concepts and that market were well honed. The Internet looked like it offered a very promising opportunity to utilise some of that technology and raise the bar on where audio standards were.'

The Liquefier software has been designed with pro-audio personnel in mind, and as such it could slot neatly into the 'on-line engineer' concept espoused by Res Rocket's Becker.

Says Woods: 'One of the things we want to do is approach mastering engineers, because Liquefier Pro is mastering software. Who better to use a 4-band parametric EQ or a sophisticated compressor-limiter-gate-expander module than one of the people you're paying to be the lynchpin in your process, the mastering engineer. Why shouldn't they, at the same time that they deliver the CD, also deliver a Zip cartridge or a CD-ROM with song clips mastered as Liquid Audio files, optimised at various bit-rates ready for Internet delivery? It makes sense that when I'm delivered a master I want

versions optimised for all these mediums of commerce—and it's another potential revenue source for the mastering houses.'

Beyond the obvious application of selling music to consumers, Woods also sees uses for Liquid Audio in providing business-to-business solutions.

'Say you're doing a series of Pizza Hut spots and the ad agency wants to hear the three 30-second mixes you just did,' he says. 'You can use Liquefier Pro to publish the mixes as non-compressed audio files to your MusicServer, then email the URLs to the agency so that they can audition the files on-line and send you back an email to let you know which mix they want. If you'd had to FedEx a DAT it would have taken a day to get that approval back, but you got it back in five minutes.'

The other major (in fact, the original) player in the on-line music commerce game is London-based Cerberus Central, Cerberus, which like Liquid Audio has made page >

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< page payment collection a priority from the outset, provides the Virtual Pressing Plant server software package, V10 server, a free Cerberus Audio Player for each customer who registers on-line with the server, and the Cerberus ATM Commerce Server which links into the global credit card network. The system, which uses MPEG1 Layer 3 audio format and is for the PC platform only, lacks the inbuilt mastering capabilities or Pro Tools connection of the Liquid Audio setup. Pricing starts at \$880 for a single server license complete with 10,000 downloads, with subsequent recharging at \$0.02 per download.

While both the Cerberus and Liquid Audio systems have the mechanisms in place for rights tracking and payments through the appropriate agencies, contractual agreements of course still need to be made initially. Where a band is signed to a 'real-world' label which is using on-line distribution as an adjunct to CD sales, there will already be contractual mechanisms in place (though whether they're appropriate for the new on-line reality is another matter).

However, what to do when a band originates and operates solely in the on-line domain and anyone can listen and download the MIDI material, is another matter altogether, and somewhat uncharted virtual waters. The server tracks who plays what at what time, which gives some measure of protection, but ultimately the answer will be private on-line rooms, or studios. As of writing, all the DRGN virtual studios are public, which means any jammer can enter any studio and

Cerberus: 'enabling' on-line audio technology

contribute to a jam or listen and download a sequence as a MIDI file. However, it's a trivial technical matter to introduce private rooms, and Res Rocket Surfer plans to do this soon.

'What you'll be able to do is designate who is allowed to enter and to jam in a room,' explains Becker. 'So that way you really have the ability to set forth a copyright agreement among the people you're going to play with. You fax it to each other or whatever, and then actually have some enforcement of it by not allowing just anyone to walk into the studio except for those people you have an agreement with.'

For vocalists and other non-MIDI musicians wondering how they can get involved in DRGN jamming, Res Rocket's Rubin has a positive response.

'We believe that we will be able to incorporate digital audio directly into DRGN,' he says. 'We feel that it's important to allow

vocalists to directly sing into DRGN or to allow musicians direct access rather than only MIDI access to our world. One of the codecs we've looked at, from QDesign, is incredibly impressive and we have opened discussions with them on incorporating it into DRGN. So I think it's very safe to say that we will include direct digital audio support eventually. We will likely start with support of sample delivery technologies, such as [Headspace's] Beatnik and Downloadable Sounds, and grow from there to having a digital audio track or two in DRGN itself.'

The new developments in on-line music-making and music commerce described above are up and running now and starting to make their mark. As always with new technologies, new possibilities are beginning to emerge, and new opportunities are becoming available for those who want to take them. ■



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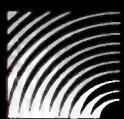
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Control room A



Royaltone

In a city that hasn't seen much studio growth lately, LA's two-year-old Royaltone Studios brings a sense of the old Hollywood grandeur. **Dan Daley** reckons that in doing so, it points to the future of the West Coast's recording scene

WHY DO PEOPLE continue to build recording studios? If the writing isn't on the wall, then it's at least in between the lines of the copy in trade magazines in which those who already participate bemoan higher costs and stagnant rates. Well, sometimes studios just "happen"—which is pretty much how LA's most recent recording palace, Royaltone, came about.

The studio business in the US in general and in Southern California in particular had been jostled by the economic recession of the early 1990s. And Los Angeles was the flash point for what would become nearly open warfare between conventional recording studios, which had organised themselves into a coalition called HARP, and so-called project studios which HARP members perceived as unfairly eating into the waning market for music recording. It was not a particularly congruent moment in which to enter the tenuous fraternity of studio ownership.

And Royaltone Studios, on Magnolia Boulevard in what Los Angelesans refer to as 'The Valley' (the spacious bowl on the other side of the Hollywood Hills) was intended at first to be a hybrid child of the times: neither pure

project room nor conventional for-hire facility. Purposely off the beaten path of Hollywood and its surrounding neighbourhoods where music studios had congregated for years, the studio was intended to serve as home to acts signed to Alias Records owned by Delight Jenkins in Burbank. What was supposed to be a private studio, but one that did not pull its clientele away from existing LA studios took on a life of its own, however, as construction began in 1993, after a year spent looking for the appropriate space.

But by the time Jane Scobie, Royaltone's manager and a London native who moved to the States in 1989 after an eclectic career in that city's music and recording business, had arrived, the emphasis had shifted to being a commercial facility. 'When I came here [October, 1995], it was already the largest studio that had been built new from the ground up in Los Angeles in probably ten years or more.'

Most ironic, though, was the fact that very few of the primarily regional college alt/rock bands signed to Alias Records ever used the facility. Without a lot of trying, news of Royaltone's appearance spread quickly through the LA studio grapevine. Technically speaking, the studio had first opened in **page 64 >**



Reception area



Mix room

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< page 63 early 1995 when engineer Gary Meyerburg, who was supervising the technical aspects of the studio's construction, brought in friend and former Eagles drummer Don Henley for one of his solo projects, followed closely by Hugh Padgham's production of Melissa Etheridge's 'Your Little Secret' recording. Producer-engineer Joe Ciccarelli was also retained as a technology consultant.

Built from a design originally done by Studio bau:ton and later elaborated on by Jenkins and architect George Newburn (now of design firm Studio 440) and built by studio construction specialists DP Construction, the nearly 11,000ft² facility is massive even by LA standards. It houses two studios, one a large tracking room centred on a vintage 40-input Neve 8078 (that was previously used in Motown's studios) with 31105 modules, 72 channels of GML automation and a Macintosh computer interface. The 23 x 21 x 14 foot control room overlooks a spacious tracking area that measures 48 x 31 x 22 feet and offers three iso booths, two amplifier closets, variable acoustics, and a 9-foot Steinway grand piano. Studio B's control room measures 28 x 24 x 14 feet with two iso booths; it's intended primarily for mixing and some overdub work and is equipped with an SSL G-Plus with Ultimotion and Neve modules.

The initial projects proved that the new \$5m-plus facility had significant potential but also revealed some sonic issues. 'What we had found from these early projects being done here by the time I came on board was that the studio needed some fine tuning,' says Scobie, who strongly recommended that the studio shut down and all sonic issues be examined and corrected before a formal reopening.

'It's not that the studio sounded badly, but it needed some small corrections,' she explains. The cure process was to invite in some notable pairs of ears for assessment, including George Augspurger and Vincent van

Haff, which resulted in significant changes to the main monitors in each room, these were originally designed by Ocean Way's Allen Sides, and included JBL speaker component and Augspurger cabinets; the upgrade included Avalon crossovers and new Larry Phillips amps on the low end, which Scobie says made a 'significant improvement' to the overall sound.

It was the low-frequency response of the control rooms that got the most attention. RPG diffusers were removed from the back of the control room, which Scobie says eliminated a build-up that was occurring at around 80 cycles, and the filling of the Neve room's bass traps with what she described as 'tons and tons' of sand. Close-field monitors and amplification include Auratone Sound Cubes, KRK 9000B, Tannoy SRM 10B, TOC Time Align, Yamaha NS-10, Bryston, EM Acoustics, and Perreaux and Yamaha amps.

The closing was not an easy decision to make, Scobie admits. It could have slowed the studio's initial momentum, which had gained considerable impetus from the first clients of Henley's and Padgham's stature; and closing was not without cost, with the upgrades adding several tens of thousands to the studio's already sizable bottom line. But, stresses Scobie, it was an absolutely necessary move, even if it seemed a frightening one at the time.

'You cannot open until everything is right,' she says. 'Every client is a first-time client in a new studio facility. So it has to be right and it has to stay right.'

SCOBIE ATTRIBUTES the studio's success in the last two years to a combination of things. Technically speaking, Royaltone offers a rather good selection of both vintage and state-of-the-art gear, the consoles being the perfect representation of a philosophy that extends through the outboard **page 66 >**

Built from a design originally done by Studio bau:ton and later elaborated on by Jenkins and architect George Newburn (now of design firm Studio 440) and built by studio construction specialists DP Construction, the nearly 11,000ft² facility is massive even by LA standards.

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Studio A tracking room

Royaltone has a striking interior design, a motif modelled after a stately European castle that contrasts sharply with the low storefronts and wide boulevards outside. The regal interior design includes amenities that are extensive and which fit the Grand Hotel motif of the facility

Tech CL-2B stereo limiter. The studio's tape machine complement includes four Studer A800 Mk.III with recent transport upgrades, a pair of Ampex ATR-102 decks, a Studer A820, and Panasonic and Sony DATs.

The other attraction, though, is decidedly aesthetic. Royaltone has a striking interior design, a motif modelled after a stately European castle that contrasts sharply with the low storefronts and wide boulevards outside. The regal interior design includes amenities that are extensive and which fit the Grand Hotel motif of the facility, including a private, moonlit whirlpool spa, and several beautifully decorated private client lounges which, fitted with one-of-a-kind furnishings. **page 68 >**

< **page 64** racks, as well, including an AMS RMX 16; API 550A, 550B and 560 EQs. Avalon M-2 dual-channel mic preamp and E-2055 stereo EQ; dbx160 and 165, an EAR MP2 stereo mic preamp, a Lexicon PCM170, PCM80

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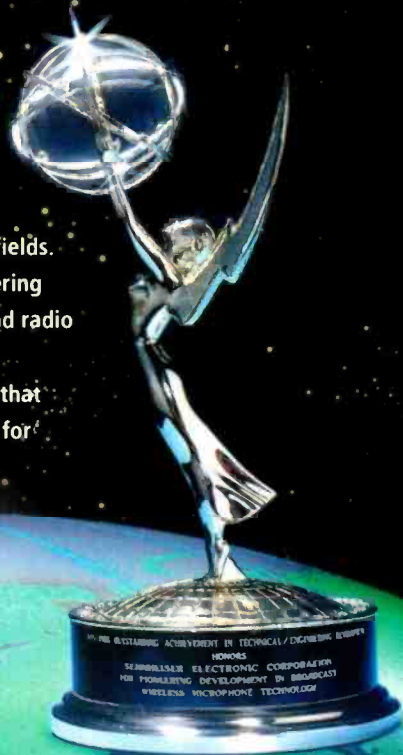
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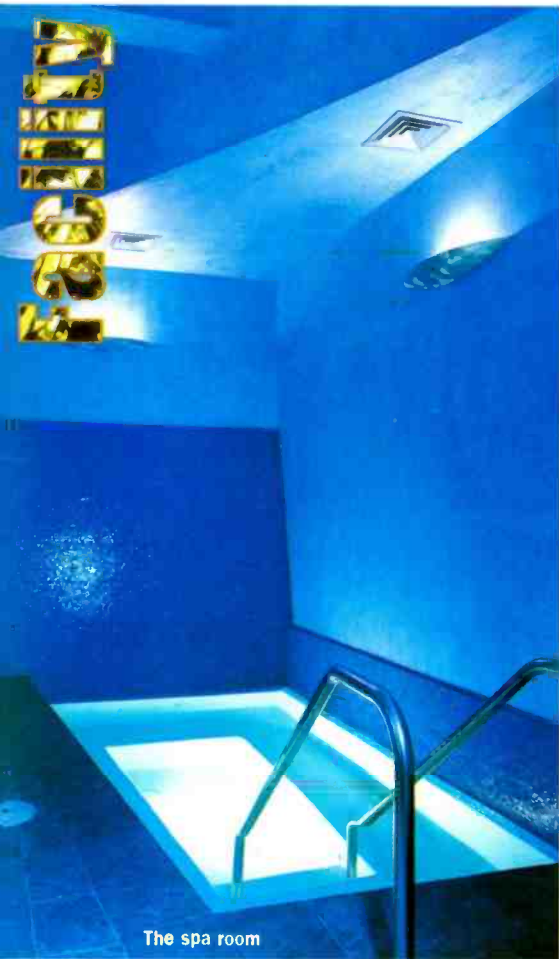
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The spa room

< page 66 which offer clients a way to get away from it all without leaving the premises.

These rooms have a remarkable effect on people using the studio,' says Scobie. 'The facility is huge, so there's lots of room to wander around. Then I've seen people come back to one of the private lounges and finish lyrics or work out new musical arrangements. It's quite unique to have something so visually appealing and inspiring in conjunction with a recording studio.'

It's not quite an amenity, but the front reception area offers visitors a glimpse of what might be—at three feet tall—the world's largest lava lamp. Skylighting is used in the main tracking room, which provides an airiness that contrasts nicely with the castle-like interior, which comes with its own heraldic coat of arms.

As beautiful as Royaltone is, it still has to compete in an extremely tough market. Scobie, who worked in music publishing, record labels and ran her own producer and engineer management firm in the UK, says she needs to draw upon every bit of that wide-ranging experience in order to keep the studio competitive and profitable. 'It is difficult out there, there's no denying that,' she says. 'But Los Angeles is experiencing a very good upswing in music recording at the moment, and every studio has something different to offer, which is important. I mean, the things you have to consider are pretty

detailed. Location, for instance. We get a lot of Japanese clients and we find that they like to be near shopping areas, like Hollywood over the hill. But other clients like the fact that we can give them what's virtually a closed environment as though it were a residential facility but still be within a short drive of anywhere in LA. The small private client areas, the jacuzzi. All of that comes on top of having desirable equipment that's maintained properly.'

Attention to detail is apparently paying off, as is an increasingly assertive marketing campaign that has seen Scobie nurturing New York-based producers as she tries to widen Royaltone's client base. Producer-engineer Tony Visconti has done two projects there this year—the Sea Horses and Christian Lane—and Nile Rodgers, who has his own facility on the east coast, has done Jimmie Vaughn, All 4 One and Paula Abdul there. Other artists who have availed themselves of Royaltone's

Contact

Royaltone Studios,
10335 Magnolia Blvd, North
Hollywood, CA 91602, US.
Tel: +1 818 769 2596.
Fax: +1 818 769 2573.
Net: www.royaltonestudios.com

technology and aesthetics include Rod Stewart, Van Halen, the Scorpions and Des'ree, as well as producers like Stan Lynch, Rick Nowels, Greg Goldman and Rob Jacobs.

Summing it up, Scobie observes that 'The studio is designed to maximise both creativity and efficiency, by creating a versatile environment that lets you go from work to relaxation at any pace the client wants. It's like working in your own home—if you happen to live in a very well-equipped castle.' ■

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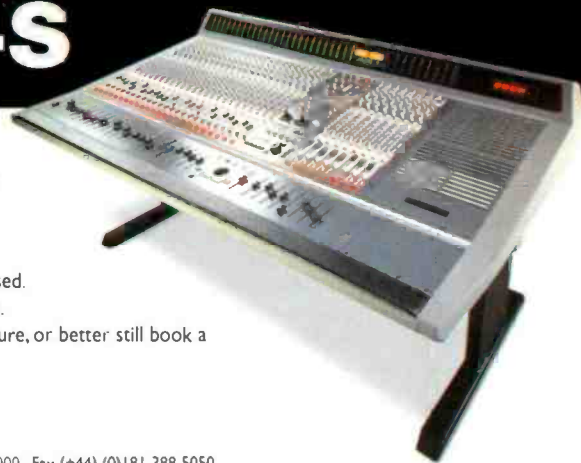
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Fishy

Business

Not all feature films need big budgets and supersonic soundtracks to make their point, some rely on thrift and ingenuity. **Rob James** reports on the posting of *Shooting Fish*

MOST OF THE HYPE surrounding the audio postproduction of movies concentrates on big budget, high profile, international productions and state-of-the-art production facilities. But for every blockbuster, tens if not hundreds of low to medium budget movies are quietly completed in a variety of ways in more modest facilities. *Shooting Fish*, a British comedy drama much in the Ealing tradition, is one such production.

The title refers to the ease of 'shooting fish in a barrel'—the fish in question being the victims of confidence tricks perpetrated by the

leading characters: Dylan (Dan Futterman), an orphan with a burning ambition to buy a stately home and Jez (Stuart Townsend) another orphan. As we enter their lives they are living in a gasometer and perpetrating a scam involving an 'intelligent' talking computer. Dylan and Jez are joined by Georgie (Kate Beckinsale) after they hire her from a secretarial ad in a newspaper. Georgie's father owns the house of their dreams but can't afford to keep it. The film charts their adventures towards the ultimate goal of acquiring the house. There are scams and counter scams in plenty.

London's Shepperton Studios hosted the posting of the film and has been much in the news since the Scott Brothers took it over. A considerable investment has resulted in two world-class dubbing theatres equipped with Harrison MPC consoles and Akai digital recorders. But for pictures that cannot afford the rates commanded by these studios there is one room at Shepperton that, although less prestigious than it once was, is still producing good work; Theatre One. Lead mixer on *Shooting Fish*, Mike Dowson, assisted on Stanley Kubrick's *Full Metal Jacket* and the Oscar-nominated *Gorillas in the Mist* which were all completed in the same room. Dowson's number two on *Shooting Fish* was Mark Taylor. Original music was composed by Stanislas Syrewicz.

The first temp mixes were done at the end of 1996 and the film was more or less completely mixed in time for the 1997 Cannes Film Festival. There were already some foreign sales, but the involvement of Fox ensured financial success. When a major distributor gets involved they go through a process of previews which almost inevitably



result in changes being required. In this case several months of recutting followed. The final film is around 20 minutes shorter than the original with at least one scene cut completely and replaced with one line of ADR. Ironically, due to the distribution arrangements, the version of the film being shown in Scandinavia still has the original scene.

Once films would be completed to the director and producers satisfaction and that would be the end of it but with the complex financing arrangements surrounding even modestly budgeted films weeks and months of revisions are now the norm. Mike Dowson reckons that, 'a lot of executives involved in the process these days don't seem to be able to visualise the film in their heads while it is in production and only start to tailor it to marketing requirements once a version is substantially complete. Very few directors these days seem to be able to make their own film and stand by it, there are a few, but pretty much if enough of the executives want changes they will get them.'

According to Dowson: 'With this particular film they were quite happy about making

changes and when the director, Stefan Shwartz, went back to make the changes he was very happy with what they had achieved. When I first saw it they were struggling to get it below two hours and it is now just over an hour and a half. This must be one of the few times a 'director's cut' has turned out shorter than the original.'

The location recording, or floor mixing, was done by Simon Clark onto a stereo Nagra with time-code, without noise reduction. The pictures were originally cut on film with the re-cuts done on an Avid. The location tapes were transferred to time-code DATs and 35mm mag film with time code. After picture editing, an EDL was generated from the cutting-copy magnetic-film track using a Colin Broad time-code logger and the DATs loaded into an AMS AudioFile at the Sound Design Company for conforming and editing by Stefan Henrix, who is also the supervising sound editor for the film.

'It would be unfair to say anyone sound designed this picture,' Dowson says. 'If you come up with concepts which affect the whole soundtrack you deserve a sound design credit, but that really only applies to certain pictures and the space for it is almost always present in the original script. The film is shot and cut with the sound design in mind.'

'It's not every picture that needs that kind of thing. There was no real need for a sound designer, as such, on *Shooting Fish*.'

Dialogues were premixed onto a Sony 3324 digital multitrack with ADR recorded at Shepperton onto Akai DD1500 and loaded into AudioFile from DAT. Effects were tracklaid on a Studioframe by Colin Chapman and premixed from this onto the 3324. 'We almost always premix direct from the workstations if we can,' Dowson continues, 'trying desperately to avoid going to Tascam if at all possible because of the relatively long lock up times.'

The first final mix was recorded onto an Otari MTR-90 with Dolby SR noise reduction. 'At that point we knew we couldn't finish the mix because the music still wasn't sorted out, but as we did this mix we added quite a few sound effects which were not in the original premixes which meant when they came back to do the mix proper we were in a position where we had effects on the final mix that we did not have in the premixes and they wanted to add more effects. In the kind of schedule allowed on pictures with this sort of budget, you do not have time to properly update the pre-mixes. So for the first "final" final mix we came off the MTR-90 adding new music and more effects onto the 3324 and then mastered onto SR-D plus the necessary Dolby Stereo. There were no picture cuts at this stage so that was okay. Then the picture went to Cannes and they recut the picture on Avid.'

'Out of that came an EDL. But by page 72 >



Postproduction



< page 71 now they had made a video master at 25fps and they decided to use that for the recut which meant the EDL was only a rough guide. So we had to play off the 3324 onto a bunch of Tascam DA-88s for dialogue effects and music. The dialogues were loaded into AudioFile, roughly conformed to the EDL and accurately placed by phasing to the guide track. Dialogue editor Richard Fettes added even more effects at this stage. From the AudioFile tracklay they managed to generate a kind of EDL that gave the editors a guide of what to do with the effects and music. The effects, Foleys and music were loaded into an Akai DD1500 and conformed to the dialogue with a few intelligent tweaks as, and where, needed. For the final final mix we had a 16-track AudioFile and two 16-track DD1500s giving us the elements back which we mixed onto the 3324 before mastering to SR.D on M-O disc with all the other delivery requirements M&Es, D M&Es going onto Tascam.

'You get into situations like this and you think there must be a better way and, of course, there is.'

The sound of a feature film depends largely on the directors' interest in it. In this case Stefan Schwarz was interested, but not fanatical.

'He doesn't care how it happens as long as the intention is achieved,' explains Dowson. 'They were certainly interested in sounds which give them gags.'

'Stefan [Henrix] is a very, very good dialogue editor and he did all he could, but he is no mixer and he brought me a whole bunch of problems. A lot of the location sound was plagued with radio mic interference, particularly some location scenes shot around Alexandra Palace, most of these had to be post synced, there were horrendous HMI lighting whistles.'

The tools used to deal with all this consists of two Yamaha DEQ5 digital equalisers, a Urei

Little Dipper analogue notch filter and a Dolby Cat 43a. Dowson sees the DEQ5s as a direct replacement for the ubiquitous Little Dipper.

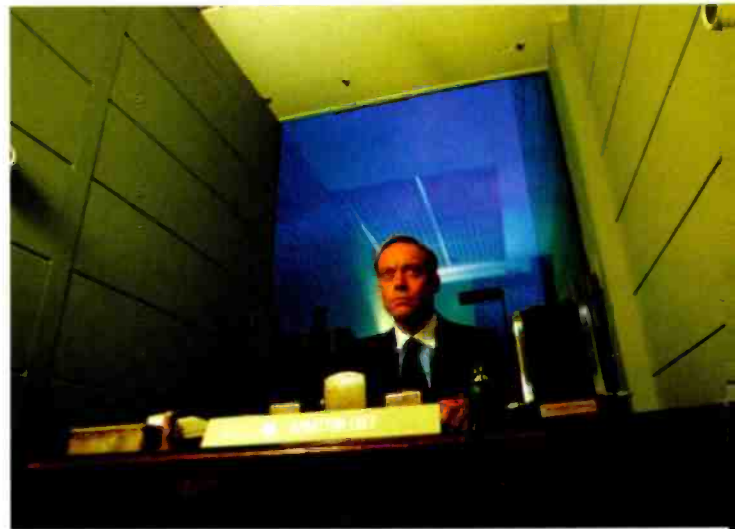
'The DEQ5 is great, but the ability to peak bands in the notch mode would make finding the problem frequencies much easier.'

Dowson also makes considerable use of the Dolby Cat43a noise reducer. For those unfamiliar with this device it uses a standard Dolby A Cat 22 card with a controller that allows the card to be used in decode mode with fader adjustment to the various bands. Legend has it the Cat 43 was born after a dubbing mixer heard an engineer playing audio through a Cat 22 card on an engineering test rig which varied the effect of the decoder bands. He liked what he was hearing and the Cat or 'Orange Box' was the result. The effect is something like a frequency-conscious expander. There is also an SR version, the Cat 430, that Dowson would have liked to use, but did not have available for this picture.

Despite these tools, cleaning up dialogue is a time-consuming operation. The lighting whistles do not remain constant in frequency or level from shot to shot or even within shots and you have to be constantly aware of the filters' effect on voice quality.

'It was a labour of love; but there comes a point in a picture with a schedule and budget like this where you just have to say, "Enough, I can't do any more without spending a lot more time on it". In this case we mixed the dialogues in about four days, did the rest of the premixing in another four, and did the first final mix in two.

'When it came to the last final mix, once



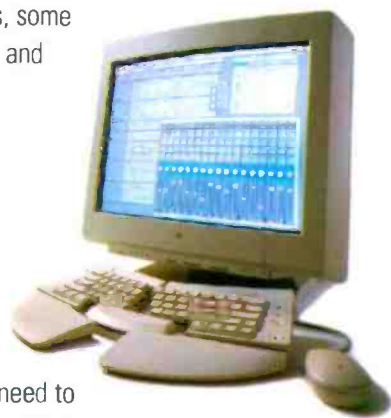
the various versions of dialogue were combined, life became even more difficult. Because I hadn't had time to get as much of the rubbish out as I would have liked and the new juxtapositions made some of the artefacts more obvious. You spend maybe 20 minutes sorting out one bit only to find five feet along the frequencies have moved and widening up the Q really affects the dialogue. I had quite a lot of sibilance generally and some of the filtering and other processes the material went through accentuated it a bit. I tried using a de-esser we've had here for years but it is extremely finicky to set up, and although I was getting reasonable results, I tried a BSS Opal compressor/de-esser and that was an absolute life-saver. I took some page 74 >

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< page 72 advice from BSS and found using the compressor section as a pure de-esser worked wonderfully well. The dialogue was far easier to listen to. It took some hardness out and eased off the sibilants really nicely. A bargain at the price.

'With the changes in technology suddenly a lot of the transfer bay work has moved into the cutting rooms,' he suggests. 'The editors don't have any great problem tracklaying using DAWs once they grasp the essentials because they know what they want to achieve; the problems arise on the analogue side. They should be in this wonderful position to assess sound really well, but they haven't had the training or experience to do that, and they don't necessarily have the ear for it. A lot of them have a problem identifying what is and is not a real problem.'

The mixing console in Theatre One is a venerable, and heavily modified, 40-channel Trident Series 80 film desk fitted with Otari Diskmix automation. This system is well liked, but Otari is not keen to extend it further since it no longer sells automation systems for fitting to other manufacturers' desks.

'It is just as quick as Flying Faders, its simple, and we use it just like a 40-channel recorder. We never bother with off-line editing of mix parameters,' comments Dowson.

'The music was all 2-track and with discrete mixing—like SR.D—you have to actively fill the speakers with sound. With Dolby Stereo, the matrix will give you a centre image and stuff bleeds into the surrounds; with SR.D you have to work that bit harder to fill it out and use a few more tricks.'

One of the tricks Dowson used on the music was to pass it through a Dolby SDU 4 decoder to spread it without major effort ('Dolby don't really approve of the method, but the final test is whether it works or not').

Dowson disagrees with Todd-AO's Chris Jenkins over Dolby's influence on the quality of film sound: 'I can see the purist in him talking about the Dolby matrix putting the ultimate quality of cinema sound back years, but you have to remember what it has done for quality in the average cinema.'

Making the Dolby Stereo track as compatible as possible with the SR.D is necessary because any problem with the SR.D track on the print causes the system to switch to the analogue optical track. Careful choice of reverb and effects is needed to make such changes as unobtrusive as possible. Dowson has a favourite Lexicon program that he uses for this purpose.

Reverb was taken care of by a couple of



Lexicon 300Ls and an AMS. Other toys in The-are One include an Eventide Ultra Harmoniser and AMS 15-80s. All the various record and replay transports are synchronised using a Timeline Lynx system including, of course, a biphasic film module. In addition the Akai DD1500 is often used as a time code gearbox to deal with the usual mixed collection of frame rates.

Early mixes of *Shooting Fish* were all done to a video picture and Dowson is wary of the faith placed in current nonlinear editing processes to keep the picture in sync.

'When it came to the last final mix I insisted we had a film print, partly to get a true sense of scale, but mainly to be absolutely certain the neg cutting had resulted in the print having the same sync as the tapes we had been working to,' Dowson explains. 'Traditionally, the rubber numbering process gave you a direct route back to the clapper board. With nonlinear processes there are so many things that can go wrong that result in the sound being out of sync with the picture and there is virtually no way of checking where things went wrong. I have only mixed two films this year which were completely in sync, one was traditionally edited and tracklaid on film and the other was nonlinear, but the whole process had been carried out at 25fps, shot, cut and dubbed.'

With the old way of doing things there was an 'audit trail' right the way back. This is an area that will require further attention if the full promise of nonlinear is to be realised. But despite the tortuous route, *Shooting Fish* sounds fine.

What began as a budget feature 2-week mix has stretched to several months of intermittent activity. Could it have been simpler? Of course it could, but it would have required a larger budget up front and the foreknowledge that major revisions would be needed after completion. In a sense, some of the problems here were caused by the film's success—if Fox Searchlight hadn't picked it up the major revisions would not have been required—but there were still fundamental problems with the chosen route.

It would be great if film projects always went smoothly with well-recorded location sound and a clearly laid out postproduction process route. Multichannel music or at least music that has been mixed with a matrix decoder in circuit so there are no nasty surprises ought to be the norm, but unfortunately isn't. In the real world, the route followed by many films is verging on anarchistic. The last few years have brought profound changes to film postproduction process. Very few people would want to return to physical editing of sound let alone to nonautomated mixing. But something vital is in danger of being lost. The old way of doing things may have been a bit agricultural, but at least the process was clearly defined and refined over many years with appropriate skills employed at the critical points. Projects can work smoothly using the current technology with the proper preplanning. Sadly, few are well planned. It is time to inject a little order into the digital age. Not only would quality improve, but costs would actually fall since 'rescue jobs' are invariably more expensive than doing it right in the first place. ■



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RECORDING

On the 50th anniversary of the APRS society, **Tim Goodyer** and **Dave Harries** take to the streets of London to trace the origins of its recording studios and its music recording scene

THE STUDIOS that served the early stages of the music recording scene have since become as much a part of its history as the records they produced. The days that defined popular music also saw equipment and working methods derived almost from scratch. But while records poured out of these studios, the studios themselves were few in number, refining their recording and production practices with a fervour and secrecy that made them as glamorous as the stars they made—and building formidable reputations for certain of those who operated them.

As with many historical events, the story of these studios is heightened by the conflicting recollections that arise when it is researched. So when the 50th anniversary of the APRS presented a golden opportunity to look back at the formative days of London's first studios, it was no surprise to find that anecdotes now outnumber hard facts by a considerable margin. A few signposts exist to help define the framework, however, so when Abbey Road opened its doors on 12th November 1931 for Sir Edward Elgar and the LSO to make the first recording of *Land of Hope and Glory*, we can be certain that it was called EMI Studios, that IBC had been running for some time, that the opening of Decca's Broadhurst Gardens facility was three years away, and that Billy Higgs independent music studios, Levy Brothers studios and Star Sound studios would all appear over the following four years.

IBC grew out of Radio Normandy when, after WWII, its major shareholder, a former MP named Captain Leonard Plugge, was unable to recoup his investment from the French. It was established as both the Universal Programmes Company Limited and IBC—standing for International Broadcasting Company or International Broadcasting Corporation (according to Adrian Kerridge and Peter Harris respectively; Harris recalls it being the only corporation other than the BBC). When Allen Stagg arrived to run Studio B alongside John Terry, they were in the business not only of recording but of training a particularly high standard of engineer. That the names found here recur throughout this

story is testament to IBC's success: Dennis Preston, Adrian Kerridge, Eric Tomlinson, John Timperley, Jack Clegg, Jimmy Lock, Peter Harris, Ray Prickett, Keith Grant... And Joe Meek. Today Stagg regards Meek's involvement with IBC sourly, but Meek did go on to establish himself as the first independent producer-engineer at his studio at 304 Holloway Road in 1960.

'When I first started, I was wearing a white coat and sweeping the dog-ends up off the floor,' comments Adrian Kerridge. 'In those days Allen Stagg really put you through your craft. Then I started spinning discs on shows—we had a live announcer in the room and I'd run the show from two turntables, and do the whole show in as long as it took to do the show, and then the payouts. There's no better way of learning than doing something live and getting your craft and your art drilled into your head pretty quickly.'

The two rooms that once comprised IBC are no longer studios, along with many of the other key studio sites: Decca's studio in Broadhurst Gardens now used by the English National Opera, Philips' Stanhope Place address was made familiar by Paul Weller (as Solid Bond Studios), but now hosts another business, Pye's spot in the former ATV House has become a casino, Trident's St Anne's Court home is now empty; and the New Bond Street location that housed Guy de Bere and later became Advision (before it moved to 23 Gosfield Street in 1969) and then Chappell's has been cleared. A few sites still support related studios, however: Star Sound is now Air Edel and, of course, EMI has become renowned as Abbey Road.

From a literal handful of studios during the 1930s and 1940s, there was a watershed beginning in 1956 when the first studios not associated with record companies appeared. These included the first Advision and Philips in 1956, CTS at its original Bayswater address in 1957, Lansdowne in 1958 and **page 79 >**

From the top. 1 Star Sound showing Air Edel colours. 2 Adrian Kerridge: from IBC, to assisting Joe Meek, to running CTS. 3 Abbey Road soldiers on. 4 Philips at Stanhope Place



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< page 77 Pye in '59. Originally, all were building custom equipment, common links being limited to tape recorders such as EMI's BTR1 and BTR2 machines, which helped keep engineers' expertise specific to one studio. But there were other factors that distinguished an engineer's prospects from those today: 'I joined EMI the same day as George Martin — 1st November 1950,' recalls Ken Townsend. 'I was at [EMI] Hayes for a while and I came to Abbey Road at the tail end of 1953, early 1954, and even then there was apparently a pact between the studio manager of Decca and EMI that no staff would be given a job at either of the other ones, and they didn't want the techniques being divulged. In fact, there was probably some sort of unwritten law when you look back—nobody did move between those two companies, and they were at that stage the two biggest companies.'

Even Abbey Road hosted an uneasy peace between two former rival recording companies—HMV and Columbia Gramophone—that had been 'thrown together', in Townsend's words, under EMI.

'It was a bit like EMI and Decca were later on,' he continues, 'you weren't allowed to speak to each other because you had your own recording techniques and they were absolutely dead secret. And so it was even after 1945 when the war finished. When I joined, the people who were HMV and the people who were Columbia still considered themselves as either HMV or Columbia people.'

There weren't magazines like *Studio Sound* that published all the microphone techniques and all the sorts of microphones that people are using. Recording engineers were a little bit, I suppose, a bit scared of somebody taking their jobs over.'

One of the key movements of personnel of the time was that of Allen Stagg from IBC to Abbey Road. After 15 years training the industry's engineers, Stagg received a call from Ken East inviting him out to lunch.

'I said, "What's it about?". He said, "I'll tell you when I see you";' Stagg relates. 'They'd apparently heard all about how IBC was, and he wanted me to do the same at Abbey Road. What a job.'

'I did a few things but I never did see it as anything other than a temporary thing as far as I was concerned, for the very simple reason that I was forced into being confrontational, which is against the grain as far as I was concerned. But I couldn't see any other way forward.'

The tragedy was that when I left I was asked to make a recommendation and I said, "Well, there's only one person there and that's Ken Townsend". I knew and everybody else knew that Ken was the obvious choice, so I recommended him and they chose Gus Cook instead.'

The early recording studios were all to be found worked into existing buildings as opposed to enjoying purpose-built facilities. Decca was a municipal building, Advision was originally a dental manufacturing company and even Abbey Road began as a residential property. The circumstantial nature of **page 81 >**

From the top. 1 Place your bets at Pye. 2 Evidence of Decca's past life. 3 Transport of delight at Advision. 4 IBC: company or corporation? 5 Trident, deep in Soho

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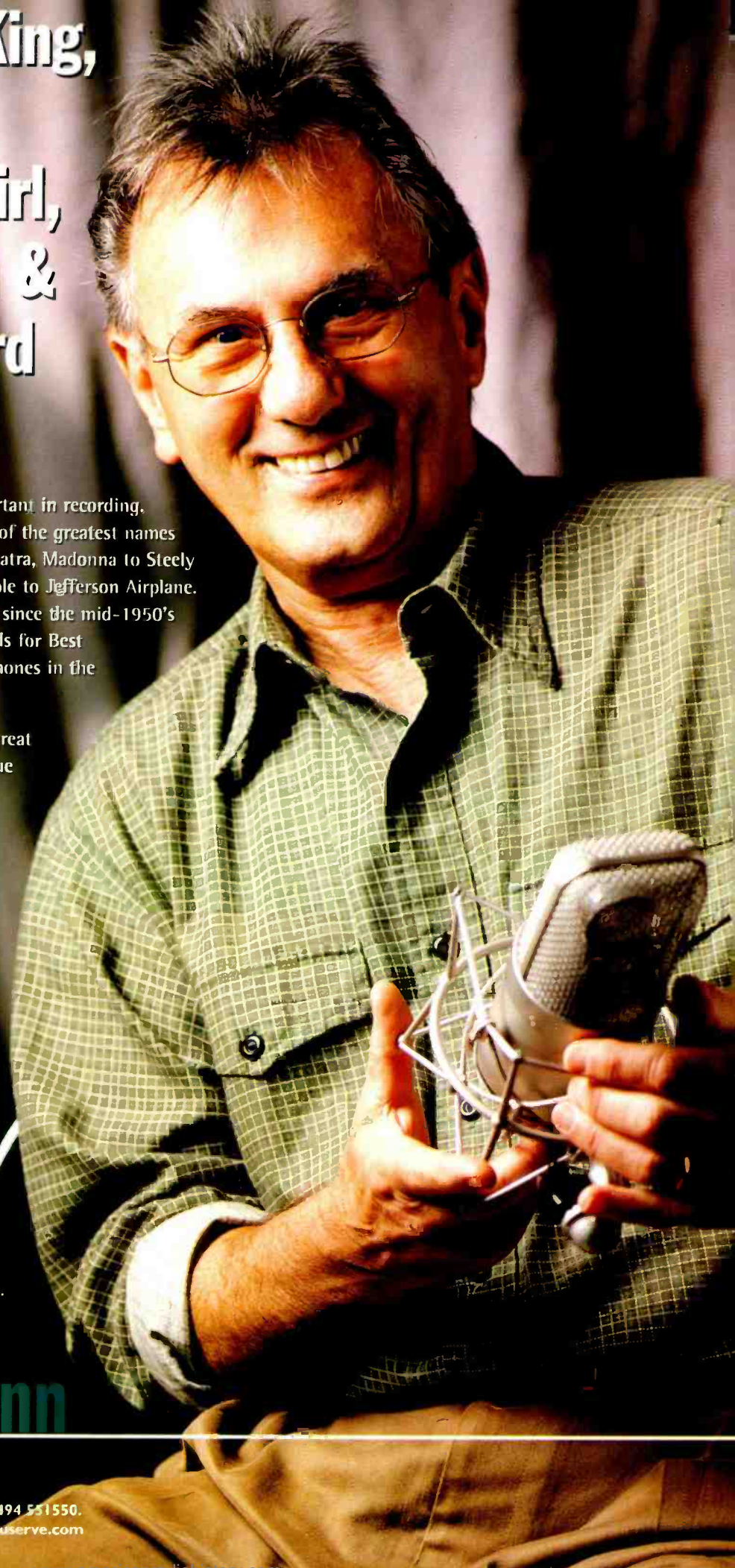
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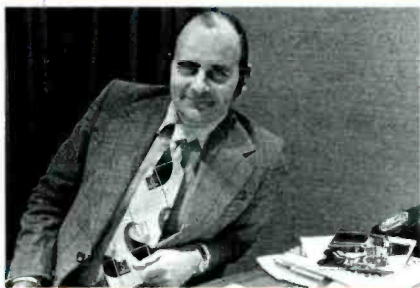
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Barry Sheffield on Trident:

'We used to have the police come round on a fairly regular basis when the Beatles were there. There was one chap that had ginger hair—a policeman—and he used to bang on the door at two in the morning. They used to come in and they used to stow their helmets under their arm in the control room and they'd say, "A lot of joss sticks tonight", and we'd say, "You want a beer?", and they'd go away again. Then you'd see them in about two nights' time.

'I think because in those days you were honest enough to let them in and they could come and stand and be with the stars—they weren't interested in what we were doing anyway.'



< page 79 such premises obviously entailed making any number of compromises, although many of the live rooms—such as those at Decca, CTS in Bayswater, Olympic in Carlton Street, Advision in Sharpleshall Street (subsequently used by Mayfair) and later Trident in St Annes Court—did possess excellent acoustics.

'It was purpose-built, triple-wall, floating floor, trick ceiling that looked low, but in fact wasn't,' says John Timperley of Advision's Bond Street days. 'It was very well equipped: Neve, pukka air conditioning that added moisture to the air to keep the string sounds the same night and day...

The first site chosen by Dennis Preston for CTS studios was in Kensington Gardens Square, Bayswater, and was previously a banqueting hall owned by retail magnate William Whiteley.

'Somebody found an old print that showed it in its heyday with a minstrels gallery at one end and all sorts of things,' Peter Harris explains. 'The drawback we had there was that underneath the studio were the storage cellars of the furniture company next door—Frederick Lawrence & Co—so at crucial times you'd hear these steel-wheeled trolleys being trundled around downstairs. So one had to rush round and beg the gentleman who controlled the loading bay to get these guys to lay off for a little while.'

Any tension that exists today between audio and video people can, in part, trace its origins back to these early days as much of the music recording grew out of established radio and film facilities. Peter Harris remembers the dissatisfaction of film-music composers with existing facilities driving them into places such as CTS (Cine Telesound Studios), established specifically to attract them: 'All the film studios had scoring stages then, but many of the composers were not madly happy about the results they got,' he says. 'There were exceptions, of course, but a lot of composers knew that the record-type studio could produce a better noise for them. So CTS was set up with film projectors, sprocketed recorders, and optical recorders, and very shortly coined an awful lot of film work from the UK, and a lot from America. All the major composers from the States used to come over: Mancini, Goldsmith, Baccarach... It also captured a huge amount of the commercial, making commercials, because ITV had just started. One of the directors was Johnny Johnson, who was known as 'The King of the Jingles', we used to do a lot of Cliff Adams work and a couple called The Shakespeares were quite busy in that field at the time. So we had a very large percentage of that sort of work.'

But studios already serving film companies, and the film companies themselves, were often ready to belittle the work of a new breed of engineers who were interested in establishing a new benchmark in audio.

'They were bitchy,' confirms Jack Clegg, who toured Pye, Decca and CTS after his stint at IBC. 'I did stuff for Pinewood with Frank Cordell, and they were forever picking holes in it and saying, "Well, I can hardly hear the cellos..."'

The major studios like Shepperton page 83 >

- From the top. 1 Trident's typically anonymous entrance. 2 Ken Townsend at Abbey Road.
- 3 Star Sound's Deco frontage.
- 4 Home of a generation: IBC.

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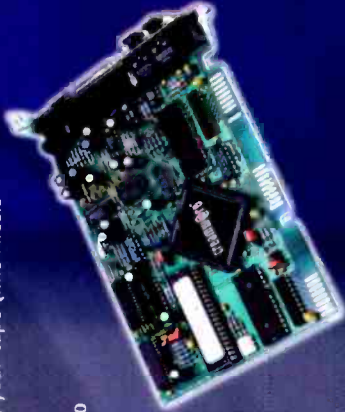
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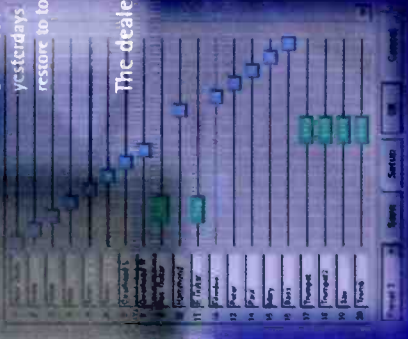
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Mike Mailes on Decca:

Almost to the end of Wilkie [Arthur Wilkinson] retiring, if you did anything that was slightly different you were considered to be not one of the real Decca people. It wasn't on. I remember Wilkie once walking through the number two studio—it had an access through to the Number 3 canteen and studio area, a sort of shortcut. I don't remember what I was recording—a piano, voice or something, pop, or jazz even—and I'd got the piano propped up on a little half-stick. He walked through and said, "You can't record a piano like that". In my young way, I said, "Well, you come back at half past two when the session starts and I'll show you". This was the only way we could tackle the problems that were coming along. People wanted different things and you had to go about them in different ways.'



< page 81 and Pinewood, although they did record music it was done under duress," adds Eric Tomlinson, who succeeded Allen Stagg at the helm of IBC. "They would tell the sound department there is music next week, and there was a sort of, "Oh all right, I'll do it". It was not the most popular reception in the film industry.

"While we were at CTS I did a score with Ronald Goodwin—*Those Magnificent Men in their Flying Machines*. Pinewood were dubbing it and they said they must have the music, as soon as the first reel was done. It went, and at about quarter to one we got a message from Pinewood to say the music is useless—stop recording, you're wasting your time. We carried on.

"Went over to Pinewood and there was a committee there, of sound people, and they ran it for us and said, "It just won't work, it sounds too big, it's got echo on it, and left is left and right is right. You don't understand film music, you people in London. And this is what it should sound like". They said they couldn't do much with it, at which point Ron Goodwin said that we thought they were wrong. Ron made a very good speech about how he'd just done the film music for *How the West was Won* and how he wanted this music to sound every bit as good as that. And then we tried to make friends and said, "Come and have a drink, we'll discuss it further". And they all said, "Can't do that". Then the lights went out and we were left to find our own way out."

"We had a problem because Shepperton used to mark up the reels wrong so we always put the wrong picture and sound up," adds Jack Clegg. "I'm sure they used to mark them up wrongly because they were so insanely jealous. We weren't allowed to do film music because we were a sound studio."

But the sheer volume of hits that came out of Britain and the London studios proves that the engineers had learned their trade well.

Technical progress accompanied and assisted the recordings. Eric Tomlinson recalls the first stereo recording taking place at IBC in the hands of Adrian Kerridge, who now heads CTS.

"It was for an American company, Empire I believe. Johnny King I think was the musical director. These Americans came over and they brought with them a brown plastic attaché case in which was one of the portable Ampexes. It was shiny brown leathery-type hard case and you opened up—broke it in half and the top half was the deck, and the bottom part the amplifiers, and then two speakers popped out. We were very short of mics, but we managed to find Adrian a couple and packed him off. We had the Ted Heath band there, and he put one mic at one end and one at the other, and we were all outside in the corridor listening to this fantastic stereo. Took the wind out of my sails a little bit but nevertheless it really was quite good considering he just had two microphones up. It was a fairly interesting time.

"I've still got the actual tapes of that session. In mono. It was the best Ted Heath band and it was in top form—in page 84 >

From the top. 1 The English National Opera in action at Decca. 2 Now just another business address: the former Philips and Solid Bond site. 3 Abbey Road sporting an almost graffiti wall

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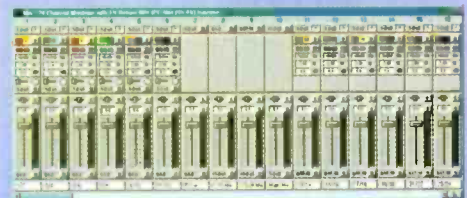
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RECORDING

< page 83 fact, just a few years ago I was playing the tape early one morning when I was setting up and in came some musicians: "Hey what's that? Sounds great". And I said, "Well you ought to know, you were on it".

"It was only a commercial record, it was nothing spectacular, but I still use it in a strange studio to acclimatise myself to the sounds of the room."

The opportunities for technical development were irresistible and the foundations of numerous reputations were quickly laid down, including that of Rupert Neve. But Neve was in the good company of designers such as Bernard Marsden and Dick Swettenham who was responsible for all the desks used at Olympic.

"Bernard used to go around with a cigarette packet and draw circuits on them," says Eric Tomlinson of Marsden. "Then he'd put that cigarette packet in the fire, so consequently nothing was ever really kept. He would design all these little bits and pieces. I remem-

ber going to see this big box with a magic eye in there which opened and closed. He used it for disk cutting to get more level on. Of course Michael Barclay of Pye loved that—get records louder, or apparently louder."

Most notable for their in-house equipment were Decca and EMI.

"We had a manufacturing centre upstairs and all the RS60s, limiters and things, they were made there," explains Ken Townsend. "We later made those into cutting rooms, when we formed a thing called REDD, which was Record Engineering Development Division [based in Hayes], which started making the REDD equipment—the REDD 1 was the first sort of stereo gear."

"The REDD 17 used 40dB amplifiers made in Germany—to my knowledge, that was the first ever recording console, rather than a sort of a box. It had eight inputs and two auxiliaries. You had sum and difference transformers on Channels 1&2 and 7&8, and at the next stage

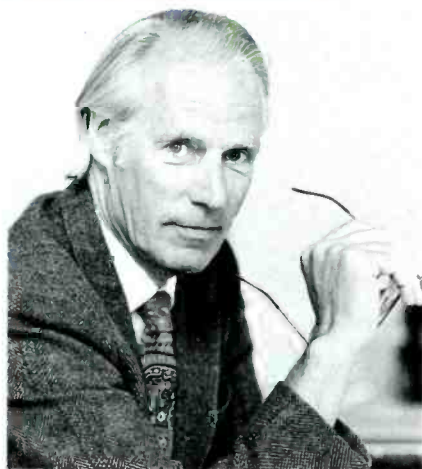
you could plug in either pop or classical EQ."

"One of the big things that we got going was the echo chamber," continues Stuart Eltham, who began his time with EMI's Abbey Road in 1948, "and it took quite a time persuading the research department that we needed a mixer—they thought you could just put echo on everything. We had to try and explain to them that you needed more echo on violins and voices, and you didn't need any on the drums... Which means you wanted to select which microphone circuits you were going to inject echo on and able to adjust the level. The trouble was they used to give us what they thought we ought to have—you thought, "For God's sake, why doesn't one of you sit in on a session and see what we're trying to do?"

The BTR1 appeared from EMI's R&D rooms in 1949, giving way to the BTR2.

"It was still a mono machine," Eltham says, "but it had been redesigned and it was pretty good. One of the big things was that page 86 >

Below: George Martin in his Air years



Jack Clegg on Air:

"With Anthony Newley, I did a thing called 'That Noise—Can You Hear It?'. Up turns the band and Tony Newley and he says he's being haunted by this noise in his head, like tinnitus. He said to me, "What are we going to do about the noise?". I said, "What noise?". He told me about this noise that was haunting him—a kind of rhythmic noise. I didn't know anything about this, and we couldn't add it later; it had to be the root of the thing because it had to be driving the rhythm section and we'd got to put it on a track on its own. 'There was a cardboard box that Arthur used to keep with novelties in, so I grabbed a handful of these things—there was a football rattle, a pop-gun and a duck call. I couldn't find anything else, so I stuck a ruler on the edge of the desk—this is while I'm setting up the bloody session—and went 'dong', cut it into a loop, stuck it on the BTR at the back and whipped up some headphones, and that was the basis of the rhythm section driving the piano, bass and drums.

"The beginning of a session is all fraught anyway because you've only got three hours to get the bloody thing done and the last thing you want to be doing is prattling around with pop-guns and football rattles. You didn't get any help; you set up your own bloody studio and as often as not you were your own tape op. It really was in at the deep end."

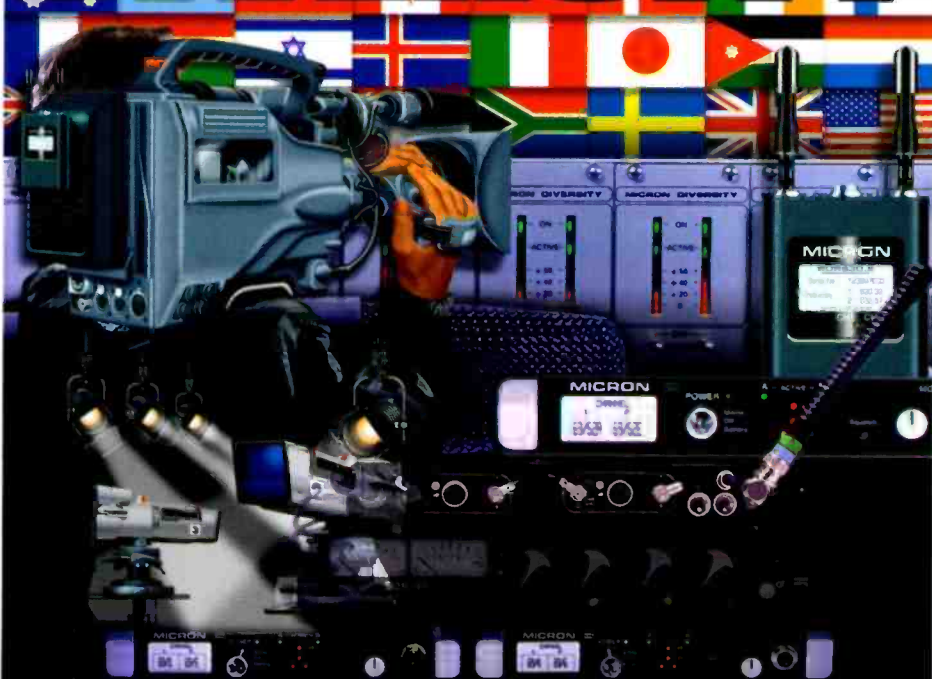
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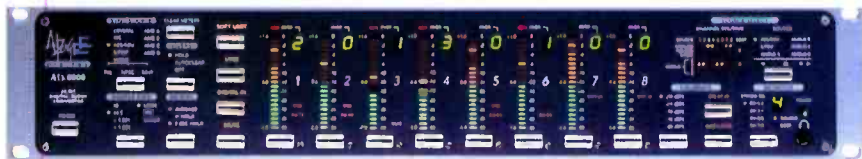
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< page 84 somebody at the factory designed a way of getting bias on the tape—the previous method used to give quite a few harmonics that caused distortion. Somebody there had designed a push-pull method of making an oscillator, so it just gave out pure frequencies and no harmonics, and all the harmonics were killed, and you got a pure source of bias in the tape, and it didn't distort.

Today, such equipment commands equal measures of respect and cash—although some original users remember its shortcomings.

'All the mixing consoles were pretty bloody awful,' says Decca's Jack Clegg. 'I'm thinking of the mixing console in Number 1, which was "Heath Robinson". There were ten channels, so if you wanted the bass—and we're talking about 4-track recordings—to be on Track 1 you had to be in a particular place in the studio. You actually had to physically move people around in the studio to get them on different tracks. It was awful.'

Tom Stevenson remembers the first Neve desk appearing in 1964 at Chappells when it had been bought by Philips. 'In 1964 I was so impressed with what Rupert had done I raised capital to set him up in business. In fact, the day that Harold Wilson got into parliament when there was a great shortage of money around, I was able to raise capital, but he turned it down and I think he got it from a semi-religious organisation.'

The installation provided the inspiration Eric Tomlinson, then based at Anvil Studios in Denham, needed: 'We went to Chappells in Bond Street and saw the very first Neve desk.

A black one, rather a long black one—you had to be very long in the arm to reach the top of it. We met the sales guy and he said, "There it is, we can do you one of these". And I said, "Well, it's good, but it's not very good for us, it's too big, too long. It would be difficult in our control room. You wouldn't be able to see the screen, you have to see the screen. It's got to be lower. And we want to be able to work quickly on it". So he said, "Well, there is another design coming out...". That was the very first of the blue-coloured slimline modular desks, the number of it I don't know, but it was one which had EQ on the channels, and so on. We talked Ken [Cameron] into buying one of those, but being a Scotsman he balked at buying a 24-channel one, he bought 18.

'It worked very well once we got over the first teething troubles. We were using 3-track and 4-track Studers, 4-track 1-inch I believe it was and 3-track half-inch, and, I think, 4-track half-inch. So I had numerous head-blocks.'

A Neve also replaced a Telefunken desk in Pye's mobile in either 1965 or 1966 and worked with. 'It was the first desk that wasn't shiny black,' says Pye's Ray Prickett, 'it was that bluey beige. I chose that for that desk and they stuck with it for many years.'

Throughout the 1960s and 1970s studios came, moved merged and closed. The doors to the once-exclusive club had been forced open and the cocktail of enthusiasm, entrepreneurship and business that came to characterise the studio business began to take hold. Particularly significant in the open- **page 88 >**



Roger Cameron on Advision:

'There was a trap-door at the end of the studio that had a Garrard 301 turntable with an arm connected to it. I had a button on the console that used to operate a relay that controlled the motor under the 301 that turned the turntable round and opened the trap-door. And that was the air conditioning.'

'I used to get the horn players complaining that they couldn't breath. So I just used to shut the door and pretend I couldn't hear them.'



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< page 86 ing was that of George Martin's Air Studios in 1969. This followed his departure from EMI in 1965 over money—having requested a rise and expenses for his secretary, he was informed that the Beatles made £66m profit that year. Martin challenged the statement, believing that the figure was £66m turnover. The revelation that it was, indeed, profit prompted his departure and the formation of his own independent company.

'We opened with 16-track. Air's Geoff Emerick states, 'Abbey Road was still 8-track. We intended to open with Studer 16-tracks. I seem to remember, but they weren't ready so we bought 3Ms again, then Studers.'

'George and I had lunch one day,' recalls Trident's Barry Sheffield, 'and George said, "I reckon that Air Studios is the best studio in the world now. I think we're better than you are". And I said, "George, that's the best bit of news I've ever had because I want to be number two because I've got somewhere to go and you've got nowhere to go". I can remember him saying, "I wish I hadn't said that".'

Inevitably, not all the trading met with the approval of the engineers. Olympic's sale to Virgin, for example, came as a surprise to Keith Grant: 'Cliff called me up to the office and said, "I've sold it". I said, "What do you mean you've sold it?". He said, "I've sold it to Virgin". I said, "You might at least have told me about this". I know I was a microscopic shareholder, but for goodness sake...

'And that was that. I immediately had two offers to reopen—I was offered £5m to reopen another studio by one party, and then

shortly after that another party asked me the same question: "Would I reopen another studio in London?". And that same party six or eight months ago approached me again. I said, "No thanks, I've had my fair share".'

The studio operated by Chappell Music Publishing from its basement faced difficulties when the death of owner Louis Drefus incurred death duties so large that they forced its sale. John Timperley's memories of the acquisition are not fond ones: 'ATV nearly bought us, EMI looked at the books, various big corporations made offers and counter-offers. And in the end Philips got us.

'Got ruined by Philips,' he states. 'I've no hesitation in saying that. Philips came and looked round and were distraught at the equipment level: What had we got all the Dolbys for? Why did we need all these microphones? What about this and that? My God, you've got four echo plates and a chamber...

'Gradually the old guys that hired me were got rid of, and in the end it came down to the fact they didn't want to have another studio competing with their Philips studio in London. They did their damndest to close us down, and within three or four years they did. They wrecked it. Out of pure jealousy.'

Most recently, the famous Decca Recording Centre has also closed leaving just a couple of engineers behind.

'They probably feel they have to,' Timperley observes, 'if only to play their tapes to them, sort out the library and do the odd session. But eventually when they retire...

'Have they kept Jimmy Lock?' ■



Geoff Emerick on Abbey Road:

'If we wanted to be really luxurious we'd record three songs in a session, otherwise we'd do four. That was that the union allowed and in those days too you didn't have any mixing time afterwards—you had to get it right on the session—so it was like being a live broadcast in a way.

'But they were good records: you relied upon the arranger to do a really workable score, that you knew in advance was going to work well and you had an engineer who knew how to balance up the rhythm sections and the brass and the strings. The net result was—if the artist was good, and they generally were, certainly Matt Munro was—you got a very good recording in a very short space of time. Very efficient way of recording.'

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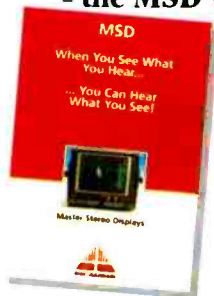


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SUMMIT	EQF-100	£2150	£80
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TL AUDIO	EQ2	£999	£40
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Fairlight MFX 3 - 24T, unused, boxed, call.	£19,995
Dolby XP 24 - with 24 x A cards.	£1,200
Dolby M16 - old Dolby A.	£495
Timeline Lynx - system supervisor, 1.43 SW.	£495
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This is just a selection of what is currently in stock, or available, many items are sold before we have a chance to put them on the list! If you are looking for anything specific, call or fax to be put on the database. Similar equipment always wanted, part exchange welcome.

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AKG C414-ULS Digital Mic ~ Demo	999.00	595.00
AKG CK62ULS Capsule for C460 ~ New	177.00	99.00
AKG CK63ULS Capsule for C460 ~ New	177.00	99.00
Amek 9098DMA Dual Mic Amp ~ New	809.00	699.00
ATC SCM10PRO Passive Monitor (Pr) ~ Demo	700.00	595.00
ATC SCM20APRO Active Monitor (Pr) ~ Demo	2506.00	1950.00
ATC SCM20PRO Passive Monitor (Pr) ~ Demo	1250.00	935.00
ATC SCM50APRO Active Monitor (Pr) ~ Demo	4754.00	2995.00
Audio Design DMM1CASE Case for DMM1 ~ Demo	165.00	99.00
Audio Technica AT822 Stereo Condenser Mic ~ New	255.00	178.00
Audio Technica AT825 Stereo Condenser Mic ~ New	323.00	239.00
DBX DBX274 Quad Expander/Gate ~ New	425.00	299.00
Denon DMD1300 MiniDisc Record/Player ~ New	426.00	325.00
Denon DN045 MiniDisc Replicator ~ New	1750.00	1325.00
Denon DN1100R MiniDisc Record/Player ~ New	1500.00	1050.00
Denon DN951FA CD Cart Machine ~ New	1200.00	950.00
Denon DN980F MiniDisc Player ~ New	1450.00	995.00
Denon DN990R MiniDisc Record/Player ~ Demo	1005.00	1495.00
Denon DNM1050R MiniDisc Record/Player ~ Demo	1200.00	895.00
Electrovoice RE16 Dynamic Super Cardioid Mic ~ New	384.00	269.00
Focusrite BLUE215 Dual Channel Mic-Amp/EQ ~ Demo	2405.00	1795.00
Focusrite BLUE245 20-Bit A/D Converter ~ Demo	2405.00	1795.00
Focusrite GREEN2 Pre-Amp/EQ ~ Demo	700.00	599.00

Limited Quantities Available

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Genelec 1030A Active Near-Field Monitor (Pr) ~ New	1124.00	895.00
Genelec 1031A Active Near-Field Monitor (Pr) ~ Demo	1056.00	1550.00
Genex GX2000 1.3Gb MO Disk Recorder ~ Demo	5995.00	1995.00
HHB MCA1000 PORTADAT 4-Bay Charger ~ Demo	425.00	249.00
HHB PDR1000TCMS TC/Master Sync. DAT ~ Demo	4744.00	3575.00
Lexicon 300L Digital FX (LARC) ~ New	4305.00	3495.00
Mackie OTTO 34ch Universal Auto. Gain Cell ~ New	1273.00	949.00
Marantz CD67SE CD Player ~ New	208.00	215.00
Pioneer CDMW74 650Mb/74 Min. CDR Disc ~ New	4.99	1.99
Pioneer D9601 Hi-Sampling DAT Recorder ~ New	999.00	699.00
Quad 707 Power Amplifier ~ New	681.00	410.00
Rode CLASSIC Valve Studio Mic ~ Demo	999.00	595.00
Roland SDX330 3D Space Chorus ~ New	680.00	499.00
Sony SRPE1000 Graphic EQ ~ New	254.00	149.00
Sony TCDD100 2-Head Portable DAT Recorder ~ New	595.00	425.00
Sony TCDD10PROII Portable DAT Recorder ~ New	2650.00	1995.00
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US: The Zero Sum game

Sea changes in studio strategy may see studio owners having to relearn their arithmetic writes **Dan Daley**

ZERO SUM' is one of those trendy business math concepts that was a staple of economics for years but which gained currency during the Cold War as East and West tried to establish parity with ICBMs. (Remember those?) Simply put, a zero sum model states that there is a fixed number of something, and that any change from one side of an equation has to be compensated for at the other end. For instance, let's say that Farmer Brown and Rancher Jones each own ten hectares adjacent to each other and there was no other land available in any other direction. One day, Rancher Jones decides that his cattle need another five hectares for grazing. Late that night, Farmer Brown receives a visit from heavily armed members of Rancher Jones's family who convince him that he can make do with half as much space for his alfalfa plants. As a result, the next day Farmer Brown has five hectares and Rancher Jones has 15. Voila: zero sum. (The fact that Farmer Brown was still breathing was part of the original equation, so it's not regarded as an additional value—except perhaps by Farmer Brown.) Based on this example, you can see why the concept translated so

well for military applications.

It's been like that here in terms of recording studios. Prior to the advent of the personal recording studio, conventional studios were like butchers and bakers: there were only enough of them in a given neighbourhood to support the local demand. It was a nicely balanced economic model. Once home studios started showing up, even though it distressed many conventional studio owners, there remained a belief in the zero sum model based on the notion that, no matter how much work people could do at home, they would eventually need to come to a conventional studio for large ambient recording spaces, expensive cutting-edge technology and for technical talent. For much of the late 1980s and early 1990s, conventional and personal studios crowded up next to each other, stretching the zero sum equation, but never quite tearing it. A large facility might close down, but it was often replaced by two smaller conventional studios, each with some specialised capabilities. Thus, the balance was maintained.

That changed in the last couple of years. Major markets in the US, particularly New

York and Nashville, have begun losing conventional studios. But rather than being replaced one-for-one by new conventional studios that could better operate in the changing environment, they are now being replaced by more personal studios. Zero sum no longer applies since the personal recording studio changes the basic equation. There is no answer to the hypothetical question: How many project studios equal one conventional studio? That's because personal recording technology has brought more people into the game than was possible before under the old model's regime. The growth of the independent record market supported and sustained a new open-ended model equation, one that stated that the potential universe for recorded audio was as infinite as the number of people willing to buy the CDs.

The American record industry is learning now, as it did back in 1980, that that number is hardly infinite. With returns as high as 40% earlier this year, even the independent record labels have found themselves in a contracting universe. So as the music business shrinks will the professional audio industry find itself returning to the comfortable days of the zero-sum equation once again?

No way, Jose. The genie is out of that particular bottle, and not about to be coaxed back in. Certainly, there is more than lip service being given to the notion that low-fi doesn't sell records in the long run, and that quality audio is part of what's required to turn the

Europe: The universal divider

With the deadline for a DVD-Audio standard looming large, the international consent seems as distant as ever writes **Barry Fox**

THE IFPI AND RIAA promised that their International Steering Committee would finish golden-ear tests on the competing DVD Audio systems and propose a standard by the end of 1997. By making such a daft promise the record industry once again displayed its ignorance of the audio industry. By October the ISC still could not agree on the methodology, so had not even started testing.

Nicholas Garnett, the IFPI's Director General, and Hillary Rosen, the RIAA's President, then wrote to the senior management of all the major record companies, suggesting that instead of testing and recommending a single standard, all the competing systems should go on sale, and the public left to buy whichever they prefer. In no uncertain terms the record companies told their trade bodies to finish the job they are paid a handsome sum to do. Garnett ducked questions for a week and then relayed the message that there was nothing to say until after an IFPI board meeting in Rio.

Meanwhile, more companies are promoting rival technologies. Philips and Sony have stopped pretending that DSD, Direct Stream Digital, is for archiving only. Super Audio CD is now proposed as the 'next

generation music carrier' because of 'the need to migrate from the Compact Disc'. DSD, they say, is the 'digital Rosetta Stone' because the data rate is an exact multiple of the CD data rate.

Sony Music has released 'Alto', the first commercial recording to use DSD technology. Alto, by guitarist Joe Beck and jazz flautist Ali Ryerson, was recorded with a sampling rate of 2.8224MHz, to give a data rate of 2.8224Mbit/s per channel, a frequency response of 100kHz and dynamic range of better than 120dB. The signal was then down-converted to conventional 16-bit, 44.1kHz format for CD release, using Sony's Super Bit Mapping technique.

In an AES paper (Coding Methods for High Resolution Recording Systems) Bob Stuart of Meridian and the ARA attacks DSD. He 'firmly believes that it would be a very great mistake to try and standardise the archive format, particularly to

anything of such questionable audio promise... bitstream coding might be appropriate to very simple 2-channel systems, but its data rate requirement becomes unacceptable when the needs of multichannel are taken into account'.

Stuart argues in favour of noise shaping, with pre-emphasis and de-emphasis, sampling at 96kHz or 88.1kHz, and 16-bit coding.

Dolby Labs is now throwing its hat into the ring, with proposals for a lossless coding system (as distinct from the lossy coding used by Dolby Digital AC-3). Although

Dolby has its own lossless system (developed by Mark Davis) the company is negotiating with Meridian to sub-licence a lossless system invented by British engineers Peter Craven and the late Michael Gerzon, and now owned by Meridian. The deal could be similar to that which let Dolby licence the HX-Pro analogue tape recording technology developed by Bang & Olufsen in Denmark.

'Our lossless system is ready to go—and targeted for DVD use', says Stuart.

'The audio standards debate is now a complete mess.'

Pioneer, Panasonic and Samsung all have rival systems.

Stuart was planning a trip to Japan in

Philips and Sony have stopped pretending that DSD, Direct Stream Digital, is for archiving only. Super Audio CD is now proposed as the 'next generation music carrier' because of the need to migrate from the Compact Disc.

business around. That's why Seattle has been reduced back to the status of small coastal fishing village and why rap producers are adding weird elements like harmony and melody to their records. But too many people have realised the benefits of keeping the means of production within their grasp. When a conventional recording studio is replaced by a personal studio, it's truly not being replaced at all, and that's why zero sum doesn't work anymore. In a recent survey by a large weekly record industry trade publication here, based on the number of number-one records done there, producer-auteur Sean 'Puff Daddy' Combs's private Daddy's House studio in New York—at all of one year old—was evaluated as being the No.1 studio on earth. In Nashville, by the time this appears in print, two major record label presidents who are also producers will own significant recording studios that are primarily for their personal use.

The loss of a comfortable equation does not mean that the future will be necessarily uncomfortable. But similar sea changes have already permeated the film and broadcast industries—remember that there were once only three networks? Now there are 70 and counting, hardly the stuff of zero sum equations. The main issue for many Americans, who are enamoured of the free market but who often resent the changes it brings, is to recognise when a model no longer works and to be ready to embrace a new one.

November to talk to Audio Working Group 4 of the DVD Forum, to 'try and turn their camel into a horse'. This followed a disastrous demonstration given by WG-4 at the New York AES. Astonishingly, notes Stuart, the Japanese demonstrated the audio quality of a 96kHz system 'over a PA system with Bose speakers on stalks'.

Stuart believes the ISC has overlooked a simple solution: 'If you have a lossless system, you don't need to do a listening test. All you have to do is check what data comes out'.

Even if there is agreement on the best system to use for DVD-Audio, the public will need a good reason to pay any extra for it.

When DMX, the subscription music by satellite service, launched in Europe two years ago with a blaze of publicity, viewers were offered the chance to buy a digital decoder and pay a subscription to receive non-stop hi-fi music. With so many free FM radio stations now on the air, and digital audio broadcasting already on test transmission, I never could see any sense in the DMX business plan. But DMX thought they knew better. Unfortunately they didn't. A European cable station recently told subscribers that the DMX service had been discontinued.

I phoned all the numbers I had for DMX in the UK to ask for a comment. All were unobtainable or 'cut off'. Rival Music Choice Europe chortled when I asked about the demise of DMX. But for how long will MCE have good reason to stay so smug?

Technology: future tense

The specialisation that marks early technical progress is beginning to give way to a convergence of jobs and equipment writes **Kevin Hilton**

WE DO NOT NEED to have an infinity of different machines doing different jobs. A single one will suffice. The engineering problem of producing various machines for various jobs is replaced by the office work of "programming" the universal machine to do these jobs.'

So proclaimed English mathematician Alan Turing, the thinker generally considered to have developed the concept of the modern digital computer. Without wishing to unduly criticise an undoubtedly brilliant mind, Turing's processes were those of a scientist: the theory is the thing, usually omitting any consideration of the practicalities of the situations the machine is placed in.

Another visionary, the author Douglas Adams, summed this up in one of the jokes from his book, *The Hitchhiker's Guide to the Galaxy*. In describing a creature that could evolve into anything on a whim, he wrote, 'They do this with such reckless abandon that if, sitting at table, they are unable to reach a coffee spoon, they are liable, without a moment's consideration, to mutate into something with far longer arms... but which is probably quite incapable of drinking the coffee'.

In many respects, this is the dilemma faced by broadcasters as the practices of computing continue to make themselves felt on a completely different discipline. With the main difference being that the technicians will fight to the death to protect their right to drink coffee, even if someone does design a piece of equipment that does it better.

Such practicalities do not appear to have occurred to some in the computer field, which is to be expected given the missionary mind-set that some leading figures have. One such is Craig Mundie, senior vice president of Microsoft's consumer platforms division, who used his slice of the recent IBC keynote address to make a few perfunctory pronouncements on the future, while furthering Laughing Bill Gates' bid for world domination (a classic case of a geek trying to inherit the earth).

According to Mundie, broadcasting and computing are industries at a crossroads, heading towards 'an inevitable convergence'. Everyone should be well aware now that the two areas are seen as becoming joined at the hip (or at any rate the chip) and Microsoft is preparing for this by developing a new operating platform, Windows CE (Consumer Electronics).

Mundie said that this will be combined with the company's existing Web TV technology, which puts the Internet on TV screens. He added that the two programs

were designed to give 'better pictures and audio and flexibility of access to the Internet, using the two together to create a new television experience.'

The only real spark in the keynote session came when the second speaker, Dr Abe Peled, chief executive officer of NDS, said that although the PC will be 'an important target for digital broadcast transmissions, the PC and its software are not yet ready for prime time.' Such an opinion seems unlikely to slow down Microsoft, as it is also combining the technology of Windows CE and Web TV with Internet Explorer 4.0 and the upcoming Windows 98.

'This will allow us to use television metaphors on the Internet,' Mundie said, referring to the tie-up with Explorer 4.0. However, a telling phrase shows that Microsoft still sees itself as an outsider looking in. Mundie said that Microsoft's initial work is concentrated on the PC, but moving more towards video.

'In our work on Windows 98 and NT 5.0 we are taking video (TV) and adding it to the world of data. That will define future television platforms, with the opportunity for enhanced TV, Email and interactive guides.'

In the professional field, Microsoft's big new launch is Softimage's DS (formerly Digital Studio), a NT-based integrated picture and audio editing, image processing, special effects, compositing and management package that is designed as a single multi-skilling workstation. While attempts were made in the past to produce a one-stop solution, the view was that the skills involved in audio and vision were too different to be combined. Even those fully behind DS say this is still the case, unless a programme budget does not make provision for separate sound work.

Lewis Moore, creative director of Happy Fish, a DS beta-test site, observes 'Because all the packages used in DS have a similar file format, [a vision] editor wouldn't be too frightened to go into the audio package. But if a job requires a proper sound dub, then you need the specific tools and skills. You can do most things on DS—there is no reason why you can't have a sound engineer come in and do the sound dub on DS. It's a question of the right ears for sound and the right eyes for vision. Different people but the same gear.'

Perhaps the answer has nothing to do with the development of new equipment. That has been established. What we now need is genetic engineering to produce people who can adapt to any circumstance and any function. Mind you, such creatures already exist—they're called consultants...

Analogue tape line-up

Continuing last month's analogue recording theme, **John Watkinson** looks at the all-important practice of lining up a tape machine

TAPE LINE-UP is meant to achieve two goals: first that the best quality reproduction is obtained, and second, so that tapes can be interchanged between machines. Good sound quality requires that the overall frequency response is flat, the bias level is correct and the overall gain is 0dB. Interchange requires much more than that. In order to interchange correctly, the mechanical alignment of the heads must be right, level on tape must be right and the frequency response on tape must meet some standard.

Analogue tape recorders are capable of fine performance, but almost everything affects the sound quality and the quality drifts off in service. In order to maintain quality, analogue recorders have to be lined up with great regularity.

Line-up starts with mechanical stuff. The check list shows the preferred order. Always clean the tape path first. Heads and guides can be cleaned with a proprietary solution on a cotton bud. Tape binder is tenacious stuff and sometimes has to be gently persuaded off with a cocktail stick. Never use a metal tool for this or you may scratch the metalwork. Rubber pinch rollers may be attacked by head cleaner; use water and a tissue to clean them. In fact, some head cleaning solutions, such as xylene, attack skin so count your fingers afterwards.

The tape path needs to be demagnetised. Using an AC-powered degausser, move the tip past every item in the path then move the degausser well away from the deck before switching off.

Try transporting a scratch tape. Fig.1 shows what to look for. At Fig.1a, flange scraping may be due to incorrect hub height. At Fig.1b, tape rippling may indicate a misalignment. Tape should look flat like a mirror as it moves. Check how the two tape edges move past the heads. If one edge appears tighter than the other Fig.1c there could be a zenith problem. Finally calibrate the tension gauge and check the tape tension.

Assuming this is a line-up rather than a head replacement, the wrap angle and zenith angles of the heads will usually be okay. It's the

azimuth angle that's the most important—this is critical because if it is incorrect it makes the effective head gap larger, increasing the aperture effect of the head and impairing HF response. It will be clear from Fig.2a that azimuth error is more significant in the wide tracks of, say, a half-inch stereo deck than it is with the narrower tracks of a multitrack.

Azimuth is adjusted using a reference tape containing transitions recorded at 90° to the tape edge. The replay head is adjusted for maximum output on a high frequency (Fig.2b), or if the head has two tracks it may be adjusted to align the phases of two replay signals on a dual trace oscilloscope (Fig.2c). Caution is needed to ensure that alignment is not achieved with exactly one cycle of phase error. In a multitrack recorder, all of the tracks are mixed to one signal using the console and adjustment is for maximum output.

Reference tapes are delicate and valuable and should be handled like eggs. Ensure the deck is in record lockout. Avoid stopping and starting reference tapes in the middle and rewind using a slow spooling mode if the deck has one.

Once the replay azimuth is adjusted, attention turns to the record head azimuth. This is adjusted by recording onto a blank tape which is played back at the recently adjusted replay head. The record azimuth angle is adjusted to get the conditions of Fig.2. Erase heads don't need azimuth adjustment. As an erased tape doesn't have a signal on it, it's pretty hard to measure its azimuth.

In stereo analogue machines, it is important that the record azimuth adjustment is not made when the bias levels in the two channels are unknown. As recording actually takes place at some point after the trailing head pole where the bias field decays, a different bias level in the two channels has the same effect as an azimuth error. Where a machine is being extensively overhauled, the azimuth may need to be adjusted before a bias adjustment can be performed. In this case it will be necessary to repeat the record > page 100

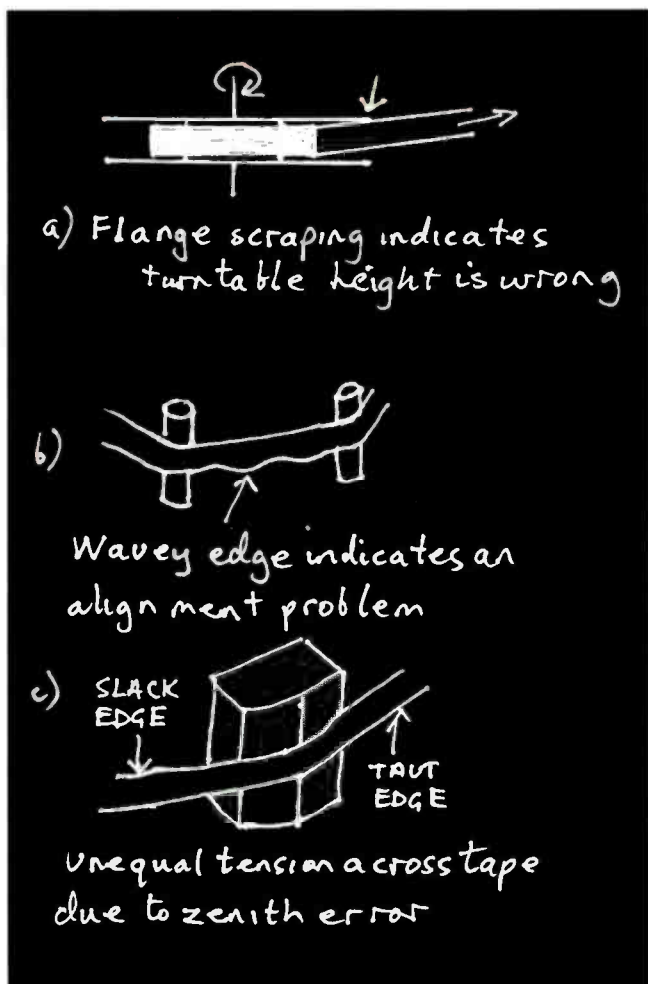


Fig.1: Alignment problems

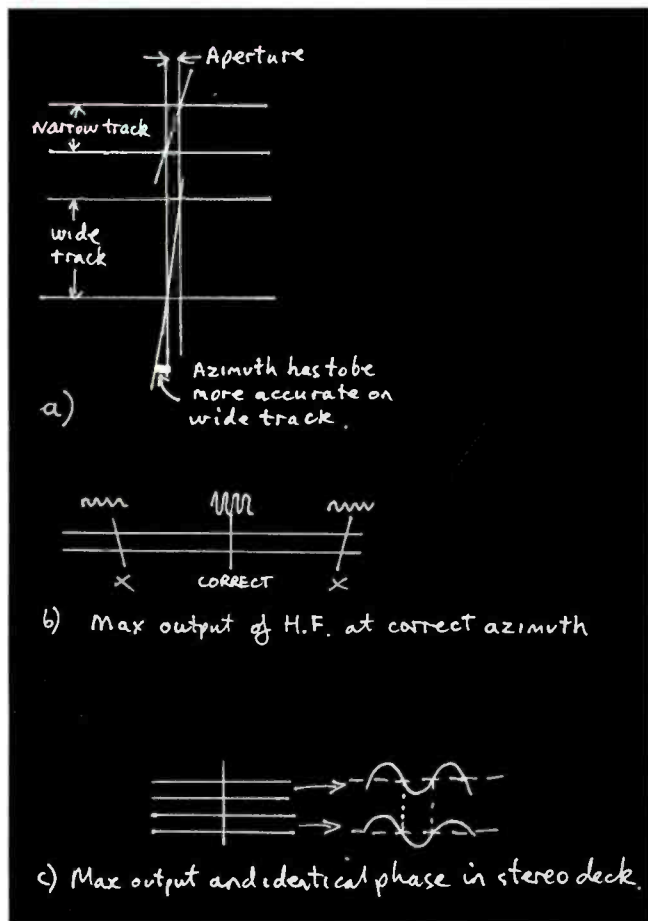


Fig.2: Azimuth alignment

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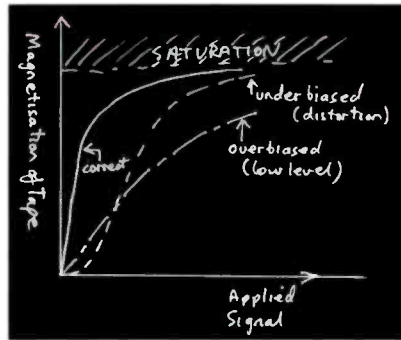


Fig.3: Optimum bias level

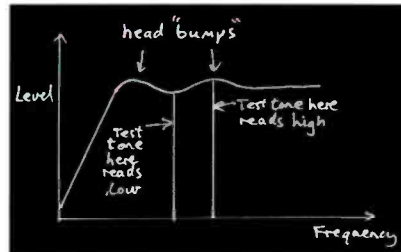


Fig.4: Head bumps can confuse LF EQ

< page 98 azimuth adjustment.

In the presence of bias the normal B-H loop is not exhibited and instead the tape exhibits what is known as an anhysteresis curve shown in Fig.3 for low frequencies. Recording is carried out in the linear portion of the correctly biased curve. Note that underbiasing fails to remove the nonlinearity of hysteresis whereas overbiasing reduces the sensitivity of the tape, raising the noise level.

Unfortunately, the intensity of the bias field falls with increasing distance from the head. This means that only one layer of the tape coating will be correctly biased. Layers closer to the head will be overbiased and layers deeper in the coating will be underbiased. High frequencies are reproduced by the surface layer of the tape because deeper layers suffer spacing loss. Consequently, biasing for the best high frequency output results in distortion at low frequencies.

As there is no optimum amplitude of the bias signal a practical compromise must be made between distortion, replay level and frequency response which will need to be individually assessed for each type of tape used. As overbiasing is less damaging than underbiasing, often the bias level is increased until the replay output has reduced by 2dB-3dB, generally at 1kHz.

As the bias level affects the frequency response, EQ adjustment is performed after bias. Replay EQ compensates for replay head losses and wear. It is adjusted using a reference tape recorded with the correct pre-emphasis time constants for the standard used by the machine under test. In other words if your ATR has NAB EQ it has to be aligned with an NAB reference tape. The frequency response section of the tape

contains a series of test tones spaced through the entire audio spectrum. The high-frequency and low-frequency replay EQ adjusters are turned to get the same meter reading at each frequency. This ensures that a tape recorded elsewhere will play on this machine with a flat response.

Some care is needed when adjusting the LF EQ because of head bumps. The low-frequency response of ATRs, especially those using high tape speeds, is irregular as shown in Fig.4. If a test tone coincides with a response peak, you would be tempted to turn the EQ down, whereas if it coincides with a trough, you might turn it up. The solution is to assess the level of all of the low frequency tones and adjust the EQ for the best average.

Once the replay EQ is adjusted, the record EQ can be adjusted using a test-tone generator and a scratch tape. The record EQ compensates for record head wear and losses and is adjusted to make the overall response flat when measured at the output. Correct record EQ ensures that a tape made on this machine will play elsewhere with a flat response. A fairly low level should be used to avoid misleading results due to overload.

Once a flat response is obtained some attention has to be given to level. The correctly biased anhysteresis curve in Fig.3 flattens at high levels. Distortion begins when the level of signal plus bias reaches tape saturation. Consequently, analogue tape has a maximum operating level (MOL) often defined as the level above which distortion exceeds, for example, 3%. At the opposite extreme, the minimum useful level is determined by the noise floor of the tape. If a lower MOL is chosen to reduce distortion, the penalty is that the signal to noise ratio falls. Consequently all analogue recording is made between a rock and a hard place where low levels are too noisy and high levels are too distorted.

Line-up check list:

- Clean tape path
- Demagnetise tape path
- Check for smooth tape travel
- Check tape tension
- Set replay azimuth with high frequency reference tape
- Set record azimuth with scratch tape
- Set optimum bias level
- Recheck stereo phase if significant change made to bias
- Adjust replay EQ using multitone reference tape
- Adjust record EQ using scratch tape
- Adjust replay level using reference fluxivity tape
- Adjust record level using scratch tape
- Adjust meters (if fitted)
- Make coffee

What the tape sees is a magnetic field, whereas what the user sees is a signal level on a PPM or a Virtually Useless (vu) meter. The connection between the two is affected by the gain of the record amplifier and the sensitivity of the meter. The solution again is a reference tape with a known strength of magnetic flux recorded on it. The tape is played and the

replay gain is adjusted to give the standard level as measured on the output socket with a test set. Then the machine's level meters can be adjusted to give the correct reading on the scale. Using a scratch tape and a standard level input from a generator, the record sensitivity is adjusted to make the overall gain unity.

Modern tapes have greater energy and offer higher MOLs. When aligning for these tapes, the level obtained during playback of the reference tape will be set low by the amount of extra MOL needed. ■

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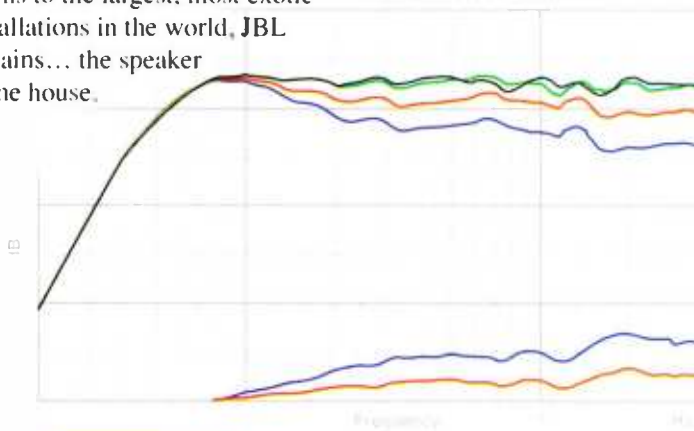
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Multichannel coding

As DVD prepares to impose compression on its audio, the differences between the main coding systems become of particular importance to studio people. **Francis Rumsey** demystifies AC-3 and MPEG2

DOLBY'S AC-3 and the ISO-MPEG2 standard are two leading processes for reducing the bit rate of audio signals while attempting to maintain the highest audio quality. They both encompass a range of options to code audio all the way from mono at low bit-rates up to 5.1-channel (or more) surround sound at moderately high bit rates. They have been adapted for use in various forms of Internet audio, and they will feature increasingly in broadcasting, multimedia and film-sound applications. Yes, you're right, they are not the only ones around, but they are the two main systems adopted for the DVD standard and, consequently, feature quite prominently at the moment. So what are their main features, the main differences between them, and are there variants on the standards?

Both the Dolby and the MPEG audio coding standards have gone through a number of stages of development to get where they are today. Dolby was involved in low-bit-rate audio coding quite some time ago with its adaptive delta modulation-based system known as AC-1, AC-2 and AC-3 have quite a lot in common, AC-2 having been the basis for Dolby's use of transform coding to deliver stereo audio at moderately low bit-rates. AC-3 grew out of AC-2, using many of the same principles, but with a number of additional features and clever techniques to allow the coding of any number of channels from 1 to 5.1 channels as an ensemble. It now forms the mainstay of the company's digital audio product line in the field, and is increasingly becoming known simply as Dolby Digital (although strictly that probably only applies to the film-sound version).

MPEG audio was the result of input from a number of different parties, under the banner of the International Standards Organisation (ISO), in an attempt to create a worldwide standard for the coding of low-bit-rate audio. It, too, has gone through a process of evolution, leading from the MPEG1 standard with its three layers (Layers 1, 2 and 3), capable of dealing with mono or 2-channel stereo audio, to the MPEG2 standard being discussed here, capable of dealing with any number of channels from 1 to 5.1 (or indeed even 7.1 in one embodiment). Many people appear to confuse MPEG2 with MPEG1, Layer 2. This is understandable but unfortunate. MPEG1, Layer 2 is the moderate-complexity version of the 2-channel standard (ISO 11172-3), used for numerous applications in broadcasting, multimedia and communications, particularly DAB (Digital Audio Broadcasting). MPEG2 is the more recent multichannel standard with extra bells and whistles, and is specified in ISO 13818. An MPEG1 decoder should be able to decode MPEG1 data, though. To add a little extra confusion, there are two versions of MPEG2 audio, which will be described below.

Both AC-3 and MPEG systems depend on a

knowledge of psychoacoustics to do what they do. They can only get away with reducing the bit rate of the audio signal so significantly because they can calculate what the human can hear, and what it can't, knowing the nature of the audio signal over a small portion of time. Using sophisticated models of hearing, the encoders analyse the audio signal every few milliseconds and determine its characteristics. Based on this analysis they re-quantise the audio after splitting it into a large number of frequency bands, within which wanted signals effectively mask the resulting increased noise. So they are both what are called lossy coding systems, because they lose some of the information that was present in the original signal. In addition to the psychoacoustic process, they also adopt a number of techniques such as prediction, lossless coding, bit reservoirs, joint channel coding and scale factor coding to minimise the number of bits needed to represent the signal.

The sound quality of both systems depends on the bit rate used, and the big competition has always been to produce the system that gives the highest audio quality at the lowest bit rate. Certain target bit rates tend to be set by standardisation bodies, leading manufacturers of coders to aim particularly at achieving a certain quality at that target rate. The

Both are, indeed, very good systems and it will come down to the usual market penetration issues, to determine whether we do end up with a dual standard

most recent example of this is the EBU request for coders to demonstrate 'indistinguishable' quality (according to the ITU-R BS.1116 listening test standard) when coding 5-channel audio at 384kbit/s.

Both systems split the audio band into narrow divisions, but the way they do it differs. There are patents held by parties in both camps which guard certain aspects of the process. Essentially the Dolby system does it by using a time-to-frequency-domain transform, whereas the majority of the MPEG layers do it by using a multiband digital filter (known as a quadrature mirror filter bank). Transforms have been used in some aspects of the MPEG standards (notably in Layer 3, as a secondary process to achieve higher frequency resolution), and the most recent version of MPEG2 (known as MPEG2 AAC) involves a transform as the primary band-splitting method. In fact there is a certain amount of cross-fertilisation of intellectual property in MPEG2 AAC, since the Dolby transform windowing function is reputedly incorporated in the standard, giving Dolby a

small foot in the MPEG camp.

Dolby's patents on transform coding seem to be very tightly written and consequently have precluded others from using some aspects of the process without paying license fees. Sony's ATRAC process, employed in the MiniDisc is one example of a system that employs transform coding and which reputedly fell foul of Dolby patents, now requiring the licensing of some aspects for MiniDisc players.

WHEREAS AC-3 is a single 'standard', MPEG2 is not. This is because there are two flavours of MPEG2, one known as MPEG2 BC (for backwards compatible) and the other known as MPEG2 AAC (for advanced audio coding). The latter also went under the name of MPEG2 NBC (non-backwards-compatible) for a time, but that has fallen by the wayside. MPEG2 BC is specified in ISO 13818-3 and MPEG2 AAC is specified in ISO 13818-7.

The key difference between the two is implied in the previous paragraph. MPEG2 BC is backwards compatible with MPEG1. In other words, an MPEG2 BC data stream should be decodable by an MPEG1 decoder, but only the 2-channel portion of the frame. MPEG2 BC has a compatible stereo mix incorporated into the main part of the frame, and surround sound information is encoded in an extension portion of the frame that is not recognised by the MPEG1 decoder. MPEG2 AAC, on the other hand, cannot be decoded by an MPEG1 decoder, and contains all the channels of a multichannel surround signal in one ensemble. It uses good aspects of many different low bit rate coding techniques combined into one process, and has strong similarities with both Layer 3, bits of AT&T's PAC MPAC, and suggestions of AC-3 influence.

Why two flavours? It comes down to bit-rate efficiency. AAC is capable of encoding five channels at a much lower bit rate than BC. To give an example, recent tests indicated that AAC at 320kbit/s outperformed BC (Layer 2) at 640kbit/s. So we are talking of an improvement of more than a factor of two. The somewhat unfortunate aspect of this is that it was the BC version of MPEG2 that was standardised for the audio on PAL DVD. If DVD had been just slightly later in arriving it is probable that AAC would have been used instead.

The difference in frequency splitting mechanism between AC-3 and most of the MPEG standards has already been mentioned. It should also be noted that MPEG2 can be operated at half sampling frequencies, allowing much lower bit rates with a reduction in audio bandwidth. The other main difference between the two is in the method of multichannel encoding and matrixing for compatibility with smaller numbers of channels, although again the AAC version of MPEG2 makes these **page 104 >**

< page 109 differences much smaller.

AC-3 transmits the 5.1 surround channels as one combined ensemble, without a separate 2-channel downmix. Any downmixing that might be required is then performed in the decoder. Such downmixing might be required to play a 5.1-channel movie over a mono or stereo replay system, for example, or it might be necessary to create a Dolby Surround analogue matrix version of the 5.1-channel movie for replay over analogue Pro Logic systems. Critics of this method have claimed that it does not allow the producer-sound mixer control over the balance of the downmixed version, relying as it does on mathematical downmix coefficients to determine the stereo mix, but Dolby has introduced a means of transmitting variable downmix coefficients with the signal to enable programme originators to alter the downmix during the programme.

MPEG2 BC, Layer 3 can be used to encode multichannel information separately from 2-channel or mono information, resulting in the transmission of 5+2 channels of data, allowing independent simulcasting of conventional and surround sound without constraining the design of the multichannel coder or the balancing of both mixes. Alternatively (MPEG2 BC, Layer 2) an automatic 2-channel downmix, compatible with 2-channel decoders (MPEG1), can be created at the encoding end and transmitted along with a 'multichannel extension' that is used to extract the original 5 channels by rematrixing with the 2-channel downmix in the decoder. The former approach demands a very high bit rate

(around 900kbit/s) for high quality, and the latter around 640kbit/s.

MPEG2 AAC is more similar to the Dolby approach, requiring any compatibility matrixing to be performed in the decoder, and allowing a data rate of around 320kbit/s for high quality.

CONSIDERING APPLICATIONS, MPEG2 BC and AC-3 are the two main low-bit-rate audio formats specified for DVD-Video. It was proposed that PAL DVDs should carry MPEG2 with AC-3 as an option, and NTSC DVDs should carry AC-3 with MPEG2 as an option. The high degree of political manoeuvring surrounding this compromise position has led to confusion about whether PAL DVDs have to carry MPEG2 audio, for example. In fact it depends how you read the letter of the standard, and Dolby recently claimed in a newsletter that it was okay to issue PAL DVDs with AC-3 audio on them, and without MPEG2, because the standard allowed for MPEG2 audio or linear PCM, with AC-3 as an alternative. Only time will tell how the market pans out in this respect. Both are, indeed, very good systems and it will come down to the usual market penetration issues, liaisons with movie and record companies, and so forth, to determine whether we do end up with a dual standard for low-bit-rate audio on DVDs, or in the end only one.

It may be surprising to discover that even the relatively crummy audio quality currently available from Internet audio over a modem is based in most cases on a version of MPEG or

Dolby Digital. Companies such as Liquid Audio, Real Audio, and Xing have adapted the technology to the Internet. Obviously it is necessary to operate at pretty low bit rates for most such applications, unless you are blessed with an ISDN line and a quiet Internet, but both standards can be operated down to rates as low as 32kbit/s, or even lower if some modification is allowed, and with careful dynamic processing and equalisation the results can be reasonable.

Dolby holds sway over the film-sound market, with Dolby Digital used for many film releases with digital sound. Other major players including DTS and Sony are sharing the field with Dolby, but this is an area where MPEG2 has no particular involvement at the moment. There is no mainstream cinema sound system in operation that uses MPEG2, and this counts against it when considering movies for DVD. The MPEG2 players are more closely involved with broadcast sound and multimedia than they are with the movie industry.

It is remarkable that we can now talk of obtaining such high audio quality at such low bit rates. It is not long ago that 728kbit/s for two channels was considered an achievement (BBC NICAM), and that is what we currently experience on stereo TV broadcasts in some parts of Europe. Now we are talking of 320kbit/s for five channels, which demonstrates the phenomenal progress that has been made in recent years. The chances are that it will not go much lower, at least so far as high quality audio is concerned. We are now close to the theoretical limits that most people in the field accept exist. ■

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Desk job

When you associate a 'sound' with a console, you're normally talking about the electronics. However, things are different if you're a studio designer, says **Philip Newell**

DURING THE PROCESS of preparing a paper for presentation to a forthcoming conference on acoustics, I invited a couple of research fellows, from a university near to where I was completing the construction of a new studio, to independently measure the performance of a new room. The results of the initial tests were somewhat confusing, however, as they seemed to entirely contradict what I knew of the rooms which I had been designing.

The solution was that while the academics were expecting to be measuring the decay time of the control room itself, it transpired that what they were actually measuring was the decay time of the various component parts of the framework of the mixing console—the legs, cross frames, and underside panels of the desk were ringing like bells in response to the tone bursts. The impulse response of the room was, therefore, compromised by the acoustic coupling of the monitor system to the mixing console. As the mixing console is much closer to the mixing personnel than are the monitors, the resonant response of the framework is something which should not be ignored, as in rooms of short decay times, it cannot help but colour the response of the monitoring system. The mixing desk that presented me with this particular set of problems is now on its way out.

Only a few months earlier, and in a different country, a studio that I had completed had a mixing desk installed—one reputedly with a remarkably pure signal path. In this case, the impulse response of the room was relatively unaffected by the desk's presence, but on sustained bass notes, the panels on the rear and underside of the desk rattled to an extent that was insupportable. Different notes produced different rattles from different places on the console.

It is unavoidable that any object, immersed in a sound field, will, to some greater or lesser degree, vibrate in response to the pressure waves received through the air. At the natural vibrational frequencies of each component part, resonances will

occur if the excitation is either by impulsive or a transient signal, (transients contain very great number of frequencies, impulses contain all frequencies) or by a sustained musical note at the resonant frequency of the component.

In the 1991, I wrote for *Studio Sound* on the intrusive nature of many mixing consoles when introduced into control rooms. The,

Manufacturers should place their equipment in a room containing a loudspeaker capable of producing 90dB or 100dB of level, and sweep an oscillator through the full audible range

then, editor wrote in his editorial that it was, perhaps, one of the most important articles on monitoring that he had published for a long time. More recently, my book *Studio Monitoring Design* (Focal Press) carried a whole chapter to this subject, but in spite of these efforts the situation still seems to be going

from bad to worse.

It comes down to this: why will mixing console manufacturers not wake up to the fact that when the mixing console is anything less than as acoustically unobtrusive as possible in the monitoring environment, they are displaying either their arrogance, their ignorance or both? A mixing console is a component part of a whole control room environment, in which all parts must be considered to be building blocks towards a complete system. Nobody, and nothing has any exemption from this requirement, and all persons involved in the design and production of equipment for use in recording studios should respect this fact.

Surely manufacturers of equipment should—as a matter of course—place their equipment in a room containing a loudspeaker capable of producing 90dB or 100dB of level, and sweep an oscillator through the full audible frequency range before unleashing it upon the world. Any rattling of panels identified by this procedure should then be dealt with. The loudspeaker should then be excited by a transient signal, and any noticeable panel resonances should be damped.

Undamped panels, having considerable areas of unsupported metal, have no place on high-quality mixing consoles, or even on low-quality ones for that matter. Time and time again, my acoustic design work in control rooms is being compromised, and the acoustic performance is being limited, by the equipment installed within these rooms. I am not the only designer complaining about this state of affairs, and it is high time that equipment manufacturers got their collective act together to sort this problem out.

For once, on the last occasion, it was not me pointing the problem out to the clients, but the independent tests of academics from a local university discovering it for themselves, and somewhat to their dismay. But I appeal to all manufacturers of equipment—on behalf, not only of all the designers working in the field, but also on behalf of studio owners and users—to take this problem seriously. ■



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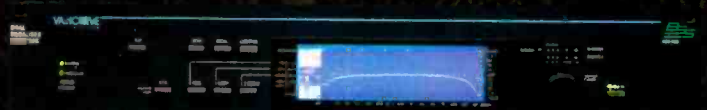
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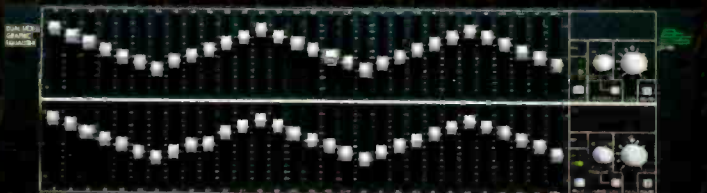
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BSS Audio



BSS Audio, Linkside House, Summit Road, Potters Bar, Herts., EN6 3JB, England • Tel: +44 (0)1707 660667 • Fax: +44 (0)1707 660755
Harman Pro North America Inc. 1449 Donelson Pike, Nashville, TN 37217, USA • Tel: +1 (615) 399 2199 • Fax +1 (615) 367 9046
WWW: <http://www.bss.co.uk>

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