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# Studio Sound

THE INTERNATIONAL PROFESSIONAL AUDIO MAGAZINE  
FOR RECORDING, POSTPRODUCTION AND BROADCAST



## EXCLUSIVES

- Soundtracs DS3
- Audio Developments AD-245
- Spectral Design AudioCube
- Lafont Audio Labs LP-23
- Joemeek SC4 DAD & C2
- Rosendahl interfaces
- Tascam CDRW5000
- HHB CDR-850
- PreSonus M80



# SHAKESPEARE IN SOUND

Love in postproduction



## The **JERRY WEXLER** Interview

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THE HISTORY OF THE MICROPHONE  
RUBY ANNIVERSARY COMPETITION  
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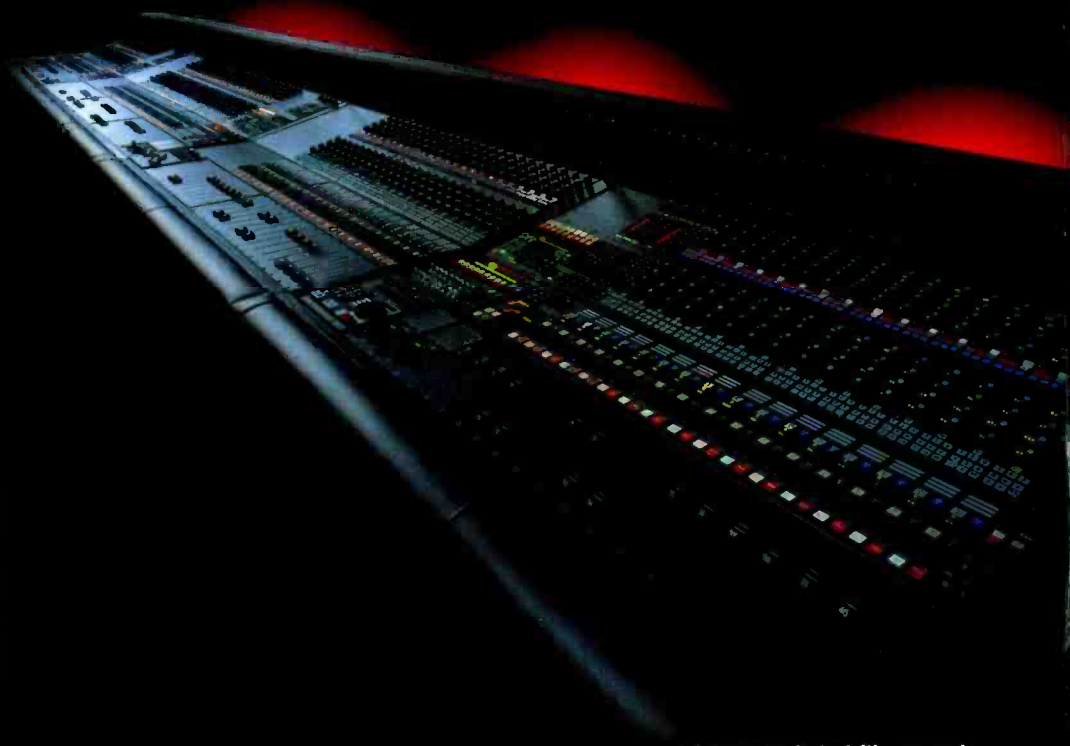
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**SSAIRAs. Time to Vote**  
Vote for the equipment of your choice for inclusion in *Studio Sound's* 1999 Audio Industry Recognition Awards. See page 8.

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## The mechanic's tale

THE SITUATION UNFOLDS, the mechanic of the household returns from six hours under the car in a cold dark garage. While washing his hands he is stirred to recount his experience to a captive audience to whom he is effectively speaking in an alien tongue. Of course, the problem was that one of the washers had been left out from the bit that holds the shank in place which had caused the whole assembly to move to the point where it had become difficult for the bit that had been giving the problem to be engaged and work smoothly. The audience stares on with glazed eyes that blink only with the thought that the car is now fixed and transportation, as it has become known and appreciated, can now resume as before. To the mechanic it has been a sharing experience of knowledge acquired by his own hand, hard earned at the coal-face of practical experience.

At times I feel our technologists are lined up at a massive washbasin, talking at, and over, each other of their own personal triumphs while the end-users and the public stand at a respectful distance behind, patiently holding out clean towels and trying to overhear the briefest morsel of useful information.

Witness the popularisation of science and technology for broadcast consumption, how it is sensationalised and glorified, with, in many cases, misleading and premature conclusions given about how it will impact on the life of the viewer. What these programmes celebrate is the development of the technology from the perspective of those who have developed it—the handwashers. The towelholders are not invited to the sink.

When dealing with the public it is important to put things into context, to reassure and to be realistic otherwise we create people who believe that anything will give you cancer if you feed enough of it to a laboratory rat.

If you don't sprinkle reality on your technology in progress you also risk desensitising its eventual target audience to being less able to identify the really important stuff.

**Zenon Schoepe, executive editor**

## Perfect for radio

ONCE USED as an elegant put-down for the ugly and badly dressed, the line 'perfect for radio' stands poised to epitomise the coming fortunes of entertainment media. Today there is much that is perfect for radio and more is sought.

For while radio emerged to address just one of the five senses out of necessity, it has since been recognised to be a worthy form in its own right. The same is true of the monochrome photography that begat a colourful daughter and moving grandchildren. It's true that it was our inability to devise a means of capturing sound and images to mirror our senses that originally gave us still photography and sound-only recordings and broadcasts. But—like the natural history programmes that manage to turn the familiar into the amazing—our limitations have inexorably drawn our attention to the merits of these selective arts. The proof exists in the continued, if specialised, use of B&W and even sepia-toned photographs, the resurgence of interest in radio, and the pervasive reissue of audio recordings.

Logic suggests that should we successfully extend the present cinema experience to include a third spatial dimension, to involve some tactile aspect, or even to appeal to our sense of smell, there will still be a place for 'movies' as well as 'stills', 'wireless' and 'tee-vee'.

So don't expect still pictures to fade away, don't expect the radio to become silent, and don't wait for the dot on the television screen to disappear forever. Get ready to perm a wealth of new possibilities from tomorrow's foray into multichannel interactive multimedia.

**Tim Goodyer, editor**

# Studio Sound

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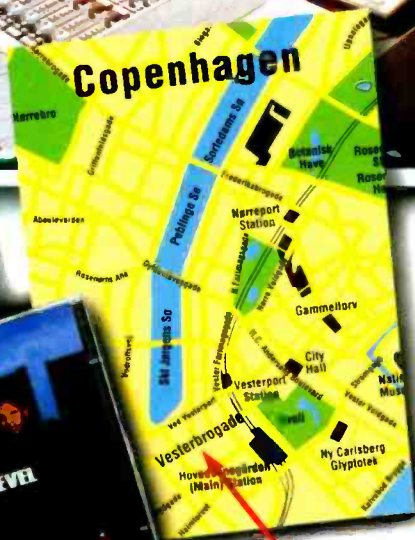
# Great Studios Of The World



## PRODUCTION NOTES

Founded in 1984, Medley Studio plays an important role in the Scandinavian recording industry, attracting major European projects for both recording and mixing. The recent installation of a 64 channel SL 9000 J Series continues Medley's commitment to providing its clients with the highest possible level of sonic performance, with the new console already used by the renowned producer/remix team Cutfather & Joe on a number of sessions, including the mixing of 4 tracks on the hit CD release 'Another Level'.

"Clarity, depth and punch are essential to the way we work" says the team. "The 9000 has it all and easily takes you where you wanna go. The automation is accurate and at the same time easy to use. The console structure also leaves a door open for a last minute overdub... It makes life so much easier..."



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+65 (0)438 2272

■ **Denmark's** Lundgaard Studios seen a flurry of activity including the installation of a surround monitoring system in Studio One, an SSL SL4048 in Studio Two, Apogee AD8000 converters in both studios, and the purchase of a third Atari RADAR II and new Pro Tools 24 systems. The surround monitoring consists of five Genelec 1031As, a Genelec 1092 sub and Magtrax<sup>®</sup> Musicbox routing matrix.

**Lundgaard, Denmark.**

**Tel: +45 753 67744.**

**Genelec, Finland.**

**Tel: +358 17 813311.**

■ **New York's** Sear Sound recording studio has added a third room to its site above Manhattan's busy streets. Designed by Walter Sear and Steven Durr & Associates, the new studio is equipped with a GML-automated custom console designed by Walter Sear and Avalon, and custom monitoring designed by Steve Durr using TAD and Altec drivers.

**Sear Sound, US.**

**Tel: +1 212 582 5380.**

**SDA, US. Tel: +1 615 383 1616.**

■ **National Chinese Radio** has taken four Oram Series 4 desks while further east, Kuala Lumpur's Synchro-sound has added SADIe Classic systems to its mastering rooms where they will keep the company of Sonic Solutions systems. The prestigious Malaysian facility has a further ten studios equipped with AMS Neve consoles and Pro Tools Dds.

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

**Studio Audio & Video, UK.**

**Tel: +44 1353 648888.**

■ **London's** music studios The Town House and Olympic have recently installed Otari RADAR II HDR multi-tracks. The move represents the Virgin group studios' first investment in digital nonlinear recorders and have already seen service on The Muse feature film and Gem Halliwell's solo project. London's RAK Studios, meanwhile, has installed a PMC MBI monitoring system in its MCI-equipped Studio 2 to complement the MBI-XBD monitors and Bryston amplification already installed in the SSL SL4056-equipped Studio 3. RAK is 21 years old this year.

**The Town House, UK.**

**Tel: +44 181 932 3200.**

**RAK Studios, UK.**

**Tel: +44 171 586 2012.**

**Otari, US. Tel: +1 818 594 5908.**

**PMC, UK. Tel: +44 1707 393002.**

■ **Belgium's** new multipurpose Think N Talk facility has placed a 48-fader CS2000 console complete with ES108 Dynamics and TT007 machine controller alongside an extensive collection of outboard, a large video projection system for postproduction. Accommodating music recording, TV and film post, and radio commercial production, the Euphonix' resettability was an important aspect of its selection.

**Think N Talk, Belgium.**

**Tel: +32 22 89 6170.**

**Euphonix, Europe.**

**Tel: +44 171 602 4575.**

■ **Italian** post house International Recording has invested in a 32-fader AMS Neve Logic DFC digital film

console for its Studio 1 and a second 48-fader DFC for its Studio 2. Already an AMS Neve convert, the 41-year-old, 10-studio facility that has seen action with Italian legends including Fellini, Bertolucci and Zeffirelli, and dubbed the likes of *The Godfather* and *Star Wars* cites advances in Hollywood as the reason for adopting digital working for its ADR, Foley dubbing and video post services.

**International Recording, Italy.**

**Tel: +39 06 476701.**

**AMS Neve, UK.**

**Tel: +44 1282 457011.**

■ **London** Studios has ordered a third Calrec T-series digitally-controlled analogue console and a second C2 analogue console, both of which are part of the refurbishment of Studio 3 and replace Neve desks. The installation of the 72-channel T-series and 12-channel C2 will mean that all three of the facility's studios will have identical audio desks.

**The London Studios, UK.**

**Tel: +44 171 620 1620.**

**Calrec, UK. Tel: +44 1422 842159.**

■ **French** post facility TeleEurope has installed two D&R Octagon and one D&R Cinemix console at its Paris HQ. A subsidiary of TDF Video Service counts France 3 and Arte among the customers for its combined audio and video services.

**TeleEurope, France.**

**Tel: +33 1 4458 1818.**

**D&R, The Netherlands.**

**Tel: +31 294 418014.**

■ **American** recording studios recently seen spending money include Nashville's The Workstation, County Q, MCA Music Publishing, Positive Movements, The Castle, Ray Stevens Enterprises all buying Otari Radar II systems; Refraze Recording in Dayton Ohio whose Trident 80B console now has 31 channels of Uptown System 2000 moving fader automation; and Miami's Inner Circle and Franklin's The Sound Kitchen with more RADAR II installations.

**Otari, US. Tel: +1 818 594 5908.**

**Uptown, US. Tel: +1 410 381 7970.**

■ **London** postproduction house 750mph has opened with a complete patchbay and interconnection supplied by VDC. The installation was specified by Nigel Crowley and Sarm's Bill Ward, and involved precabling off site.

**750mph, UL. Tel: +44 171 534 9999.**

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

■ **Recent Rental** sales include those of beyerdynamic MC740 condenser mics to Ireland's Sensible Music hire department, two Heritage 3000 consoles to Westfalensound in Germany bringing their total of Midas desks to 12, two further Heritage 3000s to Ampco Pro rent in Holland, a 20-channel Sony Freedom radio mic system to UK-based AVC Technical Equipment Hire, and several XTA RT1 real-time analysers to British company The Production House.

**Sensible Music. Tel: +353 1 497 0661.**

**AVC, UK. Tel: +44 1753 821351.**

**The Production House.**

**Tel: +44 1232 798999.**



▲ **UK: Salex** has provided new acoustic design for Tele-Cine including all four of its digital on-line suites. The leading London post facility, whose clients include the BBC, ITV, Channel 4, PolyGram and Sony, now has DS90 panels in its digital suites, two telecine transfer suites, a sound dubbing room and a voice-over booth. Salex, UK. Tel: +44 1206 508111

► **Sweden: Studio Sound's Panasonic Competition** has been won by Bill Brunson of Stockholm, Sweden. Bill (pictured) took time out from composing and teaching electroacoustic music at The Royal University College of Music in Stockholm to answer the handful of questions necessary to secure the WR-DA7 kindly provided by Panasonic (Studio Sound, January 1999).

He was pleased we'd not asked for a slogan and managed to avoid the confusion that prevented many of you realising that the WR-DA7's largest multichannel panning ability is for 5.1 surround. Bill is currently composing a large work for chamber orchestra, live electronics and video projections, and has plans to present both the acoustic instruments and electronic sounds in 5.1, 'so the mixer fits right in'. Congratulations from all at Studio Sound.



## Abbey crossed

**UK:** Abbey Road Studios, the icon of London's recording scene, has found itself at the centre of an international controversy following the theft of the Belisha beacons on the famous Abbey Road zebra crossing. The 8-foot high illuminated poles that feature in the studio's letterhead seem to have become the ultimate target for the souvenir-seeking fans who come from around the world to view the studio and leave their mark on the front wall.

The incident—discovered one Thursday morning, early this month—seems to have been anticipated by the borough council, already aware of the studio's graffiti problem, and the police are believed to have alerted London's international airports with particular reference to Japanese tourists returning home with ungainly baggage. This follows a rumoured black market pandering to Japanese businesses and recording studios eager to share Abbey Road's heritage by dis-

playing what are purported to be genuine Abbey Road Belishas in their foyers—although both the police and council maintain that this is the first actual theft of anything more sizeable than chunks of painted tarmac.

Abbey Road Studios' Chris Buchanan commented, 'I suppose it had to happen. But even so, it's a bit of a shock. We're checking the Abbey Road Interactive cameras to see if they have picked anything up and will share out findings with the police.' Reluctant to go on record, Buchanan also let slip that the studio has had a modified letterhead ready for such an eventuality for some years.

A council workman who arrived to survey the damage said, 'Blimey, they've had an angle-grinder on these. How'd they manage that? Look at this—they must have taken the power from the lights. Next thing you know, they'll have had somebody's eye out carrying them home and they'll be suing the council.'

April 1999 **Studio Sound**



## Meister-Bleister

**UK:** The well-documented phenomenon of HF loss-over-time of professional monitoring systems, that in the past has created such agonies in mastering studios, has been eliminated thanks to a unique British invention unveiled this month in Henley-in-Arden.

Speaker cable 'resistive-reactor' (REAR), was first theorised as a time-dependent negative process to the passage of high-frequency transients by the late Alan Blumlein, who's only remaining spiral-bound notebook from his time at the EMI company's research laboratories has been in the possession of a Mr VG Baxter, who was a war-time apprentice of Blumlein's. While the actual process of 'rejuvenating' tired speaker

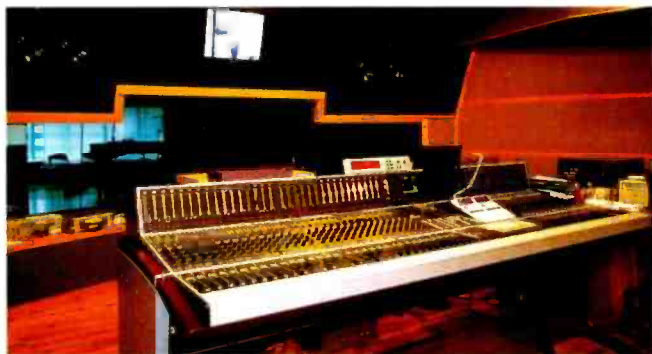
cables remains a secret, the patent application details how a large reverse voltage applied 'backwards' to the normal passage of signals can reduce losses in the region of 10hcta-Victors up to 1milli-Victor measured into an 8Ω load. dBA weighted, across a 'Baxter reversed-measure potentiometer' (Bampot).

The patent application successfully received approval earlier this month after the German audiophile magazine *Der Gramofone* tracked the reclusive Mr Baxter to his English-midlands air-conditioning company ahead of the official launch of the product. Their reception was reported to be 'cool'.

The Baxter Blaster is available as a world-wide mail order service



▲ **UK:** Cameron Macintosh's *Martin Guerre* has taken up the DAR TheatrePlay sound effects replay and editing systems through audio production specialists Autograph Sound Recording. The system incorporates DAR's OMR8 workstation technology and has provided programme material for the UK tour of the musical.



▲ **Hong Kong:** Kowloon's Dragon Studio installed ATC monitoring in its two studios and Sonic Solutions editing room recently. Studios A and B have identical SCM200A 3-way, 4-driver main monitors driven by ATC SPA24-850 stereo amplifiers while the editing room has an active SCM100A 3-way, 3-driver system. The studio is owned by PolyGram and is one of Hong Kong's first 24-bit digital facilities. ATC, UK. Tel: +44 1285 760561.

that guarantees a turnaround of just 24 hours for the processing of suspected tired speaker cables, returning them in a sealed plastic wrapper with a voltage trace chart for each individual pair.

## CEDAR Awards

**UK:** Following their successful introduction last year, the British-

based manufacturer has announced the 2nd CEDAR Awards. Divided into six categories—CD Remastering from a Modern Recording (post 1949), CD Remastering from a Vintage Recording (pre 1950), Remastering of a Film Soundtrack, Audio Restoration for Broadcast Use, Audio Restoration for Forensic Use, and a Dealer award—with nominations welcome from everyone including nominees. The Awards will be presented at the New York AES Convention: nominations and queries should be addressed to:

**Clive Osborn.**  
**Fax: +44 1223 414118.**  
**Email: clive@cedar-audio.com**

## Bye bye

### Charlie Brown

**US:** American blues legend Charles Brown gave his last performance from hospital in Oakland, California to be caught by Telarc engineer Michael Bishop on a pair of Neumann M50 mics, Millennia M2a preamps and a SADiE 24.96 system. Soon to die of congestive heart failure and cancer on 21st January, Brown insisted on keeping his promise to contribute to Maria Muldaur's forthcoming album. Just a week before his death, he was honoured by a tribute given by Bonnie Raitt, Dr. John, Maria Muldaur and others and will be further remembered in the Rock & Roll Hall of Fame.



▲ **Europe-UK:** Team Jelbe AB's fifth OB vehicle has claimed the title of 'Scandinavia's largest'. The digital truck (pictured) is wide-screen and surround-capable and features a 56+48 input SSL Aysis Air broadcast console, 16 digital cameras, two digital video servers, and a satellite uplink. The latest addition to the French-based Le Voyager mobile stable, the 5.1 capable Le Voyager III, will offer an SSL Axiom MT digital console with 96 remote mic preamps. The BBC has taken delivery of a 48-channel Innova Son Sentury digital console as part of the refurbishment of one of its OB vehicles, in readiness for a tour of Europe in the service of the long-running *Songs of Praise*. The British Corinthian Television operation, meanwhile is preparing to construct what is believed to be the first mobile with four expanding sides. CTV's new trailer will boast 20 cameras, a selection of beyerdynamic equipment including MC836 and MC837 shotgun mics and DT109 headsets and use a Pro Bel XD serial digital router with 96 inputs and 192 outputs, a 64 x 64 Freeway stereo router and a System 3 controller. The trailer will expand to some 5.5m in width prompting claims that it is bigger than many established studios.



**1999**  
**SSAIRA**  
V O T I N G

**T**HE MUNICH AES Convention in May will be the setting for the second SSAIRAs—the Studio Sound Audio Industry Recognition Awards. Following our call for nominations in the last couple of months there follows a list of products that have been put forward in the various categories at the time of going to press.

While the voting process is now effectively open, products can still be nominated and indeed will be should our readers choose to vote for products that are not currently listed. The only condition is that the product has to have been released onto the market since last year's European AES Convention in Amsterdam. Nominations will be updated on the Studio Sound web-site [www.prostudio.com/studiosound](http://www.prostudio.com/studiosound).

While anyone can nominate a product for a category, only qualified readers of

**Fax your vote to:**  
**+44 171 407 7102**

## N O M I N A T I O N S

### 1. Large scale console

Amptec Stone-D001; D&R Octagon;  
Innova Son Sentury; SSL Axiom-MT

### 2. Medium to small scale console

Allen & Heath GS3000; Panasonic  
WR-DA7; Soundcraft B400; Spirit 328;  
Tascam TM-D1000; Yamaha DSP Factory;  
Yamaha 01V

### 3. Outboard dynamics

dbx DDP; Purple Audio MC76;  
tc electronic Finalizer Express;  
Thermionic Culture Phoenix; TL Audio  
Ivory C-5021; SPL Transient Designer

### 4. Outboard preamp

CLM Dynamics DB2005; dbx 786;  
Grace Design Lunatec V2; Neotek  
MicMax; PreSonus M80;  
tc electronic Gold Channel;

### 5. Outboard equaliser

BSS Opal DPR944; CLM DB500  
Expounder; LA Audio DigEQ;  
Manley Massive Passive stereo tube EQ;  
Millennia Media NSEQ-2; SPL Qure

### 6. Outboard reverb

Eventide DSP4500; Lexicon PCM91;  
TC Electronic M3000;

### 7. Combined outboard device

Alesis Q20; Antares ATR-1; Eventide  
DSP4500; Focusrite Platinum Voicemaster;  
Lexicon PCM81; Thermionic Culture  
Vulture; Tube Tech MEC1A

### 8. Monitors

Acoustic Energy AE2 Pro; B&W Nautilus  
801; Hafler TRM6; Harbeth Monitor 30 pro  
active; Genelec 1030; KRK V8; Miller &  
Kreisel MPS-2510; Miller & Kreisel  
MPS-5410; Spondor SA300; Studer A5

### 9. Microphone

AKG C4000B; Alesis GTAM62; Audio  
Technica AT4060; Audix C111; Brauner  
Valvet; CAD VX2; Neumann M147;  
Neumann TLM103; Røde Broadcaster;

Røde NTV; Shure KSM32

### 10. Convertors

Lucid Technology AD9624/DA9624;  
Waves L2

### 11. Audio editor

Merging Technology Pyramix 2.0; Roland  
VS1680; SA&V SADiE 24-96; Sek'd 24-96

### 12. Audio recorder

Akai DD8 Plus; Alesis M20; Alesis XT20;  
DAR SAM; HHB CDR850; Marantz  
CDR630; Marantz CDR640; Otari PD20;  
Otari RADAR II; Sonosax Stelladat II;  
Tascam DA-45HR; Tascam CDRW5000

### 13. Desktop duplication

Mediaform 5900; Mediaform CD2CD;  
Otari CDP50; TraxData TraxCopier

### 14. Location portable equipment

Denon DMP-R70; Filmtech LSP4;  
Micron 570 SDR; Sonosax Stelladat II;  
Terrasonde Toolbox

### 15. Comms

Trilogy Broadcast Orator

### 16. Plug-ins

Sonic Foundry Soft Encode; tc electronic  
MasterX; tc electronic Unity;  
Waves Renaissance EQ

### 17. Special category

Adgil Director (monitor controller); Akai  
S6000 (sampler); CB Electronics SR-3  
(synchroniser); Deltron AIRPatch Recall  
(patchbay); Digidesign ProControl  
(hardware controller); Dolby DP569  
(encoder); E-mu E4XT Ultra (sampler);  
LA Audio SPX2 (source selector);  
Magtrax MusicBox (monitor controller);  
Martech MultiMax 9 (monitor  
controller); Miller & Kreisel LFE-4  
(monitor); Sonorus StudI/O (PCI  
interface card); Studio Technology  
StudioComm 68/69 (surround  
controller); Zonal 999 (mag tape)

*Studio Sound* are eligible to vote and this will be verified by the requirement for readers to quote their unique reader identification number.

The unique reader identification number is the 9-digit number starting with a zero that is located in the middle of the top row of your *Studio Sound* address label. In all instances the inclusion of the unique reader identification number is essential.

### Ways to vote

Readers can vote for one product in each category in four ways.

1. By filling in the form and posting it to:  
SSAIRAs, Studio Sound Magazine  
Miller Freeman Entertainment  
8 Montague Close, London Bridge  
London SE1 9UR, UK.
2. By faxing the form to:  
+44 171 407 7102
3. By emailing their unique reader identification number, the category numbers and their votes to:  
[SSAIRAs@unmf.com](mailto:SSAIRAs@unmf.com)
4. By filling in the interactive voting form on the Studio Sound web-site:  
[www.prostudio.com/studiosound](http://www.prostudio.com/studiosound)

3. By emailing their unique reader identification number, the category numbers and their votes to:  
[SSAIRAs@unmf.com](mailto:SSAIRAs@unmf.com)
4. By filling in the interactive voting form on the Studio Sound web-site:  
[www.prostudio.com/studiosound](http://www.prostudio.com/studiosound)

**Readers will only be allowed to vote once. Readers may only vote for one product in each category.**

The objective is to identify equipment that genuinely warrants recognition for being special in some way.

Readers are not obliged to vote in all categories and their attention is drawn to Special Category 17 which serves as a 'catch all' for any products not covered in the other categories.

Any questions can be directed to Zenon Schoepe and Tim Goodyer at Studio Sound. Tel: +44 171 940 8513.

# SSAIRA—Voting Starts Now



# SSAIRA FAX VOTE

**Your reader identification number**

The reader identification number is the nine-digit number starting with a zero that is located in the middle of the top row of your Studio Sound address label. In all instances the inclusion of the reader identification number is essential.

**6 Outboard reverb**

**12 Audio recorder**

**1 Large scale console**

**7 Combined outboard device**

**13 Desktop duplication**

**2 Medium to small scale console**

**8 Monitors**

**14 Location portable equipment**

**3 Outboard dynamics**

**9 Microphone**

**15 Comms**

**4 Outboard preamp**

**10 Convertors**

**16 Plug-ins**

**5 Outboard equaliser**

**11 Audio editor**

**17 Special category**

**SSAIRA FAX: +44 171 407 7102**

April

10-12

**16th International AES Conference 'Spacial Sound Reproduction'**

Arktikum, Rovaniemi, Finland.  
Contact: Juha Backman, Nokia.  
Tel: +358 10505 9140.  
Email: aes16@acoustics.hut.fi  
Net: www.aes.org

13-15

**PLASA Light and Sound Shanghai**

Intex Shanghai, 88 Loushanguan Road, Shanghai, China.  
Contact: Marcus Bernie, P&O Events.  
Tel: +44 171 370 8231.  
Fax: +44 171 370 8143.

17-22

**NAB 99**

Las Vegas, Nevada, US.  
Tel: +1 202 429 4149.  
Net: www.nab.org/conventions

21-22

**ABTT's**

**21st Trade Show**  
Royal Horticultural Halls, London SW1, UK.  
Contact: Association of British Theatre Technicians, 47 Bermondsey Street, London SE1 3XT.  
Tel: +44 171 403 3778.  
Email: office@avtt.org.uk

26-28

**DSP World Spring Design Conference**

Santa Clara Convention Center, Santa Clara, California, US.  
Contact: Miller Freeman Inc.  
Tel: +1 415 278 5231.  
Fax: +1 415 278 5200.  
Net: www.dspworld.com

28

**Interactive Seminar on the Internet**

Contact: Michael Beyer, Genter Communications.  
Tel: +49 911 9535 320.  
Fax: +49 911 9535 309.  
Net: www.msjow.com.  
Email: michael.beyer@bci.de

May

8-11

**106th AES Convention**

MOC Centre, Munich, Germany.  
Contact: Martin Woehr, Bayerischer Rundfunk Studioproduktion.  
Tel: +49 89 59002434.  
Email: 106th-chairman@aes.org  
Net: www.aes.org

8-11

**DISMA Music Show**

Rimini Trade Fair Centre, Rimini, Italy.  
Contact: Ente Autonomo Fiera di Rimini.  
Tel: +39 541 711 711.  
Fax: +39 541 786 686.  
Net: www.fierarimini.it

15-16

**Conference: Smart Business—Smart Technologies**

Midland Hotel, Chicago, USA.  
Contact: SPARS.  
Tel: +1 561 641 6648.  
Email: spars@spars.com

17-19

**Cable & Satellite Mediacast 99**

Earls Court 2, London, UK.  
Contact: Reed Exhibitions.  
Tel: +44 181 910 7717.  
Net: www.cabsat.co.uk

19-22

**CEDIA UK**

Novatel, Hammersmith, London, UK.  
Contact: CEDIA UK.  
Tel: +44 1462 627377.  
Fax: +44 1462 620429.  
Email: cedia\_uk@compuserve.com

24-25

**DVD Production Europe 99**

The Conference Forum, London, UK.  
Contact: CCW.  
UK Freephone: +0800 917 3596.  
Tel: +44 1306 501 530.

25-30

**Expo Light & Sound 99**

Romexpo Exhibitions Centre, Bucharest, Romania.  
Contact: Romexpo.  
Tel: +40 1 222 43 56.  
Email: romexpo@cciro.ro  
Net: www.cciro/romexpo

29-30

**Sound Control Live 99**

SECC, Glasgow, Scotland.  
Contact: Mammoth Events.  
Tel: +44 1353 665577.  
Fax: +44 1353 662489.  
Email: events@clara.net

June

1-3

**Showtech 99**

Berlin, Germany.  
Contact: OTSA, UK.  
Tel: +44 171 886 3106.  
Fax: +44 171 886 3101.

6-11

**Sound, Vision and Home Appliances 99**

Jeddah International Exhibition Centre, Jeddah, Saudi Arabia.  
Contact: Al-Harithy  
Tel: +44 171 223 3431.  
Fax: +44 171 228 4229.  
Email: ACEXpo@aol.com  
Net: www.members.aol.com /ACEXpos

10-15

**Montreux International Television Symposium and Exhibition**

Montreux, Switzerland.  
Contact: WHD PR.  
Tel: +44 171 799 3100.  
Email: news@whdpr.com  
Net: www.montreux.ch /symposia

22-25

**CommunicAsia 99**

Singapore Expo, Singapore.  
Contact: Overseas Exhibition Services.  
Tel: +44 171 862 2080.  
Fax: +44 171 862 2088.  
Email: singapore.oes@dail.pipex.com  
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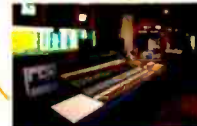
users

valve classics



## C-1 dual valve compressor

Ⓞ The original TL Audio Classic range products have been part of some of the most important records of recent years. Now, as part of the new 'Valve Classics' range, we have managed to develop and improve them even further. Extra features, uprated hardware and refined circuit design have given our best-sellers a new lease of life.



**TOBY WOOD**  
(Engineer - CTS Studios, London)

"The C-1 proved its worth very rapidly, sounding clean and transparent, and without any unwelcome artefacts - it also has excellent internal dynamic range."



## PA-1 dual pentode valve preamp

Ⓞ Each Valve Classics product now utilises US General Electric military specification ECC83 valves running at 250v DC for an even smoother, fatter sound - and the combination of tough steel chassis, 6mm milled aluminium front panel and gold plated ceramic valve bases means the units positively relish being bounced from one session or concert to the next.



**JON ASTLEY** (Mastering Engineer - Led Zeppelin, The Who, Tori Amos)

"I had auditioned other valve equalisers for the Led Zeppelin album, but the EQ-2 came out on top since its sound suited the project so well - both Jimmy Page and I loved it for the sort of top end we wanted."



## EQ-2 dual parametric valve equaliser

Ⓞ The EQ-2 equaliser now boasts ultra-low noise bipolar op-amps and an improved ground planing system, in addition to a much requested shelving option on both LF and HF bands. The new PA-1 preamp has output level meters, improved valve stage frequency response and extra output drive capability - enabling even easier interfacing with today's high level digital recorders.



**ADRIAN UTLEY** (Guitarist, Writer, Co-Producer - Portishead)

"There seems to be a real buzz about TL Audio equipment at the moment, and I've encountered so many engineers and producers using TL Audio products that it just seemed to be the obvious choice."

Ⓞ Add these improvements to what we're already the world's most flexible and affordable high-end valve processors, and you'll realise why everyone wants to own a Valve Classic.

Ⓞ To find out more, contact your TL Audio dealer today.



**IAN DAVIDSON**  
(Townhouse Studios, London)

"We own both the EQ-2 Equaliser and C-1 Compressor units and are very happy with them."

**TL Audio**®

new valve classics

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email: info@tlaudio.co.uk

## Broadcasting obscenity

THE SCIENTIFIC MAXIM being 'patent or publish', I have decided to announce my new invention through your pages. My resources are limited but my imagination has given me speed to conceive of the 'de-heckler', a prime device for use in the preparation of recordings of comedians, politicians and their like. So I cannot unveil the details but imagining a block schematic involving a digital (like profanity) delay and my intelligent language software development will give an indication of its potential. I invite the 'de-community' to contact me for more information.

The secret of my work is what I call my 'ex-directory'—the ability of the software to find the words that must not be broadcast and then to remove them from the audio stream. But my problem is this: as I want my invention to have truly international appeal, I need a list of all possible profanities in all major languages. In English, 'blast' and 'buggery' are no problem, neither are short words starting with 'f' and 's', but I'm unsure of the acceptability of 'feck' and 'smeg'. And so in Spanish 'cabron' is out, but what of the commonly-used 'gilipollas'. And in Japanese there should be no 'senzuri', but maybe 'hekoki' is okay. You can see my dilemma.

Obviously I need to draw on your magazine's notorious international circulation to help me compile a list of profanity, blasphemy, sacrilegiousness and evil-speaking in all major languages. If you could appeal to your readers to provide examples of all that is unacceptable on my behalf, I can proceed with my work. I guess I am asking for abuse! Can you oblige?

**Sergei Yikyuk, University of Tula**

## Yellow peril

HAVING WON a large amount of money in the State Lottery, I have decided to fulfil a life ambition and get myself into the recording business. I've always wanted to be a part of it but without the ability to be a rock star or the cash to be a player, I've been biding my time in a day job. But now opportunity is smiling on me and I want to make my mark.

So I've looked at your magazine and decided to build my dream recording studio—and not just any studio, you understand. I've looked into 'project studios' and found them pithy. I've looked into 'high-end' recording studios and found them precious. I've looked into studios making radio shows and found them lonely. And I've looked into studios working on motion pictures and found them crowded with egos. What I want to do is so different it'll knock your

socks off. I'm going to build a studio in a yellow submarine.

Think about it—a fully mobile recording facility with no sound isolation problems, no planning restrictions, no access problems and no neighbours. Damned perfect. We'll keep in touch with the world over radio-ISDN links and be in total control of our working environment.

I've spoken to the US Navy and have an option on a vessel (and I'm angling to keep some of the weaponry) and I'm getting ready to fit it out. I'm hoping you can put me in touch with some studio designers out there who might share in my vision and maybe help put me right over whether I should go analog or digital. Seems to me that digital and valves might run too hot for a sub, so a seventies theme might be good.

Obviously there's a way to go yet, but as soon as I'm ship-shape I'll be organising a launch party for the world's press to attend. I'm thinking about under the ice cap. Sure hope you can attend.

**Name and address withheld**

## Naked desire

I RUN A NUDIST cable TV channel and I have a problem with microphones.

My star presenter's show relies quite heavily on her having the freedom offered by a radio mic as opposed to a boom mic but she always works nude and is allergic to the surgical tape we have been using to secure her equipment. Since we have been unable to find an alternative means of attaching a lavalier mic and transmitter pack to her and our ratings are fading, we appeal to you.

Are you aware of any alternative systems that might suit our requirements?

**Dean Merten, Peekskill  
Pennsylvania, US.**

## Head case

IT IS CLEAR TO ME through the coverage you have given to the subject in the last two years that the requirement to embrace multichannel monitoring into the control room is the biggest issue facing facilities.

However, it is also clear that the precise orientation and mounting of multiple monitors within rooms optimised for stereo reproduction remains a grey area that still requires much more discussion.

Allow me to share a solution with your readers that I have come up with which could serve as an inexpensive, short-term, and very elegant fix-it. I have not patented it because I have no interest in remuneration for the invention because I believe that significant scientific advances ought to be shared and be freely available to all.

This close field multichannel monitoring system employs headphone drivers positioned around the listener's head in an approximation of a typical LCR LS RS configuration. By taking a readily available construction site hard hat and rivetting the four outside earpieces at the corners of an imaginary square with the head within its centre, the centre dialogue channel should be positioned directly above the nose.

The skull can be isolated from the playback system by a thin foam-rock wool-carpet sandwich.

As has been asserted with free-field multichannel monitoring it is vital that the earpieces are all matched and of the same model type and brand.

The downsides, although minor, are weight, which is largely dictated by the choice of headphone (I recommend 'open' rather than enclosed types), and for extended listening forward visibility can be compromised which I believe makes a 7-channel system impractical. However, I have been experimenting with a modification which uses a curtain rail curved around the outer perimeter of the hard hat on which the front earpieces are hung and this permits instant retraction and return with the pull of a cord.

The .1 subwoofer constituent baffled me for some time but I have found that best results can be achieved by tucking an 8-inch free driver inside the trouser belt, positioned on a full bladder.

The system is accurate and gives reliable room-independent results.

**Charlie K Framton, Nebraska**

## A producer replies

I must take issue with your comments regarding what you describe as the lack of budget available for audio personnel by those 'who believe that TV sound can be done on the cheap.' (*Studio Sound*, January 1999, p4).

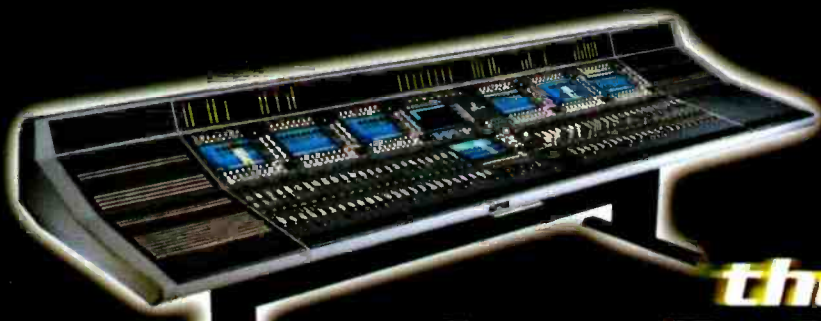
As one of those producers of what you scathingly describe as 'one man and his camera productions' I think I know a little more about the economics of making programmes like this than you do. You are correct in identifying that budgets are tight but let me tell you that the cost of a dedicated sound recordist on location, and the audio posting that follows, is nothing in comparison to what it costs to feed, water and keep them in crisps and biscuits for the afternoon.

If sound recordists made a point of having breakfast at home before they go on a shoot perhaps they would have more work as a result.

**Ralph Holm-Meyde,  
H-M Productions, Bristol, UK**

April 1999 **Studio Sound**





*the installed*

# DPC-II

## Digital Production Console

- 160 Digital Channels
- Worksurfaces from 16 to 96 motorised faders
- 24 bit Conversion
- 96kHz operation
- Stereo, LCRS, 5.1, 7.1

**THE WORLD'S LEADING FACILITIES ARE STAYING AHEAD..**

- ▣ For the past two years, every couple of days one of the World's leading audio facilities has become a convert to a Soundtracs digital console.
- ▣ Their decision to go digital may vary but their reasons for selecting Soundtracs appear to be unanimous.
- ▣ Whether for post-production, broadcast or music, there isn't a more cost efficient digital production console offering the features and facilities, with the high level of automation and sonic integrity than that provided by Soundtracs.
- ▣ These facts, reinforced by the Soundtracs premier software and hardware support, is simply enabling them to stay ahead.



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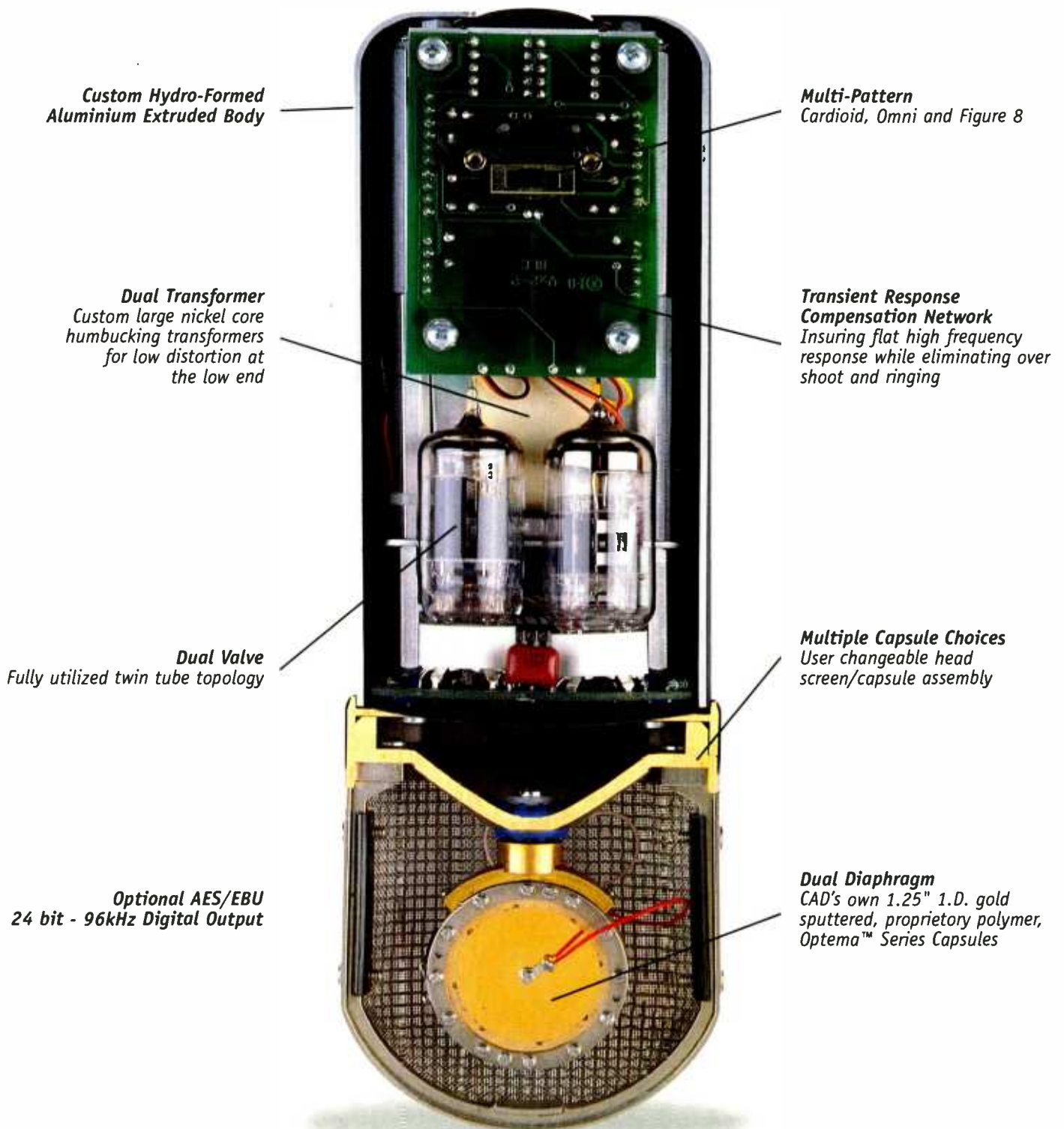
# ...staying ahead

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STUDIO SOUND PRESENTS A CHANCE TO

# WIN!

## RUBY REWARDS

You can't **CELEBRATE** a birthday without presents. Although it's more usual to receive them than give them, the occasion of *Studio Sound's* 40th anniversary seemed too good an opportunity to miss to organise a give-away of unprecedented proportions



**RATHER THAN LIMIT YOUR PROSPECTS OF WINNING** *Studio Sound's* celebratory competition by offering one big prize, we have enlisted the help of the world's leading audio manufacturers to provide a selection of unique custom equipment—a one-off version of a top model in their catalogue. And they have delivered the goods in spades. The kit below makes an impressive enough listing in its own right, but as a custom *Studio Sound* Ruby issue, every unit is destined to become a collector's item, not to mention being a talking point in your studio for years to come. As an additional coup, we have secured ten pairs of ticket to the Royal Air Tattoo 1999 which marks the 50th anniversary of NATO are included in the opening phase of the competition next month.

**HERE'S HOW IT WILL WORK:** Each month of this year you will have the chance to win a selection from the equipment listed below. The selection will change month by month until by the end of the year we will have given it all away—and you will have to wait until *Studio Sound's* 50th anniversary to enter a comparable competition.

All you have to do is correctly answer the questions set for each unit and renew your acquaintance of any lucky charms you may have adopted. As long as you are a registered *Studio Sound* reader, you may enter to win any number of units as long as you do so separately (multiple entries, as ever, will be treated with the disdain they deserve), and you include your Unique Reader Identification Number.

Enormous thanks are due to all those who have so readily contributed equipment, time and advice in the preparation of this competition. It is a tribute not only to *Studio Sound's* place in the pro-audio industry but to the industry itself.

### REWARDING RUBY PRIZES

**AKG** 535 stage condenser, C1000, and C3000 microphones

**A&H** 32-channel GS3000 console

**CEDAR** Series-X DHX dehisser

**Drawmer** DS201 dual gate

**EMO** E520 Single DI box; E445 cable tester; E325 3-way mic splitter

**Genelec** I029 monitors

**Joemeek** SC2 compressor

**KT** graphic DN-360 graphic

**Marantz** CDR640 CD recorder

**TL Audio** CI Classic compressor

**Purple Audio** I176 compressor





Q2

# sometimes analogue is the right solution

1998 saw Calrec introduce two new digital consoles, emphasising Calrec's commitment to a digital future. However Calrec recognise that for many applications an analogue console is the right solution. That's why Calrec still supply a full range of high performance analogue production and on-air consoles to broadcasters world-wide.

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# Spectral Design AudioCube

Largely unknown outside of its native Germany, Spectral Design has technology that deserves to be recognised more widely. **Dave Foister** discovers a well-kept secret in Bremen

**T**HE EVOLUTION of the DAW has generally followed clearly defined lines. Recording and cut and paste editing have become more and more sophisticated, and have been augmented by ever more powerful treatments as DSP capabilities have increased.

The logical extension of the processing developments was the concept of the plug-in, where a DAW makes its architecture available to third parties in the hope that the resulting wealth of processors will make it the ultimate virtual studio.

The AudioCube system from German DSP specialist Spectral Design approaches it from completely the opposite direction. Recognising that nowadays a DAW, particularly when it is aimed at mastering applications, stands or falls on the range and quality of its processing, Spectral has developed a huge and comprehensive range of processors—known as Virtual Precision Instruments—to be used with a modified version of an existing simple but effective audio editor. Thus AudioCube is not hard-disk recording with processing thrown in; rather it is powerful signal processing with a hard-disk recorder thrown in. Indeed it can be used as a real-time processing rack without anything being recorded to it at all.

Although AudioCube may not be familiar outside its home territory (where, in fact, it is very successful), the products of its designers are. When SPL wanted to complement its analogue processors with a distinctive range of digital boxes, Spectral's expertise wrote the software for the red-pannelled line that includes the Loudness Maximiser, the Spectraliser and the Machine Head. Spectral's close links with Steinberg explain the appearance of essentially the same range of processes for the VST platform, and it is no surprise then to find the same ideas appearing within AudioCube. Don't assume from that, however, that all the AudioCube Instruments belong in the Ever So Slightly Wacky camp; they cover pretty much every requirement, from restoration to EQ and dynamics, that is likely to be encountered in a mastering situation.

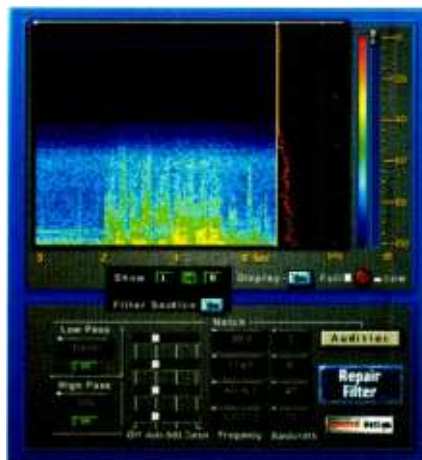
AudioCube is a complete turnkey system running on dedicated hardware and built on a modified version of Steinberg's editing platform. The host machine is a specially assembled box that conceals it within a powerful PC.

Various versions are available, of which the top model is the AudioCube 400; this has two 400MHz Pentium II processors, a clear enough indication that all the audio is handled by the PC with no additional DSP. Forget any concerns about the resulting resolution—all processing is 32-bit floating point. A blue rack cabinet houses the PC parts along with the various drives, which can include removable 9Gb or 18Gb Audio Shuttle disk drives, a 4x CD writer (fitted as standard) and an Exabyte tape drive. Everything runs under Windows NT, and this is even partially responsible for the optional networking between DAWs and external machine control. It also handles twin monitors, once the exclusive domain of the Mac, and given the enormous amount of power on tap the two screens are almost a necessity.

For convenience Spectral divides its processors into two broad groups, perhaps best categorised as corrective and creative treatments. A major part of the thrust of the processes is restoration of damaged material, be it on tape, LP, 78, film or whatever. To this end Instruments are provided for the removal of the obvious artefacts such as noise, clicks and crackle, plus some extra ones for problems not often addressed elsewhere.

The treatments within this group are addressed in broadly similar ways. An important part of the design philosophy is that there should be as few user adjustments as possible, which results in control windows that look far too simple for the task they are meant to perform. This soon turns out to be deceptive, as the sophisticated software behind them is more than up to the job, although the benefits in terms of setting-up speed are obvious.

The DeClicker is a good example of the approach. Designed to remove the kind of clicks found on a variety of sources (78s, LPs, digital sync clicks and optical films are all listed as suitable cases), its essential on-screen controls consist of no more than a choice of three modes (Old, Standard and Modern) and a THRESHOLD slider. Acknowledging that sometimes the removal of a click, even with clever interpolation, can sometimes leave a further artefact, there is also a DEPLOY control. Two real-time displays show what's going on, both in terms of DSP activity and the waveforms of the clicks being removed, and the most helpful feature of all is an A D P M O X button. This is a function found on many



of the processes, and it effectively solos the material being removed. When the process is working optimally, the output of the Audition mode will consist of nothing but clicks and crackles, with no musical signal audible at all, making it very easy to find the right settings.

Another common feature is a set >

< of four buttons to trade-off quantity against quality. This can be used in conjunction with a master graphic display of the computer's processing activity, logging the percentage of resources in use against time. With such power available it takes some doing to get close to the limits, but if a big chain of complex processes is in use it may be helpful to back off the requirements of one or two, particularly as even the quick and dirty settings are still very effective. It's worth mentioning at this point that several processes can be used simultaneously via a main Console window that has a chain of insert points, an output fader and precision metering. In the unlikely event that the resources are exceeded, it is possible to perform a non-real-time bounce via a chain of processes and then add more afterwards.

DeCrackler and DeScratcher offer similar facilities to the DeClicker, operating on disturbances of less than 20 samples and up to 1000 samples respectively. The other obvious restoration tool is DeNoiser, an algorithm requiring no noise fingerprint to operate and again minimising the adjustment required from the user. This still leaves several controls for optimising the algorithm's behaviour, and adjustment is considerably more critical than it is with the other processes. The noise floor and curve is identified



automatically and shown in a graphic display, and the user can then control the amount of noise reduction and the resulting side-effects. Specifically there are controls for Ambience, helping to retain the low-level detail of the signal, and one intriguingly (and apparently intentionally) labelled SILENCE, helping to ensure that the HF content of the signal is not disturbed too much. I felt less comfortable with this process than any of the others; even on Spectral's demo material I thought I could hear the filters opening and closing with the material unless the adjustments were made extremely carefully and the noise reduction minimal. Some other material worked much better, and the deciding factor seemed to be the amount and consistency of the noise being removed. Given the right material, DeNoiser works well, although it proves yet again that this is the most difficult of the standard

restoration processes.

AudioCube adds some less familiar ones. One is an Azimuth corrector, automatically re-aligning the time relationship between the two channels, primarily to compensate for misaligned analogue tape heads. An extra trick here is a balance meter that shows how well the signal is spread across the two channels; in conjunction with the Audition facility and a MONO button this allows the correct stereo image to be restored very easily.

A completely new one to me is the DeClipper. This specifically addresses the problem of digital overers, where the clipping is as hard and absolute as it could be. A graphic display shows a level histogram, indicating the distribution of the numeric values of the samples over time. This and a Clip 'LED' show the presence of overers, and the algorithm interpolates what should have been there and substitutes it for the flat-topped signal. This was demonstrated with a piano recording that distorted badly on peaks, and the clipping disappeared completely when treated. This is a hugely useful facility that works incredibly well with virtually no user intervention (you can reduce the level to compensate for the restored peaks here, or choose to do it later) and can salvage things that I would previously have thought were beyond redemption.

Perhaps the final restoration device is the Repair Filter, a set of four very-narrow notch filters that can automatically lock on to steady tones within a signal. Obvious targets are mains hum and its harmonics, monitor line whistles, and optical film artefacts, and these show up clearly on a coloured spectrogram as continuous lines through an otherwise random spectrum. The automatic algorithm does a very good job of finding and eliminating such things, even managing to track changes, and if finer control is required you can edit the frequency and bandwidth parameters manually.

Crossing over into the creative area is the De-esser, which I reckon is the best I have ever heard. It is intelligent enough to dispense with thresholds, just offering two controls, one for S reduction and one for a Breathe parameter that fine tunes the effect on surrounding material. This is another process that offers an Audition function to let you hear what you've removed, making it blindingly easy to set up.

The more creative EQ requirements are dealt with by two very different processors. The first is called AnalogEQ, which gives a pretty clear idea of its aspirations, and comprises three identical parametric bands plus high and low shelving and high and low filters, all with a choice of slope. Spectral believes that the reason digital EQ rarely sounds like its analogue counterpart is its behaviour around >

CD-Inspector Mozart.CDE									
EAN: 0028944590425									
Time	Track	Index	PreGap	Length	Emp	Copy	ISRC	Type	
00:03.51	1	1	00:03.51	04:08.29	off	Deny	DE F05 94 30500	Audio	
04:12.05	2	1	00:00.00	02:35.60	off	Deny	DE F05 94 30500	Audio	
06:47.65	3	1	00:00.00	00:36.45	off	Deny	DE F05 94 30500	Audio	
07:24.35	4	1	00:00.00	02:25.03	off	Deny	DE F05 94 30500	Audio	
09:49.38	5	1	00:00.00	01:25.30	off	Deny	DE F05 94 30500	Audio	
11:14.68	6	1	00:00.00	00:42.10	off	Deny	DE F05 94 30500	Audio	
11:57.03	7	1	00:00.00	02:19.05	off	Deny	DE F05 94 30500	Audio	
14:16.08	8	1	00:00.00	00:53.37	off	Deny	DE F05 94 30500	Audio	
15:09.45	9	1	00:00.00	03:06.11	off	Deny	DE F05 94 30500	Audio	
18:15.56	10	1	00:00.00	00:33.47	off	Deny	DE F05 94 30500	Audio	
18:49.28	11	1	00:00.00	02:08.32	off	Deny	DE F05 94 30500	Audio	
20:57.60	12	1	00:00.00	01:40.60	off	Deny	DE F05 94 30500	Audio	
22:38.45	13	1	00:00.00	02:42.30	off	Deny	DE F05 94 30500	Audio	
25:21.00	14	1	00:00.00	03:14.25	off	Deny	DE F05 94 30500	Audio	
28:35.25	15	1	00:00.00	04:44.10	off	Deny	DE F05 94 30500	Audio	
33:19.35	16	1	00:00.00	00:55.33	off	Deny	DE F05 94 30500	Audio	
34:14.68	17	1	00:00.00	00:58.67	off	Deny	DE F05 94 30500	Audio	
35:13.60	18	1	00:00.00	01:13.53	off	Deny	DE F05 94 30500	Audio	
36:27.38	19	1	00:00.00	00:46.35	off	Deny	DE F05 94 30500	Audio	
37:13.73	20	1	00:00.00	01:03.55	off	Deny	DE F05 94 30500	Audio	
38:17.53	21	1	00:00.00	03:30.55	off	Deny	DE F05 94 30500	Audio	
41:56.33	22	1	00:08.00	03:41.10	off	Deny	DE F05 94 30500	Audio	
45:37.43	23	1	00:00.00	03:16.15	off	Deny	DE F05 94 30500	Audio	
48:53.58	24	1	00:00.00	01:11.22	off	Deny	DE F05 94 30500	Audio	
50:05.05	25	1	00:00.00	02:22.53	off	Deny	DE F05 94 30500	Audio	
52:27.58	26	1	00:00.00	00:58.00	off	Deny	DE F05 94 30500	Audio	
53:25.58	27	1	00:00.00	02:39.25	off	Deny	DE F05 94 30500	Audio	
56:05.08	28	1	00:00.00	02:26.25	off	Deny	DE F05 94 30500	Audio	
58:31.33	29	1	00:00.00	01:04.12	off	Deny	DE F05 94 30500	Audio	
59:35.45	30	1	00:00.00	03:05.25	off	Deny	DE F05 94 30500	Audio	
62:40.70	31	1	00:00.00	00:48.38	off	Deny	DE F05 94 30500	Audio	
63:29.33	32	1	00:00.00	00:59.52	off	Deny	DE F05 94 30500	Audio	
64:29.10	33	1	00:00.00	00:24.23	off	Deny	DE F05 94 30500	Audio	
64:53.33	End								



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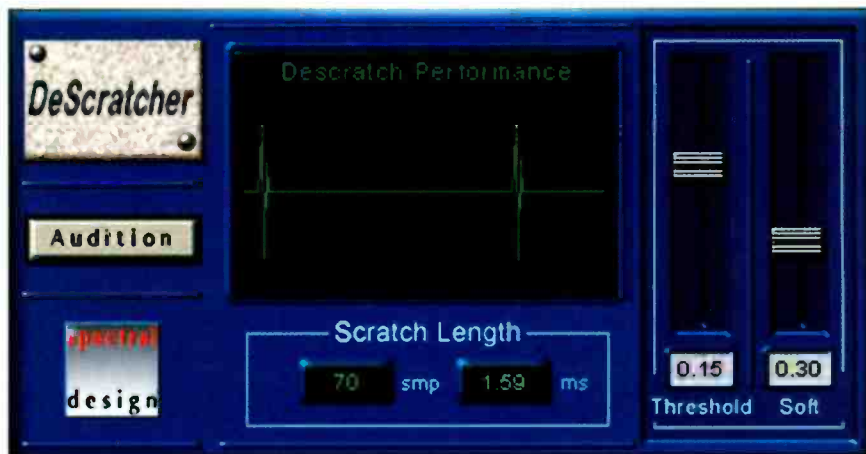
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< the top of the pass band, where the anti-aliasing filters affect the shapes of the upper reaches of the EQ. AnalogEQ's algorithms aim to preserve the characteristics of these HF extremes despite the presence of the brickwall filters, and certainly its character seems to succeed very well. Its screen display is perhaps the best example of Spectral's visual design, resembling a big chunky aluminium front panel complete with strong light source, and knobs that move via the mouse and show their numerical values as well. If desired the resulting curve can be shown graphically. One means the EQ uses to overcome the filter difficulties is to run at double the incoming sample rate, using a tool also available on its own for doubling or halving the sample rate with the absolute minimum disturbance to the signal. This has obvious applications in both directions, as existing recordings may require upsampling for forthcoming media, and current high-sampled recordings need to be downsampled properly for release on 44.1kHz/48kHz media. It has been said that some of the high-sampling recorders don't do a very good job of downsampling, so a tool like this, that does it as it should be done, could be in demand.

AudioCube's other approach to EQ is an extraordinary processor called FreeFilter. In essence this is a third-



octave graphic with a couple of twists—it can tilt its whole shape around a selected point, group bands together, and similar tricks—but its remarkable feature is the ability to learn a spectrum curve from input source material and apply it elsewhere. The example shown to me was the idea of learning the spectrum of a known polished production, analysing the spectrum of a more basic demo, and adjusting the EQ applied to the demo so that its spectrum matched that of the target track—all automatically. The clear benefit in the mastering room is the ability to match the essential characteristics of the tracks on an album, particularly a compilation. Many other possibilities offer themselves, such as

matching the sound of a headworn microphone to one placed in a 'better' position. The results are shown on a clear graphic display and can still be manually adjusted if required.

The aforementioned Spectraliser, Loudness Maximiser and tape saturation simulator—known here as Magneto—complete the creative treatments, and function pretty much as their hardware counterparts. The Spectraliser is a subtle and effective digital enhancer, adding controlled amounts of harmonics to increase or restore sparkle; the Loudness Maximiser is self-explanatory, pushing the signal up to the digital limits using compression that is at once extreme and transparent; and Magneto simulates the effects of driving >

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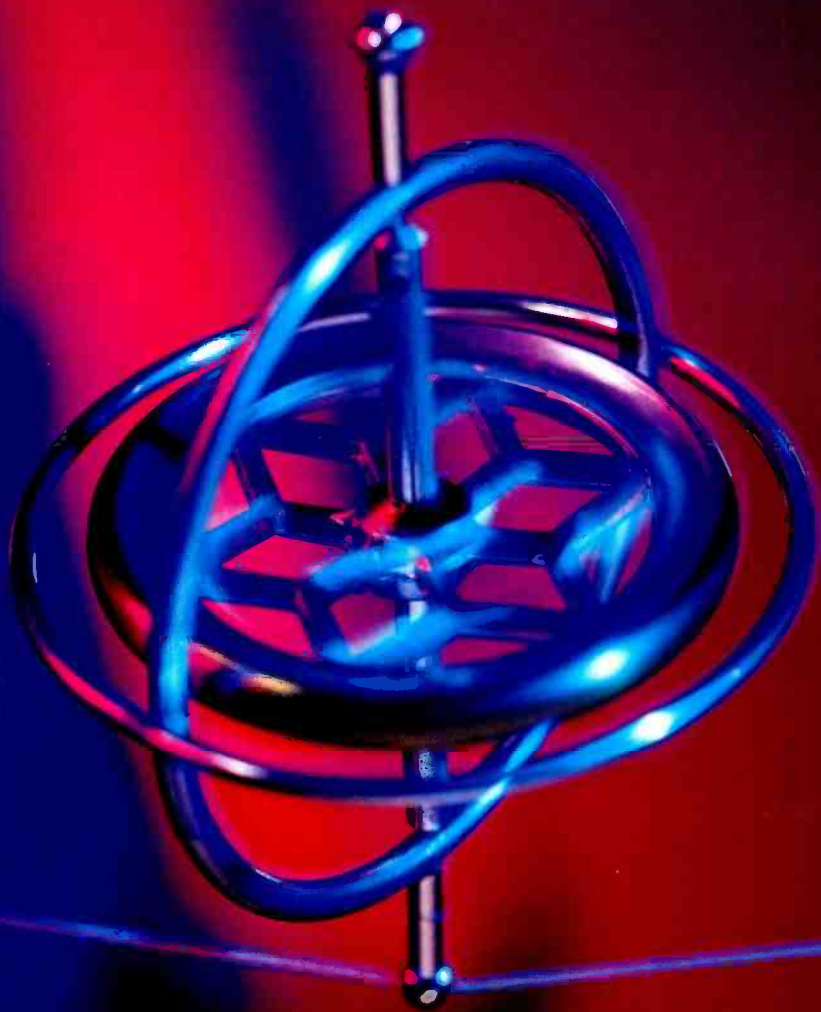
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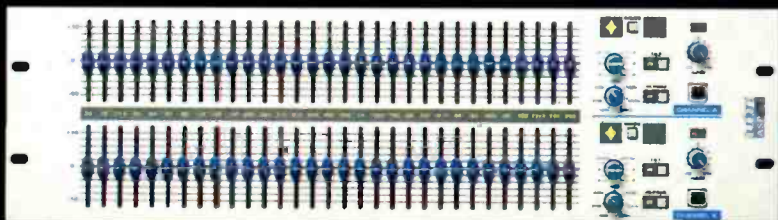
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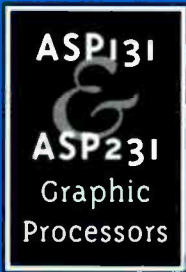


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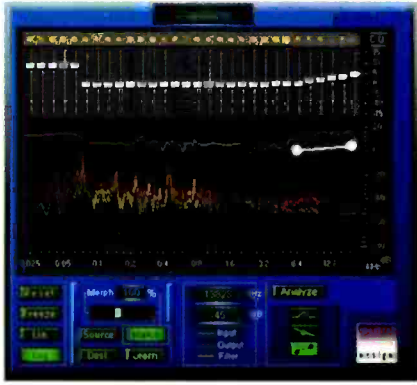
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< analogue tape hard, including a tape speed switch and scoring over the hardware box in having a great big pair of yellow vu meters to show what's happening.

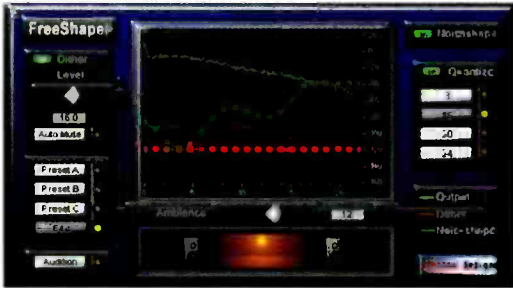
There are more straight tools, some of which appear elsewhere as a display element of an associated process. Thus the spectrogram display is available on its own, as is the fast real-time phase scope, switchable to show a polar display, that helps with the setting up of the Azimuth correction. A new addition is MatrixScope, a surround display that analyses a two-channel encoded surround mix and shows where the decoded outputs will appear on a normal speaker layout. It can highlight potential phase problems in colour and can show the effects of Pro Logic dominance steering.

Of particular interest to mastering engineers will be FreeShaper, a tool for designing your own dithering and noise shaping. Besides three preset algorithms offering a choice of useful noise shapes, full editing of the shaped noise is provided using ten frequency points to create the desired curve. There is even a control for distributing the noise across the stereo stage in varying amounts (showing two loudspeakers moving apart in a backlit room), allowing full customisation of the noise shaper's behaviour to suit the material.

This is an extraordinarily compre-

hensive palette of processors. There are no real weaknesses; with the possible exception of the DeNoiser, which is trying to perform a notoriously difficult task, everything delivers substantially more than could be expected. There are a surprising number of genuinely novel features here, in a package that is truly self-contained in that it can produce a finished master within the system, fully PQ'd on either CD-R or Exabyte.

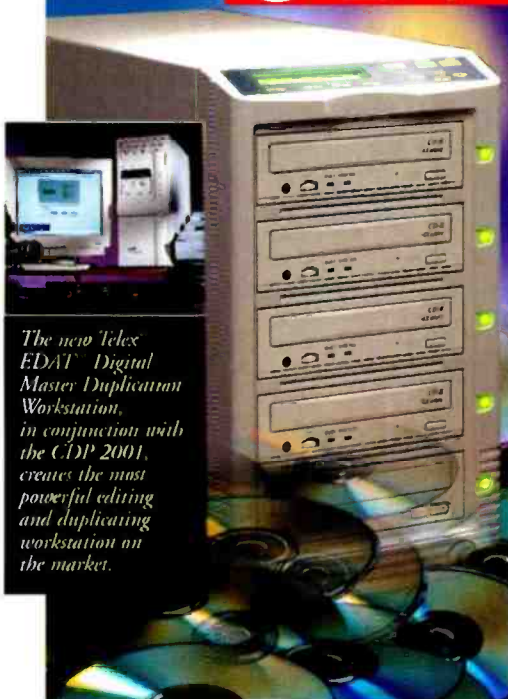
There is an extension to the system called Quadriga that offers a bold solution to the problem of archiving old analogue material to digital storage. The full-blown system will control a suitable Studer transport for automated import of analogue tapes, and use AudioCube's analysis tools to identify possible problems such as clicks, azimuth errors and so on. The radical departure is that no attempt is made to correct the problems; the idea is to store the raw audio, along with the log of what the system has found, in a version of the broadcast .WAV format. The philosophy is that it may be pointless to devote time and expertise to the restoration of audio that may never be needed, as long as the facility exists to restore it in the future should the need arise, possibly using more powerful tools than currently exist. Meanwhile the archive takes up a fraction of the floor space, is far less vulnerable to >



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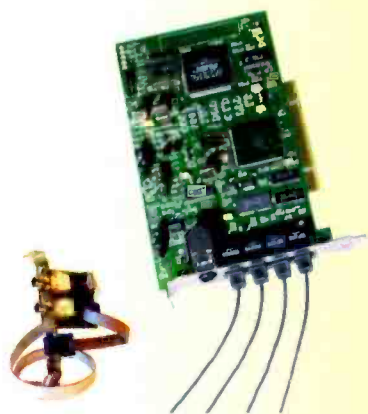
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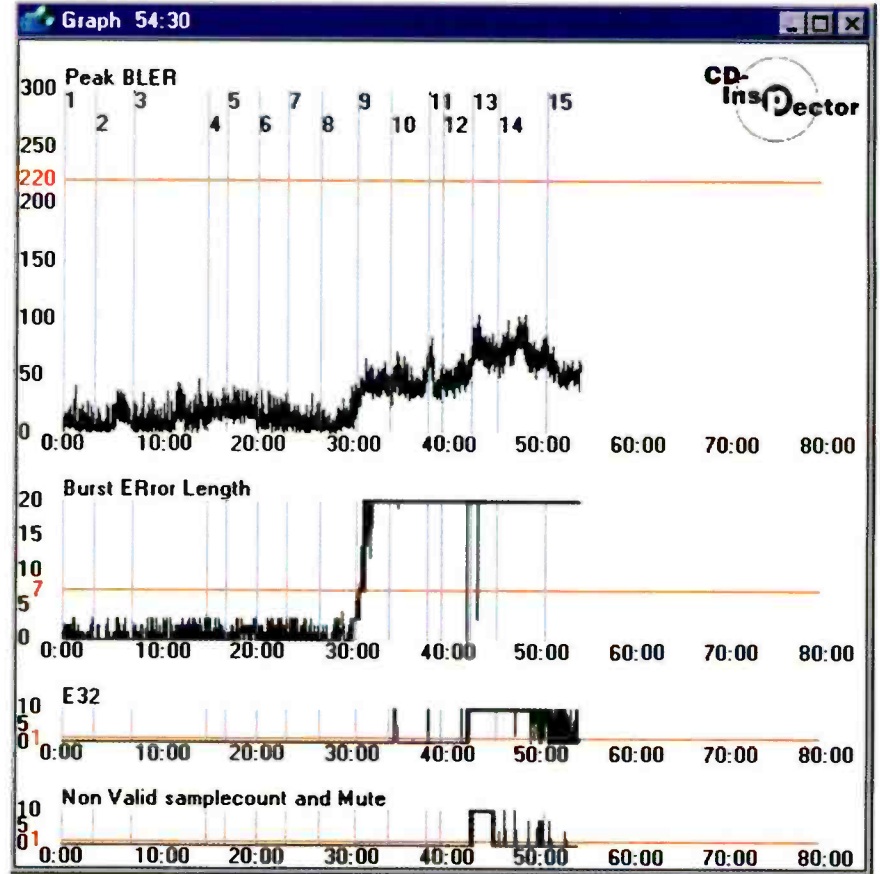


< aging, and can even be automatically transferred to new storage media should they become available.

Spectral's keenness on the integrity of audio material is also reflected in tools for verifying various media. Typical is CD-Inspector: this uses a modified Sony CDP-D500 pro CD player hooked up to the AudioCube computer to play a finished CD and check it for all the various types of error. These are then shown in graphic form against time, along with red lines showing the maximum allowable values within the Red Book standard. Not only does this allow duff CDs to be chucked out before they can do any damage, but it allows a very impressive printout of a good CD's integrity to be slipped into the case where the booklet goes to show the duplicators that the source is OK. Similar checkers are available for DAT, Exabyte, and even a real-time AES-EBU data stream.

The fact that a system of the sophistication and power of AudioCube and its associated tools can be in widespread use in certain territories and virtually unknown elsewhere is a strange reflection on the supposedly shrinking world, and of the concept of Europe

**Spectral Design,**  
Germany.  
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as an integrated entity in particular. Spectral Design deserves to be seen and heard in the UK, the US and indeed

everywhere else, as its combination of versatility, quality and innovation may well be unique. ■

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# Soundtracs DS3

Soundtracs will show its third digital postproduction desk at NAB in Las Vegas. **Zenon Schoepe** reports on its substance and highlights enhancements to the flagship DPCII's software

**N**AB WILL SEE the first showing of a working prototype of a new digital desk from Soundtracs called the DS3. In a move that could be considered as a natural one for the company that has managed to reinvent itself as a purveyor of digital consoles to the postproduction community, the new board will be aimed directly at medium-sized rooms that appreciate the concepts of the company's flagship DPCII from which it is closely derived.

Prices will start at around £40,000 (UK) for 24 analogue and 24 AES-EBU I-Os, substantially more than the £25,000 (UK) that a comparably sized Virtua asks, but then it is substantially more desk. Price will max out in the £60,000 (UK) region and the DS3 will be doing the show rounds looking for finalising feedback *en route* to a

shipping date at the end of this year.

Economies have been made through the availability of only one fixed control surface size, but with scalable input options 48 to 96 inputs—it will handle one or two racks. The same formats are supported as the DPC in TDIF, AES-EBU, ADAT optical, MADI and 24-bit analogue. Savings have also been made in the processing which runs a less powerful engine with fewer SHARC chips.

The desk has 5.1 capability, but predictably not 7.1, a similar control surface in operational principle to the DPC, but one that has been stripped down slightly, most apparently by the use of only one row of faders rather than the DPC's upper and lower banks. Consequently it requires more scrolling of inputs across the surface. The touch-

screen, and assignable rotary, and switch control arrangement will be instantly recognisable to a DPC driver, but there are no electronic scribble strips. There are also fewer touch-screens compared to a DPC of similar width, but it sports the same monitor control switching, same transport and locate system, similar talkback system and studio system, input routing is the same with the qualification of fewer sources, output routing is the same, but with fewer buses (32 rather than 40), but still with the freedom to allocate these to auxes, groups or stems.

Channel processing remains the same as the DPC at 4-band parametric EQ, two filters, compressor, and gate with side-channel linking. Perhaps the best way to look at the DS3 is to regard it as not far off from the functionality of

## DPCII v1.0

**S**UBSTANTIAL ENHANCEMENTS to the DPCII have arrived with the release of v1.0 software. The last report on the console covered v0.64 and this revision, for the most part, adds tweaks and extra twists to an already powerful platform and should make a surprising difference to those who are already running the desk. However, the implementation of a monitoring matrix should be seen as the most significant improvement.

Going back to ground zero on the DPCII is beyond the scope of this short piece and readers should refer to the last article (*Studio Sound*, January 1998) for more detailed explanation as I will attempt to concentrate here only on some of what is new with v1.0.

Soloing of the side chain on the dynamics to hear what is happening to the filter is now possible, along with stereo linking of compressors across adjoining odd-even channels. Gate keying sources can be selected by name and destination across the desk.

The 5.1 panner has been improved with use of buttons to switch only to sub, 5.1 and the 5 in Isolation. Additionally short-cuts are available on a button push to allocate to the discrete channels with a dedicated rotary sub trim pot.

Changes to the output routing section have enabled direct output through the digital patchbay to any destination as pre or post fader. The insert point, previously available only on the analogue card, now permits analogue insertion on digital signals by a process of assigning send and returns and has an insert send trim.

The talkback mixer has two strips accessible through dedicated pages for local and remote communication and these can be arranged as presets with the screens hidden but destination switches remaining active.

Studio mixers allow fast assembly of submixes with 15 inputs running onto a stereo bus, and the inputs can be sourced from the 5.1 buses for a quick way of performing a fold

down of 5.1 into stereo for a headphones feed. Output routing for this also takes in cueing systems, but can also be used purely for recording to stereo for reference purposes.

Assignment options have been increased and while you can still perform the assignment of input channel from the touch-screen you can now also form the assignment via fader touch. Additionally pressing a SOLO now also assigns control and you can run a combination of these modes simultaneously. There is a lot of scope here for personal setups, but running all three modes together would probably get a bit confusing.

With two operators on the desk, a LOCK button can split the control of the desk into defined areas and numbers of inputs. In line with 2-man operation, the split automation controls are now active and splitting extends to inputs, control groups and even deciding who is to be in charge of the master fader. Part of this package is the ability to allocate a small number of faders, but a large number of inputs to an operator which he can then scroll through. Still on the split aspect, automation can also be addressed separately and independently either side of the split and the full-blown version 1.0 will be able to discard a split's last mix pass leaving the other side's automation intact.

The busing system now has an active BUS CONTROL button that serves as a fast means of bus configuration while reverse interrogation helps to confirm that there is no accidental sharing of buses in 2-man split operation.

A similar principle is used for aux buses which include global pre-post switching, set all to off and 0dB, and the ability to copy levels from faders to the auxes.

The Bus Setup page, there are 40 buses that can be auxes, groups or stems, has been placed further up the system and whereas before changes to it caused the console to dump the automation and think that it might be starting a new session and either flatten or keep parameters, it now allows selective readjustment of parameters across the

desk and to keep the automation data. This means that should you need to add buses well into a session then you can without having to restart further back than where you left off. Minor and significant I would say.

System diagnostics has been enhanced to show firm and software in each of the system components, dates and connection types between the relevant sections. Remote diagnostics allow remote investigation and testing of the system via 56k modem link and the calling up of utilities which are already on the hard disk to reprogram the surfaces as it is all Flash-programmable.

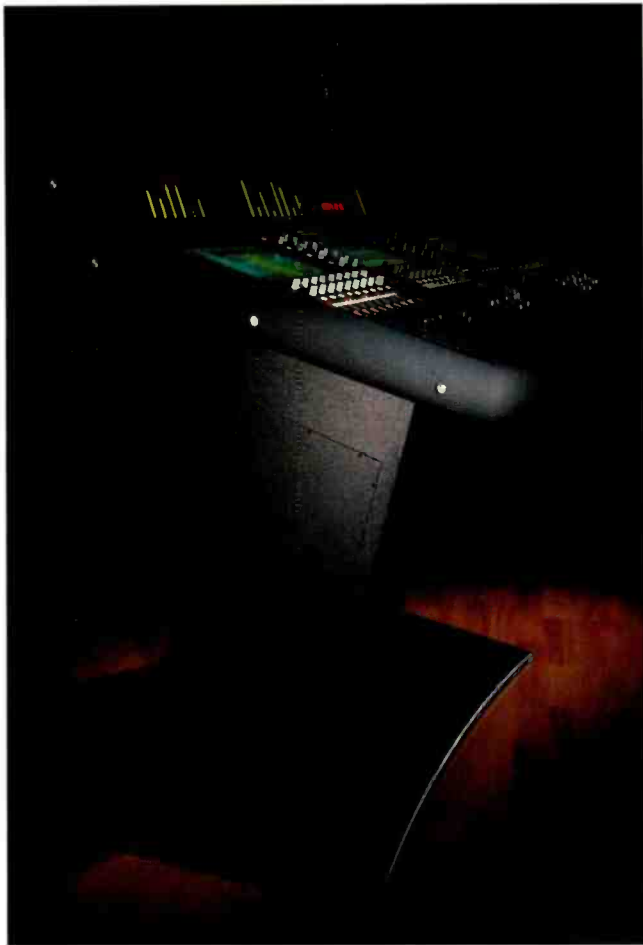
The Monitor Matrix is an important development for the DPC because if your desk is digital and has pretensions to film mixing then it is fairly pointless to need to go outside the desk for analogue switching purposes. The matrix is a 40:8 mixer that can take as its inputs anything that comes in to the console and pick up the buses for PEC-Direct switching. Stems of any width can be attached to paired control-room source buttons and these can be programmed to switch automatically. You can also switch speaker sets with this arrangement and processor insertion. Monitoring levels can be calibrated similarly and speakers can be soloed.

There is enough scope here to get as fancy as you want or as plain and simple.

Automation improvements have been inherited from changes made to Virtua such as the ability to offset whole mixes with exclusions and the ability to perform block edits to match late in the day scene cuts. You also get a dedicated short cut save mix pass button which avoids dialogue boxes.

These are merely v1.0 highlights from what amounts to a powerful upgrade. Those who have not sat down with a DPC before ought to do so soon. Those that have, it is time for a revisit. ■





a DPC, but with a smaller control surface and more restricted I-O.

And because it is based on the DPC then it has proven technology, so we are not talking about a green-field start. It can be argued that Soundtracs has completed its baptism of fire and the hard stuff with the introduction of its first digital product as a relatively affordable offering and the altogether larger scale, higher-end DPC. Bridging the gap twixt the two, by comparison, should be relatively straightforward.

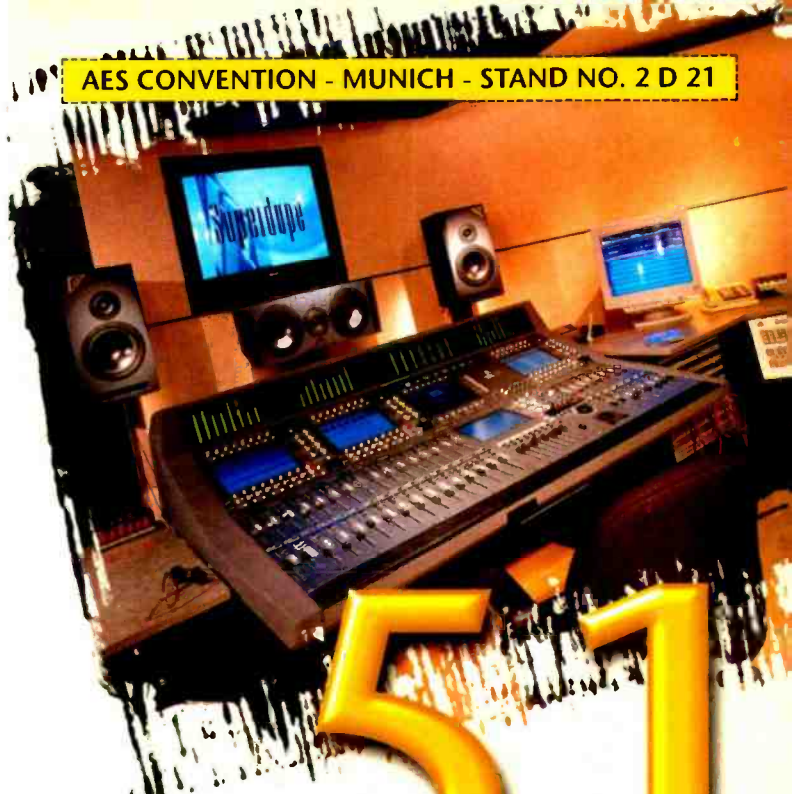
Significantly, there is automation data compatibility between the DS3 and the DPC, so what Soundtracs is doing with the unveiling of this product is creating a digital desk dynasty that aims to encourage post facilities to tie in to its technology. Lest we forget, Soundtracs recently announced an agreement with SADiE manufacturer Studio Audio & Video to jointly develop a combined digital mixer with large-scale hard-disk recorder and the DS3 would seem to fit the bill as the likeliest desk companion. The alliance is

projected to produce a 96kHz, 24-bit system with 24 or 32 tracks. It is also intended to include the kind of dynamic editing capabilities required to attract the postproduction sector. You may see where this is all pointing; although it has to be stated that this is still some time in the future, but Soundtracs is getting into systems and lining itself up to supplying multiple desks to a facility in a similar manner to other manufacturers.

The DS3 is extremely promising. It looks good, has the right depth of feature list, and it has got the pedigree, but most importantly it hits a price point that is currently poorly served and straddles the chasm between the truly affordable and the substantially more expensive. One to observe with interest. ■

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Superdupe dubbing suite,  
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 Design by Walters - Storyk  
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# 5.1

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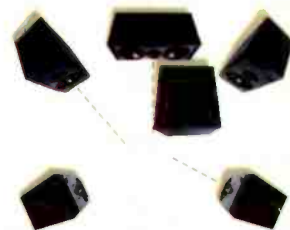
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# Spirit Digital 328

The newest comer to the digital 8-bus console party is Spirit, with its digital 328, that brings some surprising innovations in the face of stiff competition. **Rob James** puts it to the test

**A**S I SEE IT, progress in mass-market 8-bus console design often appears to proceed on the basis of 'two steps forward, one step back'. In the rash of affordable digital consoles that have appeared in the wake of Yamaha's ground breaking DMR, DMC and 0-series, there have been too many 'me too' designs. At first sight the Spirit 328 appears to offer less in the way of features than many contemporaries but in fact it offers a genuine alternative to the semi-screen driven, highly assignable paradigm. One advantage claimed by its British manufacturer is removal of the obligation to learn to navigate the often tortuous geography of nested menus. If Spirit has succeeded, this should make the 328 almost instantly accessible to anyone who has experience with an analogue 8-bus recording console and a nodding acquaintance with assignability.

The 328 follows the in-line model but, since there are full facilities in both paths, there is no need for a conventional 'flip' key. There are 32 3-band EQs, two multi-effects processors running Lexicon algorithms and two control channels of dynamics. Two desks may be cascaded together in a similar fashion to others to give a maximum of 64 mono inputs.

The control surface presents 16 deceptively similar but not identical channel strips. The rest is occupied by a master output fader, stereo inputs, monitoring inputs, control, assign and interrogation keys, machine control and a small 2-line LCD with cursor keys parameter knob, ENTER and EXIT, UNDO and REDO keys.

A channel strip starts at the top with the analogue input stage, very similar to other Spirit designs. The XLR low-impedance MIC input accepts balanced or unbalanced signals up to +28dBu with a claimed 66dB of useable gain range. The high impedance line input is a 1/2-inch A-gauge TRS jack which accepts balanced or unbalanced sources. In Spirit's usual fashion, the insert jack is unbalanced, tip send, ring return and the insert is line level, just before the A-D converter. This jack can also be used as an unbalanced send if the tip and ring are shorted. The TRIM control ranges from +6dBu to -60dBu. A 100Hz low-pass filter at 18dB per octave, completes the non-automated analogue section.

All the A-D and D-A converters are 24-bit,

128x oversampling, sigma-delta types. The quoted maximum dynamic range of 112dB warns that the 24-bit theoretical range is not fully available in practice. Having said that, the Spirit has a subjectively good sound, more analogue and less clinical in feel than many of the others in this class.

Moving down the strip, the 10-segment LED bar-graph meter marks the point at which the 328 radically departs from more conventional layouts, digital or analogue. Running horizontally across the 16 strips is the much vaunted E-strip. Finally, above the 100mm motorised faders are MIC-LINE, TAPE SELECT, SOLO and MUTE keys.

The lower 'row' of the E-strip contains rotary encoders. One per channel strip, each with a concentric arc of LEDs. The upper row begins with three keys to bank select the surface faders, mutes and solos between Inputs 1-16, Inputs 17-32 and Masters. Pressing an illuminated key gives a fourth option of direct fader control of MIDI controller parameters. The next three keys globally switch the chan-



nel bar graphs between Inputs 1-16, Inputs 17-32 and MASTER which shows Group, Aux and Effects master levels. The remainder of the horizontal strip has two LEDs and eight keys that give immediate access to one parameter on each vertical strip when no individual channels are selected to the E-strip. The indicator LEDs show which of the input banks the encoders will affect. The keys switch between Level, Aux, FX, and Pan, the controls following the surface bank except when the encoders control the level of whichever input bank is not on the surface.

To allow control of a complete, expanded

channel strip the next two keys down the strip are Selects labelled MIC-LINE and TAPE. Flitting either of these keys changes the function of the rotary encoders into a single set of controls for that strip (or strips if adjacent odd-even pairs are linked for stereo). Encoders control the three EQ bands, each with cut-boost, frequency and shape (Q). Unlike many digital desks the frequency bands are not full range but are deliberately limited to a similar range to analogue EQs. LF covers 40Hz-800Hz, Mid, 200Hz-8kHz and HF 1kHz-20kHz. LF and HF bands can be peaking or shelving. The familiar 15dB of cut and boost are available and Q ranges 0.3-2.8, indicated by the width of the LED arc.

The rest of the encoders deal with Aux Sends 1-4, two FX sends and pan.

The routing and interrogation is managed from the Select panel in the Master section. Again, Spirit has departed from the rest of the pack and come up with a logical and intuitive method of routing, de-routing and checking what is routed.

This can be accomplished by pressing a SELECT key on a channel and the required assignment keys on the Select panel. To identify all the channels with a particular assignment the destination key is pressed and held, whereupon the Select keys on all routed channels light up. Alternatively, holding down a destination key and then pressing the Select key on the channel path or paths you wish to route. Channels may be routed to groups, and channels and groups to the main mix bus.

Phase reverse, EQ on-off (Solo safe), mute and direct out to tape together with record arming are assigned and interrogated in similar fashion to the routing. If a channel is not assigned a direct out, the tape send takes a group output on the basis of Sends 17-24 and 25-32 both send Groups 1-8 respectively.

Apart from the fader-controlled channel inputs, there are two independent stereo inputs. The first of these, STE-1 has four pairs of analogue TRS jack inputs that are submixed via four analogue gain pots before the converters. STE-2 has a single pair routed via a gain pot. The digital stereo inputs may also be routed here. Rotary encoders after the converters allow the level of both stereo inputs to be automated. One obvious use for these is external effect returns. The internal effects





returns also have rotary encoders. Each of the aux and effects sends is globally selectable, pre or post fader.

The desk surface also carries analogue outputs of Mix at -10dBu on phonos and +4dBu on XLRs along with Aux outputs on TRS jacks.

Another area where the 328 differs is in I-O options. There are no slots for optional interface cards. The standard complement renders this unnecessary as it is fitted with two 8-track digital tape sends and returns in both Tascam TDIF and ADAT Lightpipe optical format with an additional ADAT optical output assignable to Aux-FX-Mix or Group buses. All these are located on the relatively sparse rear panel. Other interfaces to be found here include the single assignable SPDIF and AES-EBU I-Os, wordclock I-O, LTC on a TRS jack, a 9-pin D-sub for Sony P-2 protocol machine control, MIDI In Out and Thru and a 26-way D-sub for cascade connection of a second 328. There are no inserts on any of the digital inputs.

The monitoring is clear and mostly self explanatory. Two 2-track returns are provided with analogue inputs on TRS jacks each has an analogue gain control that will accommodate levels from 100mV domestic, to +4dBu pro. The two 16-segment meters display C/RM (control room) output level. In addition there is an adjacent key which switches the meters to read the dynamics gain reduction. Solos can function as AFL, PFL, Solo and SIP (Solo In Place). Dim is a fixed 20dB. Level controls are provided for the C/RM and Phones outputs. Other controls and indicators in this area are MIX and TRK which select which signal is fed to the monitor chain, C/RM (L, MONO), and 18V which switches phantom powering on the 16 mic channels. Three LEDs indicate the power rails are healthy.

External machine control is unusually good. A set of decent sized internally illuminated transport control keys are accompanied by STO1 and STO2 keys which are used to grab locator times on the fly for later recall via the LOC1 and LOC2 keys. The time-code display is an 8-character red LED device. Both MMC, time code master and slave and Sony 9-pin (P-2 protocol) machines may be controlled with specific setups for various Alesis, E-mu, Fostex and Tascam machines.

Up to this point the 328 is similar to an analogue 8-bus. The LCD and associated keys deal with the parameters which do not easily fit into the analogue model. Menu navigation is reasonably intuitive if you have previous experience of menu-driven systems. If not, the manuals are helpful. It is here that decisions are made such as exactly which parameters are linked in stereo pairs, what the sync source is and so on. This is also where the onboard effects are selected and parameters modified.

The 328 stores up to 26 user setups plus factory default that include the configuration and setup parameters. Up to 100 snapshots can be stored and recalled, either by using the STORE, NEXT and RECALL keys, via the menu system or against time code. There is no means of crossfading between snapshots. The dynamic automation is less impressive. An external MIDI sequencer is required and I have always found this a rather cumbersome



way of working.

The effects are pure Lexicon with all that that implies, and are under automation control. 112 presets are augmented by 128 user memories. Editing is comprehensive and reasonably straightforward via the LCD and cursor keys.

Dynamics are another area where Spirit has gone its own way. Two dynamics units may seem somewhat limited (sorry) by digital console standards. However, this is somewhat deceptive since these are not conventional signal in, signal out devices. In effect, on offer here are two sets of dynamics parameters which can be applied to multiple channels in the console. This means it is slightly less of a problem that the groups cannot have dynamics applied since it is possible to select multiple channels to be controlled by a 'unit'—the catch is the side chain. At present the control signal can only be derived from a single mono or stereo channel, effects return or the main mix.

The Spirit 328 is an interesting departure from the conventions set by Yamaha. I think it is largely successful in what it sets out to do. It is immediately more familiar to users of analogue consoles. Menu delving is kept to a minimum and the routing is very clever.

There are a few complaints. Switching the console on or off produces a thump on the C/R output even when this is cut. It also takes a subjective dogs age to boot. The time is actually around a minute but the Pac-man chewing its way across the LCD would fail to distract the audience at a live event.

Many of the keys are tiny little oval, internally illuminated items that require a determined prod to operate. I found my delicate

digits became rather sore after intensive use.

Changes to stereo channel linking do not take effect until the pair of channels is ungrouped and re-grouped.

In many of the applications of this desk, onboard dynamic automation would be an irrelevance. However, I feel Spirit has missed a golden opportunity by omitting true onboard dynamic automation. This is a relatively weak area in all the existing consoles in this class and since parent company Soundcraft has considerable experience in this area, I had expected more than just sequencer dynamic automation.

The EQ and dynamics have a definite 'analogue' feel to them. This may be viewed as an advantage by some and a disadvantage by others and personally I find the surgical nature of some other digital EQs and dynamics more useful for what I do. But I liked the musical character of the 328. Much the same applies to the effects - different manufacturers algorithms do sound well, different, thank goodness.

My real reservation is that the 328 is ultimately somewhat limited. There are no surround facilities whatsoever, panning, routing or monitoring and the dynamics and dynamic automation are compromises. However, what it does, it does well. As a stereo recording console with one, two or even three digital 8-track machines pretty much everything you need is included. To use it with an analogue multitrack or more than 16 microphones would require external converters and Spirit supplies suitable boxes as optional extras.

This console is accessible, sounds good and has a wide range of applications. If the feature set fits a given application I would recommend it warmly. ■

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# Soundscape Mixtreme

Branching out from full-blown DAWs, Soundscape has introduced a flexible and powerful PCI card. **Rob James** finds it a worthy addition to the line and to your options

**S**OUNDSCAPE HAS CARVED itself a decent enough niche in the DAW market with the SSHDR-1 and SSHDR-2 workstations. From promising beginnings, these have evolved into reliable workhorses and enjoy use in a variety of fields. Both systems use the PC simply as a host, with processing, I-O and management of storage used for audio done by Soundscape hardware. Mixtreme is a departure from this methodology with a rather different aim in mind. And it comes at such reasonable cost (especially without the optional SPDIF board) that it's worth considering simply as 16 channels of PC audio I-O. That it comes from a company with a good track record and offers a lot more than I-O makes it a highly interesting proposition.

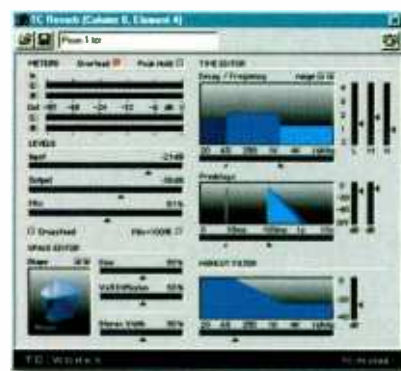
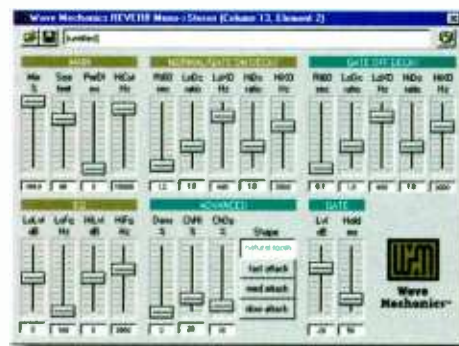
Mixtreme is a PC card with an onboard Motorola 56301 series DSP engine, 16 channels of TDIF I-O and, optionally, stereo SPDIF I-O. Recording performance is largely dependent on the capabilities of the PC and the recording application software. The backplane of this half-length PCI slot device carries a single 25-way D-connector for the first eight channels of TDIF I-O and two phono (cinch) sockets for wordclock or Superclock I-O. These do double duty as SPDIF I-O when the little optional daughter board is fitted. A further two connectors are used to break out the second eight channels of TDIF I-O and MIDI. The card is supplied with a breakout cable for these which terminates in a second 25-pin and a 9-pin D-connector. These are mounted on a panel that fits in place of a PC card blanking plate if you have any slots free. If not, the connectors may be removed from the plate and mounted in suitable holes. These are to be found in most PC cases but will need the blanks knocking out. No MIDI driver is yet available, but like all Soundscape software updates so far, will be a free upgrade.

Installation of hardware and software is easy. The small size of the card means it will usually fit without fouling other components or cables. Software installation follows usual practice and, once complete adds Windows Multimedia drivers and ASIO drivers. I was running under Windows 95 but the drivers are Windows 98 capable and NT4 drivers are also supplied. Due to the various other cards fitted in my machine, Plug and Play decided to allocate the Mixtreme card IRQ 5. This would not normally pose a problem provided there are no conflicts, but in this case all I could get out of the card was clicks. Further inspection of the Mixer software revealed a PO, Processor Overrun message with nothing running. Changing to another, more normal, IRQ by removing an unused card provided the cure. In more conventionally loaded machines you would be unlikely to run into this but it is worth bearing in mind. If multiple cards are fitted, they share one IRQ.

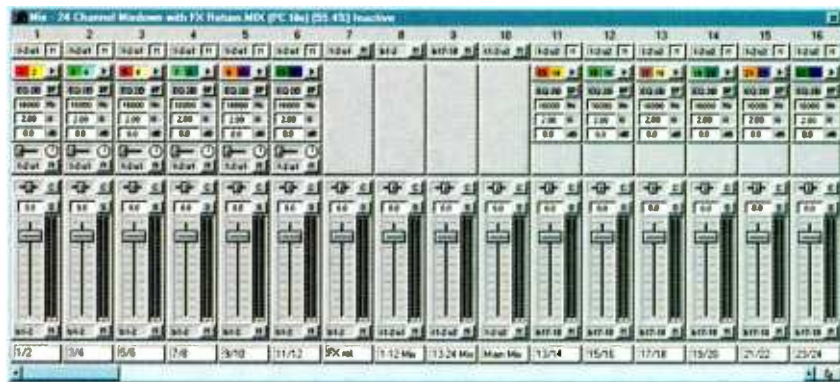
Soundscape offers three optional external I-O boxes for use with Mixtreme. The SS8IO-1 which first appeared with the SSHDR-2 is the up market item. A 2U-high rackmount houses eight channels of 20-bit A-D and D-A, balanced on XLRs and conversion to and from ADAT optical format plus eight LED bar graph meters. The new interfaces are the SS8IO-2 and SS8IO-3. These are both 1U-high, half-rack-width units. The SS8IO-2 provides conversion from TDIF to and from ADAT. I had the SS8IO-3 analogue to TDIF interface. This uses the same 20-bit converters as the SS8IO-1 but with unbalanced phono analogue connections. This provides a cost-effective solution for those who neither require balanced analogue or ADAT capabilities. Wordclock connections are also phono. An 8-way DIL switch sets wordclock parameters. Sync in and out are independently selectable between wordclock and superclock and the output phase relationship of the wordclock and Left-Right clock selected between 0, 90, 180 and 270 shifted—useful for some equipment which insists on a shift.

The supplied software is the Soundscape v2 mixer. This is functionally identical to the mixer software supplied with the full Soundscape workstations and provides a clue as to one application—to extend the capabilities of an existing system.

My first experiments involved using the card purely as a mixer with the I-O connected to my Yamaha 03D. This may seem an odd thing to do, but I wanted to try out the plugins and this was the quickest way of doing it. In this configuration, no audio goes through the PC's processor, hard disk or memory and performance is only really limited by the card itself. From this I moved on to using SAmplitude 24-96 as a recorder with Mixtreme providing I-O and mixing. Recording and playback (streaming) uses a percentage of the available Mixtreme DSP power. The actual amount is partly dependent on which video card is fitted and Soundscape reckon it varies between 12% and 35%. A list of recommended



video cards is supplied, together with a list of particularly problematic ones. In my case the figure was around 8% to 20% depending on exactly which elements were in use—when using mixer including the tc reverb any fig-







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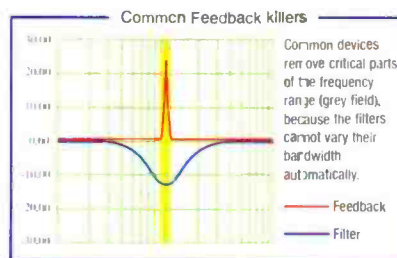
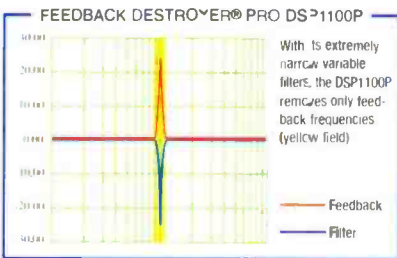
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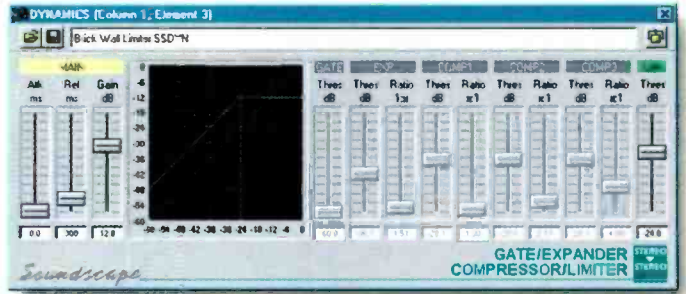
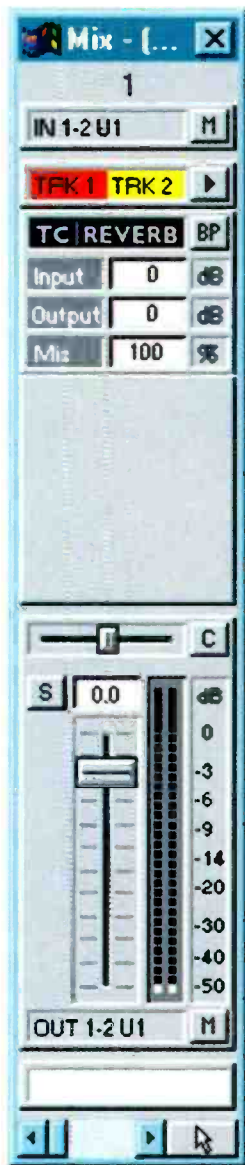
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< ure over 85% total processing in use began to produce errors. With the same mixer and the tc Dynamizer substituted for the reverb, I could get away with over 90%. Another display shows the percentage of Mixtreme memory in use. In practice, this can virtually be ignored since you will almost certainly run out of processing long before memory. To give an idea of the amount of processing used by individual elements, I found an empty stereo channel strip with I-O fader and meters uses 1.4% a 2-band mono EQ uses 2% and a stereo version 3.7% of the total. There are 16 mix buses per card.

The software is easy to use once you get used to the concepts. It is, essentially, a do-it-yourself mixer design kit using a palette of elements together with an onscreen display of the mixer and controls to operate it. A good range of templates is supplied, but half the fun of this way of working lies in designing your own. I have reservations over the current EQ design in terms of limited Q for dialogue clean-up purposes but for most applications it is more than adequate.

The plug-ins supplied for review are of high quality and, in the case of the tc electronic ones at least, the same sort of price you would pay for Pro Tools plug-ins. At first sight this seems disproportionate in comparison with the price of the card. However, you often get what you pay for and the both the Wave Mechanics and tc electronic reverbs are excellent. I have



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always favoured tc electronic's hardware reverbs over many others and this plug-in does not disappoint. The Wave Mechanics reverb is almost as impressive, but somewhat different in both approach and sound. On the dynamics front there are perfectly usable and DSP efficient dynamics elements along with a chorus-flanger and two

tap delay in Soundscape's own optional Audio Toolbox plug-in pack, but, for those wanting more, especially for mastering, the tc electronic Dynamizer provides it. If anything this seems somewhat cleaner than the hardware Finalizer. There is of course, a downside. The tc electronic plug-ins are processor hungry—the reverb uses around 30% and the Dynamizer 40%. Practically, a reasonably loaded mixer with 16 mono or 8 stereo channels is about the safe maximum. If the one of the tc electronic plug-ins is used this will drop significantly.

Comparison with the Yamaha DSP factory is unavoidable but I feel the two products are only superficially similar. Yamaha offers a lot of processing at an excellent price but the algorithms are pretty much fixed in hardware so it isn't likely to be much use for plug-ins. Also, Yamaha does not include any high-level application software, just drivers and diagnostics. As yet the third-party software offerings have not caught up with the hardware. Soundscape offers a means of removing some of the processing overhead from the PC and a way into high-quality third-party plug-ins at an affordable price point, together with comprehensive mixing and I-O. The initial feature count may be lower but the potential may be greater.

I have evaluated a fair selection of PC audio add-ons over recent years. With most of them the cycle runs like this: initial excitement over ease of installation, power and new features is slowly replaced with a nagging sense of dissatisfaction. Somehow, very few PC-based products manage to live up to early expectations. Certain limitations become apparent over time which are less than obvious on first acquaintance. Sometimes the problem is intrinsic to the hardware, sometimes it is in the software, being either buggy or not available. Soundscape's Mixtreme manages to reverse this process (and this is also true of the company's full-blown workstation systems that become more impressive in serious use, not less). Once a suitable setup for a task has been established operation becomes easy and reliable. The plug-in potential is good and the possible upgrade path is long and well trodden.

In short, although perhaps less impressive than some others at first sight, Mixtreme should leave you feeling good, long after the initial purchase. ■





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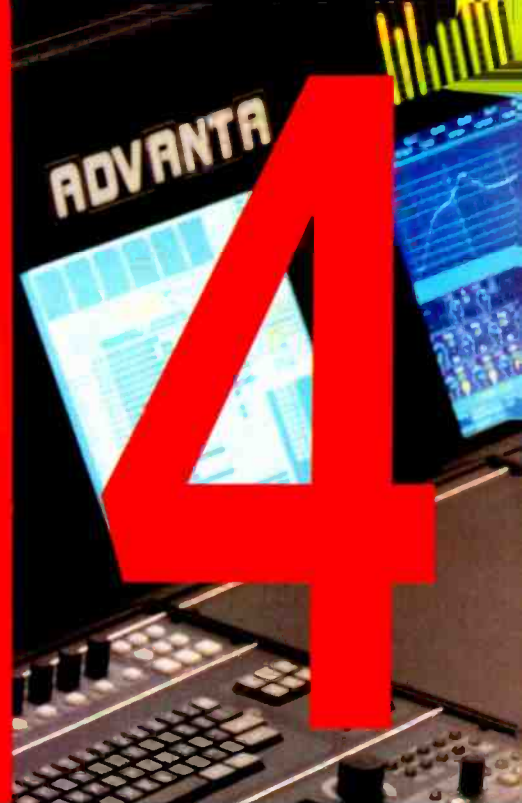
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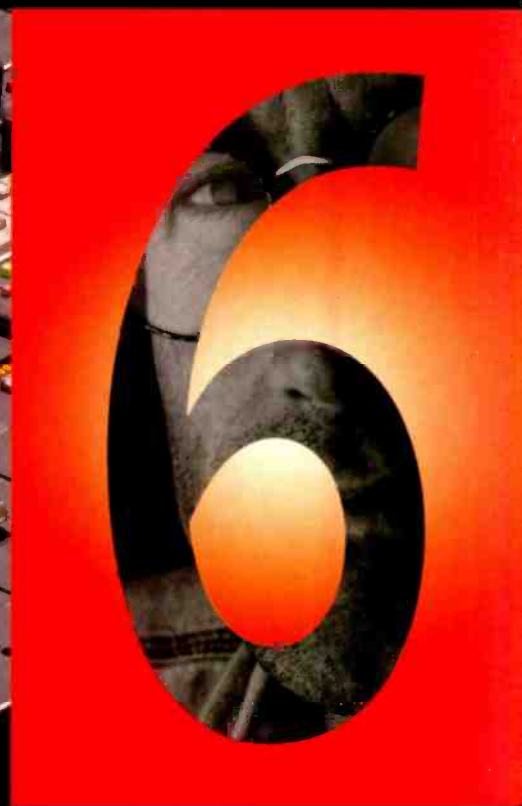
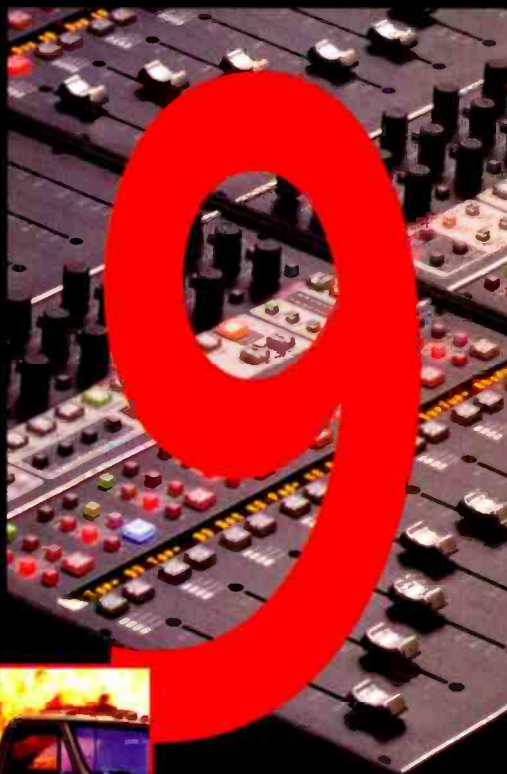
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## SQN 4-S Series-IV

When field testing can involve dragging equipment around in a field, strength and reliability are key design issues. **Neil Hillman** takes on the stalwart of location stereo mixers

**B**ENT DOUBLE like old beggars under sacks, knock-kneed, coughing like hags, we cursed through sludge, ill on the haunting flares we turned our backs. And towards our distant rest began to trudge.

Some 80 or more years after Wilfred Owen wrote from the running-red killing fields and choking gas of northern France, at a brown-field site north of Sutton Coldfield, an area that was once home to a sulphur-breathing power station, was yielding to the onslaught of earth-moving equipment. We lifted leaden boots through the glutinous soil and spoil that was groaning in submission to the relentless progression of a new BMW engine plant and headed to the shelter and relative peace of the site canteen. Within months this development will be producing automobile engines at a rate greater than one per minute around the clock: 'Vorsprung durch Technik' as the others say. It was a cold, wet Birmingham February and dirty, hostile conditions in which to conduct location interviews,

presenter pieces to camera, and also assess the newest version of the stereo mixer from SQN, the 4-S series-IV.

It is entirely possible that you have never heard of the reclusive SQN company. It seems never to advertise, rarely attends trade shows, and yet its mixers are considered by many to be the broadcast-industry standard. Produced on the Isle of Man, SQN was among the first manufacturers of broadcast-quality 'over-the-shoulder' mixers. Designed and produced by engineers who had themselves been location film record-

ists, much of the philosophy that determined the design and appearance of the original mono-mixer has since been incorporated into other manufacturers' equipment. While imitation might be the sincerest form of flattery—the mono 3-series was an undoubted success and still remains popular and in production today—the advent of a wider demand for location stereo recordings required that a new model should be on offer.

The SQN 4-S was introduced in 1984, enjoying several release revisions including M+S additions on the Series-III.

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This Series-IV was created to comply with the new EMC Directive, which the Series-III was unable to meet with regard to the pick-up of RF interference, and along the way it underwent something of a face-lift.

The Series-IV mixer has four transformerless balanced inputs using female XLR connectors mounted on the left-hand side, in-line, with Input 4 nearest to the top. Channels 1 & 2 also share a 5-pin XLR input for a stereo microphone, with a standard pin-configuration of Pin 1 for ground, Pin 2 and Pin 3 for left (or M) live and return respectively, similarly Pin 4 and Pin 5 are for right (or S) hot and cold in turn. This left-hand end panel is also home to a small female 4-pin Hirose 'power-through' connector for powering

devices off the same power source and on-off switch as the mixer. A 1/4-inch headphone socket with adjacent knurled volume knob is also here, with an optimum headphone impedance in the range of 200Ω-600Ω. The outputs of the mixer are also sited on the left-hand panel and are available on two 3-pin male XLR connectors, a female 12-pin Tajami push-on connector that carries the main outputs in an umbilical feed to and from a video camera, and a smaller female 12-pin Hirose connector, which provides an unbalanced feed of Left and Right outputs 10dB down on line-level, to feed equipment such as a Pro-Walkman for transcription cassettes or a DAT or MiniDisc for quick wild-track gathering. This subsidiary Hirose connector also makes available

Channels 3 & 4 post-fade as unbalanced signals out; these channels may if required be switched out of the mixing buses and be recorded separately or used as clean-feeds. Access to the inputs of the Left and Right mixing buses are available here, too, to enable the cascading of mixers.

The right-hand end panel carries the spring-loaded battery compartment cover that holds 8 AA 1.5V cells along the bottom of the mixer, with the external 4-pole Hirose DC-in connector and the 3-position (External-Off-Battery) power switch mounted one above the other, next to the battery cover release catch. A slating mic processed with 2:1 compression is activated by a red push-to-talk button at the top end of the panel while four pan pots run in-line from >

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< top to bottom across this panel, this time the Channel 1 control is nearest the recordist compared to the reverse layout for the microphone inputs, and these may be configured in different ways depending on settings made via the front control panel—more of which later. The pots may be overridden by a toggle switch below each pan pot that sets the signal either hard left or hard right. A small omission from the labelling on this panel, but perhaps in the heat of battle important, is an indication of which direction the pan pots or the toggle switch should be turned for Left or Right routing; the legend is in fact set on the base-plate of the mixer. Which with gloved hands, wet weather or a mixer carry-bag full with radio-mic receivers, NP-1 type external battery power, and possibly a small slave-recorder highlights my biggest grumble with the mixer layout. SQN has made the base-plate in effect a control surface that is just plain inconvenient to access during any form of field operation using such a setup as this.

The mixer base-plate is engraved with enough information to satisfy the most ardent of 'smallest-room' readers, including a frequency plot of the 2-stage bass-cut filters. There are also toggle-switches for Line or Mic level output for the main outputs, Normal or High impedance toggle-switch for the XLR-routed outputs and a recessed adjustable pot to set the return level from, usually, a Betacam camera; this return signal is heard in the headphones, but strangely not fed to the meters. The level is set therefore by simply A-Bing send and receive until the relative loudness is equal. This adjustment allows for signals of between -18dBu and +22dBu. The other major controls tucked safely away from easy reach are the four microphone power selectors, each channel being switchable in five ways for either 12V 'T' power, +8V phantom power, 12V phantom power, 20Ω dynamic or by means of a fixed 50dB attenuator switched before the microphone amplifiers, line-level.

The top face of the mixer is cluttered, no doubt about it. If nothing else, the roll-off filters could easily be placed on the right-hand panel giving the eye an easier scan across the top; once set they are infrequently adjusted by most recordists anyway. Designed with M+S working very much in mind, the four inputs are designated as two pairs that gang together. Each channel pair has associated with it a GANG (stereo ganging) 3-position toggle-switch, a MAT (M+S matrix) toggle-switch and a PHASE toggle-switch each mounted above the beautifully crafted and unique SQN fader knobs. GANG allows for either individual operation of the two faders in the '0' position, stereo in the 'S' position or M+S

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While the mixer is very idiosyncratic and certainly not intuitive in its configuration, the integrity overall of the product is excellent. It is light, the limiters are silent, its power consumption is meagre and the audio quality is superb.

operation of the pair when in the 'MS' position. With GANG at 'S' the gains of both channels are controlled by the first fader of the pair and the first channel pan pot acts as a balance control. The second fader and its pan pot and pan switch are inoperative, as is the M+S matrix.

With GANG at 'MS' and MAT to the left, the input and output signals are treated as an M+S stereo signal. The gains of both channels are controlled by the first fader and the second fader acts as a width control. The pan pots and pan switches are inoperative. With the GANG switch at 'MS' but this time the MAT switch to the right (shown as an arrow on the panel), the input from the pair is treated as an M+S signal which is then matrixed into an AB stereo signal for output. Gain control is as before.

I generally set my M+S image by monitoring the sum signal and introducing the 'S' microphone until it just starts to colour the 'M', at which point switching to the properly decoded signal brings the image to life, so the layout of the monitor selector-switch is fine, also allowing for PFL of the inputs.

Other irritations are that the meters are on the left-hand side of the top face which means right-handed operation has a tendency to mask them, the return signal is unmetred, and the line-up tone is after the Master Gain pot preventing the easy movement of line-up level for identification purposes. But these are minor quibbles. While the mixer is very idiosyncratic and certainly not intuitive in its configuration, the integrity overall of the product is excellent. It is light, the limiters are silent, its power consumption is meagre and the audio quality is superb. The mechanical construction is clearly based on the Anderson bomb-shelter principle as it survived one of the filthiest, wettest assignments I can remember, unperturbed.

*Sine Qua Non? Dulce et decorum est.* Maybe, with more time together, just maybe. ■



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# Joemeek SC4 DAD and C2

Adding a few unexpected facilities to an established favourite and offering it at two distinct price points has given Joemeek a new lead. **George Shilling** comes up to speed on a couple of new compressors



TO THE CASUAL READER, it must seem as if a new Joemeek unit appears every month. And perhaps that's not far off the mark because far from resting on any laurels, Ted Fletcher, the man behind Joemeek, has consistently sought to upgrade and improve existing models, as well as to introduce new designs. Keen Joemeek-spotters will have noticed subtle improvements to existing designs, with version numbers appearing on the back panels (such as V2.03), as if they were software releases. Although the designs benefit from years of audio history and experience, Fletcher obviously sees his designs as a modern technological progression.

Now I'll come clean: the SC4 and C2 are both green Joemeek compressors. But hey, why change a winning format? The brand has an endorsement list which reads like a Who's Who of music and pro-audio. And as well as three floors and 14 employees working at Joemeek headquarters in Newton Abbot, Joemeek now has a factory in Scotland churning out units by the truck-load.

Oddly enough, the manual states that the SC4 is an SC2 (the first Joemeek photo-optical Compressor), albeit one with numerous enhancements. The SC4 retains a similar sized 2U-high case, with useful front panel handles. On the back of the black case there are XLR analogue connectors in pairs of inputs and outputs. There is also a pair of TRS jack sockets providing insert send and return—not for left and right as might normally be expected, but mid and side

which reveals a major new design feature for a Joemeek. Although sum & difference techniques are commonly used in broadcast, and were once popular with disc-cutting engineers, the circuitry to do this is rarely, if ever, built into studio outboard compressors. When working with stereo material, the SC4 decodes the left and right inputs into sum and difference signals, not entirely dissimilar from those you might derive from a M+S mic technique. These are then compressed separately, before being encoded back into normal stereo before the output. This system results in an unbeatably solid and stable stereo image, even with moving sounds and heavy compression. Apart from this major benefit, there are a couple of other bonuses. The aforementioned insert points can enable separate external processing of mid and side components, so why not auto-flange the side channel and filter the stuff in the middle, for example? The possibilities are endless, and can give you some unusual fun and inspiration. Another related feature is a continuously variable Width control on the front panel. This has a centre-detent for normal stereo, but can be rotated left into mono, or right to an enhanced-width stereo output, resulting in an apparently wider-than-your-speakers stereo image. On an entire mix this can be a little disconcerting, but used sparingly it can be very effective.

Unlike other outboard manufacturers, Joemeek has not released any Pro Tools plug-in versions of its units. Ted Fletcher

asserts that the exact characteristics of Joemeek analogue electronics cannot be accurately reproduced by DSP technology. Fletcher quotes frequency response up to 30kHz using the analogue connections, which is obviously unavailable digitally with a maximum sampling frequency of 48kHz. However, rather than ignore the burgeoning digital market, Fletcher has come up with a solution in the form of the SC4 DAD. With the addition of a digital board you can now directly interface with any digital recording setup. By utilising high-quality 24-bit converters running at 44.1kHz or 48kHz, signal integrity is retained as far as possible within the limitations of the format. Digital connectors are provided on both AES-EBU XLRs and Toslink optical connectors, with a rear-panel push-button to switch from Consumer to Professional mode, necessary for interfacing certain devices. This will rarely need to be switched, but I would say that I think all buttons should be on the front of any device designed to be rack-mounted. An IEC socket includes a fuse holder, which is rotatable for voltage conversion.

On the front, legending is the usual black-on-green. Fluorescent orange would be better, but you soon learn where everything is. The biggest knob is the input gain on the left, with multiple soft detents. On the far right the output gain is similarly knobby. Next to the INPUT knob are two push-buttons for Digital Input selection and M+S. The >





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latter bypasses the decoding circuitry at the input stage, allowing you to input directly an M+S signal. ATTACK and RELEASE controls provide a wide range of compression characteristics, and like previous models there are no ratio or threshold controls. The familiar Joemeek system is used, whereby a compression control boosts the signal to the photocell-compressor side chain as it is increased. Ratio varies, continuously increasing as input level increases. The way this happens is determined by the Slope selector, now upgraded from the SC2's four positions to five. These determine the rate of ratio increase to level. With the SC2, I found I rarely used Slopes 3 and 4, but this new array provides a little more control. Slope 5 is completely ridiculous, with an almost inside-out effect achievable with some signals—the louder the input, the quieter the output seems. A compressor IN-OUT push-button is provided, accompanied by two LEDs (one for in and one for out—just the one would

have been enough.) Unfortunately, this is not a true 'hard-wired' bypass, but this fact is compensated for with a 2dB increase in gain when the compressor is in, making comparison slightly easier. The two vu meters were subjected to physical abuse from colleagues seeing the unit for the first time, and assuming them to be a stereo pair. No, the needle is not stuck(!), one simply shows Input signal level, and the other gain reduction, which is fine in use. Perhaps, though, they could have been positioned or coloured differently to look less like a stereo pair. Beside these is the aforementioned WIDTH control. Near the OUTPUT GAIN knob is a pair of push-buttons for selecting digital sync (internal or external) and output sampling frequency (+1.1kHz or +8kHz). Sample-rate conversion can be achieved easily, as the input and output converters are completely separate. An additional LED indicates the presence of digital sync. Sync is achieved within a second when switching frequency or sync source, and levels have been sensibly set in relation to the analogue connectors. When using digital connectors, all front panel gains controls are still operative. Using analogue connections in a normal professional environment, you seem

to need the input gain set fairly low for a normal input level. However, this allows more gain for you to drive the compression harder, and it is virtually impossible to overload this unit or

make it distort. It also means that operating in a -10dB environment is easy. The two gain controls have default marks, but these seem to be arbitrary, as at these settings there is a gain boost of several dBs.

In use, the compression is smooth and sometimes slightly deceptive. Unless the attack and release settings enable audible 'pumping', the compression can be surprisingly discreet. There is none of the graininess associated with older valve designs such as Fairchild, and none of the loss of high-frequency content that happens with most other compressors when compressing heavily. Even with the most ridiculous amount of compression, all that is achieved is level adjustment—tonal changes are subtle, and the full audio frequency spectrum is left intact. There is often a 'sweet



spot' on the compression knob where a certain threshold is crossed and the signal pumps a bit more, and I particularly enjoyed using the Joemeek gently on acoustic guitar and

savagely for a wacky piano sound. It sometimes works well subtly over an entire mix, but is not always the best mix compressor: it is not designed as a levelling amplifier. The SC4 is, however, a smooth and clean performer, with a very low noise floor.

The baby C2 compressor is a half-rack unit a fraction of the size (and price) of its big brother the SC4. However, at its heart is similar circuitry. It even uses similar M+S technology. Of course, many features are missing compared to the SC4, but the front panel Input and Output Gains, COMPRESSION knob, and ATTACK and RELEASE knobs all work almost identically. The gain structure is set up similarly, with a range easily encompassing -10dB and +4dB working environments. Slope is a function of input gain, the LED metering is adequate, and the legending actually slightly better in some respects than the SC4. You have to suffer an external PSU

and connectors on balanced 1/4-inch TRS jacks, (no insert points or digital converters of course), but for the money this unit is superb, with no discernible difference in audio performance compared to the SC4.

Both these units have the unique Joemeek sound with the added stereo stability of M+S.

They are not right for every signal, but with experience you can find numerous uses for them. As always, Fletcher's manuals are an entertaining read, and I eagerly await the next installment. ■

**Joemeek Distribution, Quay House, Quay Road, Newton Abbot, Devon TQ12 2BU, UK.**  
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**SONIC SOLUTIONS**

# Audio Developments AD-245 Pico

Founded on the need for reliability and consistency, location recording advances but it does so with traditional caution. **Neil Hillman** enjoys the rebirth of a favourite mixer



**W**HILE THE MARK has been making-out with a felicitous yet frigid Franc, and the South-East Asian economy whimpered and later moaned softly under the weight of economic recession, the British Pound has aspired to a new exchange-rate high. For British companies struggling to maintain their exports these are tough times; but some have had the ability to react quickly to the situation with developments that are more than just a stop-gap response.

Introduced in the latter part of last year, Audio Developments' AD-245 mixer is fundamentally an improved version of an old favourite, the AD-145 'Pico' which graced many location recording trolleys and edit suites in its time, but was in need of updating and bringing into the M+S arena.

The AD-245 mixer is housed in a rugged, ribbed aluminium case that from first glance suggests both its robust nature and continues the themed design of the complete range of AD portable mixers, the 146, 147, 148 and 149; and is available in 6-channel, 8-channel, 10-channel and 12-channel versions. A fold-down carry handle locks either in the upright carry position or swings through 90° to tilt the mixer toward the operator when in the conventional operational position. Control elements are conveniently restricted to just the top

face, while the rear panel is easily accessible for all the input and output connections.

This panel houses latching female XLR inputs, the number depending on the version chosen, width-ways across and corresponding to the respective channel strip. The main Left and Right outputs are transformer balanced and line-level, and are carried on male XLR connectors, again in line with the output module. Next to the main outputs is a male XLR, transformer balanced, carrying a mono line-level mix-down output which is created by the summing of the left and right outputs. Output impedance for all three outputs is given as less than 60Ω. Directly below the outputs are three 1/4-inch jack sockets, one for monitor-headphones capable of driving an unbalanced 25Ω load at 0dBu, the other two being

recording device. This level is adjusted by means of a recessed pot adjacent, set for 0dB when fully 'down', allowing 20dB gain for lower-level signals.

A 6-pin male XLR connector, marked SUB, carries talkback facilities to and from a remote source—most likely a boom operator. The send is unbalanced and low impedance, suitable for driving headphones of 25Ω or greater and the balanced return may be at mic or line level and altered by DIL switches within the mixer. The gain of the Sub return may be increased by 20dB with a recessed calibration pot next to the stereo RETURN gain pot and in a similar fashion. Through this arrangement the boom operator may hear a programme feed while there is no communication taking place, and this source may be selected via an internal DIL switch to be either the mono output or the input signal from Channel 1 (usually the boom mic clean).

The Mic-Line input module is clear and intuitive in the usual Audio Developments way of presenting controls clearly, logically and with the minimum of decoration. From the top, a toggle switch selects between 48V phantom, dynamic or 12V 'T' powering and below this sits the MIC-LINE selector toggle. Underneath these sits the line-input

attenuator-microphone gain pot, selectable between 20dB or 30dB for line inputs, and 40dB to 70dB gain for a microphone input. A row of three different colour-capped pots comprises the 3-band equaliser stage, marked HF, MF and LF, with adjustment of ±10dB around 10kHz for HF, similarly for LF around 100Hz while MF carries ±15dB around a centre frequency of 2.5kHz. There are three toggle switches alongside the EQ knobs, in a row; a 2-position for phase change, a 3-position for HPF (high-pass filter) offering OFF, 150Hz and 90Hz where the HPF is pre-input transformer to prevent LF saturation from wind noise; and finally a 2-position EQ in-out switch.

PAN routes the signal to either the left or right mixing bus, just above a PFL push-button switch. A red LED indicates that PFL is selected alongside the top of the Penny & Giles 100mm long-throw fader. Below the PFL LED is the OVERLOAD LED that illuminates 3dB before clipping at the input to the fader.

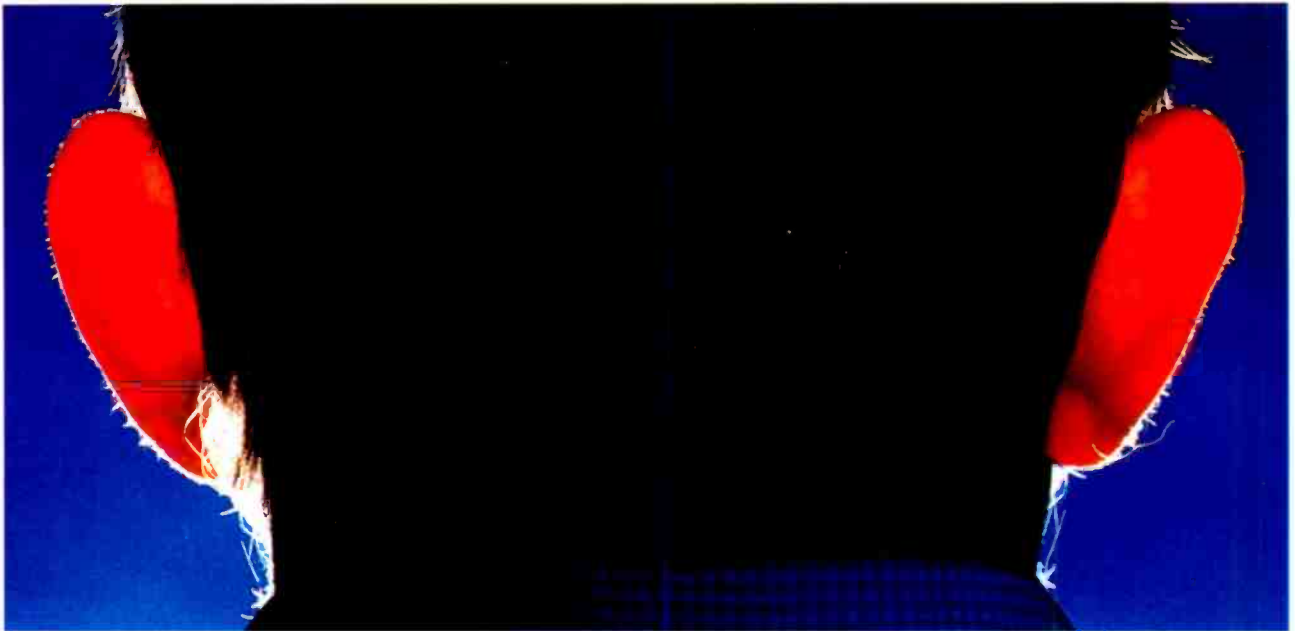
The output module carries the two meters—one above the other—and these may be selected to read BATT, L-R output or MON. A pair of push-buttons selects first the oscillator and then either a 1kHz or 10kHz signal routed to the L-R output. Gentle 7:1 slope limiters, for use with low noise-floor digital recorders, may be selected to work independently or linked together, their operation being indicated by a pair of red LEDs. Below the limiter selector is a push-button to select Direct or Return signal monitoring, with an override of PFL, and into this chain an M+S matrix amplifier may be selected to enable the decoding of an output sent in M+S or to check for mono compatibility and phase cancellation in L-R operating mode.

The MONITOR LEVEL pot and the mono OUTPUT LEVEL pot are sited above the grille for the internal microphone, used for either SLATE or EXT talkback purposes, below which sits the recessed preset for the internal mic gain and the push-buttons for talkback send and slate respectively.

The AD-245 location mixer is easy on the pocket and easy in use, serving as a simple yet excellent entry-level introduction to the range of AD mixers. It offers quality and flexibility, with sufficient features for it to be considered remarkably good value in anyone's currency—including the embryonic and ephemeral Euro. ■

**CONTACT**  
**Audio Developments,**  
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# Ash Howes

Photo: Chris Hook Studio: Battery Studios, London



on **BASF**  
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**"I use BASF SM 900 maxima because of the sound – it is so punchy, the output is so high and the noise levels so low. A modern analogue tape like SM 900 gives me all the things I want: warmth, compression, etc., without losing that sound."**

Ash Howes's credits include recordings with **Texas**, **All Saints**, **Bryan Ferry**, **Alisha's Attic**, **Astrid**, **Another Level**, **Montrose Avenue**, **Hillman Minx**, **Rare**, **Roddy Frame** and **The Other Two**, **Seafruit** and **Jimmy Sommerville**.

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### Calrec digital Alpha 100

An all-new version of the Digital T-Series shown at NAB last year, the Calrec Alpha 100 digital audio production console has a maximum configuration of 96 stereo/48 mono channels, a two layer design for channel path per fader or dual path operation, 8 stereo or mono groups, four main outputs plus 5.1 capability and a mix minus output per channel. Other features include 48 multitrack outputs, 20 auxes, dynamics, EQ and filters on all channels all the time, and dynamics on groups and main outputs. The system will boot in 15 seconds, has full control surface reset without disruption of audio, a high level of redundancy, hot card and panel switching and a PC-based memory system.

Calrec, UK. Tel: +44 1422 842159.

### Lectrosonics in Europe

Lectrosonics has appointed Raycom Broadcast Ltd as UK and Eire distributor of Lectro radio microphones and IFB systems following type approval. The 300 Series permits 256 user-selectable synthesised UHF frequencies which are PC-programmable by authorised service centres to meet frequency allocations of countries. Belt-pack and hand-held transmitters are available for any microphone together with a compact receiver for camera mounted, rack mounted, quad-pack or stand-alone applications. The Studio receiver is a half-rack



configuration supplied with LecNet software and RS-232 computer interface. Extensive audio signal processing includes dual-band compandor, wide range input limiting, wide deviation and adjustable low frequency roll-off for ultra low distortion and noise. To meet wireless IFB requirements, the Lectrosonics design provides 256 spot frequencies. The base station transmitter provides DIP switch configuration for direct interface with Clear Com and RTS intercom systems, balanced microphones, or line level signals via a rear panel XLR connector. The belt-pack transmitter features a 5-pin input jack for positive or negative biased electret lavalier mics, dynamic mics and line level signals, with a user-adjustable low frequency roll-off, and input gain control and LEDs. All core components are constructed from rugged, precision machined aluminium.

Raycom Broadcast, UK.

Tel: +44 1789 400600.

### tc electronic intonates

tc electronic's Intonator is a vocal intonation processor with pitch correction, de-essing and a special adaptive low-cut filter designed specifically for vocal processing. Based on >

Less mainstream but no less useful than compressors and EQs, the telephone simulator is an essential tool in many postproduction studios. **Rob James** dials up Lafont's LP-23

**M**ANY AUDIO PROCESSORS, 'fairy dust' as some of us refer to them, have applications in sound for picture and radio drama as well as music. Equally, a fair number are really only appropriate for music. Much rarer are processors with no aspirations towards music, but of these telephone simulators are a good example.

tortion appears to be independent of the main signal level. From here the signal passes to a Frequency FADE block. This simulates the fading associated with single side-band radios, superheterodyne frequency fading and other transmission effects that involve fading of signal. The fade rate is controlled by a VLFO (very low frequency oscillator).



There have been off the shelf telephone simulators before the Lafont LP-23 but these have usually amounted to little more than band limiting filters. More complex designs have mostly been limited to one-off, custom built devices or programs for digital effects boxes which can be difficult and time consuming to set up. The LP-23 sets out to provide a single (mono) channel of processing to simulate the effects of telephony and various forms of radio transmission. To this end the unit offers a great deal more than simple low-pass and high-pass filters.

The LP-23 is constructed in the ubiquitous 1U-high rackmount format. Connections are ridiculously simple. XLR connectors for signal in and out plus a balanced jack for a separate noise output, an IEC mains connector and no more. There are no MIDI, no time code and no computer connections of any sort. The front panel is finished in a restrained dark claret with silver areas denoting the various processing blocks. Knobs come in two flavours, large with light grey caps and small, black all over. All the buttons except one are mechanically latching types with red LED indicators adjacent. The remaining button is a square, internally-illuminated type labelled TEL which silently and instantly switches the unit in and out of circuit. The overall impression is of restrained and simple design.

There are two signal chains in the unit—a main audio chain supplemented by a noise chain. The processed noise may either be output separately or used in conjunction with the audio chain. In addition to the TEL switch each block of processing may be individually switched in and out of circuit.

The first block in the audio chain is the Telephone Filter. This has the usual high-pass and low-pass filters—35Hz-2kHz and 18kHz-800Hz, respectively with an 18dB per octave slope. This section also contains a Balance control that sets the ratio between direct

The rate is variable from 2s-15s. The last block in the audio only path is a single-band parametric equaliser (400Hz-7kHz) with a maximum boost of 166dB and variable Q (0.6-3). The noise chain is fed from a clock that drives a noise generator via a shaping filter to provide a pink noise output. A Level control varies this output from infinity to -7dBu. The noise chain has independent high-pass and low-pass filters with similar characteristics to the others apart from slope.

After this point the two chains are mixed. A Voice Over control decides whether the mixing will be constant or if the noise will duck when audio is present. The ducking is variable from 0 to -20dB. The combined signal goes through a Squelch section which is, in effect, a steep slope noise gate with a threshold control variable from 0 to -15dB. The final control covers Gain Correction and allows up to 10dB of boost or cut enabling the level of the effected signal to be matched to the direct.

Jean-Pierre Lafont has done his homework well. The choice of ingredients is nicely judged, balancing useful features with simplicity of use. The independent audio and noise filters are particularly useful. The LP-23 delivers the goods with a variety of convincing simulations of the degradation to be expected from telephone and radio transmission. Part of the key to success is understanding that what is required is not a perfect recreation of what would actually happen to a signal, rather it is what the audience expects to hear. Simply sending a signal through a telephone or radio chain is often unconvincing, not to mention time consuming to set up. It might be thought memories and automation

control would be desirable if not essential in a unit of this type. In fact, this would be to ignore the way in which most film mixing is done. The accent is on speed and ease of set up. A brilliant effect which takes half an hour to

achieve and longer to automate is no good. A thoroughly convincing effect that can be set up in moments and recorded on a spare pre-mix track is just the job. And this is exactly what this unit provides. ■

#### Contact

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# PreSonus M80

The thunder of the microscopic mic preamp has been stolen, but drizzle still has much to offer as **Dave Foister** discovers.

**M**ODULAR DIGITAL MULTITRACK is responsible for many things, of which one of the oddest is the number of eight-packs it has spawned. If a thing's worth having it's apparently worth having eight of, so that we build up racks of processing in modular lumps to go with our eight-tracks. Units of this type include compressors, valve buffer stages and line mixers, but the most popular is the rack of eight microphone preamplifiers: since no digital 8-track has mic inputs, it remains just a studio recorder until eight decent preamps are added to turn it into a complete mobile facility. PreSonus has a whole range of products fitting into this eight-channel category, and of course it includes mic pres.

Equally naturally it adds to its standard complement of facilities one or two features that make it that little bit different.

The M80 is a 2U package with eight high-quality fully-specced preamps. Some comparable boxes are only 1U, and the M80's extra real estate gives it a bit of room to spread out,



provide decent metering and be operable without tweezers. Each preamp has switchable phantom, phase reverse, pad and high pass filter, with a single gain control and an LED output meter. Inputs and outputs are balanced on XLRs, although the input connectors are actually Neutrik combo sockets with a jack in the middle. This is used for instruments, and provides a high (1 Megohm) input impedance. There is no real provision for proper line inputs, as the channels have 12dB of gain even with the control at minimum. The power supply is in a separate box, connected via a 4-pin socket into which it is perfectly possible to insert the plug upside down, as I discovered with almost disastrous results.

Each channel has a balanced insert send and return for the connection of outboard EQ or dynamics, a particularly useful touch in the light of the mixing facilities provided. For this is not simply a rack of discrete preamps; like one or two others, it adds a stereo mix bus and a master module to turn it into a simple 8 into 2 mixer. Thus each channel has a switch to route it to the L/R bus and a pan pot, and the ninth module

has both a master output control and a headphone socket with its own level control. Balanced stereo outputs appear on the back on XLRs, and the drive capability, on both the line outs and the headphone feed, is more than adequate. Too many units like this fail to appreciate

the importance of a proper loud headphone signal, but the PreSonus can't be faulted on that score.

The mixing feature isn't quite the bonus it might appear to be. Since each channel has only a single gain control, it is not possible to adjust the levels to the mix bus without disturbing the levels to the direct multitrack outputs. Any thoughts of running 8-track with a live mix to stereo simultaneously are therefore scuppered, as the one will always compromise the other. There are units that allow for this possibility, but as it stands the M80 will do an excellent job as an 8-track front end or a stereo mixer, but not really both at once.

There is one last feature that tries to address a common desire and to set the M80 apart in a small way from the competition. Each channel has a control marked IDSS, altering the harmonic content of the input signal. The input stages incorporate a new Jensen transformer, and the following FET input amplifier has the facility to adjust the drain current, boosting even harmonics in an attempt to

emulate the character of a valve, or tape saturation, according to the PreSonus manual. Fears that the mere presence of such an arrangement might compromise the integrity of the signal even when it is supposedly doing nothing turn out to be unfounded; even turned up to 100%, the effect of the IDSS control is very subtle indeed, so much so as to have me wondering whether it might be some kind of emperor's-new-clothes wind-up. On a signal that lends itself to the treatment (saxophone through a 414 was one) it showed itself as a slight thickening of the sound, possibly at the expense of the extreme top end, but on many sounds I found I could flick it backwards and forwards between its extremes without noticing any significant difference.

This is therefore a curious mixture of the practical and the odd. On the practical side it works very well—these are without a doubt

high quality preamps and the essential facilities are all there. The mixer set-up, slightly limited as it is, adds a useful extra dimension, and one of these in a rack with an ADAT or DTRS machine would make a neat and comprehensive

package. The IDSS could have been dispensed with in my view, but it does no harm and there may be occasions where it adds just what is needed. In a field with plenty of competition, the M80 may have just enough to get noticed. ■

**PreSonus Electronics,**  
PO Box 84008, Bayou  
Rouge, LA 70884, US.  
Tel: +1 504 344 7887.  
Fax: +1 504 344 8881.

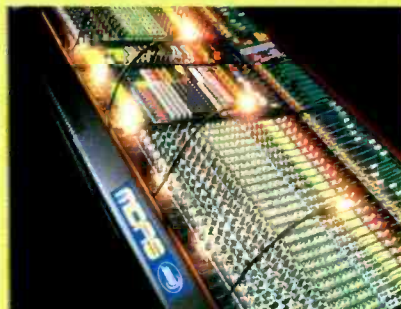
## NEW TECHNOLOGIES

< tc's DARC-chip technology, the Intonator preserves the vocalist's personal touch by allowing vibrato, initial intonation and limited correction individually, all at 96kHz internal processing and 24-bit resolution. A 'Do-not-process-anything-but-this-note' setting can be achieved via an internal custom scale feature. A pitch window allows you to specify when a note will be considered out of tune, whereas the amount control limits the level of pitch correction added to the audio. Analogue Dual I-Os enable simultaneous recording of processed and unprocessed vocal signals. The D22 is a digital delay designed specifically for broadcast and offers up to 1300ms of delay per channel (on two channels) and features 24-bit A-D/D-A convertors and AES-EBU, SPDIF, and Wordclock BNC 75Ω. Seamless delay updating eliminates audio clicks, pitch changes and other unwanted artefacts and internal sample rates of 44.1kHz and 48kHz are supported with external rates of 32, 44.1 and 48kHz. Programmable set-ups can be stored for instant recall, additionally a User Interface Lock mode is provided for "Set & Forget" purposes. The company now has a 24-96 I-O card for its flagship M5000 processor and has unveiled a similarly equipped Finalizer 96kHz.

tc electronic, Denmark. Tel: +45 8621 7599.

### Midas heritage 2000

Second in its new Heritage series of consoles, the Heritage 2000 aims to offer a cost-effective alternative to the 3000 with which it shares all the advanced features and



automation except bus structure. It has 12 groups, 12 auxes, three masters and 8 matrix buses with automation of input fader levels and mutes and the ability to create LCR mixes. A broadcast comms module is included yielding one mix minus output per channel. More than 60 orders for the 3000 have already been taken.

Midas, UK. Tel: +44 1562 741515.

### Soundcraft Series Four

The Series Four FOH desk is fully modular and VCA equipped and follows the layout of the existing Series Five but with a smaller footprint. Available in 24, 32, 40 and 48-frame sizes, each has four stereo inputs. Stereo mic-line inputs have full EQ (two fully parametric mids and swept shelf-peak HF and LF) and can be substituted instead of mono inputs and the desk has 8 VCAs and 8 mute groups. There are 10 auxes, four of which are mono-stereo switchable and have direct access to a 16 x 8 matrix. Show-time automation through a PC can be >

April 1999 **Studio Sound**



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# HHB CDR850

The goal posts have been moved again in the stand-alone audio CD-R game. **Zenon Schoepe** discovers the offer is smarter and slicker

**Y**OU MAY REMEMBER the stir that HHB's first own brand CD-R, the CDR800, caused when it was announced and you will recall how it set something of precedent for what could be realised and expected in a stand-alone dedicated audio machine for not a lot of cash. There was little wrong with the original CDR800, indeed I still consider it to be class leading in its time and functionality, but things move along, much as it has in Marantz's CD-R range, and the new CDR850 adds extra features, CD-RW handling and a more elaborate interface over HHB's first attempt. But first politics and fact. The observant will have noticed great similarity between the CDR850 and the Fostex CR300 CD-R machine, which was shown for the first time at NAMM, in much the same way that HHB's CDR800 had a great similarity to CD-Rs from Fostex and Otari that followed it and that is because they are, apart from cosmetic differences, extremely similar if not identical. Both sets of happy coincidences can be



traced back to two different generations of Pioneer originated machines.

The CDR850 is a significant development in functionality over the CDR800 and employs the traditional business side down orientation of the disc rather than the upside down platter found in the CDR800. I-O interfacing is better with balanced analogue XLR I-Os, phono I-Os, AES-EBU input, plus optical and coax digital I-Os. There's also an 8-pin parallel remote control port. A small infra red remote control, extremely similar to one supplied with the CDR800, is provided and for the most part duplicates the central functions of the front panel and adds the sort of programmable and direct access track playback functions with repeat that you might expect. However, most significantly the remote allows you to activate fixed rate fade in and fade out recording on a single button press. Both are selectable to 6s, 9s, 12s and 16s times and their are instances where this could be useful on record once media.

Other than this, the machine works very nicely from the front panel which centres around a large and very informative display and the tray, which opens and closes with reassuring deliberation and smoothness, has a large LED above it to indicate record, pause, erase or playback status.

Analogue input levels pots are ganged while input selection is made from a 6-position rotary switch. Nice. Other features worth

mentioning include pause mute, which is preset at 4s but can be extended indefinitely by simply holding it down for longer, and a TIME MARGIN switch. Repeated presses of the latter cycles through elapsed time, remaining recording time, total recording time and a margin indicator in recording which shows remaining headroom on the two channels independently and can be reset. Marvellous.

During playback you get to view elapsed and remaining time on tracks and the disc and the margin indicator.

You can also enter Skip IDs and fix these with the finalise process although I am not sure whether all CD machines will be able to recognise them.

In addition to manual analogue and digital source recording, the CDR850 gives you single-track digital sync recording, which stops when the next ID from the source is detected, and an all-track synchro mode. This second mode has the option of instigating automatic finalisation when completed.

The MENU button accesses set up options such as setting SCMS, analogue input auto track ID marking level, and auto stop delay (the length of silence in digital recording required to flip the machine in to record pause—0, 10s and off). The SRC can be fully bypassed.

In terms of CD-RW erasing you're offered, last track, TOC, all tracks and all disc erasing options. Playback features that add value to the total CDR850 package include auto pause at the end of a track, fade in start from pause and fade out to pause. Clever stuff and smarter than many stand-alone CD players. A-Ds are 1-bit and D-As are multilevel sigma-deltas. I felt immediately at ease with this machine as it exudes capable confidence and feels solid and chunky. Operation really is very simple although I'm still not happy with the remote's size and ineffectual squidgy close-clustered buttons and you are required to use it if you want to perform certain operations as there is no equivalent available on the front panel. I still want to be able to enter track indexes

and it's perhaps strange that with all the extras piled in to the unit that a delay function has not been included for those tight manual track number entry moments.

But I'm attempting to split hairs here and these complaints are more than compensated for by the simple inclusion of a margin readout alone. It sounds good and the

headphones circuit is loud and clean. This is a very, very good audio CD-R that has raised the ante yet again on what can be expected for the money. You have to consider it if you're after the best. Recommended. ■

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## NEW TECHNOLOGIES

< added for snapshot control of some console functions as well as Visual FX and Virtual Dynamics.

**Soundcraft, UK. Tel: +44 1707 665000.**

### Cool boom

The Kit Cool boom support is attached at the operator's waist and is held vertical by an elastic strap thus taking the weight off the operator's arms. Freedom of movement is assured and the articulated tube holding the boom is fixed to the vertical tube by a



3/8-inch thread. Four foam covered rollers are said to guarantee silence of operation, the whole arrangement weighs 450g and the support tube can be adjusted to between 55cm and 1m above the operator's waist.

**Boom Audio, UK. Tel: +44 171 235 5330.**

### KRK V6

KRK's V6 active monitors cost \$799 (US) and use two separate amplifiers and a true electronic crossover with 60W to the woofer and 30W to the tweeter. They employ a 6-inch kevlar woofer in an anti-resonant frame, a cross-braced cabinet, Neutrik combo connectors and video shielding.

**KRK, US. Tel: +1 714 841 1600.**

### Millennia amp

Millennia media has released the MM-990 high performance amp with complete compatibility with Jensen/Hardy 990 and API 2510/2520 modules and is a pure Class A, all-discrete J-FET amp. Frequency response is stated as being down 1dB at 355kHz and 0.3Hz while maximum output level is said to be +25.5dBu into 600Ω.

**Millennia Media, US.**  
**Tel: +1 530 647 0750.**

### Cable catalogue

London-based cable and component specialists VDC has released its product catalogue guide to its range of audio, video, data and mains cabling and components. Included are Van Damme OFC cables, such as the Green series digital multicores, Brown series multiquad. Red series video multicores plus the full resistor colour code for standard mic, patch, install and quad cables. New audio and video multicore connectors include the VDM, PA-CON and OB-Con. The catalogue is free to anyone who enquires.

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

**Fax: +44 171 700 3888.**

**Email: sales@vdcctrading.com**

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others without complicated manual programming. Operationally the buttons are large and straightforward to use, while the illuminated LCD display gives a clear indication of what is going on at all times. No noisy internal cooling fan to worry about in quiet studio conditions. The Remote Panel can control a MusicTAXI from over 500m away via the RS422 interface. The online menu indicates online time, send-level, receive-level, adjusted headroom, Rx and Tx audio configuration, SYNC flag of MusicTAXI at the other end.



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# Rosendahl Studiotechnic MIF, VIF, WIF, BF & LIF

Where functionality shines and glamour is an unlikely extra there is an interface box to be found. **Rob James** investigates the all-star cast of Rosendahl's Studiotechnic range

**R**OSEDAHL'S STUDIOTECHNIC range of interface boxes is designed to address a variety of time code problems. In line with all these units, the MIF MIDI interface, VIF VTC interface, WIF wordclock interface, BIF bi-phase interface and LIF LANC-RC time-code Interface tested here are presented in neat and remarkably compact extruded aluminium cases. 115mm wide, 32mm and around 175mm deep, not including protruding connectors and switches. Three units would fit into a 1U-high 19-inch rack

space, given suitable metalwork. All are mains powered via a standard 2-pin Euro connector, remarkable given the diminutive proportions so there are no plug-top supplies or in-line bricks. All use an 8-character red LED alphanumeric display and neat toggle switches to control power and parameter setting. Depending on model there are small indicator LEDs and a small hole to access a preset pot for setting LTC output level at up to 3Vpp.

Given the fairly exotic nature of some of these boxes, I chose to concentrate on the units



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## NEW TECHNOLOGIES

< the Series X+ range features the BRX+ debuzzer and AZX+ azimuth corrector. Both are based on 40-bit floating point DSP with 24-bit AES-EBU and SPDIF I-O. The news coincides with a major upgrade to its flagship NR-3 noise reduction module in V2. This sports an improved NRC capture algorithm which rejects genuine signals that exist in the presence of noise; three user-selectable signal models; two entirely independent noise reduction setups which can be switched between; and the ability to morph between the two setups. An improved user interface is included and the upgrade is free to existing users. Version 2 of CEDAR for Windows has also been released.

**CEDAR, UK. Tel: +44 1223 414117.**

### TDK CD-RW

TDK has introduced its CD-RWXG rewritable disc which is compatible with consumer recorders, players and DVD



players. Other developments include data and audio CD-Rs, DVD-R and DVD-RAM discs.

**TDK, Luxembourg. Tel: +352 505011.**

### ReporterMate mobile

You/Com has extended the connection possibilities of its ReporterMate portable solid state recorder-editor with a mobile phone feature which permits the sending of reports on location back to base. The standard FTP protocol implementation in the ReporterMate has a built-in error check mechanism and this ensures quality is retained. In emergencies the recording can also be played out live and a special connection to the mobile phone allows a 4-wire connection to be created with the studio. Equipment



required at the studio end to optimise the receipt of GSM transmitted audio are the StudioSet (for live contributions) and the NewsDepot for the reception of real-time and file contributions.

**You/Com, Netherlands.**

**Tel: +31 15 262 5955.**

### Quested VS mkIIs

The following changes have been made to the electronics of the Quested VS2205 and VS2108 monitors. Input sensitivity is now controlled by a 10-position rotary switch in 2dB steps for 8dB extra gain on the VS2205 and 4dB on the VS2108. >





# What's new



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with the most general appeal. The first was the MIF, MIDI interface, which converts to and from MTC and LTC, and also generates both. I have had nasty experiences with other units that purport to provide these seemingly simple functions—like locking up and requiring a mains-off reset when presented with high-speed code. It's worth noting, however, that although MIF is capable of operating at all the common time-code frame rates it is not a time-code gearbox—that is, it cannot be used

to convert from one frame rate to another. A 3-position toggle switch selects LTC or MTC inputs with Jam the third option. The only required setting is code source. With LTC (connected via phonos) chosen as master, response is fast and reliable. High-speed (over 110%) stationary or reverse code is translated into an MTC full-frame message and when play-speed code resumes, lock is achieved in well under 1s. MIF performs equally well with MTC as master. Jam mode is very ingenious. Switching to Jam from the LTC position starts generation at the fixed position of 0:59:40:00 at 25fps. Switching from MTC to jam while MTC is running results in generation continuing regardless of changes to the input code. The generator starts from the last received MTC value enabling a specific start point and frame rate format for the generator to be set via MTC. This is simple and effective.

The VIF, VITC interface, is equally simple. There's no need to specify on which lines the VITC is present as the unit scans from lines 6 to 22. Where multiple VITC codes are present the first two valid lines are decoded. LEDs indicate ISP (Input Signal Present), the odd Field and Jam. Two BNC inputs and an external terminator allow for looping though.

The WIF wordclock interface, resolves a wordclock output (44.1kHz or 48kHz) to a number of possible inputs and also converts from VITC to MTC. In Video mode a PAL video signal input results in wordclock (or DigilDesign Superclock) output, phase locked to the video. A valid VITC or LTC input results in a wordclock output resolved to the input and an MTC output of the code. The WIF takes around 2s to lock and, when using a varispeed

source, it is necessary to vary the speed, stop and resume playing. Fixed pull-up or pull-down is switchable.

The other two units are slightly more esoteric and in the case of BIF, bi-phase interface, inevitably a little less friendly and intuitive. Unlike the others, the BIF has four push-buttons on the front labelled ON, SET UP, SET DOWN and MODE. Supplied with a 9-pin D-connector to make up a bi-phase input cable, TTL and opto-isolated inputs are

I have had nasty experiences with other units that purport to provide these seemingly simple functions—like locking up and requiring a mains-off reset when presented with high-speed code. It's worth noting, however, that although MIF is capable of operating at all the common time-code frame rates it is not a time-code gearbox

provided plus a 5V supply. Instructions are included for construction of a simple bi-phase generator using mechanical switches, 5V supply and opto inputs, or a more sophisticated arrangement with a toothed wheel and opto sensors. BIF handles all rates from 1-256 pulses per frame. It is also able to generate a different frame rate time code to the bi-phase frame rate. This is very helpful if you want to work with a 24fps film picture and 25fps material on tape or a DAW. Another piece of

cunning allows the MIDI output to be configured. Any DAW that can chase MTC follows BIF at sync speed using the normal quarter-frame messages. In reverse, or other speeds, many machines will not follow. To ameliorate this, BIF provides several output modes combining MMC commands with MTC. Current options are: full frame, LOC, which works with machines which support MMC slave together with MT slave modes, and QF or QF-2 which works with some machines which only support MTC slave mode. BIF may be set to any valid time code as a start point.

The final unit interfaces the common LANC remote control and RC time-code protocol found on domestic and semi-pro video equipment to LTC, MMC-MTC and or Sony 9-pin. I could not test this unit due to lack of suitable kit but, given the standard of the rest, I have no hesitation in recommending anyone with this requirement to try the LIF.

This range of interfaces succeeds in making some of the more trying problems of connecting bits of dissimilar kit together relatively easy and straightforward at reasonable cost. I am suitably impressed. ■

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Tel: +49 89 3610 4802.  
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Tel: +44 1222 450 120.

# Tascam CD-RW5000

Tascam has delayed its entrance in to stand-alone CD-R despite its strong background in the technology. **Zenon Schoepe** reports

**Y**OU HAVE TO SEE the entry of Tascam into the pro CD-R arena as a significant one. The manufacturer is steeped in all sorts of drive technology through its umbrella Teac operation and has been producing high performance CD-based drives for years in the computer market. Yet has held back on a dedicated standalone audio product until now. The CD-RW5000 is a good first effort that must imply that there is more to come. Like the other current generation machines around it will handle CD-R and CDRW and comes with a full complement of interfaces—balanced XLR and unbalanced phono analogue I-Os, AES-EBU output plus coaxial and optical I-Os. A strong selling point must be the inclusion of a wired remote and while this is not as substantial as that found for the Marantz CDR640, which also has a display, it betters the infrared hi-fi-style 'wands' found on HHB's current range.

The remote offers the usual duplication of front panel switches such as transport controls



but adds cue searching and a Fast mode that skips more rapidly than the cue mode but without fragmented audio playback. The remote also adds direct track access and programming and a repeat mode for playback duties.

You'll also find duplications of the FINALIZE, ERASE (for CD-RW operation), SYNC START, AUTO/MANUAL track increment, TRACK INCREMENT, and DISPLAY found on the front panel. DISPLAY permits the viewing of track time, remaining track time and total remaining time. You can also switch the meters off, which helps to avert the confusing inconsistent level results from the same disc between the metering of different brand machines and helps you to forget that there is no peak hold or indication of margin remaining, the latter being a marvelous feature of Tascam's DAT machines.

However, it's to the front panel you must go for the source selection of analogue or digital and the allocation of digital input source. This is all admirably straightforward but the inclusion of individual left and right channel pots for analogue input level, while it may nod towards more traditional times, is never as convenient as the type of ganged controls you now find everywhere. The 2 o'clock position represents nominal level on these pots but they are not detented.

Two digital sync modes are supported, the first optimised for a single track (Sync-1) digital dub, the second (Sync-All) prepared for multiple track recording. This is fine and dandy for

Sync-1 as recording will be terminated when the machine sees the next track ID. Recording can be also terminated by pressing STOP for Sync-1 and Sync-All but otherwise both modes will look for a full 20-seconds of -36dB before they stop automatically. This last case could pepper a CD with some long gaps if you're not paying attention.

All in all it's a nice machine with great ergonomics, good trad-tascam-style transport buttons and livery and it's interconnection possibilities extend to the thoughtful inclusion of a 15-pin D-sub connector for control I-O.

A couple of omissions spring to mind. First there is no facility to record paused silence, something that is usually performed by the PAUSE button on other machines. The significance of this will depend entirely on your experience of other CD-R machines as many use this as a means of adding rills at the end of recordings. It means you can then add tracks simply by cueing up tight on the source program and firing the two machines simultaneously. When you don't have a pause mute creating quality silence between tracks becomes an issue. If all you do is dupe from a prepared master then there is no problem but piecing CDs together from a multitude of sources will require care if you want slick results.

The second point concerns the sample-rate converter. The CD-RW5000 has one but it is not user controllable for bypass. For the majority of quality, stable 44.1kHz sources this will not be an issue but should the source stray by  $\pm 100$ ppm then the SRC will kick in and kick back out should it return within tolerance. Interestingly Tascam says that this switching in and out of circuit will be audible; I had no easy way of simulating this fine degree of jitter and was not aware of any spurious audio goings on in the time I ran the box but you have to take their word for it. Perhaps most significantly there is no indicator to tell you that the SRC has engaged and that would be useful. The inclusion of a switchable SRC would have avoided this philosophical discussion altogether.

I do like the remote, admittedly it is wired but the cable is plenty long enough at around 5m which means you can put it well away from the machine and the remote itself is small enough to not dominate. You still have to maintain sight of the deck though. The switches are small but they're well spaced. I also like the simplicity of operation which requires no recourse to the manual as nothing is hidden (apart from the SRC) and I would reckon that you could be burning a CD within five minutes of connecting this thing up.

So, in summary, we have a good solid performer with a couple of irritations that sounds good, runs well and certainly qualifies as a contender in the entry-level CD-R stakes. ■

## Contact

**US:** Tascam America.  
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**Tel:** +44 1923 819630.  
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## NEW TECHNOLOGIES

< Monitors can be balanced more easily against a sub-bass. Contour selection is now via two 3-position switches for LF and HF trimming, the HF has flat, lift and cut positions and the LF now has an off position that reduces LF extension but increases headroom. Other changes include a power switch and enhancements to the amp module design and protection circuitry.

**Qusted, UK. Tel: +44 181 566 8136.**

## More valve classics

TL Audio has released the EQ-2 dual parametric and PA-1 dual pentode preamp in its Valve Classics range. Improvements over the originals include raven-blue 6mm CNC milled aluminium front panels, gold-plated ceramic valve bases and General Electric US military spec ECC83 valves. EQ-2 circuitry has been refined and adds peak-shelf



switching on the LF and HF and drive-peak LEDs to monitor level. The PA-1 has circular back-lit VU meters and drive-peak LEDs and circuitry has been improved around the valve stages with extra output gain for easier interfacing.

**TL Audio, UK. Tel: +44 1462 680888.**

## Sadie Artemis

Studio Audio & Video's Artemis DAW is capable of 192kHz editing and mixing, surround panning and can be configured for 24 I-Os. All internal processing uses 32-bit floating point and each system has time code support and four channels of RS422. The supplied breakout box 800 includes 8 channels of digital I-O, XLR digital reference input, and 8-channels of unbalanced analogue I-O. The 800B adds balanced analogue I-O and all systems include on-board SCSI interfaces. It runs Sadie 3 software.

**SAV, UK. Tel: +44 1353 648888.**

## Solo for DAWs

The Seasound Solo PCI interfaced digital audio recording system provides a variety of common functions required by the digital-audio musician: pre-amplification for microphones and low-level instruments, line-level input controls, input mixing, monitoring, and 24-bit/96kHz conversion of audio signals to-from the digital domain. The Solo features a pair dual impedance universal preamps with 65dB of gain while the low level inputs include insert I-O jacks and two line level inputs on separate 1/4-inch jacks. The four inputs are mixed into two channels using individual level and pan controls and the combined inputs are converted into two digital record channels. The digital audio playback data from the computer is converted into two line level feeds driving the separate phone jacks for main output and control room monitor. A headphone amplifier output with two jacks has been added for convenience on the front panel.

**Seasound, US: +1 415 331 4970.**



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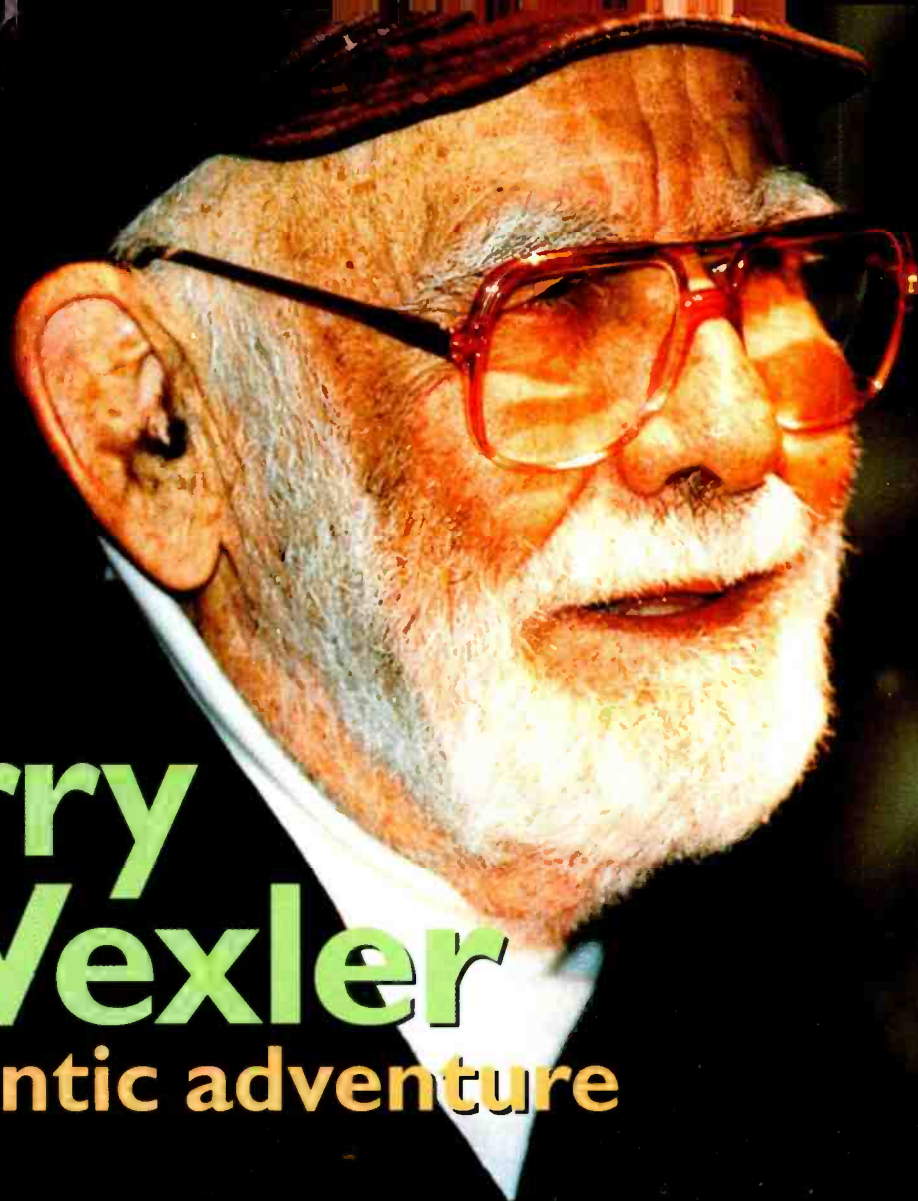
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# Jerry Wexler

## Atlantic adventure

**I**CAN'T THINK of anything I ever did where the music didn't resonate with my own personal tastes,' opens production legend Jerry Wexler. 'There are bands that I signed yet did not have the slightest desire—and made no attempt—to go into the studio with. I only ever worked with one white rock group and that was The Sanford-Townsend Band: Barry Beckett was the co-producer and we had a hit called 'Smoke From a Distant Fire', but that represented a slight deviation from my normal work.'

Indeed it did. A native New Yorker who started out writing for *Billboard* magazine, Jerry Wexler was the man who coined the term 'rhythm & blues' back in the late-forties to replace the title of 'race records' on the black music charts. Following his move to Atlantic Records early in the next decade, he played an instrumental role in bringing black music to the white masses, courtesy of studio work with artists such as T-Bone Walker, Professor Longhair, Big Joe Turner, Champion Jack Dupree, Ray Charles, Ruth Brown, LaVern Baker and The Drifters. In the process he helped build the fledgling independent label into one of the giants of the industry, and during the sixties he not only

Studio Sound April 1999

Legendary American producer and record company executive Jerry Wexler is the man who christened rhythm & blues. **Richard Buskin** asks about his musical philosophy and his experiences developing Atlantic Records and Muscle Shoals

defined the role of the hands-on producer thanks to projects with soul singers such as Aretha Franklin, Wilson Pickett and Solomon Burke, but, later in that decade and the next, he strived to develop Muscle Shoals into a major recording centre while working with the likes of Willie Nelson, Dire Straits and Bob Dylan.

An inductee into the Rock & Roll Hall of Fame, Jerry Wexler last produced Etta James' 1993 album *The Right Time* and, at 82 years young, his passion for music is undiminished, as are his clear-sighted observations and vivid recollections about a life spent immersed in it.

'For me there are three different types of producer,' he says. 'First there's the documentarian, and that would be Leonard Chess. Let's say he would hear Muddy Waters in a bar on a Thursday night with his band, well he would bring him into the studio on the weekend and

reproduce what he heard in that bar. Then there's the Phil Spector type, where the whole thing is conceived in his brain. Every atom, every little platelet is provisioned by him, including the role of the artist; that would be your songwriter-musician-engineer, and then the third type I have no name for, but I can define it as "serving the artist". Most of the producers in this last category are original jazz fans and record collectors; John Hammond, Chris Strachwitz, Ahmet and Nesuhi Ertegun, Bob Thiele, Alfred Lion. It's not just that they love the music, but they bring a heavy load of information with them.'

Such was the case with Jerry Wexler. As a kid his preference for the pool hall over the classroom didn't bode well for his future, yet with 20/20 hindsight it's easy to see how his prodigious knowledge of the recordings that he fervently collected amounted to an ace in the >

◀ pack for a man whose destiny lay in helping redefine twentieth century popular music.

'You know, if I am thoroughly immersed in everything from King Oliver through to The New Orleans Rhythm Kings and Bessie Smith and Jelly Roll Morton, and then on to swing with Count Basie and any number of small bands that I've heard,' he asserts, 'Man, I've got a bag full of licks and riffs that you just don't have unless you're coming from this place because I'm a record collector. I might be in a session and need a rhythm pattern, and I'll take a lick that I heard on a Clarence Williams record which I picked up in 1939 called "Black Mountain Blues" in which I heard a tuba and the bass clef of the piano, single note in unison. Unbelievable. That stuff gave me the chills, I was a kid then and I had no idea that this would ever have any meaning for me except as entertainment. Years later I would be in the studio, looking for a lick or a hit or an idea or a sonority, and I'd actually use that.'

'We brought something to the game, we brought something to the table, which was information, and it comes

'I might be in a session and  
need a rhythm pattern, and  
I'll take a lick that I heard on  
a Clarence Williams record  
which I picked up in 1939  
called "Black Mountain Blues"'

more from jazz than from the blues. That was our diction, but here's what is strange: these people had backgrounds in jazz and became producers of all kinds of music, whether it was rhythm and blues, pop, Tex-Mex, whatever. It wasn't so much that they became jazz producers, because by definition jazz producers don't do that much hands-on work in the studio. Neither do folk producers, whereas with pop and R&B producers there's a lot of hands-on.

'When Bob Dylan came to me and asked me to do that first gospel album, *Slow Train Coming*, I had no idea what I was in for. All I knew was that the genius had done me the honour of saying that he wanted me to produce an album with him. However, it soon transpired that he wanted the structure and the sonority that he had heard in Ray Charles, Aretha Franklin and Wilson Pickett records, as opposed to Woody Guthrie rambling and scrambling down the road with his guitar on his back and making eleven-and-a-half-bar mistakes. He wanted that structure.

'That was in 1977. Many years before, around 1972, Bob came by a session that I was doing, and we took a break

and went back to my office, we lit up a cheroot and he said to me, "Man, I've done the word thing, now I want to do the music thing". I wasn't sure what he meant, it was just idle chatter to me, but sure enough when he came to me many years later I understood what he meant. When you listen to *Slow Train* it surely sounds different to anything else that he ever did. I'm not saying that it's better, but if Dylan hadn't gone through that Woody Guthrie/Rambling Jack Elliott phase, making mistakes on chords and going into odd metres and so on, he wouldn't have been Bob Dylan. He had to do that, but now he was saying, "I want a taste of Otis Redding". So, that's what we did, but ordinarily do you think notable producers of folk records like Manny Solomon and John Hammond did very much in the studio? I don't think so.'

While the musical intuition and innovation of Jerry Wexler, Ahmet Ertegun and his brother Nesuhi have been well documented, the success of Atlantic Records is more remarkable considering that none of the numerous other small independent labels that existed during the forties and fifties—including names such as King, Federal, Exclusive, Aladdin, Imperial and Chess—are still around. Yet, to Wexler's mind, the reason for this is pretty straightforward.

'We kept turning out and selling records,' he says, 'and we recognised the need to expand from this narrow alley of R&B into the big rock field. There was a recognition of repertoire, because you couldn't exist for five decades on R&B alone. It's just not possible. If we hadn't gone into the English thing, into the Buffalo Springfields and the Sonny and Chers, there wouldn't be any Atlantic Records.'

While Atlantic Records is very much alive and kicking, the widely acclaimed Atlantic Sound is confined to the past. Wexler, however, is hardly a sentimentalist in this regard—neither does he share the rose-tinted views of many of his contemporaries when comparing the music-making methods of yesterday with those of today.

'There's no more Atlantic Sound because whatever went into the Atlantic Sound soon became available to everybody,' is his analysis. 'Today, the way that we are going with synthesisers and all of these gimmicks, a lot of people feel that the use of machinery—of click tracks, drum machines and so on—is dehumanising music but I feel the next step may be the utilisation of electronic devices to build in the little human element; the extra breaths, the little pause, the slightly out of time note. I think that's the next step and it'll probably happen.'

That said, Jerry Wexler is not averse to highlighting the human skills that had to come into play in the days before multitrack recording, automated mixing and digital effects provided the artist. >



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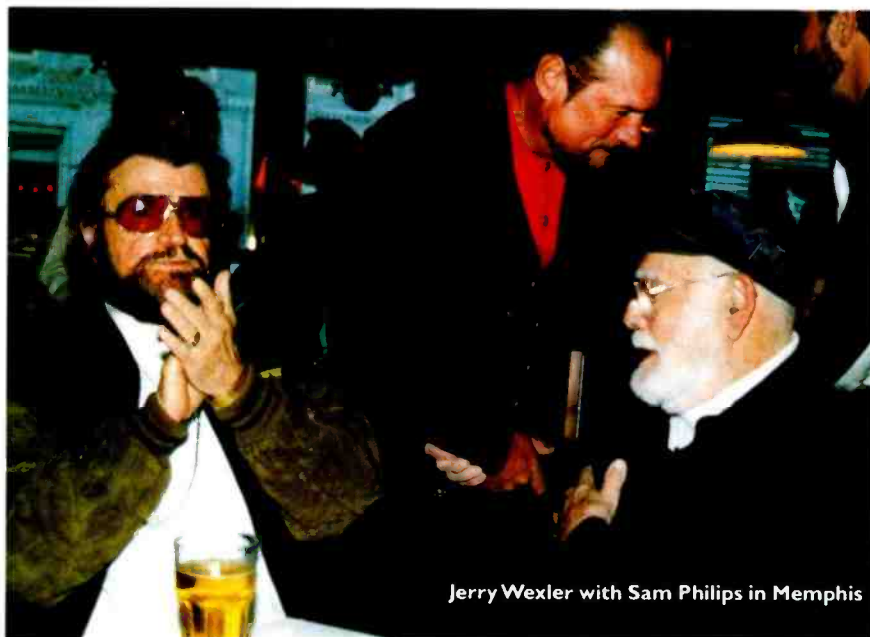


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< the producer and the engineer with more options and greater freedom in the studio.

'When we were doing mono, man, we had to be good,' he says, 'because we had to mix it on the spot and it had to be right, right then and there. We couldn't remix it and make it the way we wanted it, and a lot of that credit goes to Tom Dowd. There again, good music is good music. The basic elements have to be there, comprising rhythm and intonation. Those are the two things; it's got to be in time and it's got to be in tune, whether it's 'How Much is that Doggie in the Window?' or 'Got My Mojo Workin''. Whatever it is, it's got to have those qualities, and then there's the general quality that people never talk about; it's called sonority, and that is the way the sound leaps off the record and goes into your ear. As [jazz guitarist] Eddie Condon once said, "Do you want music pouring into your ear like honey or do you want it to come in like broken glass?". So, intelligible lyrics, a good hook, a good rhythm pattern, a good melody—that works. It worked for Bing Crosby and Perry Como just as well as it might have for Neil Young.'

During the course of a florid and eventful career, Jerry Wexler worked with heroes from an earlier generation as well as numerous younger talents that he would come to admire. Given the



Jerry Wexler with Sam Philips in Memphis

multitude of abilities and musical styles that these people have encompassed it would be futile to start comparing their talents, yet Wexler's appreciation for the opportunities that came his way—from projects with blues luminaries such as T-Bone Walker and Jack Dupree to those with soul giants like Solomon Burke, Aretha Franklin, Wilson Pickett and Ben E. King—is as tangible as his regrets over the ones that fate swiped from his grasp.

'Otis Redding called me a week before he went down in that plane,' he recalls. 'He said, "I want you to do my next album", and I said, "Otis that could be very political. I don't want to have any problems with McLemore Avenue [Stax Recording], with [owner] Jim Stewart and everybody". He said, "You won't". I said, "Well, how come?". You see, the Stax sound was a fantastic thing, and Otis and Steve Cropper had really milked it. Now he wanted another >

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◀ sound; he wanted the sound that we had behind Wilson Pickett and Ray Charles and Aretha Franklin. There was a different kind of beat and a different way in which the horns were stacked. So we talked about that, but then he went under... He was one of the greats.

T-Bone Walker was probably my favourite blues player. I love the architectural structure of his solos. Every phrase has shape, every phrase is a coherent statement of its own as opposed to, for example, the overwhelming majority of rock guitarists. T-Bone represented a deeper thrust into the blues than what you might call mundane rhythm and blues. He played Texas blues, which was a form in which other instruments were involved, and there were also jazz influences in his playing.

He was of a vintage where blues men played in juke joints or after-hours joints where workers came from turpentine camps or from cutting sugar canes. They came in for a good time on a Saturday night and that music was for dancing, so it might involve a drum and a piano as well as T-Bone's guitar, as opposed to the straight Delta blues men such as Robert Johnson who didn't play in combination with other instruments as a rule. Nor could they be danced to because of the constant shifts in scale signatures, time signatures and so on. I mean, a Delta blues player—an early Muddy Waters or early Elmore James—

being free to go wherever he pleased, might play 20 different licks in one go, any one of which could be a rhythm pattern for a whole record.

'Champion Jack Dupree, on the other hand, was really more of an R&B man than a bluesman. There were very few piano players who played solo without another instrument; with a few exceptions most of them were part of a band.

'...an early Muddy Waters or early Elmore James might play 20 different licks in one go, any one of which could be a rhythm pattern for a whole record'

Well, the session I did with Jack Dupree, 'Blues From the Gutter'—and you've got to believe me, it took a lot of courage to use that title in those days [1958]—featured a combination of blues and jazz men. The alto player Pete Brown would alternate between 52nd Street, playing with jazz people like Frankie Newton and Hot Lips Page, and the fleshpots of Newark for the low-down New Jersey blues. At the same time you also have to remember that in Champion Jack there were a lot of New Orleans influences, and there were very few solo

pianists in New Orleans except for people like Stack-A-Lee Archibald [real name Leon Gross]. So with Jack there was a whole mixture.

'Working in the studio with these old-time blues players was difficult but doable, because they were very amenable. They wanted to do everything they could, although not specifically to please me, because I always viewed myself as a man who was serving the project, and I always hoped that this came across. I was there to serve them, and I think that they felt it. Trust was very rarely an issue. It was more of a concern when I went south to Memphis and Muscle Shoals and started to work with the players there, because this was like repeat activity; I'd be back time and again working with the same cadre of wonderful Southern musicians, and it was necessary for them to really build up some trust in me.'

Which they did. On Beal Street in Memphis there is now a Blues Walk of Fame where gold notes in the pavement are engraved with the names of those who have immeasurably enhanced the artform on either side of the control room glass. So honoured at a recent ceremony was Jerry Wexler, alongside Sam Phillips, Steve Cropper and Little Milton, and for JW it was one of the most emotional and happiest occasions I've experienced. You know, I've gotten a lot of hardware—Grammys, the Rock >

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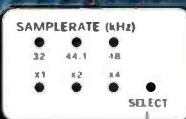


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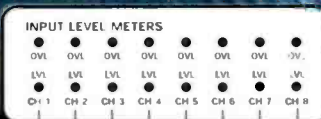
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< & Roll Hall of Fame and so on —but nothing's touched me as much as this.

"Working at Muscle Shoals was by far the best period for me, from the mid-sixties through the seventies. I feel that going to Memphis and Muscle Shoals and watching the way that they made records organically, inductively, from the bottom up, taught me what the components of a piece of music are. I didn't even come close when we had all of that success in the fifties and early-sixties. I think my understanding was broadened and deepened so much by watching records being made from scratch rather than deductively from written arrangements. Oh man, it changed my life. There was such an interaction between me and the musicians, and there was never anything like it in New York or LA."

So the move down South must have been something of a culture shock...

"It was more of a culture shock for them than it was for me. Like "Who is this Jew carpetbagger coming down from New York to tell us how to play our music?" But you know what? There's an abiding love now. That's very important to me, and this induction into the Blues Walk of Fame was sort of a caper for it." ■



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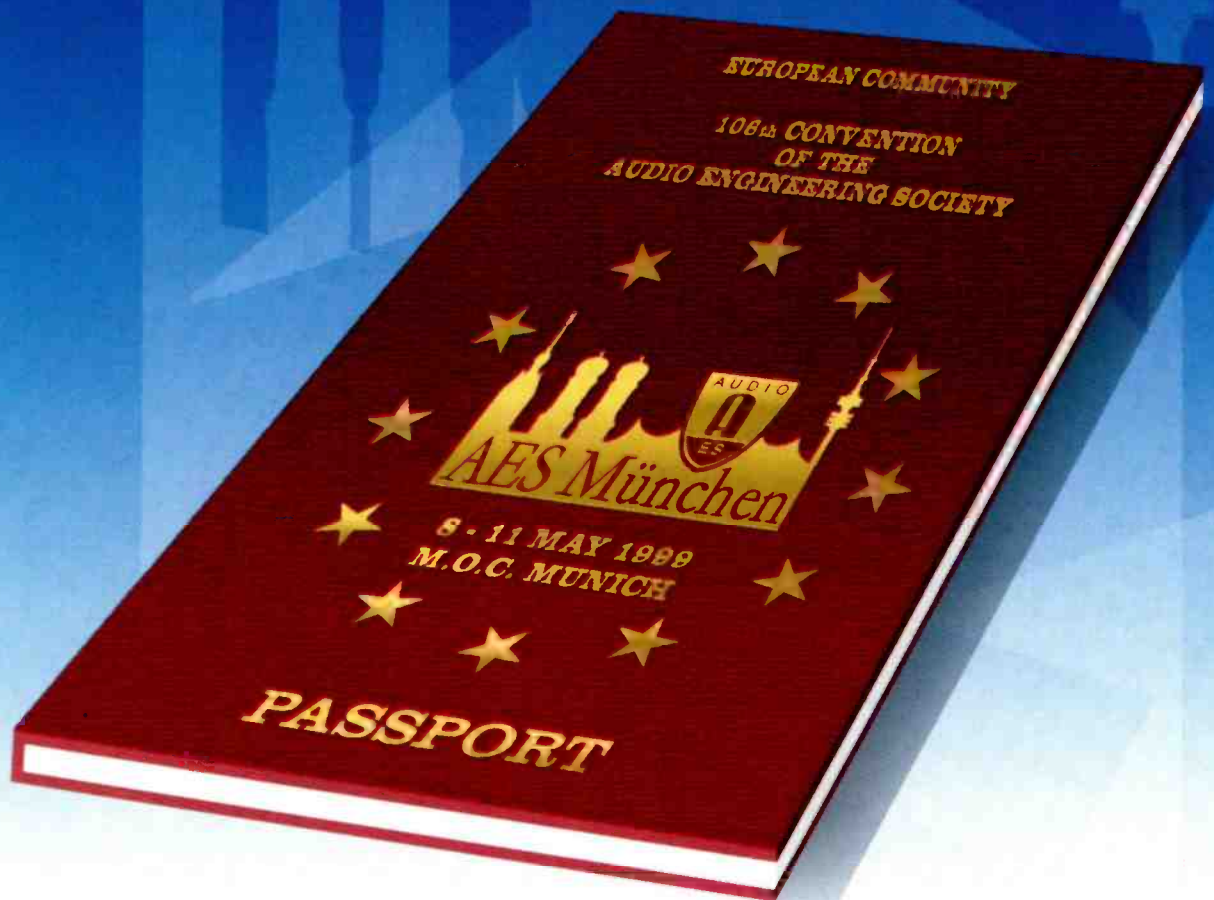
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# The Canford Audio ZERO

With forthcoming European legislation ready to paralyse broadcasters' existing vehicle fleets, a new means of city transportation is long overdue. **Neil Hillman** scores with ZERO

**R**OLLED OUT QUIETLY at last year's IBC in Amsterdam—the home of European cycling—the Canford Audio ZERO bicycle was launched. It was, however, to little press acclaim and received, at best, sparse coverage. But the implementation in January 2000 of the EU missive combining the Machinery Directive (89/392/EEC) and the concluding recommendations of the joint EU-EBU working group (EIEIO) may redress the situation. The recommendation to enforce on member-state broadcasters a zero-emission policy for news-gathering within a state capital by the year 2000 has focused attention on this shrewd and far-sighted addition to the Canford Audio range of broadcast products. More to the point, it has left national broadcasters with little time or choice other than to comply, or risk considerable punitive action; which for repeated violation of the EU-EBU emission directive (EBU/98/666/EEC) could mean the jamming of satellite distributed programme material, where such signals 'footprint' over other member territories. It is not a scenario senior personnel at the BBC—among European executives—care to contemplate. There has been enough blood-letting within the organisation over the prising away from established programme-making departments of considerable resources to sup-

port the cash-hungry but mostly unwatched News 24, along with its other forays into digital broadcasting. It would appear then that while the digital domain and 'Y2k' computer compliance had been uppermost in the Corporation's mind, other far-reaching legislation had been overlooked.

Enter then the Canford Audio 'Zero-Emission Rapide Ordure', or ZERO, for final field-trials with the BBC News and Current Affairs department in London. In brief, the ZERO is a low-gravity carrier bicycle manufactured from full broadcast specification heavy-gauge tubes and lugs, equipped with special heavy-duty fittings, an extra large front tubular basket carrier and a front swinging stand; but it would seem that it offers much more than just this.

The bicycles are hand-built by Pashley in the original 'Granville' style, in Stratford-Upon-Avon, England: the home of William Shakespeare. As a boy Shakespeare would deliver the famous Anne Hathaway's cottage pies and provisions from the local shop to homes in Stratford on a cycle similar to this, an experience he would later write about when describing his first day in the saddle through the words of Bassanio in the *Merchant of Venice*—'What demi-god hath come so near creation? Move these eyes? Or whether, riding

on the balls of mine, seem they in motion?'

Thankfully, posterior comfort has come a long way since those early 'sphere-shaker' saddle-rest days, and today's technician can enjoy bliss in the seat thanks to the Brooks 'push-pull' saddle, in effect a negative feedback twin loop of spring-steel, that in the words of the brochure 'takes the rock out of rocks and puts a roll round the hole'.

The ZERO's high tensile tube frame is brazed—as welding could leave the joints too brittle—at a temperature of 900 Celsius into the Whiteheart malleable cast iron lugs. The D-section rear stays are firstly swaged, and then trapped and pressed with the time-honoured method of bolting-on used for attaching the seat stays. Heavy chromium plating on the seat pillar results in a diameter of 25.8mm. The similarly swaged, trapped and pressed D-section front fork blades are brazed into a cast fork crown housing a Reynolds steering column and in turn a pair of North Road handlebars, with integral stem. High efficiency roller lever and rod operated brakes are fitted with leather faced blocks which ensure optimum stopping in wet weather, irrespective of how heavy the load being carried.

Power is fed through two 4-inch synthetic rubber block pedals with  $\frac{9}{16}$ -inch axles onto the chromium plated steel chainwheel from >





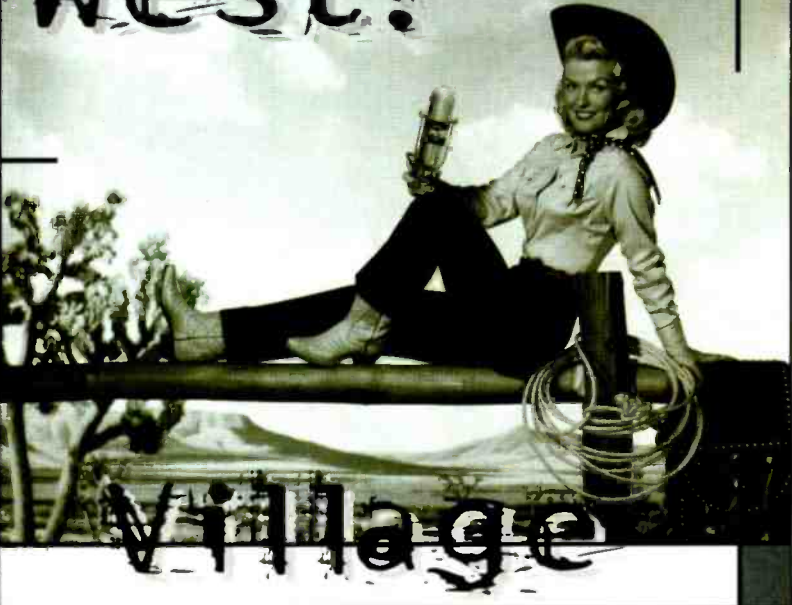
< cotterless cranks and a SKF bottom bracket unit. The BSC thread of 1.370-inch x 24tpi gives compatibility with most other bicycles, ensuring down-time awaiting spare-parts can be all but eliminated, an important consideration for fleet managers. The final drive transfer is via a 108 link, 1/2-inch x 1/8-inch heavy-duty roller chain with a spring link connector. The rear driven wheel is 26-inch x 1.75-inch running a chrome steel hub with a set of loose balls running in cup and cone bearings and a twin pawl 1/2-inch x 1/8-inch freewheel. Alternatively, 3-speed gears are available as an optional extra for those who appreciate more performance.

Both the front 20-inch x 1.75-inch wheel and the larger rear wheel have 36 spokes, laced three cross to minimise wind-up at speed. A nice touch here is the quality of the chrome-plated brass nipple fixing each spoke to the rim. Heavy duty mudguards with double nutted stays protect the rider from having to endure the distinctive 'wet-weather wash' worn all day on the back of clothes when cycling in the wet on a bike with an insufficient rear wheel cowling. A smaller, but similarly effective, front mudguard protects the tops of socks when holding tucked-in trouser bottoms if cycle clips are preferred not to be worn on location.

Optional extras available include a substantial wicker basket (650mm x 460mm x 340mm) for the front carrier, a choice of colour finish to theme with the station signage or livery and the logo which may be displayed on the cross-bar name plate, and a chain guard

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to protect trouser bottoms from turning Chino-cream to 501-black within the space of one short journey.

The specifications make for impressive reading, but what of actually riding the device? Manoeuvrability is paramount for these kind of operating conditions and the ZERO, with its low centre of gravity, certainly gives the impression that whilst 'wheelies' and 'stoppies' would be foolish in rush-hour traffic with a full load of gear in the front basket, what went on out of hours or on the way home from work with an empty basket might be another thing altogether. Once the initial desire to over-steer the small front wheel is mastered—in just a matter of moments—the riding position feels very natural, comfortably upright, and even with the front carrier loaded with equipment handling remains neutral and intuitive, although a firm hand is needed at lower speeds around town. Within minutes of mounting the bicycle my mind had drifted off as to what might be for tea that night; until abruptly shocked into the present by squarely meeting the crossbar after slipping a gear while standing up on the pedals to attack the steep gradient of Harrow-on-the-Hill. Still, had I been riding the optional ladies version of the ZERO—an open frame design without a crossbar and nameplate—I might never have been able to sing 'Climb Every Mountain' again.

Clearly we may yet see hordes of television technicians moving a-la paparazzi, *en masse* from one story to another, within the great European cities—a welcome vision to

quicken the beating heart of many confirmed conservationists not just here in the EC, but in other increasingly grid-locked major world cities interested in following Europe's inspired and courageous lead. The EU-EBU case is compelling; the two most debated sources of air-borne pollution fall at the wheels of the motor car and its exhaust emissions. Acid-rain gas is created by organo-metallies like sulphur and other impurities present in fuel after it has been 'cracked'; a process that has the particles in the fuel being attracted to nitrogen oxide which may then partly transform to nitrogen dioxide at a high temperature. Hot-house gas carbon dioxide is a result of unburnt hydrocarbons, the 'food' of the fuel; and lets not forget the odourless, colourless and deadly carbon monoxide. Balance this against a vehicle exhibiting none of these traits.

Perhaps though, while not renowned for their altruistic natures, news organisations will willingly embrace the legislation when they examine and consider the fall in average speeds within London over the last 35 years; and how this factor could compromise their ability to be first with a breaking news story. In the 1960s you might expect to cross London at about 20mph—now the average peak-time speed is 8mph; the speed of transport in the nineteenth century. Journeys are now measured in time rather than distance.

It is entirely fitting then that the last words should be given over to the great bard and



inveterate cyclist himself, William Shakespeare, who on arriving at the court of Elizabeth I after riding from Stratford to London along a route later to become the M40, removed his wrought-iron 'bicke-clippes', bowed deeply and greeted the monarch with a quotation from his latest play, *As You Like It*: 'I pray you, do not fall in love with me. For I am falser than vows made in wine'.

To which I raise my tankard and I wish you: Salut! Chin-chin! Prost! ■

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# Shakespeare in Love

Offering an alternative insight into the working methods of the Bard, *Shakespeare in Love* challenged hard for cinema's most coveted awards. **Kevin Hilton** goes behind the scenes, behind the scenes

**I**N A CINEMA WORLD dominated by special-effects blockbusters, it does the heart good to see two historical costume dramas in the running for clutches of Academy Awards. Most surprisingly, one even challenged the aural armory of *Saving Private Ryan*, *The Thin Red Line* and *Armageddon* in the Best Sound category. But *Shakespeare in Love*, in company with *Elizabeth* (Studio Sound, November 1998), has made history hip and proved what some movie buffs have known for some time—that there does not have to be a conflagration every five minutes for a film to have interesting sound design.

The Best Sound nomination at the Oscars is merely one of 13, a feat more or less duplicated at the BAFTAs. Also challenging the blockbusters were Gwyneth Paltrow for Best Actress, Geoffrey Rush for Best Supporting Actor (to go with the same nomination for his role in *Elizabeth*), Best Director (John Madden) and overall Best Picture. Last year's multi-nominated, multi-winning *Titanic* may have had a historical basis, but *Shakespeare in Love* is also a romantic comedy, a genre that has proved notoriously unrewarding in the awards stakes. To further hamper its chances, it is a British picture, albeit one made with American money.

Still, its quirkiness—which doubtless comes from being scripted by Marc Nor-

man and Tom Stoppard, whose deconstruction of the Bard goes all the way back to his play and later film, *Rosencrantz and Guildenstern are Dead*—may see it through. The plot: struggling in his career and personal life, Will Shakespeare (Joseph Fiennes) is stalled on his latest work, *Romeo and Ethel, the Sea Pirate's Daughter*. Impressed by an elusive actor called Thomas Kent at a premature audition for the play, Shakespeare later falls in love with Viola de Lesseps (Gwyneth Paltrow), who inspires his writing. Complications pile up: Viola is betrothed to a lord (guaranteeing the attention of Queen Elizabeth—played by another Oscar nominee, Judi Dench) and is revealed to also be Thomas. As women at that time were forbidden to tread the boards and female parts were taken by men, she disguised herself as a man, prompting the classic line, "That woman is a woman!"

Shot in entirety at Shepperton Studios—where a replica of the Rose Theatre was built—it was decided to carry out the sound rerecording and a good proportion of the track-laying there as well. This was due to the long-term working relationship between producer David Parfitt, a former business partner of actor-director Kenneth Branagh, and dubbing mixer Robin O'Donoghue, who spent 20 years at Twickenham Studios before moving to Shepperton two years

ago. He now works in the Korda Theatre, a dubbing suite that was built around his requirements.

The floor sound was recorded by Peter Glossop, who is noted for his innovative approach to his work. Dialogue was laid down onto the eight tracks of a Tascam DA-88, giving the sound editors and rerecording mixers a choice of the overall boom mic and individual radio mics. This took up seven of the eight tracks, with the eighth for a final mix. For safety, Glossop also backed up onto trusty Nagra. Supervising sound editor John Downer comments on this technique. "Fifty per cent of the time the mix was great. Other times, we went back to the individual tracks. Overall it gives us a fantastic variety; although it does mean that the dialogue editor [in this case Sarah Morton] has to work through all the different tracks, which is time consuming."

Robin O'Donoghue adds that this technique gives flexibility in a shoot that was dialogue heavy, where a number of actors would be talking almost all at once. "On Track 1 of the Hi-8 we had the boom mic," he says, "and then the radio mics pre-fader. If an actor popped in a good ad lib or made a nice grunting sound where it wasn't scripted, we still had it pre-fader even if it wasn't picked up properly by the boom." Downer points out that it works for technical problems as well: "If there were phasing problems in the mix, with different mics doing different things at different times, we still had the discrete inputs, which is great if you've got the budget for it."

The result is to limit the amount of ADR work needed at the rerecording stage, although the actors are always booked for this after the main shoot just in case. "Sometimes there can be crackle on the mics," says Downer, "but it's rare. We had very little ADR for a picture of this size, but it was shot anyway. If we hadn't, we would have regretted it." O'Donoghue estimates that there was 98% original sound on the whole movie.

Postproduction sound started in July 1998 and ran for around 18 weeks. Downer, concentrated on the effects, working with a small team of three—Sarah Morton, ADR editor; Brigitte Arnold; and Foley editor, Howard Eaves—at Anvil Sound Studios, based at the old Denham film studios in Buckinghamshire, before moving to the then Miramax offices in the West End of London and, finally, Shepperton. Each worked on a Waveframe workstation, which has the ability to perform an 8-track auto-conform, rewriting the EDL and selecting what is needed.

"The workstation automatically conforms as is on Track 8," explains Downer, "so it's a question of looking and seeing, because, on this kind of film, a lot of the mics cross over each other. Any extra track laying we did was to



make the voices come through and make the set sound like it is in the centre of late 16th century London.' Downer adds that John Madden, the director, wanted the audience to be aware of the city when it was appropriate, but, in scenes set in the Rose, he wanted the focus to be on the theatre.

Downer says that Madden was 'very hands on, in terms of what sounds he wanted' and has definite ideas about sound. O'Donoghue, who had not worked with Madden before, confirms this. 'With directors you have worked with before, you know their tastes but with someone like John, you have to find out what they want. When I do the pre-mix balance, which is often done without the director there, I like to have it in pretty good shape for when the director comes in, although it can be adjusted before the rebalance. This stage is useful because you find out what the director likes; for example, I tend to use a lot of reverb and some directors don't like that, they prefer it clean.'

The sound design for *Shakespeare in Love* is a busy one with, where appropriate, animal noises and plenty of crowds. Post precision extended to working out how many horses were in particular shots and what kind of shouts and calls would be appropriate for the era. This involved Sarah Morton researching through both history and period cookery books to check how life was lived at the time. 'This was all worked out ahead of the rough dub,' says Downer. 'The idea was to make people aware that this was 16th Century England, but not at the expense of the drama. It had to be subtle, not brash—although there were times when we wanted it brash.'

Brashness came at obvious cut points, with the sounds of carts and horses being used to carry across edits. One aspect that is certainly not brash is the use of surround sound. Downer felt that over use of surround would draw attention away from the other elements. 'It would be distracting to have chattering behind the audience,' he explains. 'Surround is generally better for big-bang movies, it's not really appropriate for historical drama.'

O'Donoghue concurs, saying that he does not like 'gimmicky' surround. 'I don't put anything in the rear that wouldn't be in the front,' he says. 'I never use discrete sound in one loudspeaker. If you have something like a cheer, the only difference between the left and right ear is a slight time delay. The idea of one sound in, say, the right ear or loudspeaker is unrealistic.'

The sound editors laid back 40 tracks of dialogue, which Downer admits is an unusually large number for this kind of movie. 'There was a lot of choice to be had,' he says, 'from the boom mic, the radios, the floor mix and the ADR.' The

effects were organised in eight stereo and eight mono groups, while there were a further 16 tracks of Foley, which occasionally rose to 20. Many of the effects were recorded on location; these were augmented with library recordings, both from commercial CDs and from the archive that Downer has put together from his time working on period productions, which are his speciality.

The first rough dub was mixed to a Waveframe at Anvil, but all subsequent mixes were carried out at Shepperton by O'Donoghue. Ultimately he was left with up to 32 tracks of voices, that had to be balanced and equalised, with reverb added for some scenes, particularly in the Rose Theatre. In addition there were 20 to 30 tracks of atmosphere. All these were divided into three dialogue pre-mixes (the main actors with multitrack reverbs for surround and a hard centre channel), foregrounds, five tracks of crowd noise (plus three of reverbs) and general, less detailed backgrounds and five to six effects pre-mixes.

All this had to be combined with the music, composed by Stephen Warbeck, award winner for his work in the category of Best Music, Original Musical or Comedy Score. This was recorded and mixed at CTS Studios by engineer Chris Dibble, who is usually based at Lansdowne Studios, part of the same group as the Wembley complex. Sessions took place during October and November 1998 in Studio 1 and continued Dibble's working relationship with Warbeck, whose credits include the *Prime Suspect* TV series and last year's surprise Oscar nominee, *Mrs Brown*, also directed by John Madden.

The score features a 70-piece orchestra and was recorded onto the studio's 48-track digital Studer, with discrete surround sound mixes being laid back in 20-bit onto a Genex 8-track magneto-optical recorder. Studio 1 is equipped for 5.1 mixing and is based around ATC loudspeakers. Unlike the model in America, where three mixers concentrate on different elements, O'Donoghue was the sole dubbing engineer, dealing with the dialogue, effects and music. 'It means that I'm not partisan,' he says, 'and the result is like one soundtrack, with the dialogue not drowned out by the music.' However, the music is relatively loud in some sequences, notably a montage where Shakespeare is working on the play and Gwyneth Paltrow is on stage and the end of the film. 'Initially John [Madden] wanted the dialogue to "surf" on top of the music,' recalls O'Donoghue, 'but it was almost impossible to hear both so we came back to a more realistic balance.'

The Korda Theatre is equipped with a Harrison MPC, the second such desk to be installed at Shepperton, and features an Akai DD1500 built into the con-

sole and 12 DD8s in the recording room. The room also features magnetic equipment to ensure compatibility and to avoid A-D conversion, the Waveframe tracks were downloaded onto Hi-8 and then to Akai hard disk.

O'Donoghue is a believer in making the first pass of the mix with everyone who should be involved in the process being there. 'We run through the whole reel,' he says, 'which is about 20 minutes long for each these days. This means that we can get a feel for the whole balance, which I automate and record. As everybody's ears are fresh, it means we have a good frame of reference for later, when fader creep might start to occur.'

Robin O'Donoghue says he is very pleased with the final balance, something that was validated by the Oscar nomination (shared with his assistant Dominic Lester and Peter Glossop), which was short-listed by his peers. The question is, as a member of the Academy, for which of his competition did he vote? ■



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Written to mark the 25th anniversary of the AES' Dutch Section, **Pieter Bollen** presents a history of the microphone as seen through the eyes of an avid collector

**I**N A WORLD without microphones, communication would barely exist. There would be no radio, no telephone and television would come with subtitling. To listen to music we would either have to attend concerts devoid of PA systems or have to drive to the city to listen to a barrel organ.

Microphones were first developed in the 19th century. In 1827, Charles Wheatstone christened his invention the 'microphone'. It was designed to amplify weak sounds but in reality it was more like a stethoscope. Electric microphones were first developed around 1875, when Graham Bell laid the foundation for the telephone using the electromagnetic principle. Siemens and Halske also developed their own versions, while Edison and Berliner obtained a patent for a reasonably sensitive microphone, which utilised the fluctuating resistance of carbon powder. The carbon microphone—'gruisbak' (waste bucket) in Dutch—was a substantial improvement given that it had a range of 150Hz–4kHz.

The big breakthrough occurred around 1920, when the first radio stations went on air, producing an enormous demand for high-quality microphones. In 1921, the American WC Jones succeeded in substantially improving the quality of microphones by developing the so-called double-button carbon microphone, later manufactured by Western Electric. In Europe, Eugen Reisz designed a carbon microphone with a speaking area of 38cm<sup>2</sup> and a frequency range of 60Hz–9kHz. This microphone contained a marble block measuring 120mm x 90mm x 40mm and was spring-mounted in a big ring. The secret to this microphone was a thin layer of a special mixture of carbon granules, a thin mica foil membrane and a transversal current flow between two electrodes connected to a DC power supply in series with a transformer. It cost 600 Reichsmarks at the time. This microphone, later known as the Reisz microphone, was the standard in many European radio stations until shortly before World War II. Many different models employing this principle were brought to international markets.

During the same period, the record and the film industries were also developing. The race for better microphones had started around the world. Brands started to appear in different countries—RCA, Shure and Astatic in the US; >



RCA ribbon mics including the model 77A from 1930



Ribbon mic, anybody? This selection includes AXBT, Coles 4038 and Reslo

< Lem and Melodium in France; Siemens and Beyer in Germany; Marconi and STC in Britain. These companies specialised primarily in ribbon microphones, a system that had already been postulated in 1910 by the German Reinganum. Based on the electrodynamic principle, these microphones employ a ribbed aluminium ribbon, approximately two thousandths of a millimetre thick, 5cm long, 4mm wide and held in place by a powerful magnet. A special transformer was mounted behind the system. RCA became particularly well known thanks to electrodynamic models like the 44B and the 77DX.

Thanks to its warm tone, the RCA 77DX remained popular until well after WWII. This model can still be seen in American talk shows or in company logos even today. In the Netherlands, too, microphones were being designed at the same time. Well-known carbon microphones and a number of excellent ribbon microphones were developed in the thirties and forties by Philips, in particular. Attention was also paid to the development of condenser microphones, of which only a minuscule amount was manufactured at that time.

However, it was Georg Neumann, previously employed by the aforementioned Reisz, who made the condenser microphone world famous after starting his own company with partner Erich H. This system was, incidentally, already common knowledge in the US in 1870. Neumann introduced the CMV3, equipped with M1 and M2 microphone capsules already in production prior to the establishment of the Neumann company. The CMV3 was nicknamed the Neumann Bottle due to its enormous dimensions. Its size was required for the built-in amplifier containing a massive vacuum tube, electrolytic condenser, transformer and connector. The tube, Telefunken's model RE 08 IH, was specially tested for this purpose and received the German authorities' stamp of approval 'geprüft auf Eignung für Kondensator Mikrofon'. This microphone also had a tremendous effect on the radio and film industries back then, as well as on the emerging recording studios.

During the Nazi regime the Neumann Bottle was given the nickname the Hitler Bottle, as two or three were used during his speeches: one to speak into and one or two placed near Hitler's boots to enhance the effect, when he stamped. The first available CMV3s were originally equipped with a capsule which was omnidirectional ('koplamp' or headlight). Later, it was available with interchangeable external capsules—the cardioid M7, the fig-8 M8 or the omnidirectional M9. By allowing the capsule to protrude, designers ensured that reflections between cylinder and capsule were avoided.

Research and development at Neu-

mann were practically non-existent during WWII and management moved to the factory outside Berlin. After the war, the company split into the West German Neumann and the East German Neumann Gefell (known later as Mikrotech Gefell).

In 1947, the West German Neumann introduced the U47, named after that particular year and still one of the best-selling microphones on the market today. The U47, equipped with a VF14 steel cylinder, was the first microphone with switchable directional characteristics—omnidirectional, cardioid or fig-8. The U47 was equipped with a high-pressure capsule for PolyGram and led to a stream of innovations including the M49, the M50, the U67, the KM54. The AC701K triode was added to the Neumann M49, K53, K54, K56 and SM69. The big advantage with this tube was its size—it measured a mere 10mm in diameter and 35mm in length. Other companies, including Schoeps, have often used this triode in their designs.

Telefunken and Siemens also sold a lot of these microphones not only under their own names, but also under other brand names, such as AKG and Schoeps. Every vacuum tube microphone had to be fed by an external power supply. The anode voltage required varied between 95V and 250V DC, depending on the model. I am aware of one other model with an M7 capsule, the RFT tube model manufactured in East Germany, which hooks up directly to the mains. Neumann Gefell continued to manufacture quality microphones during the era of the German Democratic Republic and used M7, M8 and M9 capsules for a long time. There was, however, one problem, especially immediately after the war: obtaining high quality raw materials.

The company is back under the name Mikrotech Gefell with models, which are high in quality and beautiful in design. During and immediately after the war, Mikrotech Gefell experimented with limited resources—even small loudspeakers were converted into microphones, whose cone was used as a membrane. The English were exceptionally good in this kind of conversion.

Many companies operating in England like Granpian, Teladi, LEM, Reslo, Shaftesbury as well as Tannoy built ribbon and dynamic microphones. Even a special silver hand-held microphone was designed for the Rolls Royce allowing the Lord or the Lady sitting behind the front wall to instruct her chauffeur. During Radio broadcasts from BBC's London studios, the ribbon microphone designed by the BBC and made by Marconi UK was used. This model is historically significant for the Dutch and Norwegians: their heads of state broadcast regularly from the BBC's Bush House studio during their exile in England. >



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A selection of Sennheiser mics including the MD421

< After the Second World War, everything recovered dramatically. Vera Lynn and Glenn Miller remained popular and the radio and record industries were booming and hence the demand for more microphones. Still, it was difficult to come by Neumann microphones, due in part to their steep price. Consequently, the Dutch Broadcasting Union (NRU) started to develop their own condenser microphones by using standard

components. It was Professor JJ Geluk, who initiated this development program, and FJ Van Leeuwen, who developed a number of models thanks to his expert craftsmanship. The capsules were developed by the NRU and manufactured by the Belle Company in Amsterdam. Contrary to many other brands, the membrane contained metal foil to compensate for the sensitivity to humidity during recording on location. While

regular tubes were used, the percentage of rejects was extremely high: only 20 out of 100 were suitable for use in condenser microphones.

The NRU not only employed its own microphones, but also RCA's ribbon microphone in addition to England's popular Standard Telephone and Cables (STC) microphones. Since approximately 1930, STC had been marketing a number of microphones for broadcasting, including its 4017A dynamic microphone for public address systems and studios, which was used extensively by the NRU and the Wereldomroep (Dutch world service). STC also marketed the 4021 reporter microphone: it had a flat acoustic screen, nicknamed the 'biscuit' and mounted onto a sphere approximately 6cm in diameter, which, in turn, was connected to the well-known signalling and communication box, the SICO. The reporter carried this box and wore a headset, through which he could monitor the programme and receive instructions from the studio or the broadcast crew on location. One of the best known models is the STC 4033, containing both a ribbon and dynamic microphone system in one housing, which could be used separately or connected in parallel. This design by Standard Electric, adopted by Western Electric as well as Altec, was particularly suitable for recording on location, as the wind cap

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was not yet invented.

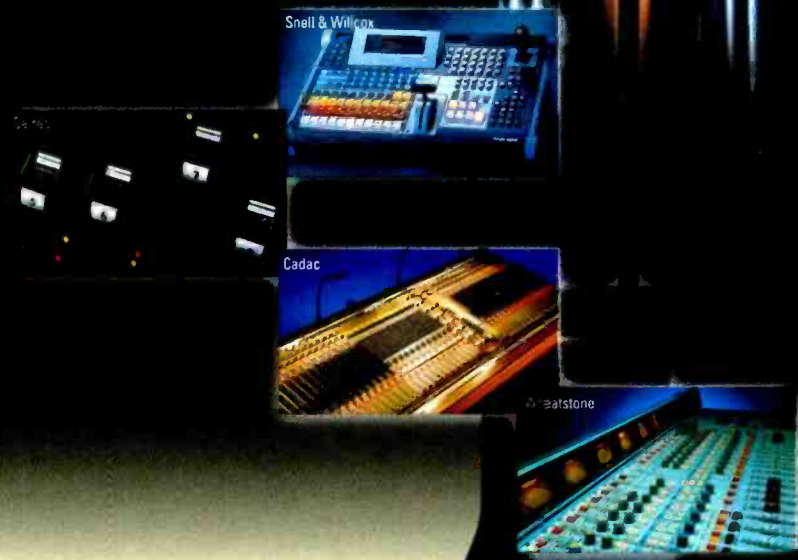
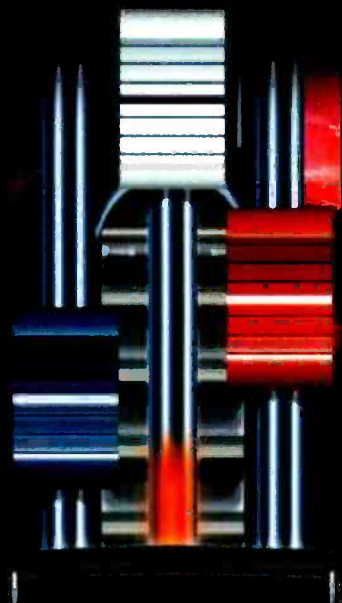
Having already earned a good reputation among professionals, the sixties saw Shure, Altec, RCA, beyerdynamic, Sennheiser, AKG, Melodium, LEM and Danavox start to concentrate on another emerging market: the growing demand for microphones specially designed for home recording. The crystal microphone or piezo transformer, usually inexpensive to manufacture, was the microphone of choice. It employed the piezo-electrical effect, the characteristic electrical charge created, when certain materials are deformed. This system was also used extensively in pick-up elements. In the Netherlands, the Ronette Company in Amsterdam specialised in and marketed an entire line of crystal microphones for the recording market and for public address systems. One of the best known is the B110, the Dutch aluminium 'bicycle light' model with a screw connector with its tin contacts, always causing such a terrible noise. Interestingly, this microphone was always used with a handkerchief during fairs or other events, but not to damp plopping noises. Every once in a while, metallic microphones, such as the first Ronette model, gave off a fair bit of static electricity, and on the sensitive lips of some unprepared reporter that was quite a shock, as amplifiers were frequently not grounded in those days. Hence the handkerchief as an insulating material, that is, as long as it did not rain. Ronette solved this problem by releasing a plastic version. The crystal microphone had to be protected against moisture anyway: it was possible that certain vocalists could severely alter the frequency range during one of their numbers due to the moisture escaping their lungs.

After the war, Philips also concentrated more and more on tape recorders and public address systems. Dynamic microphones had replaced ribbon and crystal microphones. The EL 600 line offered many high-quality models. Around 1955, the EL6031 'tulip' or tulip appeared. This hyper-cardioid microphone's element was also used in other models. Approximately five million of these elements were manufactured. Philips ordered EL6050 studio condenser microphones, used by various well-known Dutch artists, originally from Schoeps in Germany, and later from AKG Vienna. Philips owned 25% of AKG in the beginning and eventually increased its stake in the Austrian company to 51%. Two of the most important developers at AKG were Herr Gorike and Professor Bernhard Weingartner. Herr Gorike developed the well-known ADG D12, while Professor Weingartner, directly accountable to the Philips head office in Eindhoven, personally developed many products. He developed, among others, the dynamic 2-way system, such as model 202, the >

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Neumann mics including the CMV3 (far left)



Assorted Shure mics including the '55 made famous by Elvis (centre)

< first modular condenser microphone based on the CMS system, grainy microphone exterior, also damping popping noises, the Kardan suspension for headphones, the first plastic artificial head microphone, nicknamed 'Harry', and a microphone with a built-in spring reverb system. Although Professor Weingartner started his own company, Neutrik, currently the largest manufacturer of audio connectors world-wide, in 1975, he continues to lecture in acoustics and microphone technology in Austria.

A number of designers such as Fritz Sennheiser, Georg Neumann, Eugen Beyer, Karl Schoeps and the Dutchman De Boer are well known throughout Europe. Fritz Sennheiser started the Labor Company shortly after the end of the Second World War. Sennheiser manufactured tube voltage meters, which he tried to sell to Siemens among others. Siemens happened to be looking for a microphone supplier for the German Rundfunk Anstalten at the time. Once Sennheiser Labor was commissioned, it copied the Siemens MD1 model before designing the MD2 and later the MD4 on its own. In 1954, the MD21, the best-known reporter microphone, was presented to the world under the Sennheiser name. Both the MD21 and the MD421, introduced six years later, are still on the market today. This is unprecedented, certainly in the audio industry. It is obvious that a terrific product was developed back then. This was also true when the MD211, an omnidirectional dynamic microphone measuring approximately 22mm in diameter and 120mm in length, was brought onto the market.

Microphones, including the MD211, have been used many times in emergencies. For example, in the fifties, when 262 miners died in the mine disaster at Macinelle, Belgium, 17 miners were spared the same fate. Rescuers did not know at the start the exact number of miners, who were still alive in one of the mineshafts. A hole measuring approximately 50mm in diameter was drilled, into which the microphone was then lowered. The MD211's membrane was so strong that it was used alternately as a microphone and a loudspeaker. By making contact with the trapped miners in this way, the rescuers were able to determine that 17 of them were still alive and were rescued thanks in part to the small but powerful MD211. Afterwards, Sennheiser quickly established itself as the world leader in microphones and expanded its product line with the first Microport headphones and condenser microphones, then still powered via the signal line. In 1991, Sennheiser bought out the Neumann Company.

AKG and beyerdynamic, like Sennheiser, also concentrated on a wide line of products. beyerdynamic, for example, still manufactured ultra-high quality ribbon microphones. Eugen Beyer had started manufacturing movie theatre sound systems in 1924 in Berlin. The

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DT48 dynamic headphone, developed in 1937, made him world famous, which, incidentally, can still be purchased and is used extensively for hearing tests. It was in 1939 that beyerdynamic developed a dynamic microphone, the M19 model, which was particularly suited in those days for studio recording and location reporting, especially after having passed a drop test from two stories high.

From the start of his company in 1948, Karl Schoeps has specialised in condenser microphones. His 'spoon' models are well known. Initially, Schoeps developed microphones primarily for companies like Telefunken, Siemens and Philips. In 1972, under Jorg Wurke's management, the company joined the AES and the VDT and started exporting abroad, primarily to France, where more than 50% of Schoeps products were shipped. The company has always specialised in small membrane microphones, which has definitely led to its success: Schoeps is the third largest company in the world behind only Neumann and AKG. Europeans have the right to be proud of all these pioneers, who have contributed greatly to the development of microphones and their accessories and were, consequently, international trend-setters.

Finally, the Philips EL6040, a long shaft-like microphone, became known as the 'Philips penis'. While I was showing Dr Frits Philips my personal collection, I discovered that he did not know the nickname of this particular microphone. After I told him, he grabbed my shoulders and said, 'Nobody has ever dared tell me this!'

A careful survey of the current market will indicate that all kinds of old models like the STC 4038, the Shure SM59, the Sennheiser MD409N and the RCA 77DX are being manufactured again. All of the aforementioned names, in addition to a number of new competitors, are once again available in one or two models. The industry is returning to its tubular roots; in fact, it almost resembles a tube revival in the hi-fi branch. Designers do not understand: 'what can they hear that we can't measure?' But as long as the difference is immeasurable or power stations continue to burn natural gas or coal, the laws of nature are still applicable. Therefore, only one rule is valid—choose the right microphone, position it correctly, and place the instrument in a room that is acoustically sound. The 'old boys' knew this back then, and sound engineers still know this today. I invite you to compare a good, 50-year-old recording to a new one. It's obvious that we should respect the people who developed microphones 50 years ago, an era of worthwhile digital audio recording is impossible to imagine without their contributions and their microphones. ■

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A new mic system that can handle string instruments in a rock environment?

**Simon Croft** believes ears

**H**E BEGAN as a rock 'n' roller before going on to prove he can sing just about anything. Sir Cliff Richard may be a national institution and an international star, but the sheer musical range of his recent tour called for some innovative miking techniques. Imagine if you will, a 56-piece orchestra, a rock band, a vocal ensemble, and, of course, the great man himself. Now imagine taking that line-up to Australia and New Zealand, before ending up in the UK at that splendid, but acoustically-eccentric venue The Royal Albert Hall, where Sir Cliff literally packed 'em in all the way up to the roof.

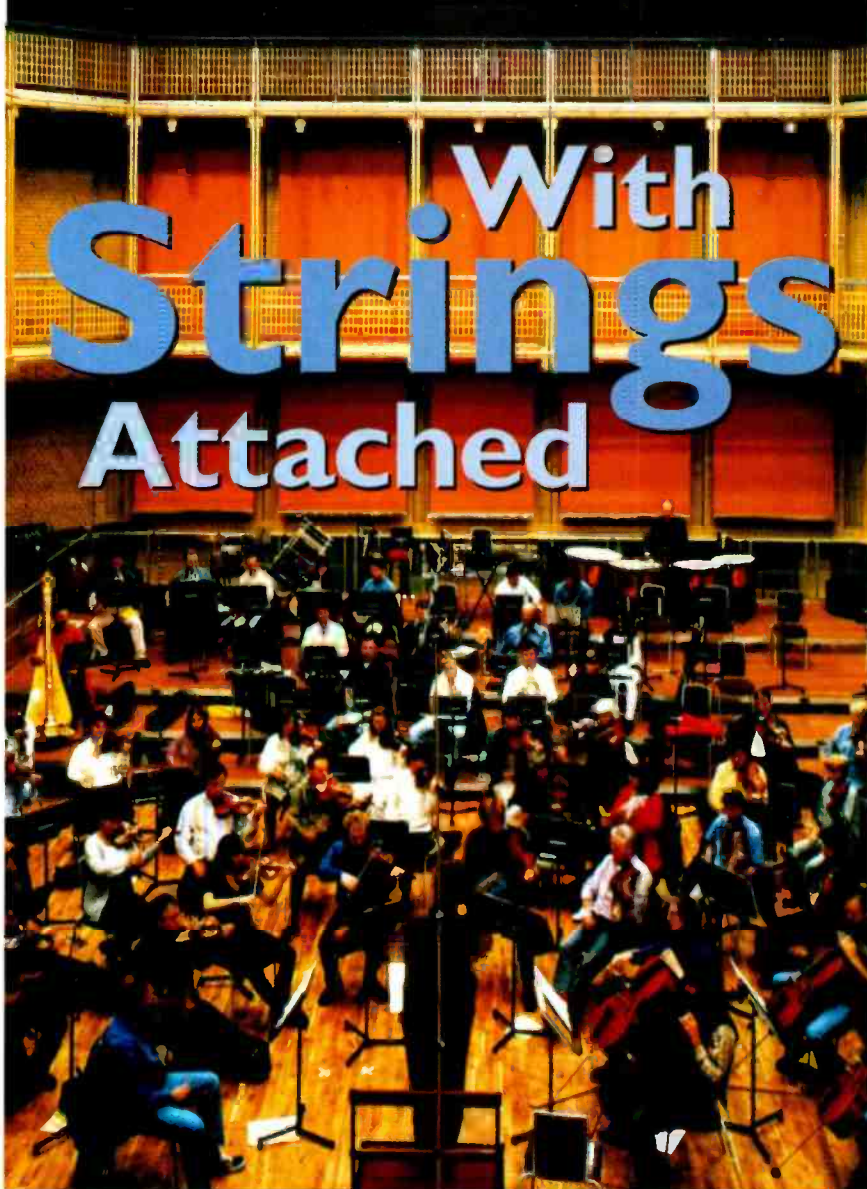
Enter Keith Bessey a sound engineer who has worked with Cliff Richard for 17 years, primarily in the studio, but also on live albums and the remastering of the artist's extensive back catalogue. 'The need was to create a full orchestral sound, but within a rock type of environment,' Bessey explains. 'Cliff's material goes from full-on rock 'n' roll numbers to standard classics, like "Every Time we Say Goodbye" by Cole Porter and "Softly as I Leave You", which is a big orchestral number.

'With the variation in all that, we wanted to have the control to do what I needed to do within the mix. And not make it sound stupid, in the sense that when it is an orchestral number, they're kind of miles away over there.'

Bessey says that objective was achieved 'big time'. He adds, 'We're actually achieving sound levels of 104dB to 105dB very comfortably, not harshly, with no problems whatsoever. It's been very successful. We've had some enormous learning curves, but achieved something I believe to be very good.' So how is it done? The answer is: with an ingenious system developed by fellow sound engineer Greg Jackman, whereby a DPA4060 miniature microphone is placed inside the instrument, using a special clamp.

'Because Greg's microphones actually go inside the instruments through the F hole,' enthuses Bessey, 'the limitation of noise going down that microphone gives you about 10dB extra headroom to control the instruments. And the sound was the sound of the violin, the viola, the cello, even the bass. These tiny capsules can pick up frequencies down to 30Hz. It was quite remarkable—beyond expectations.'

Greg Jackman says his idea 'started out of necessity' when he was called on to combine orchestra and rock band at the Songs & Vision event at Wembley Stadium, about 18 months ago. However, he confesses, 'I'm a bit of a DIY nut and I used to build kit cars, so I tend



to look at things and see them as "donor organs". Past experience had taught Jackman that, 'Practically anything you try to strap above a violin is a waste of time, really. The difference in the volumes produced by a string section and a rhythm section, plus all the racket of the PA system means you are fighting against serious amount of sound.'

The idea of putting a mic inside the instrument is not a new one. In fact Jackman had been told that Barbra Streisand's band used the same technique. But Jackman's choice of mic was fortuitous and early tests with mics attached by Blu Tack convinced him he was on the right track. Even at this stage, 'It lacked nuance and it lacked air, but there was sound and it wasn't horribly boxy or dull.' Certainly, it was a more useful sound than a top-notch string mix that also happened to be 50% bass drum. Jackman took his idea to Olympic Studios, where the technical department helped to prototype the mounting system, while London Session Orchestra lead violinist Gavin Wright was invaluable as an enthusiastic—and unpaid—guinea pig. Bessey was sufficiently impressed to order a 45 mic system for Sir Cliff's tour, complete with clamps hand-built by Jackman. For the other orchestral

instruments he used AKG 419s and all these mics were fed into a Midas XL4, where Bessey created submixes for FOH engineer Tony Blanc.

In the Albert Hall a flown Flashlight and Floodlight system was used for 'performance in the round'. Even in the ambient venue, with proximity between audience, orchestra and speakers, the mic system held its own, Bessey affirms. 'The response has been, "Wow, isn't it lovely to hear the orchestra!" In the live scenario it sound almost as if they have been recorded,' says Bessey. 'They are so clear and clean—and you have so much control over the little nuances of the instruments—that it has an effect like they have been overdubbed. In fact, they're sitting there playing live.' The mic system continues to evolve. The latest development is the addition of an in-ear monitoring system to aid players' intonation. Bessey and Jackman are also exploring the idea of using the mics as a dry starting point for more adventurous string processing.

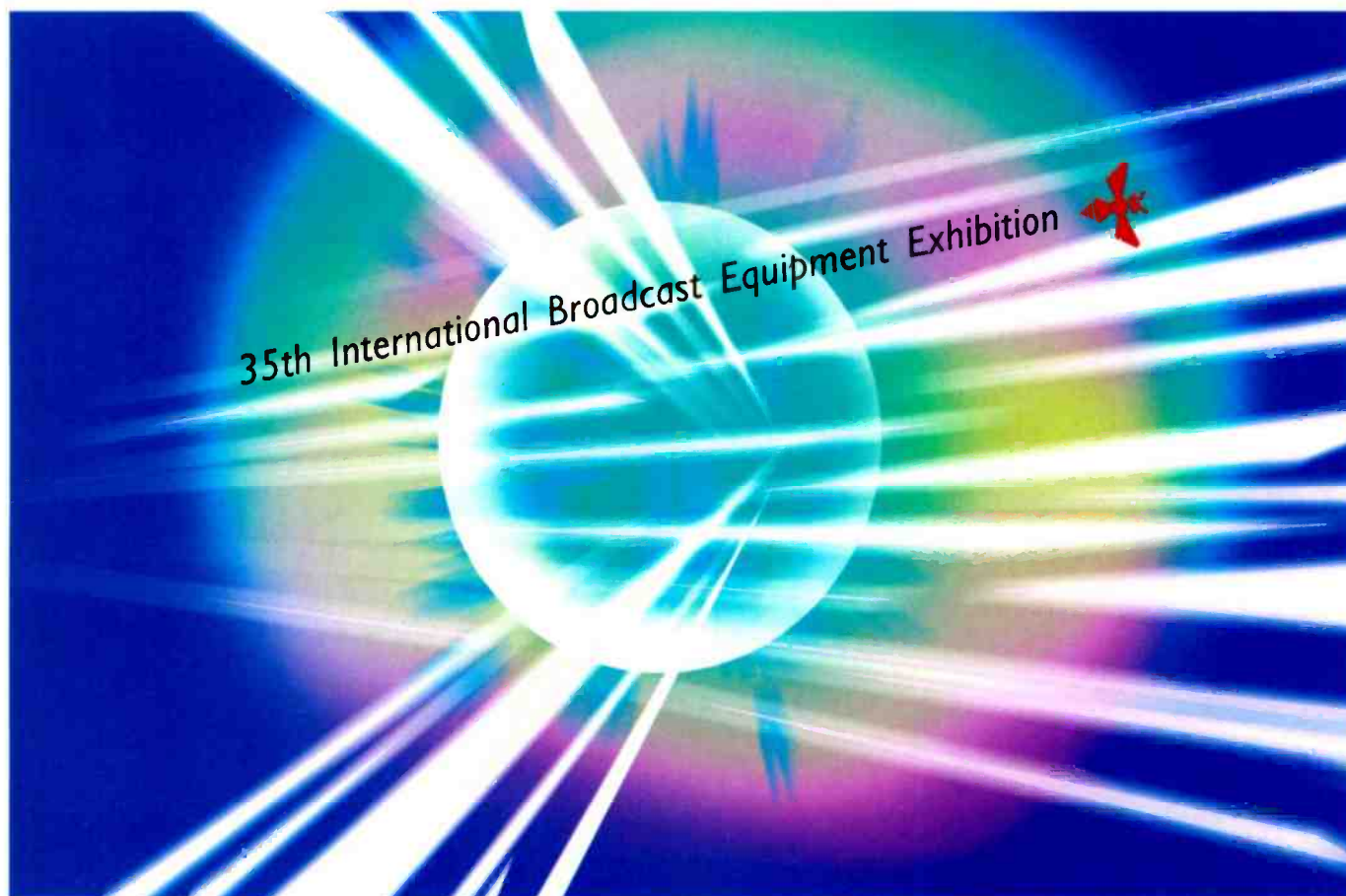
Jackman, who is happy to hire out his system for tours, concludes, 'I haven't really tried to sell this product. It's what they call a "dog with a note product": it's such a good idea, you don't send a salesman because a dog with a note will do!' ■



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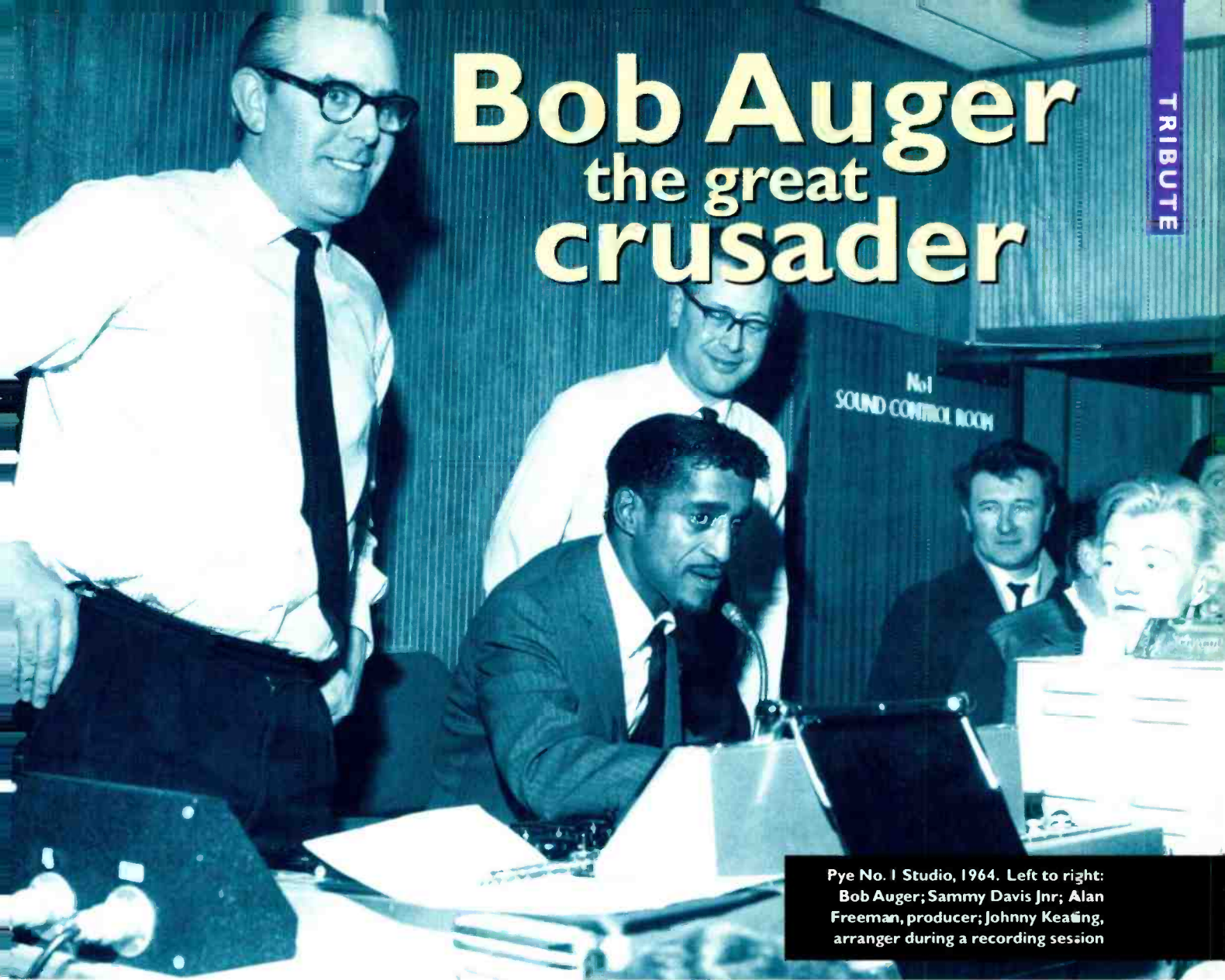
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# Bob Auger

## the great crusader



Pye No. 1 Studio, 1964. Left to right: Bob Auger; Sammy Davis Jr.; Alan Freeman, producer; Johnny Keating, arranger during a recording session

**A** 'MAGICIAN,' said Leopold Stokowski. 'He was amazing,' said Eddie Kramer. 'He was a landmark in my eyes and ears; someone who always got it right,' said Keith Grant. 'A legend for his unflappability and sympathy with artists,' said Tony Faulkner. 'He taught me a great deal about recording, but also how to cope with the things you don't find in books,' said Bill Foster. 'I admired him greatly,' said John Borwick.

To claim that it is difficult to find anyone with a bad word to say about Bob Auger sounds trite, but the list of eulogies and tributes offered could easily run to many pages. Such praise speaks volumes about his ability as a recording engineer but a former colleague, Ray Prickett, summed up in a few words, another remarkable attribute: 'Anybody who knew or worked for Bob would do absolutely anything for him'. Many of us who did work for him during his 42 years in the trade (as he preferred to call it) can relate to that. The influence he had on young engineers was also quite extraordinary and he inspired many to great things in their later careers.

Auger's passion was mobile record-

ing and this covered an enormous range of music and entailed building a studio from scratch at every venue. The locations were even more bizarre than the music and some of the rooms used for monitoring the recordings defied belief. He made literally hundreds of excellent studio recordings but it was all rather tame and controlled in comparison to life on the road. If you could handle this eclectic lifestyle, you would be able to record anything anywhere under maximum pressure. You would know where to put a microphone to record a symphonic instrument, a football crowd, a solo piano, a Leslie cabinet and Placido Domingo and that was all in one week. You also learned very quickly that it was advisable to be very economical with EQ when working in the foyer of Barking Town Hall or the vestry of one of the many churches that were used over the years. There was not even an egg box in sight never mind any lava rock and wooden panelling.

Bob Auger was also a pioneer in the use of stereo recording techniques, noise reduction, multi-microphone systems, quadraphony, digital recording and editing and would have doubtless

Bob Auger died on 12th December 1998 aged 60. Former colleague **Chris Hollebone** presents an appreciation of an inspirational recording engineer

welcomed the advent of music in 5.1-channel surround. He came into the business fairly late having been a booking clerk on the railways. His interest in music and recording was there from an early age but as an enthusiastic amateur. His first full-time position in a studio was in 1956 at Recorded Sound in Bryanston Street. He was quickly poached by Pye to work with the legendary Bob Fine, on a series of recordings with Sir John Barbirolli and the Hallé Orchestra. Fine had a profound influence on Auger because they were working in mono and stereo (and later 3-track) at the same time and the different microphone techniques became significant. Fine taught Auger more >



< than just recording techniques.

"He taught me to stand up for myself," Auger said. "He maintained that recording was a team effort, the producer was pretty important, the conductor was rather important and the engineer was bloody important. The engineer should be allowed to have a voice and was important on the day, not some chap in a white coat hiding away being told what to do. That's rather rubbed off and I am a bit like that myself today, not aggressive, but I do like it done my way if possible."

Pye started building an interesting catalogue with such conductors as Sir Charles Mackerras and Sir John Pritchard at the time Bob Auger's name began to be known for making exciting recordings. Early in 1960, he was approached to become Head of Sound at Granada Television. He ran into dif-

ficulties on day one because he was told that he was not allowed to touch the equipment unless he joined the ACTT. Granada was very poorly equipped in those days and there was some reluctance to spend much money on the audio facilities. Sidney Bernstein was firmly in charge at the time and one of his rules was absolutely no German equipment on the station. This meant a very restricted choice of microphones; echo plates and several other items were also forbidden.

Pye had decided to build a permanent studio in the basement of their office building in Bryanston Street. They contacted Auger in 1962 to ask if he would return to run the facility. Pye had three studios. Studio 3 was a small studio for DJs, Studio 2 was a cube for rock music and Studio 1 was large enough to accommodate a small orchestra. Pye

was slightly different from most other studios at the time in that most of its equipment was American. Ampex and Scully machines and a Scully cutting lathe with a Westrex head were rather different from the usual European equipment list. However, Auger was interested in new developments and Pye was an early Neve client and was the second customer in the world for Dolby A noise reduction. There was also the mobile equipment and before long Auger was persuading the Pye management to record some more classical music, even if it meant getting sponsors and subsidies. The results impressed and soon other record companies started to use this facility. Thus began a long association with RCA, CBS and Vanguard Records who booked seasons of sessions year after year.

This was the sixties and Pye was one of the major centres for recording the new wave of bands that was emerging. Bob found that he was in demand as a pop engineer as well. Top 10 hits with The Kinks, Georgie Fame, The Spencer Davis Group, Nashville Teens and a host of others followed. One of the decade's most notorious number ones was Millie's 'My Boy Lollipop' and even that bore one of the hallmarks of Auger's technique: it sounded bloody loud. Studio 1 played host to numerous sessions for film and television scores as well as having some of the great artists of the era visiting. Sammy Davis Jr., Barry Gray's score for Gerry Anderson's many puppet series, obscure Scandinavian groups, sessions with Andrew Loog Oldham, the range of music was staggering and recorded at a pace that would leave the engineer of today breathless. It was quite usual to have worked on six projects in a week and there was very likely a brass band session on Sunday with the mobile. Running the studio and engineering would seem to be plenty but he was also launching new labels for Pye, planning release dates, raising funds and anything else that was required. Pye Collectors, Golden Guinea, a brass band series, a sacred label were all driven by Auger. As Eddie Kramer recalled in a recent interview, "There was this tremendous variety of artists and music, and just by watching Bob, I learned a tremendous amount with regard to the basics. That's the kind of stuff that kids today don't know and probably don't want to learn."

Ken Attwood joined Pye in 1958 as maintenance engineer for the mobile and then worked with Auger throughout his time there. Attwood remembers an incident on the recording of Schubert's Trout Quintet for a television film that was repeated only recently. This quartet featured Jacqueline du Pré, with Barenboim, Mehta, Perlman and Zuckerman and was being recorded live on to a Nagra. The rehearsal was fine and

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the concert began. A few minutes in, the piano mic died. Bob's reaction was immediate; he carefully rebalanced the four remaining microphones and even I cannot tell where the problem occurred. I always regarded this as a supreme example of Bob's great talent as an engineer.

Things began to change in the late-sixties; bands now booked studios for weeks without any material prepared; the country was a victim of the Labour Government's Incomes Policy of the time. Auger was getting itchy feet and he was growing tired of the routine and he determined that he really wanted to do mobile recording all the time, with a healthy bias in favour of classical. The answer was Granada, who had ambitious plans to enter the record business at that time, who agreed to fund the operation. Equipment was purchased and staff recruited and one of those early candidates for an interview was a young Australian who had just arrived in England.

His name was David Martin who soon revealed that he was a truly multi-skilled person. He not only had a sound knowledge of electronics but he had a keen interest in music and proved to be very skilled in woodwork, making special boxes for transporting Neve modules.

A year or so later, Martin asked Auger if he minded him using the storage room for experimenting with loudspeakers because he had a theory that PA loudspeakers were not correctly designed for the modern rock band. London was full of cinemas that had been hastily converted to bingo halls without even removing the old equipment, so a small amount of cash and some determination would result in Martin and myself removing these speakers and cleaning them up for use. Martin was convinced that some refinement of this basic technology was the answer and coincidentally, Granada was asked to do the PA for a Dionne Warwick concert at the Albert Hall. Martin persuaded Auger that these cinema bins were the ideal solution. They were not even a matched pair but he was so confident that Auger agreed and they were shipped to RAH and set up. The sound was impressive and despite the comments about the size of the bins and the rather strange appearance, all seemed to be okay. The one thing that we all forgot was the shape of the building. It sounded terrific if you were in the best seats but the speakers were so directional, the audience on the upper levels could hear nothing. The abuse at the interval told the story so we retreated for a rethink. Eventually the world famous 'Martin Bin' was sitting there in front of us. Martin began to realise that his design needed exposure and as bands became interested, this started to conflict with his Granada work so he left to start Martin Audio.

The work continued with major classical clients but there were all kinds of

other assignments taking place. Lots of rock concerts, PA gigs, jazz, sacred music. The memorable events of those years are too numerous to mention but there were some particularly special ones such as the Isle of White Festival with Dylan & Hendrix, The Rolling Stones in Hyde Park, tours with Duke Ellington, Peter Cook and Dudley Moore, Shirley Bassey at The Talk of the Town, Buddy Rich Band at Ronnie Scott's, Mahler, 3 with Jascha Horenstein, Bing Crosby at The Palladium, Frank Sinatra and Bob Hope at The Festival Hall, Verdi's *Requiem* in the Albert Hall with Leonard Bernstein and many of these were quadraphonic recordings and some were for film or television.

Granada's plans for entry into the record business stalled and Auger sensed that a reluctance to agree to purchase a 16-track machine signalled that

they might prefer to sell out. He was right and after negotiating a very generous deal, we became Bob Auger Associates.

The timing was fortuitous because this was a frantic period of activity despite the 3-day week and the power cuts. BAA was working a 7-day week with a generator on standby, although by sheer good luck the power seemed to always be on. The generator operator, John Gott, became part of the usual crew and after the power crisis eased, he joined the staff full time.

The work was tending more towards classical as there were now dedicated trucks such as Pye, The Manor Mobile and The Rolling Stones more suitably equipped for doing gigs. Auger also used these and actually gave The Manor their first booking to record Mahler 2 with Bernstein at Ely Cathedral. Phil Newell, who had also previously >



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< worked at Pye, remembers the occasion well because there was a double booking. The only way that the two could be done was for the Manor crew to drive overnight from Edinburgh. They arrived exhausted, rigged the cathedral, checked into the hotel and booked wake-up calls. Film crews, TV crews, orchestra, chorus, offstage band, conductor, producer and engineers were all assembled the next morning, but the truck was locked. The night porter had failed to pass the message on about the alarm calls and Newell and the boys were still sleeping soundly. Auger let it be known that he was less than impressed but realised that there were mitigating circumstances and that the main priority was to get on with the job and to make up for lost time. Auger's lack of recrimination and positive attitude was an inspiration to Newell from then on.

Newell also tells a story that illustrates the respect and command that Auger inspired amongst musicians. The Manor was booked to record the orchestral version of *Tubular Bells* with David Bedford conducting and Steve Hillage on guitar. They asked for engineering support from Auger who decided that this was probably best left to me. Everything was set up as usual but the Royal Philharmonic seemed to be having an off day. Nothing sounded right, the orchestra was completely undisciplined, and



Opening of Pye No.1 Studio, 1963. Back row, left to right: Ken Atwood, maintenance; Eddie Kramer, studio assistant; Barry Reynaud, maintenance. Front Row: Bob Auger, John Snashall, tape editor; Ray Prickett, balance engineer.

the whole session was grinding to a halt. In desperation I called Auger to come over. He arrived and took one look at the layout of the orchestra in the hall and suggested that we make several changes, thereby alerting the orchestra that he had arrived. The next take sounded like a different orchestra and it was plain that Auger's presence had changed this from a 'hairy' pop session into a serious piece of music. The lost time was rapidly made up and the results were very satisfactory.

The same thing was to happen when Auger recorded Frank Zappa's *200*

*Motels* in the Stones mobile. The same orchestra was engaged and it has to be said that this movie was a little offbeat by any standards. I was there for much of the recording and I have no doubt that if Auger had not been in charge, the whole thing would have got wildly out of control. Frank Zappa always asked Auger to record every tour although we had terrible luck with him. The first night of a tour he was pushed off the stage at The Rainbow and broke his leg and there was the memorable occasion when the management at The Albert Hall decided that his concert was obscene and >

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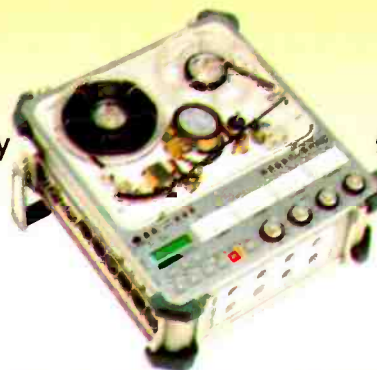
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< locked him out. We were on the inside and Zappa and the Mothers were outside. Zappa always paid up the cancellation fees without any argument; he was a remarkable character.

Bob Auger Associates initially operated from the Granada premises in Brixton Road but soon moved to Bob's house near Henley, where a large lounge had been built. The equipment was installed down one wall of the room with the Neve console on wheels that could be pushed to one side when the work was finished. The room was fitted out with permanent quad monitoring, a full complement of Scully machines with Dolby units and the EMT plate resided in the garage. This soon became a favourite place for editing and mixing for many of the artists and engineers, not the least of the attractions being the famous Auger hospitality and Monika's home cooking. Associates came and went but the client base remained diverse but increasingly classical. Unicorn Records were early purchasers of the Sony CD mastering system and this was based permanently with Auger. He had been one of the first people in the UK to use the original Sony digital processor, the PCM-1, which had no editing capability. This was the late seventies and although the technology was completely alien, Auger found it immediately attractive. The most important feature from the musician's point of view, was the lack of wow and flutter. Auger also liked the lack of tape noise and enjoyed the challenge of doing straight takes and recording direct to two tracks again. Sony introduced the DAE-1100 editor towards the end of 1981 and this naturally made the use of digital more practical. CD was just around the corner and the demand for digital recordings of classical works became the norm. Auger found electronic editing a joy and became a very fast operator.

Some work was also done with the Sony 3324, most notably the film score for *Greystoke* which was recorded to



Battle of Neretva Sessions, Barking Town Hall, 1969. Bernard Herrmann and the LPO. Left to right: David Martin, LPO member; Gavin Barratt, Producer and LPO member; Brian Snelling, Bernard Herrmann and Bob Auger LPO member

picture in a church in Tooting. Two machines were used for safety and these were locked to a U-matic which was projecting the cues in the church. An Audio Kinetics Q-lock was used and the expert on the synchroniser was Chris Braclik who was an old friend. The sessions went very smoothly and the final mix was done at CTS where the multitrack machines were locked to the mag recorder. Auger was impressed with the Sony machines except he could never see the point in making them like analogue machines. To him, open-reel technology was already outmoded and suffered from too many limitations with editing.

Braclik was to play an important part in the last ten years of Auger's life—he was not enjoying very good health and was happy to let the workload drop to a more reasonable level. This meant that having permanent staff was out of the question. It was easier to use freelance people, some of whom he had worked with before. Braclik became the supplier of transport and much of the equipment as well as gradually taking on more of the editing duties. Opera Rara had already been recording its entire catalogue with Auger for the previous ten years and he and Braclik were still working with them ten years later. They were about to start a block of sessions to finish the latest opera when Auger

developed a cough. He did not feel well enough to attend the sessions but there appeared to be no immediate cause for concern. He died at home quite suddenly but very peacefully in his sleep.

The UK has produced a great number of outstanding recording engineers and I am sure that there may have been better classical engineers, better rock engineers, better film mixers, better front of house engineers, better producers, better A&R men, better television sound engineers but how many of them did all of these things so well. He was truly a jack of all trades and master of them all. For good measure, Auger was also an entertaining writer and contributed to many magazines and several issues of *Studio Sound* as well as writing a chapter in the earlier editions of 'Sound Recording Practice'. He was a natural in front of a microphone himself and we are very fortunate that last year, Antony Askew had the great good sense to sit Auger down with a Scotch and engage him in a conversation that he recorded on MiniDisc. There are many gems in this chat but this one says a lot about what made Bob Auger great.

'I believe that you have to make it [recording] exciting. I have always tried to get more people involved in the listening than might have bothered otherwise. It's a crusade really.' ■

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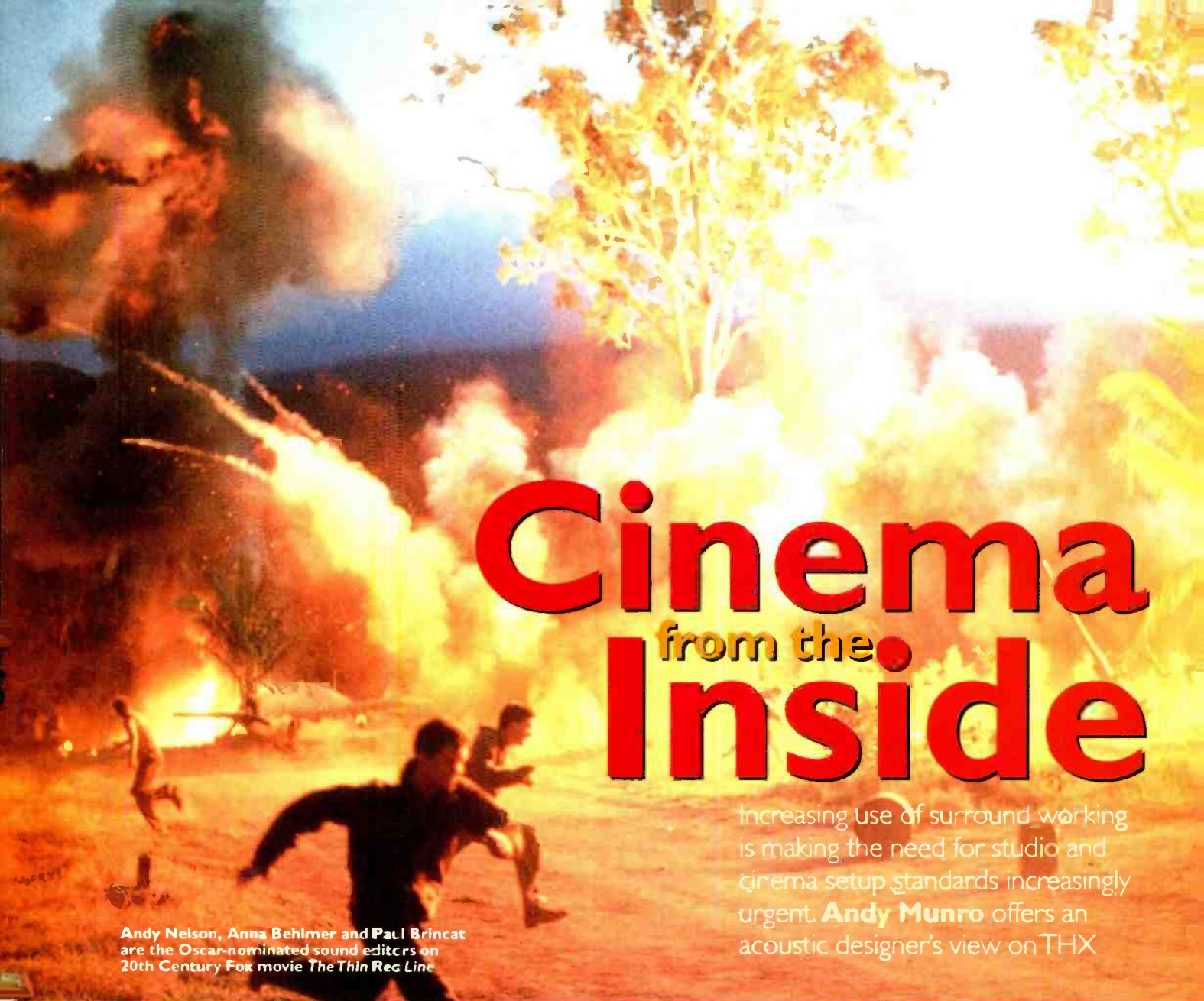
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# Cinema from the Inside

Andy Nelson, Anna Behlmer and Paul Brincat are the Oscar-nominated sound editors on 20th Century Fox movie *The Thin Red Line*

Increasing use of surround working is making the need for studio and cinema setup standards increasingly urgent. **Andy Munro** offers an acoustic designer's view on THX

**F**OR THE LAST 20 years, Munro Associates has been designing film and television postproduction facilities. This coincides nicely with the time THX has been a self-contained entity, created out of the design programme for the new Lucasfilm facilities in California. The two companies got together at the 1997 AES Convention in New York, in order to discuss the possibility of working together on consultancy projects in Europe and also the more general requirements for sound in postproduction environments which are not specifically film mixing orientated.

In particular, Munro Associates had been commissioned to design a new film mixing theatre for London-based Videosonics, which was already home to the only UK dubbing theatre with a THX certificate hanging on the wall. At the same time that I was working on a new compact 3-way monitor system which could be used instead of the large horn-based speakers so common in theatres, I was determined to build a system which had the same sound quality

as a top class control room monitor but with a directivity pattern and power response which would make it compatible with cinema sound. In other words it must be THX approved as this would make our clients satisfied of its industry compatibility.

The Videosonics project was the latest of a series of film mixing facilities we had designed, notably including Shepperton and De Lane Lea. These projects had highlighted the need for a careful approach to acoustic characteristics and room diffusion in particular, in order to achieve even coverage and accurate balance without the need for excessive equalisation. The THX specification for the theatre laid out clear guidelines for screen, speaker and console positions but we were free to develop our own acoustic design, provided we could satisfy the overall criteria for reverberation times and noise levels.

Our own experience showed that a reverberation time of 0.35s is ideal for a room of between 500 and 750 cubic metres and this fitted neatly into the

THX range of 0.3s-0.5s in the mid-frequency band. Certainly any less than this creates a room feel which lacks enough diffusion to remove the effects of individual reflections which can result in poor imaging and severe comb filter effects. The choice of speakers was made from the available 2-way systems in order to avoid using an unapproved electronic crossover. In fact, our 3-way system, complete with digital crossover (M3F) has now been fully tested and approved as suitable for small dubbing theatres and this system was subsequently used on projects of up to 500 cubic metres.

The final design of the new room was agreed with THX which has a team of technical advisers dedicated to producing the most consistent results possible from a wide variety of rooms. Particular emphasis was placed on surround speaker choice and placement in order to achieve the desired diffusion and coverage.

The only difficulty we encountered when working with the THX team really came as a result of technical differences



in measurement methods. THX uses a dedicated real-time analyser to perform all its tests, utilising up to six microphones placed in such a way as to produce an averaged spectrum. This method is well proven and does produce an average that makes the setting of third-octave equalisers less dependent on room modes and individual reflections. It is, however, desirable from an acoustician's point of view to see exactly what is going on at any one point in space because it is precisely the difference between one point and another which tells the skilled operator such details as phase and time delay, as well as frequency information. The most popular tool for analytical impulse response measurement is MLSSA, with literally thousands in use in both measurement and research applications. In an ideal world, both methods produce results which are entirely compatible and, with film rooms, both methods must ultimately agree with the Dolby man's measuring stick. It is really a question of training and the degree of understanding that goes with years of academic study of acoustics. An experienced acoustic engineer will learn everything about a system and optimise its performance so that a theatre technician can correctly equalise the room sound to satisfy an internationally agreed curve for sound reproduction—simple? Sometimes.

Many aspects of a project are addressed by THX, and the most important is the relationship between sound stage and picture. This is clearly defined in cinematic terms but when we consider the relationship from a small screen perspective and the rules are barely in existence.

It has always been my contention that a film mix translates well to the TV or video screen and that the reverse never happens and therefore can be discounted. A 'where you see is where you hear' approach seems to work well and television dubbing mixers who work with large screens and sound systems produce better work than the guy with a couple of close-fields and a small video monitor. Add the new dimension of surround for TV and all hell is let loose: mixing to 5.1 on a small screen in a small room leaves a lot to be desired in terms of how the speakers and room interact. The notion that identical speakers placed at  $0, \pm 30$  and  $\pm 110$  will produce a cinematically compatible sound field is completely missing the point of the surround mix which, in a film context, is used to create ambience and atmosphere, without drawing undue attention to the individual speakers, which cannot produce a phase coherent image except in one central position.

The surround speakers in any small 5.1 system can be identical to the front three provided they are of low directivity and they are aimed in such a way

as to avoid a directly focused sound-field at the mix position. This is better achieved with a number of speakers which can be smaller and therefore more discrete, not to mention less expensive. One could also argue that a diffuse surround mix could be created by using signal processing and phase scrambling effects in which case even a phase coherent rear speaker array will be acceptable.

The interaction between speakers and room is the key to the whole issue of successful surround mixing, and the inclusion of a new centre rear channel opens the argument to include a possible vertical axis to the equation.

The notion of creating a discrete centre rear channel from the digitally encoded left and right surround channels of a 5.1-channel mix was conceived by the Skywalker team of Lucasfilm and developed by Dolby Labs in San Francisco—it is Dolby EX. The SA10 processor can be added to any Dolby 5.1 system and it contains full mode switching and equalisation to achieve THX standards of sound system alignment. The first UK dubbing theatre to install the new system is at Shepperton Film Studios in the newly refurbished Theatre One. Munro Associates has just completed a complete refit of this famous facility which was recently used for the mix, by Mike Dowson, of Oscar-nominated *Elizabeth*.

Coincidentally the other Elizabethan Oscar nominee, *Shakespeare in Love*, was also mixed at Shepperton, in the Munro designed Korla Theatre, by Best Sound nominee Robin O'Donoghue. Both theatres feature a custom built, 5-channel, 3-way monitor speaker system with full digital control. This system has also been chosen by Disney and Buena Vista for their new facility in London.

The original THX specification was written for rooms of over 300 cubic metres and in most cases much larger spaces designed for audiences of 100 plus. The upper limits were dictated by screen size (minimum angle of  $40^\circ$ ) and acoustics problems in very large spaces.

The other extreme opens up the question of making a small room emulate the sound obtained in a large theatre or accepting the fact that this is unrealistic and simply optimising the speaker system and room to give different but compatible results. This can be achieved to a reasonably successful extent by following a few simple guidelines:

The front speakers should be of very low directivity but with a smooth power response which has relatively little difference between on and off axis response. This places the mixer at or beyond the critical distance at which the direct sound is equal in intensity to the reverberant energy of the room. This is always the case in film mixing rooms as the engineer wishes to hear what the audience will experience. Although the

direct sound is diminished the direct energy is sufficiently ahead of the reflected energy to allow the ear to locate the stereo image. This is true stereo as opposed to quasi binaural.

The rear speakers should match the front ones but can be smaller and distributed in several pairs from the mixing position to the rear wall of the room. The geometry of the room should be taken into account and strong reflections avoided or eliminated.

The room should be evenly diffusing and yet not too lively. A reverberation time of 0.25s–0.3s will work very well in most spaces up to 100 cubic metres and a value of 0.4 for rooms of 300 cubic metres. In small rooms it is the modes and specular reflections which determine the sound quality and that is why attention to detail is so important. If the reverberation time is longer than the recommended value the sound can be very pleasing with enhanced perspectives which fill out the balance of individual instruments especially if wide coverage speakers are used.

Discrete early reflections should be avoided at all costs because they create deep notches in the frequency balance and phantom images of the original sound. This is why measuring systems like MLSSA are so valuable because they allow such anomalies to be identified and eliminated. This then allows a more conventional analysis in one third octaves to set the average response for each channel.

Each speaker channel should be capable of producing 115dB peaks in any octave band at the mixing position which is well beyond the capability of many small models which should not be used for serious monitoring of original source material. This requirement does especially apply to the sub bass, or LFE, channel which often runs out of steam when replaying loud film mixes. Several sub units may be employed as required.

There is a lot more to creating a film mixing environment which can satisfy all the criteria for THX and matters such as ventilation, background noise and projection quality are all given equal scrutiny. I have learned a great deal by working with the men from Marin and I like to think our wider experience of acoustics has added to the final quality of each project where we have co-operated together. I am particularly pleased with the results at Videosonics and Berliner Synchron, both fully certified, which are smaller than standard film mixing theatres and yet achieve that impact of sound and picture aspect which define that essential movie impression.

As for the larger theatres, THX or not, I think the Oscar nominations speak for themselves. At the end of the day big movies need big rooms if only to contain the director's ego. ■

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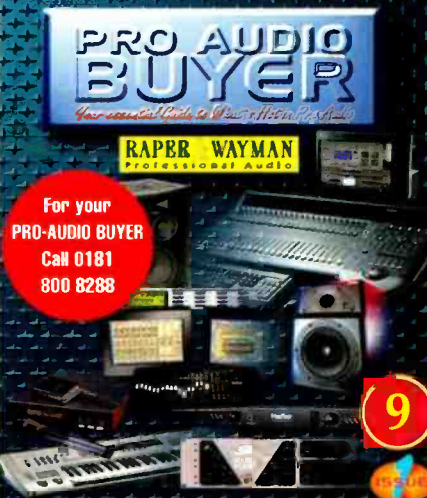
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## US: Masters of the Universe?

Modern times and modern media are reinstating old questions concerning the means and value of mastering writes **Dan Daley**

**M**ASTERING REMAINS the most obtuse of the audio arts and sciences on this side of the puddle. But the notion is being challenged by an increasing democratisation of the process—thanks to affordable black boxes, and to the fact that new audio technologies such as DVD-Audio and compressed Internet files are becoming the seductive new realms of that unique niche that exist after the record is done but before it shows up at the manufacturing plant.

A snapshot of the mastering market in the US up to about a year ago showed it relatively insulated from the massive changes that the rest of the studio industry had been experiencing. Mastering was still based around a relative handful of golden-eared deities, many of whom had seen their businesses grow and their facilities expand—Gateway in Maine, Future Disc in Los Angeles and MasterMix in Nashville were just a few who moved into new facilities in recent years—as the record business grew. Granted, much of the growth in music was at the lower end of the spectrum, a sort of rural Appalachia of the record business in which mastering was often completely

unknown. (Of the estimated 25,000-plus records released as recently as 1997, over half were from independent labels, some of which were one-label one-band sorts, whose records often never even passed through the ports of a dbx 166, much less actually mastered, before being shipped off by their naive but hopeful progenitors.)

But this wasn't a problem for the upper tier of the business that mastering continued to occupy. They simply waited for the most successful of this new wave of indie record makers to get to the point where more experienced (and financially well-endowed) hands, like major record labels, entered the picture, introducing them to the *arte noir* of mastering. In the last year, that's all changed. With record labels now actively encouraging young artists to use their advances to buy their own recording equipment, the pressure to keep the cost of new-artist releases down has been filtering through to the mastering aspect, and the \$250 to \$400 per hour charges that had become the norm in the upper tier were no longer affordable by many newcomers. There are, however, plenty of artists and producers who can afford that and would

not think of going anywhere but to the golden ears for the penultimate processing of their projects.

The future of mastering is a big question mark at the moment. Two things are certain: that multiple formats will force mastering facilities to expand and—a real possibility—change their core focus from purely audio to more generic data; and that in five years' time, none of the major mastering facilities of today will be able to make the same kind of money doing strictly music mastering. That last assumption is conceded by Denny Purcell, owner of Georgetown Masters in Nashville and one of the founding forces behind Mastering Engineers Guild of America (MEGA), which was legally incorporated in February. How that organisation decides to define itself will reflect the views of this market niche by the people who up to this point in a completely *ad hoc* manner have defined mastering itself. Purcell says he's not sure how exclusive a club MEGA will be, how far down the widening base of technology will be allowed membership. If it attempts to remain an exclusive old boys club, that could indicate a circle-the-wagons mentality, one which also characterised the recording studio business back in the days of HARP. That philosophy, of course, was futile. If, on the other hand, membership in MEGA is made highly inclusive, embracing lower levels of mastering, that could dilute—some would say pollute—the mastering gene pool, shifting the emphasis

## Europe: standard book work

New formats approach finalisation, but they may be missing a golden opportunity with talking books writes **Barry Fox**

**T**HE FINAL VERSION of the DVD-Audio specification is now ready and will be published in spring 1999. There are only two changes from v0.9, published last June.

First, Meridian Lossless Packing is now an official option, to fit 74 minutes of uncompressed, full bandwidth audio on a single side. Dolby will licence the system, which was invented by the late Michael Gerzon and bought by Meridian. Also, there is now more freedom to use Dolby Digital AC-3, instead of linear PCM, with video clips on the audio disc. The legal threats from DTS, to make DTS mandatory, seem to have cut no ice with the DVD Forum.

Meanwhile, a string of patents from WEA Manufacturing Inc in Olyphant, Pennsylvania helps explain why Warner is anxious to push DVD-Audio. The company stands to earn royalties from all the other manufacturers if the format takes off. WEA has filed a string of three applications (Europeans 877 369/70/71) which claim legal monopoly on the very basic idea of a DVD audio disc which stores at least six channels of sound, with fixed data rate depending on the channel function and importance. The two front channels have the highest quality, and are recorded at 96kHz or 192kHz, ideally with 20-bit or

24-bit coding. The rear channels, which are less important, are recorded at 48kHz, using 16-bit words. The remaining channels, which are used for deep bass, need only 12kHz.

By using simple multiples of the sampling frequency for the different channels it is easier to keep them running in exact synchronisation, so that there are no phase shifts between the sound signals coming from the various loudspeakers. Synchronisation pulses are added to help the player lock all the signals tightly together.

Not everyone will have a 6-channel sound system, so the disc must also deliver stereo. Simply summing the six signals can produce effects, which the producer never intended. So the disc also contains a stream of control signals which tell the DVD player how to balance the six signals when mixing them together into stereo. The player can also have an override control, which lets the listener alter the stereo mix to personal taste.

The v1.0 standard for Super Audio CD (SACD), the rival system from Sony and Philips, was released as v0.95 in January and will be fixed as v1.0 a few weeks ahead of the DVD-Audio standard. It's still unclear whether SACD will launch as a stereo or surround system, and thus whether there

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There remains one other loose end, for both systems. The Copy Protection Technical Working Group has not yet agreed an anti-copy policy but hopes to be finished in time for a pre-Christmas launch. In fact it's probably all academic. If the record industry launches two rival and incompatible new audio disc standards, only a few nutty consumers will risk being 'the mug who bought Betamax'.



from gifted ears to digital read-outs. (Exactly what mastering engineers had been arguing for years about with CD plants.)

Purcell and other founding members, including Bob Ludwig and Doug Sax, have considered the notion of keeping membership highly exclusive but allowing the combined wisdom it creates to filter down to a lower tier of membership via a newsletter. That, and the emphasis that Purcell puts on the need for the current elite to train the next generation of mastering gods, could serve as a means to preserve the nature of the art. That's a good possibility—reinforcing the notion of the divine right of kings kept Europe's royalty in business for over a thousand years.

Kings fell mightily this century, and the mastering gods may find apostasy rampant in the next millennium, as well. Purcell says that the elite are the only ones who can provide the highest level of audio quality in a changing format environment, and he's probably right for the most part. But they can only maintain their position if quality is what people clamour for, and in an age of compressed formats and Brixton Briefcases, that's questionable. Thus, the fortunes of upper-echelon mastering are vulnerable to the common perception of what's good enough. And if we have to depend upon record labels owned by makers of blended scotch to determine that, Heaven help us all.

The majority are quite happy with CD audio and VHS video. Those who aren't are buying DVD-Video, which already offers better-than-CD sound.

Both the rival factions continue to miss the one real chance of making DVD-Audio or Super Audio CD fly into the mass market—talking books are now big business, not just for the blind, but for drivers. All these books come on cassette, because the industry never switched to CD, with its limited playing time per disc. The DVD standard has the capacity to provide very long playing time for mono audio of FM quality; so much capacity in fact that an 8cm DVD could match a pile of cassettes. The discs would be easy and cheap to press, and the players small and portable.

As I've tried to tell the DVD Forum, if DVD audio started out with a long-play talking book function, and players were able to decode 12cm and 8cm talking book discs from day one, it could well help prime the pump. The handful of buffs who are really dissatisfied with CD and DVD-Video could use the same players for super hi-fi sound. The mass market might then follow. There is a parallel here with the way many DVD movies are being watched on PCs with DVD-ROM drives, but their owners may later buy stand-alone players.

In years to come, the industry will probably regret the fact that it's too late to change the basic DVD-A or SA-CD standards to accommodate Talking Books. If so it's their own fault.

## Dolby dilemma

The war zone occupied by surround formats is set for a change of terrain as Dolby joins the DVB Group writes **Kevin Hilton**

**T**HERE CAN BE NO argument that surround sound is an integral part of today's movies. Few modern cinemas are without multiple loudspeakers and decoders for the main systems: either the venerable analogue Dolby Stereo or the three principal digital systems—Dolby Digital, DTS or Sony SDDS. This has extended into the home video market, although this is still dominated by Dolby Pro Logic, the domestic version of Dolby Stereo.

This makes for a disparity between the cinema and the home cinema experience. Theatrical releases are the real deal, with 5.1 discrete channels. Videos are, by the constraints of both the format and the living room, LCR at the front with mono surrounds. DVD will ultimately change this, providing the take-up is strong enough with enough decent software available to lure collectors away from tape.

Because the bulk of DVDs are still coming from Hollywood, Dolby Digital—based on the AC-3 coding system—has been adopted as the multichannel audio standard, as it was for later LaserDiscs and as it is for US satellite and high-definition digital broadcasting. This endorsement by America has made Dolby Digital the current *de facto* standard, much as DPL has been for home video and, to a certain extent, European broadcasters. But it is in this sphere where things have gone slightly awry for Uncle Ray.

While some European broadcasters, including BSkyB and a number of regional German stations, have used and promoted DPL, others—notably the BBC and Channel 4 in the UK—have objected to the format, either because of its matrix or the perceived proprietorial image. Imported programmes, and some domestic productions, rely heavily on the use of surround, which has created a secret service, with broadcasters not stripping off the rear information (as long as it is mono and stereo compatible) but not informing the viewer that it is available.

Another argument against the use and flagging of multichannel for broadcast states that it is still a minority interest, only attractive to the tech-minded or cinephile viewer. Dolby disputes this: each month its newsletter proclaims the increasing sales of DPL equipped TV sets and videos around the world. Detractors and com-

petitors argue that the figures are not as great as Dolby claims.

The real fight was always going to be about future TV systems. In the early-nineties, Dolby squared up to the MPEG companies (primarily Philips) who are in with the European DVB Project, the division of the EBU that drew up the various standards for digital television. Like all conflicts, the two protagonists are closer to each other than they would care to admit but they have continued to flaunt their differences.

There is no doubting the innovation and creativity of either Dolby or the MPEG companies. It should not be inferred that—like my tirades against Uncle Rupert Murdoch or cuddly Bill Gates—I see Ray Dolby as just another evil media overlord. In this case both sides have products and technology to sell; in some way Philips and its allies are hobbled because they are linked in with standards organisations and broadcasters. This has made them less visible than Dolby, which is an undisputed

master of marketing—when a company ends up as a gag in *This is Spinal Tap*, you know it has made it.

Philips does not feel that it has lost out. Its spokespeople argue that a high proportion of dual Dolby-MPEG decoders are appearing now, with the further argument that the broadcasters' emphasis is on getting stereo for the new digital services, making the step to full surround later.

The issue may be forced now that Dolby has joined the DVB Group, an application that perhaps had to be accepted after the Federation of Commercial

Television Stations, which represents the three Australian commercial TV networks, announced that it was adopting MPEG video but with Dolby Digital as the audio for its digital services. Peter MacAvock at the DVB office told me that Dolby had shown interest in understanding more about how the system operates and how AC-3 works with digital pictures. 'It's always been possible to transmit anything through the DVB standard,' he said. 'This move doesn't lessen our recommendations for MPEG Layer 2 as the stereo signal and, in the future, surround.'

NAB may see another face-off. But, when compared to another Las Vegas staple, boxing, at least there are only two championships.

Imported programmes, and some domestic productions, rely heavily on the use of surround, which has created a secret service, with broadcasters not stripping off the rear information (as long as it is mono and stereo compatible) but not informing the viewer that it is available.

# Audio power amplifiers

Essential to the majority of audio systems, the power amplifier is much misunderstood and often maligned. **John Watkinson** joins the class

**T**HE AUDIO POWER AMPLIFIER is often considered a commodity to be purchased for the lowest cost per watt or as a black box, which is an unfortunate necessity in a practical audio system. On the other hand power amplifiers in some markets are shrouded in mystique and pseudo-scientific justifications are given for the spurious use of exotic materials which yield some intangible quality.

I do not really have much time for either of these approaches as amplifiers built for maximum economy or for maximum marketing hype have in common the fact that they do not work as well as they might, although one represents better value. Knowing a little about amplifiers can be useful.

Nearly all power amplifiers work by placing some controlling element in series with a constant-voltage source or power supply. Unfortunately audio signals are bipolar so that current flows in both directions to a loudspeaker, whereas almost all practical current controlling elements such as vacuum tubes and transistors are unipolar (they only work with current flowing one way). The solution is that a pair of elements

has to drive the speaker in a bridge arrangement. Fig.1 shows that current can be driven through the load in both directions, using a split power supply.

The conventional transistor audio amplifier is designed as a voltage source using negative feedback to provide the lowest output impedance possible and so the conventional concept of impedance matching does not apply. Nor does the impedance of the speaker cables matter much when they are connected across a zero impedance amplifier. Anything that looks like a cable and has a low DC resistance will do nicely. Lawn mower cable is durable, inexpensive and has two cores made of copper.

As there is no matching requirement, any amplifier will drive a speaker of any impedance. The only problem is what happens under overload. With a high impedance speaker, the amplifier may voltage-clip first, whereas with a low impedance speaker it may current-limit first. The ideal might appear to be to have an impedance where both limits are reached at once. As loudspeakers are notoriously reactive devices, it is better to err on the side of excess current capacity.

While the zero-output impedance

amplifier is essential to drive woofers because of the need to damp the fundamental resonance, there is something to be said for constant-current drive at higher frequencies. This nullifies the effect of inductance in the speaker which would otherwise impair HF response. Fig.1 also shows the main classes of amplifier which will be described in a future article.

has a standing current in both devices which exceeds the load current so that neither device ever turns off; in fact this is a good way of defining the class.

This is wonderful for distortion, but the standing current results in horrifying heat dissipation in the devices and a miserable efficiency, which rules the approach out for all but the hi-fi lunatic fringe. The only good news is that the devices get cooler as more power is delivered to the load, so the class-A amplifier is hard to damage. Greater efficiency is obtained if there is no standing current at all so that each device conducts half of the time. This is the definition of class-B (Fig.1b). The difficulty is in reducing the distortion. Many authorities state that it is only the transistors, which are responsible, but in practical amplifiers a significant problem arises due to layout. The class-B amplifier has large half-cycle currents flowing in the power wiring and the slightest impedance problem can inject half-cycle crosstalk into the signal and feedback circuits. The class-A amplifier is less dependent on layout and so any clown can design one, whereas a class-B amplifier needs a formal approach.

The pure class-B amplifier is seldom found because the problem of crossover distortion can be reduced by applying a small standing current, resulting in the class-AB amplifier—defined as one in which each device conducts for slightly more than half of the time. The great majority of today's audio amplifiers work in this way, relying on heavy feedback to linearise the system. As was seen last month, feedback is fundamentally beneficial, provided it is properly engineered. In the class-C amplifier, the devices conduct for less than half the cycle, and so such an amplifier alone is no use for audio, although it can be used as part of an error correcting amplifier which will be described in a future article.

The class-D amplifier is a switching system (Fig.1c). The devices are either off or on, and so little heat is dissipated in them, resulting in very high efficiency. The audio waveform is used to determine the duty cycle of the switching. The load needs to have a low-pass filter to average out the switching pulses. The feedback needs to be taken off after this filter and so the phase characteristics of the filter need to be taken into account.

The switching amplifier is difficult to engineer for low distortion at all audio frequencies, but as faster switching devices appear the chopping frequency can go up, making the filter easier to

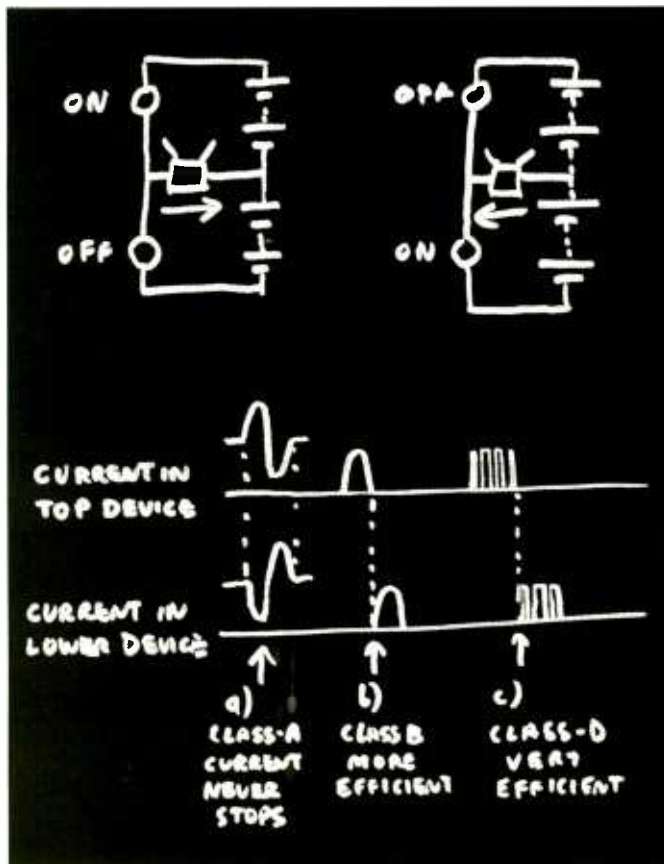


Fig.1: Bipolar drive needs a bridge system



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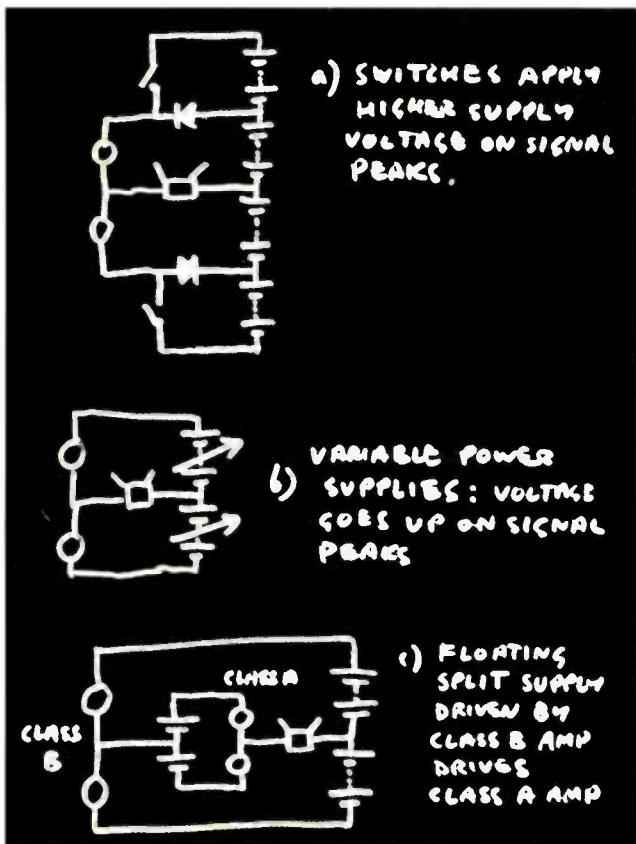


Fig.2: Efficiency tricks

design. In the mean time, the trend towards active speakers means that for driving woofers the class-D amplifier has a lot to recommend it. A large woofer is not going to respond to the switching frequency at all and the filter is primarily there for EMC purposes.

The class-D amplifier is more efficient than a linear amplifier when driving a resistive load, but the improvement in efficiency becomes even greater when driving a reactive load such as a real loudspeaker represents. The compliance of a loudspeaker and the air-spring behind it in the enclosure is an energy storage device and when a loudspeaker moves back to its rest position the speaker acts like a generator, returning power to the amplifier. This is why the speaker compliance looks like an inductor to the amplifier.

By a similar argument, the moving mass of the speaker also stores energy, and this looks like a capacitor to the amplifier. At different frequencies, one or other effect can dominate. When power is returned to the amplifier, a linear amplifier dissipates it as heat, whereas a switching amplifier will return it to the power supply.

Switching amplifiers are especially relevant in transportable applications such as PA systems where the equipment has to be moved frequently. The more efficient the amplifier, the smaller the power supply and heat sink.

For truly portable equipment efficiency and battery life is always an issue and the switching amplifier is ideal for this application. The most efficient trans-

ducer, which can be made, is the electrostatic speaker because it has no dissipation mechanism. As a result it forms an almost entirely reactive load, so that a conventional amplifier dissipates the heat instead. However a class-D amplifier does not mind a reactive load at all and the combination of an electrostatic speaker and a class-D amplifier gives the most efficient transducer possible. In fact an electrostatic transistor radio is perfectly feasible.

The class-A, class-B and class-AB amplifiers are what might be called simple amplifiers, and there are a variety of ways in which these amplifiers have been

made more complex to achieve some goal. One of the goals is to increase efficiency. It is a characteristic of audio signals that the peak to mean ratio is very high. Unfortunately the efficiency of a class-A or B amplifier is even worse at the low signal levels which exist most of the time. One approach is to have a variable power supply whose voltage increases with high signal levels. Fig.2a shows that a significant improvement in efficiency is obtained with two supply rails arranged such that the high rail switches on just before the output voltage reaches the low rail. This can work well provided the high part-cycle currents in the supply are kept out of any common impedances. Fig.2b shows a more efficient arrangement where the power supply is actually varied dynamically instead of switching between two levels. This can be done easily with a switched-mode supply by varying the reference.

Fig.2c shows a way of making a class-A amplifier more efficient. The class-A amplifier runs from a pair of low-voltage floating power supplies so that the standing dissipation is moderate. The mid point of the power supplies is then driven by a class-B or class-D amplifier in such a way that the power supply voltage always brackets the output voltage. The class-A amplifier which is otherwise conventional can then produce a much greater output swing but without excessive generation of heat. The system works well, but the number of power supplies needed adds to the cost. ■

# The digital lure

Unlike many other industries, pro-audio's development is a precarious balance of old and new. Teach your children well, advises **Philip Newell**

RECENTLY TURNED DOWN a studio design job. Actually, I lost it by default to another designer. The brief was to design a complex of rooms in a college that was intending to provide training for recording engineers. The directors there were intending to legitimise their endeavours by issuing certificates of qualification to their successful students. And here the story begins, because my reluctance to participate was prompted by the directors, for whom the marketing of the course seemed to be more important than the standards of qualifications.

'The Future is Digital' was to be their catch phrase, and so they were a little surprised at my aggressive demolition of their philosophies. These included the use of ridiculously small control rooms, and the cursory provision of an analogue room that turned out to be little more than a museum of 'how it used to be done' rather than any attempt to educate the students about analogue equipment or its operation.

'Young people want to hear about the exciting possibilities of digital', the directors claimed, 'and we will attract more students that way'. 'Maybe', I replied, 'but you will not be teaching them about the real recording industry'. My pointing out that many top-of-the-line commercial studios all around the world pride themselves in the analogue equipment they own, and that they are not inclined towards parting with it, fell on deaf ears. So the directors eventually found another designer.

Digital technology, of course, will be a huge part of the future, but the way these people wanted to run 'comparison' recording sessions from side-by-

side analogue and digital control rooms really would not provide any comparison at all. Their digital rooms were to be preprogrammed for the projects to show how fast digital equipment could

The importance of digital technology is not in dispute, but for a school to teach that analogue is out of date and in its death throes, merely to attract more clients, is an outrage.

Unfortunately, the world being what it is, it is a fact that it is easier to teach exciting things on cheap digital equipment than on cheap analogue equipment.

This could lead to a generation of recordists who have been taught lies, simply because it is more profitable for schools to do so. Can we control this? It is an important question

be used in recordings, especially when many changes were needed—but they were not intending to included any of the setup time in their comparison. They were also planning to spend equal amounts on the analogue and digital

rooms to demonstrate the price-to-performance compromises of each method of working. This was also an unrealistic scenario because they had concentrated solely on low-cost equipment. As a result, the comparison bore no relationship to what goes into or goes on in facilities at the upper levels of the recording industry. Here the costs of manufacturing digital equipment to mimic the quality and speed of use of the finest analogue equipment can be very high indeed. In some cases prohibitively so. There is little doubt that at the lower levels of the price scale digital can readily outperform an analogue alternative, but the situation rapidly changes when the overall system quality requirement rises.

The importance of digital technology is not in dispute, but for a school to teach that analogue is out of date and in its death throes, merely to attract more clients, is an outrage. Unfortunately, the world being what it is, it is a fact that it is easier to teach exciting things on cheap digital equipment than on cheap analogue equipment. This could lead to a generation of recordists who have been taught lies, simply because it is more profitable for schools to do so. Can we control this? It is an important question.

Looking back, my leaving the project was, perhaps, just as well, since as well as peddling their misguided perception of what constitutes an education in recording, they were hoping to tout the facility designer's name as part of their marketing campaign. And frankly I could never allow my name to be used by a studio whose philosophies I could not condone. ■


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