

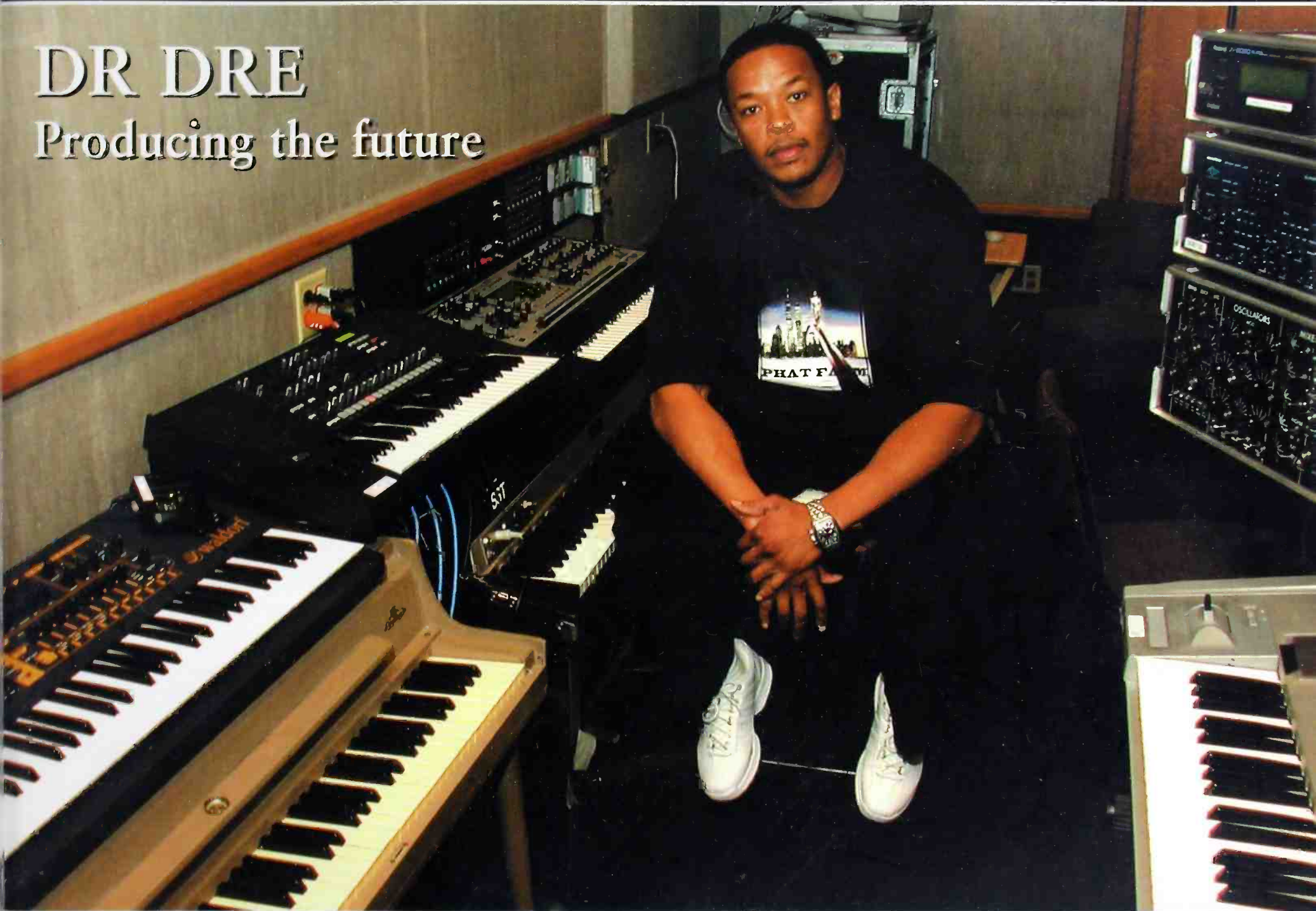
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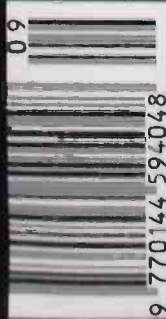
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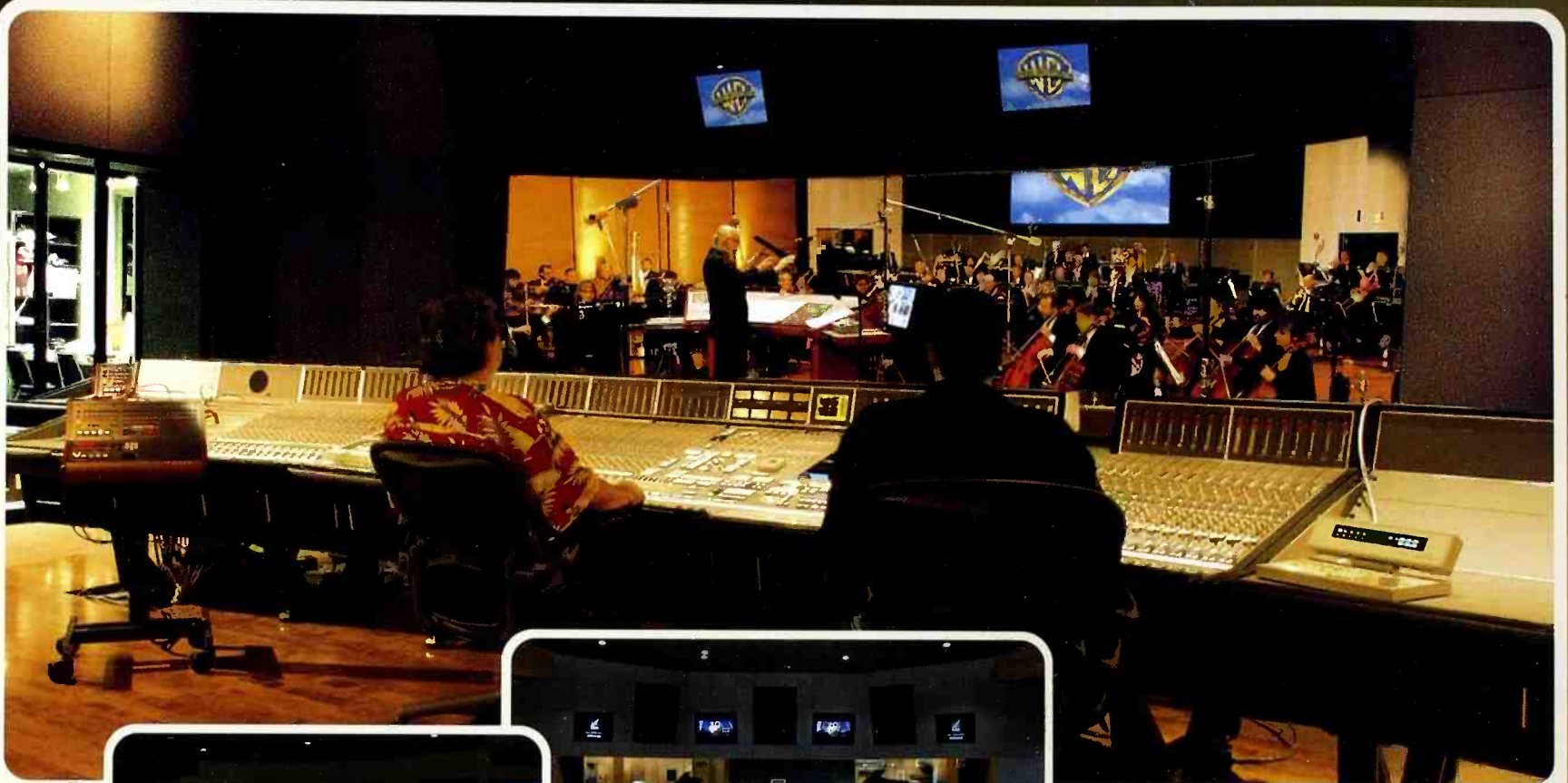
REVIEWS

- Canopus DVStorm SE Plus
- tc electronic System 6000 v2
- TC Helicon VoicePrism
- Mutec Smart Digitals
- Steinberg Wavelab
- Audio Ltd Envoy
- TL Audio VP-1
- Mackie M800
- SLS 88R

Classic rock: Footage from the *Whistle Test* vault
 Video for audio: The technological backlash
 Empty promise: Jackson Browne's classic in surround
 Room for improvement: control room monitoring analysis



Definitive Film Scoring



The Eastwood Scoring Stage At Warner Bros.



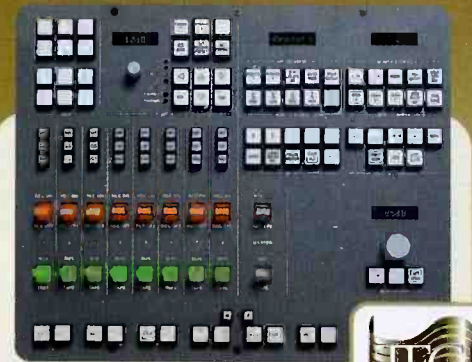
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SL 9000

ANALYSIS

- 4 Editorial**
Ladders and alternative dimensions
- 6 Soundings**
Breaking news on professional audio, post and broadcast
- 91 Classifieds**
Away from the expense and glamour, essential pro-audio sales and services abound
- 95 Letters**
Yamaha's NS-10M and Dolby's Digital join incidental music for discussion
- 95 World Events**
The latest dates to add to your pro-audio event calendar
- 96 Stereotypes & Top 10**
A new look at audio industry characters and their listening habits
- 98 Backchat**
A new Q&A spot catches industry figures with their guard down—with Peter Easty its first target

FEATURES

POSTPRODUCTION

- 16 Housework**
Stylish Stockholm postproduction facility brings Pro Tools to bear on sound design for television commercials
- 60 The Old Grey Whistle Test**
Decades of British television rock archive make a milestone DVD with Jill Sinclair and Abbey Road Interactive

RECORDING

- 22 Rudolfinium**
With a history extending from Mahler to modern Hollywood, Prague's premier recording studio continues to make history
- 48 Dr Dre**
Rap pioneer and Grammy winner, Dr Dre is regarded by the US record business as the man most likely to shape their future
- 54 Running on Empty**
Jackson Browne's unconventional classic makes a fascinating surround remix in the hands of its original engineer, Greg Ladanyi

BROADCAST

- 72 Video Focus**
The technology to get audio people into video work is to hand. Beginning with a history of video editing and following through working methodologies to setting up your own video project room, *Studio Sound* presents the audio engineer's reply to video's dominance

TECHNOLOGY

- 66 Modern Monitoring**
Using Genelec's database of measurements, *Studio Sound* offers an analysis of modern control room monitoring environments
- 84 Dr John**
The technical contortions involved in building that broadcast essential, the video recorder
- 88 Masterclass**
Still valves, still classics but definitely obscure: mics to make your mouth water

REVIEWS

- 28 Canopus DVStorm SE Plus**
Bringing video working to your computer requires installing the right editing cards, like DVStorm
- 32 SLS 88R**
The definitive loudspeaker review
- 34 Mackie FR Series M800**
The definitive amplifier review
- 36 tc electronic System 6000 v2**
Version 2 software adds dramatically to the surround capabilities of the S6000
- 38 Mutec Smart Digitals**
Digital glue rarely comes as sticky as these three units from deepest Germany
- 40 TC Helicon VoicePrism**
The enterprising Danes raise the stakes in practical voice modelling and processing
- 42 Steinberg Wavelab 3.04**
Audio editing software takes an evolutionary step with v3.04
- 44 Audio Ltd Envoy**
Streamlining electronic news gathering means rethinking your mic setup
- 46 TL Audio VP-1**
A mix of technology and facility make this a channel strip to be reckoned with

COLUMNISTS

- 82 Technology**
Barry Fox reckons that the music industry's failure to learn from earlier copy protection bids dooms it to repeat them
- 82 Business**
Dan Daley argues that surround and Internet applications are about to take on heightened significance in pro-audio
- 83 Delivery**
Kevin Hilton believes that older technologies still meet more consumers' needs than their successors

88



46



54



72



16



CONTRACTS

Spain: Madrid's Weekend Productions remix facility has recently installed a Sony DMX-R100 digital console as part of a studio upgrade. Operated by David Ferrero and Pedro del Moral, the desk went straight to work on Ricky Martin's 'She Bangs' and Santana's 'Corazon Espinado' singles and is now tied up with Epic signing Guera. Sony BPE, Europe. Tel: +44 1256 355011.

UK: Soho's Rainbow Post Production has completed building a 5.1 dubbing suite and refurbishing its stereo room with the assistance of RT Concepts and GAS Electronics. As part of the project, the facility has taken two 32-track DAR STORM audio workstations and an OMR8 recorder-editor, networked using DAR's Axis AudioServer. The installation will see the STORMs both working in conjunction with new 48-fader Soundtracs DPC-II digital consoles, one replacing an SSL digital desk. Rainbow specialises in long-form broadcast projects, and boasts Horizon Channel 4, LWT and the BBC among its clients. Another new Soho facility, Future Post, has installed an AMS Neve DFC in its surround mixing theatre, Studio One. A Libra Post has been installed in Studio Three, a 5.1 Dolby mixing studio for trailers and television. Future Post is currently working on feature films from Canada, Holland and Sweden as well as



television drama and documentaries for the BBC and independent television. Rainbow Post Production, UK. Tel: +44 20 7434 4566. Soundtracs, UK. Tel: +44 1372 845600. DAR, UK. Tel: +44 1372 742848.

Lebanon: Leading television station MTV is refurbishing seven studios and equipping for digital audio working. The update has seen a flood of BSS units installed including eight DPR-404 compressors, eight DPR-504 noise gates, five DPR-402 compressor-peak limiters, 20 FCS-960 graphic equalisers, 16 MSR-604 signal distribution systems, two MSR-602 power supplies and 25 AR-133s. BSS, UK. Tel: +44 1707 660667.

Interactive and reactive

UK: After a Warner Home Video survey showed that 64% of DVD consumers consider special features to be important, Abbey Road Interactive responded with larger and better facilities for its DVE, ECD and web site services. Against a background of general decline in these areas, Abbey Road Interactive's reported growth has allowed it to almost double its staff and floor area, and



US: With undertones of Art Kane's famous 1958 gathering of the era's jazz musicians in Harlem, SSL recently pulled together a group of elite Hollywood scoring mixers for a historic photo session to celebrate their use of the SL9000j console. Assembled on the scoring stage at the former Todd-AO, now Livewire Studios are (left to right): John Richards, Steve Kempster, John Kurlander, Dennis Sands, Bruce Botnick and Shawn Murphy.

Pro Tools in Strongroom's 5th

CONTINUING ITS PIONEERING APPROACH to studio services, London's Strongroom has 'repositioned' its Studio 5, moving its focus from being one of the facility's established programming rooms towards being a fully-fledged Pro Tools studio—the fifth commercially-available Strongroom studio. The move does not so much signal Strongroom's intent to evict clients from its remaining programming rooms as to 'make better commercial sense of the space'. The room is now centred on a 24-fader ProControl-Edit Pack surface and Pro Tools MIX+ 24 with five farm cards, three 888 interfaces and Prism AD124 and DA1 converters. Monitoring is via a 5.1 Genelec 1031A setup and Bryston B4 amps driving NS-10M stereo monitors. Outboard includes a TL Audio valve interface, Avalon's 737vt, tc M3000 and tc FireWorks. With Strongroom 5 opened just two weeks earlier, the facility's Rob Buckler spoke exclusively to *Studio Sound* about the initiative.

Q: Why sacrifice a programming room rather than expand a larger studio?

We've been integrating Pro Tools with big mixing consoles but were reticent to take out an existing console, so it made sense to develop the idea in a room that didn't have to be an instant commercial success. We wanted to educate people and offer people access to Pro Tools that they haven't had before because Pro Tools isn't going to go away. It's a different approach than putting a Euphonix in a big room: why would I

add a Sonic Solutions' DVD Audio Creator to offer all of the major commercially-available authoring systems.

'Abbey Road is committed to providing clients with an inspirational, creative and cutting edge experience,' said Samantha Harvey, Abbey Road Interactive's creative director. 'We are leaders in our field and, with our highly-dedicated and experienced team, the expansion consolidates Abbey Road's position at the forefront of interactive design and production, particularly DVD.' Further emphasis has been placed on creating a genuine test environment for alternative systems, rather than a lab-style

demonstration area. Consequently, a typical living room with home entertainment system has been created for clients to experience products in the way consumers will in their home environment.

Yamaha takes chip technology

Japan-UK: The Yamaha Corporation has agreed license terms with Cambridge-based RISC microprocessor specialist ARM over the ARM7TDMI microprocessor core. The agreement will allow Yamaha to incorporate the intellectual aspects of ARM technology into its signal processors and musical instruments.

An industry leader in the field of 16/32-bit embedded RISC solutions, ARM licences its processors, peripherals and system-on-chip designs to a variety of international electronics concerns including Yamaha. 'We first licensed an ARM7 family core in 1996,' Yamaha director Hirokazu Kato confirmed, 'but recent devices require more processing power and we believe the industry-leading ARM7TDMI core has the necessary performance to provide this extra power. By using the core we will be able to deliver innovative products to the sound synthesis and signal processing markets.'

'Yamaha has been developing products with ARM processor technology for the sound processing market since it became a licensee. This additional agreement further underlines ARM's technology strength and relevance to the sound synthesis and signal processing markets,' added Reynette Au, ARM's VP of corporate marketing.

Yamaha, UK. Net: www.arm.com
Yamaha, Japan. Net: www.yamaha.co.jp

want to learn a new desk when the SSL or Neve will do the job? We don't have to do any selling on this.

Q: How does this reflect on the established role of the commercial programming room?

The earlier programming rooms made commercial success as feeder rooms to the main studio rooms and they still make a lot of commercial sense and add a lot of value to the Strongroom. Now technology is making 'everything' possible in a programming room.

Q: So how does it relate to serious personal programming suites?

It's a high-class extension of what most producers have at home. It's designed in part to bring people back into a commercial recording studio.

Q: Who are you expecting to see come in through the doors?

We want people to be able to write and record, to come in with DJ mixers and samplers... the emphasis is on flexibility. The room has been open for two weeks and we've already seen people like Howie B and Neil McLennon, and we have Steps coming in soon.

Q: Where does this leave the Strongroom's philosophy?

We're going back to the Strongroom's roots in the MIDI days—the key thing is people both in terms of in-house expertise and clients. The message that we want to get across is that we're looking at what people are doing now and what they will want to do. We're trying to offer the best of everything including niche roles for the likes of an SSL studio.

This is our 'lab rat', our 'litmus test'. If this goes the right way, there's nothing to stop us expanding it and making it bigger.

CONTRACTS



Japan: Tokyo's Nihon Kogakuin engineering training facility has installed a 48-channel Amek 9098i production console in a new studio serving a number of its courses, ranging from concert events, broadcast media, music entertainment, sound design and audio engineering. Shigenari Numazawa of the Broadcast Media Department commented, 'As this new facility was also going to be used on a commercial basis, we could not afford any downtime. The other factor was audio quality; this is a multipurpose facility and not just for tracking and mixing. It is also used as a live TV production floor, a movie theatre, a postproduction studio, as well as for general live performances and anything else that may come along. All of this is coupled with the extremely high specifications we set for high-definition video facilities. As a result, we wanted a console that was a match in terms of high audio specifications and facilities.' The facility also boasts a real-time virtual studio facility for the creation of virtual sets, as used for broadcast on the recently-launched BS Digital Satellite channels. Amek, UK. Tel: +44 161 868 2400.

South Africa renews radio resources

South Africa: National broadcaster the South African Broadcast Corporation is deep into the overhaul of its contribution network. The network, regarded by the SABC as production resource and governed by newly adopted digital interface standards, is to conform to a 20kHz bandwidth, 48kHz sampled audio with a maximum 4:1 compression ratio and 384k bandwidth. Key to the overhaul is the installation of 25 apt NXL384A and 21 NXL384D codecs that link nine regional studios to the Johannesburg centre.

'The big problem with contribution lines where studios are linked in real-time is the delay on the line caused by codecs and routing,' comments SABC principal technician for special projects Paul Kruger. 'After testing other systems it was clear that a short-delay codec was needed for this job.'

As you would expect,' adds apt's commercial director Jon McClintock, 'SABC did expensive testing on both apt and other manufacturers' codecs and then put out the tender.'

The earlier J.4 circuits now being

replaced by the apt equipment ran at 768kbit/s giving 15kHz stereo and required additional tariff for return feeds. The new setup will quadruple SABC's audio capacity include return feeds.

Business highlights

World: Chip manufacturer Cirrus Logic has announced the signing of a 'definitive agreement' to acquire LuxSonor Semiconductors, a supplier of DVD video processors and A-V semiconductor technology. In a stock-for-stock transaction agreed by both boards of directors, Cirrus will pay some \$65m for the California-based company in pursuit of its 'Total Entertainment' programme focused on developing Internet-ready DVD players and networked entertainment systems. It also gives Cirrus access to LuxSonor's branches in Taiwan, Hong Kong and Shenzhen (China).

'The acquisition strengthens our strategic focus on consumer electronics by expanding our total DVD technology and product portfolio, while significantly extending our reach in Asia and China,' commented Cirrus president and CEO

David French. LuxSonor co-founder, chief and CEO added, 'This combination of people and technologies creates a very compelling business proposition as our customers are seeking established vendors that can provide complete entertainment systems.'

The American 'parent' of Orban, CRL, has completed the acquisition of Avocet Instruments, designer and manufacturer of high-quality audio receivers and coders for the television industry. The purchase has necessitated the relocation of Avocet's operations from Beaverton, Oregon to CRL's Tempe, Arizona headquarters. 'Avocet products solve problems with cueing remote talent for live broadcast and delivering secondary audio programming to other broadcasters for simulcasts,' said CRL's Jay Brentlinger. 'Avocet also gives CRL entry into another rapidly expanding SAP application, alternative language programming. The Avocet line makes a great complement to current CRL and Orban Television products.' Avocet product line is designed to meet a range of television broadcast and data transmission needs. Orban-CRL VP-COO Jim Seemiller has appointed Kevin Clayborn to the position of Product Manager for Avocet products.

FMR Audio has handed its distribu-

US: Turner Entertainment Networks is building a network operations centre in Atlanta, Georgia to accommodate its TBS Superstation, TNT, TCM, Cartoon Network and other Turner Entertainment Network feeds for the US domestic and Latin and South American markets. At the new on-air facility will be nine high-definition Thomson Broadcast Trinx audio routers ranging in matrix sizes from 96 x 64 up to the full 128 x 128. Additionally, there will be seven Thomson Venus2001 digital stereo audio routing switchers, two Compact Venus2001 analogue mono audio routing switchers, and two Venus2001 RS-422 data routing switchers. All the routers will be controlled by a Jupiter Control System with redundant control electronics and more than 100 control panels. The facility is scheduled to begin initial operations during the second half of 2002. CBS affiliate KFMB-TV, meanwhile, has opted for an AMS Neve Libra Live Series II for a new digital production centre where it will handle seven hours of daily, live news programming and promotional production. Turner Entertainment Networks, US. Tel: +1 800 962 4287. Thomson Broadcast, UK. Tel: +44 1753 518200. AMS Neve, UK. Tel: +44 1282 457011.

Finland: Finnish Blind Library (along with its French counterpart) has installed Otari's DAS System for high-speed conversion of analogue tape archives to digital files. The system was designed for the future DAISY blind standard and is capable of automatic phrase and cue tone detection. Such data will be stored in separate, proprietary binary files, ready for later import into DAISY talking books. The DAS System allows simultaneous transfer of four audio channels at up to 4x speed. Input signal conversion to 24 bits, with master sampling frequencies of 88,2kHz or 96kHz, depending on the output format. The converted 24-bit digital audio is dithered to 16-bit wave file format. Data is delivered via SCSI and external PC server to the final mass archive. Otari Europe. Tel: +49 2159 50861.

UK: Pearson Television Productions has purchased a Cedar DNS1000 dynamic noise suppressor specifically to remove unwanted location noise and clean up dialogue for the TV drama series, *The Bill*. The London setting for the filming of one of ITV's most successful programmes ensures that the DNS is kept busy supporting both the regular cast and a string of celebrities including the likes of Hugh Laurie, Lilly Savage, Craig Charles and Roger Daltrey. Pearson, UK. Tel: +44 207 691 6000. Cedar Audio, UK. Tel: +44 1223 881771.

CONTRACTS

UK: The first British Calrec Alpha 100 has gone to Channel 4's Westminster HQ as part of a massive redevelopment. The 52-fader desk is to be installed at 124 Facilities, a subsidiary of Channel Four with a client list including BBC TV, LWT and OnDigital as well as Channel Four. Meanwhile, MTV Europe has purchased a 60-channel Calrec T-series console as part of a major refurbishment of its Studio A, joining the Q-series desk already installed in Studio B. Studio A is the largest and busiest of the station's studios, hosting shows, from live music to light entertainment. MTV Europe's clients include Carlton Television, Sky Television, the Paramount Comedy Channel and Channel 5 as well as MTV's pan-European networks. Channel 4 Television, UK. Tel: +44 20 7396 4444. MTV Europe. Tel: +44 207 284 7777. Calrec, UK. Tel: +44 1422 842159.

US: Susquehanna Radio Corporation has installed Lucid digital sync generators and digital signal amplifiers at its new Atlanta facility. Modern Rocker 99X WNNX-FM and Top 40 Q100 WWWQ-FM now boast an all-digital signal path with Lucid equipment supplying both stations with master and back-up clocks for digital sync, digital audio amplification and distribution. Each previously had its own separate digital facility. PR&E Digital Airwave consoles serve as the facility's audio hubs, each feeding Lucid SRC9624 and AESx4, which splits the signal for Omnia processing an transmission via an Intraplex T-1. Susquehanna Radio Corporation, US. Tel: +1 214 520 4380. Net: www.lucidaudio.com

Switzerland: The DS Dreamsound recording studio modified its DynaudioAcoustic M3-based stereo monitoring to accommodate 5.1 surround. The control room and expanded monitoring were designed by Munro Associates. Owner Markus Zehnder has already hosted sessions and mixes from the likes of ex-Nirvana drummer Dave Grohl and Andreas Vollenweider. DS Dreamsound, Switzerland. Tel: +41 55 418 9050. tc electronic, Denmark. Tel: +45 8742 7113.

Finland: The Finnish Broadcasting Company, YLE, has recently purchased and installed five Waves MaxxStream streaming systems. Net: www.yle.fi/radiomafia/maxxmafia.aspx Soundata Oy, Finland. Tel: +358-9-4769 3320.



UK: Engineer-producer Greg Walsh reckons to have solved his Surrey studios' acoustic problems with the installation of Tube Trap monitor stands and China Cones. Problems of resonance and poor stereo imaging arose with the addition of an active subwoofer to his Genelec close-field monitors in readiness for a project with Miguel Bose; the speaker stands brought the required acoustic absorption while the China Cones stabilised the image. Established for his work with the likes of Chicago, Tina Turner and Heaven 17, Walsh is currently nurturing a new female artist called Be. Soundfield Studio (distributor), UK. Tel: +44 7930 506670. Net: www.soundfield.net

tion concerns over to Las Vegas-based **Transamerica AG**, freeing founders of Mark and Beth McQuilken to continue focusing on the DSP design work that has produced their RNC (Really Nice

Compressor) and brought them close to the likes of RCA, Motorola, Lockheed Martin and BMW. 'The RNC is a serious studio tool that easily competes with compressors that are far more expensive. It

embodies evolutionary advances in digital technology, coupled with the best analogue has to offer,' commented Mark McQuilken from his Austin, Texas base. 'Both Beth and I realised we were far better at designing than selling—having a specialist like Brad Lunde handling the sales element of business just makes sense.'

'I've been interested in FMR Audio for several years,' added TAG's Brad Lunde. 'FMR is an important growth company because they have found ways to make digital and analogue work together at a price people can afford. The FMR RNC delivers benchmark performance and benchmark pricing. It appeals to a broad range of users and its capability is way beyond anything we know of anywhere near the price. Distributing this product and working with FMR is going to be a lot of fun.'

Following *Studio Sound's* reviews of the MA 2.2 mic amp (*Studio Sound*, June 2001) and the SOC 1.1 compressor (*Studio Sound*, July 2001), New Zealand entrepreneur **Buzz Audio** (www.buzzaudio.co.nz) has secured CE certification and distribution through ASAP Europe. ASAP Europe, UK. Tel +44 207 231 9661. Net: www.asapeurope.com

Barn storming

UK: A derelict 16th Century barn in the Middlesex village of Denham has become the home of the predictably named Barn Studio. The latest endeavour of Lynx Digital, a 20-year veteran of the broadcast postproduction sector, the new studio offers 'a totally unique sound recording and comprehensive editing facility'.

Duran Films opens new audio facility

PARIS-BASED POST OPERATION Duran Films—part of the Duran-Dubois group alongside Les Auditoriums de Joinville—has opened a new audio facility to partner its 3D animation studios and to combine both film and TV drama work.

Central to the upgrade is the first Euphonix System 5 digital console in France, delivered by French distributor 44.1. Duran COO Hervé Le Coz spoke to *Studio Sound*.

Q: Is the whole place digital now?

Almost. Our longest experience is with digital video and graphics—we were the first in France to use Quantel computer graphics in the mid eighties. We have lots of Pro Tools, and we've had an AMS Neve Libra Post for a year, but we still have a CS3000 too.

Q: Is Pro Tools the main platform?

No, it depends on the application—editing, mixing, sound generation and so on. We still use an old AMS Audiofile for fast editing; there are six Pro Tools systems; three Fairlight systems; and around 10 Akai DD1500s.

Q: Is the System 5 intended for specific applications?

Mainly mixing big TV dramas, like *Les Misérables* with Gerard Depardieu. Playback is normally via a couple of DD1500s. If we need Pro Tools for sound design, for example, we'll bring it into the room. And we record onto two Fairlight MFX3Pluses.

Q: Doesn't that create a lot of file exchange?

Yes, but in France the DD1500 is the standard for TV drama editing rooms. A lot of TV sound editing is done by the Avid assistant, and the DD1500 is really easy to use. We don't do much editing in our System 5 room, so it's just a useful playback device.

Q: And when mixing is finished you can transfer to another room?

Absolutely. We use two Fairlights because they're 24-track, and we're starting to get a lot of work in 5.1 that uses lots of tracks. We've added rear-left and rear-right JBL monitors, and a sub, to our Genelec 1038 LCR configuration to create 5.1 in the System 5 room.

Q: Why is the System 5 suited to film engineers?

It's the PEC-Direct monitor controls in the modular panel. We have configured our System 5 like a film console, so we can have switchable subgroups of dialogue, FX, music, sound design and so on.

Q: You say that France seems quicker than other European countries to embrace digital. Why do you think this is?

I come from a music mixing background, and in the mid eighties everyone went digital because it really was cheaper—easy to set up and good technical support. It's almost the same in the film and TV industry in France today. You can interface with the edit systems and avoid expensive A-D and D-A converters. The System 5, for example, is operationally the best of both worlds.

Duran Films, France. Tel: +33 1 4529 9999.



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CONTRACTS

Germany: Frankfurt's Hessischer Rundfunk radio operation has expanded its Telex intercom matrix. Using a fibre-optic link to add a second matrix to the existing, three-year-old installation, Hessischer Rundfunk has the first active multi-frame system in Germany and is celebrating with its new youth-orientated programme, XXL.
Telex EVI Audio, Germany.
Tel: +49 9421 706464.

UK: Total Audio Solution has complemented its TARDiS mobile with the TARDiS Two. Built as before around a



Sony DMX-R100 digital console and Tascam DA-78HR recorders, the second TARDiS offers an alternative interior layout and expects to see the addition of an MX-2424 hard-disk recorder for back-up, plugged directly into the vehicle's AES-EBU patchbay-distribution system. Coincidentally, London-based OB company CTV has installed a 72-channel Calrec S2 into its new OB4 vehicle, custom-designed for live broadcast of light entertainment shows. At 40 tonnes and with a surface area of 695ft², the 32-camera OB4 is the largest OB facility in Europe.

Total Audio Solutions, UK.

Tel: +44 1527 880051.

CTV, UK. Tel: +44 20 8453 8989.

Calrec, UK. Tel: +44 1422 842159.

It offers a large 'beamed' orchestral studio area with acoustics by the BBC Design Department containing a new Steinway B grand piano, 12 on and off-line sound and video editing suites, DVD authoring and mastering, and graphics facilities. The equipment listing reveals two of the suites to be AMS Neve Logic rooms and two to contain Avid systems with Symphony Smoke and Flame digital graphics systems.

'This is the first completely new, purpose-built facility to go online for quite a while,' commented Lynx sales and marketing manager Emma Goodall. 'Denham Village is an ideal location with Pinewood, Bray, Elstree, Shepperton and various BBC facilities all within easy reach. The rural location also means that we don't suffer from access or parking

problems and can offer clients a highly professional, competitively priced, enjoyable and convenient environment in which to work.'

The Barn's advertising effort opportunistically employs a couple pondering the question: 'Have you ever done it in a barn?' Irresistible. Contact emma.goodall@lynxdigital.tv

Chrysalis' Rivals survive net cull

Net: Media group Chrysalis is consolidating its Internet portfolio on a sports website, Rivals.net. This follows losses on all of its other web enterprises including

listings site Citipages and music portal Darkerthanblue.

The company raised £27 million to invest in new media last year, and is likely to spend the remaining £5 million it still has on Rivals.net.

As part of the consolidation process, internet radio concept Puremix.com—for which a Dalet 5.1 audio streaming package was acquired and installed—has closed.

'We are used to the record business,' commented Chrysalis co-founder and chairman Chris Wright, 'where you sign a lot of musicians—some make it and some don't. There is now a much clearer idea about what kind of new media ventures are likely to be successful and which aren't.'

Fish and beans make healthy diet for Multi-Video Group

EMMY-WINNING COMPOSER and producer Peter Fish, winner of ASCAP's Most Performed Themes award for the last three years, has joined forces with Cool Beans Digital Audio in New York. Fish's Book It Ltd company is now part of the Multi-Video Group which owns Cools Beans, along with several audio-visual production and postproduction operations.

As part of the integration, Fish has designed and specified a second audio post facility for Cool Beans in conjunction with Manhattan-based broadcaster Thirteen/WNET. He spoke to *Studio Sound*.

Q: What is Book It Ltd's main operation?

Book It is my corporation, which has entered into a partnership with MultiVideo Group for the purpose of the operation and management of Cool Beans Digital Audio—at both the East 42nd St and the Channel 13 locations.

Q: What equipment is going into Thirteen/WNET New York?

In terms of consoles: two AMS Neve Libras; one ProControl; one Mackie Digital 8-Buss. DAWs include four 24-output Pro Tools 5.1 systems. Signal Processing is to electronic System 6000, Orville and various vintage gear such as Pultec EQP1-A, La2a, Urei 1176 and so on. We also have three Synclaviers.

Q: What are your design priorities here?

All of the above, with an emphasis on 5.1. The speaker placement relative to the engineer's mixing position in these rooms is unrivalled by any other studios in New York.

Q: Is Thirteen/WNET a new broadcaster, or is the Cool Beans co-operation an upgrade to Thirteen's existing post facilities?

Thirteen is the largest public television broadcaster in this country, with over 50% of all PBS original programming originating there. Check out their website at www.thirteen.org. The Cool Beans co-operation represents their entry into the audio post portion of the production process.

Q: What equipment is in Cool Beans' East Side base? Are there likely to be any upgrades here under your stewardship?

The Cool Beans gear is very current and well thought out, so no major upgrades are necessary. The major pieces are as follows: three Euphonix System 5 consoles; three Pro Tools 5.1 DAWs; three to electronic System 6000s; three Orvilles; three 5.1 environments; one Synclavier; three plasma monitors combined with rear screen projection. The rooms are 100% digital once the signal enters the into the room.

Q: Given that these developments indicate an aggregation across the full scope of audio post markets—agency, TV, film—are you planning any kind of internet audio facilities?

I think this is an area we will head to, but it is not our current number one priority.

Multi-Video Group, US. Tel: +1 212 986 1577.

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CONTRACTS

Andorra-France: Mallorca's Das Inselradio 95.8 FM has employed Klotz cable throughout its building and studio. Andorra Radio R/P has installed an entire Klotz audio cabling system, while across the border, Netia has provided Radio France Bleu with a complete 'audiogitisation' Radio-Assist system, handling audio from acquisition to broadcast through production, planning and archiving. Klotz AIS, Germany. Tel: +49 89 461000 24. Netia, France. Tel: +33 4 6759 0807.

Australia: Australia's largest radio network, DMG Radio, has ordered three more DSP Media P-16 Postations for installation at its Melbourne station. The order marks the thirteenth Postation in use at DMG which owns 61 stations in five Australian states including Queensland, New South Wales, Victoria, South Australia and Western Australia. DMG Radio, Australia. Tel: +61 418 657 658. DSP Media, Australia. Tel: +61 2 9714 5400. ARX, Australia. Tel: +61 3 9555 7859.

Japan: Three new Tokyo-based studios have recently ordered DSP Media systems; Flex Studios has taken a Postation II, Answers Studios and Hokkaido Bunka Broadcasting have both taken 16-track Desktop Systems, while Answers has also taken a standalone Vmotion system. Flex Studios, Japan. Tel: +81 3 5443 5211. Answers Studios, Japan. Tel: +81 3 3266 8011. Hokkaido Bunka Broadcasting, Japan. Tel: +81 11 214 5200. DSP Media, Japan. Tel: +81 3 5723 8181.

Strongroom endorsement

UK: East London's Strongroom Studios has endorsed its multimedia and surround-sound credentials with a string of groundbreaking projects.

As dance outfit Groove Armada embark on an SACD mix, techno duo Orbital have just completed a 5.1 mix for DVD-Video—the visuals for which were developed by Strongroom's multimedia wing Pavement.

Mix engineer Dave Pemberton used Studio 2's Euphonix CS3000 console and Boxer 5.1 monitoring system while simultaneously developing stereo and 5.1 mixes.

'Most of the sources were electronic,' comments Pemberton, 'many with pre-programmed effects with surround in mind. Any vocal reverbs were usually re-done by me with the Lexicon 960, and I didn't work to picture—they were all done afterwards.'

'The main aim was to get things spinning round the room and really exciting. We made an early decision to go surround in this room, about five years ago, and it's really beginning to benefit us now.'

Studio 5 has also recently been relaunched at Strongroom as a 5.1 ProControl-based room, aimed at budget projects for DVD.

Strongroom, UK. Tel: +44 207 426 5100.

Burma's radio alternative

Burma: Over US\$100,000 worth of broadcasting equipment has been ordered from Singapore by Burma's military government in order to kit out a new FM radio station. The station is due to begin broadcasting from the capital, Rangoon, in November.



UK: Soho's Tape Gallery postproduction facility has installed a Soundtracs DS-3 digital console in its Studio 2 (pictured with engineer Richard Bradbury). Having grown from a single-room facility which opened in 1981, The Tape Gallery now offers five studios, transfer suites, Avid facilities, access to on-line fx and voice-over libraries and production and publishing links. The 64-channel DS-3 is the focus of the upgraded Studio 2 and is highly regarded by founder Lloyd Billing: 'Consoles that sell for three times the price don't come anywhere near the sonic quality of the DS-3,' he commented. The Tape Gallery: +44 20 7439 3325. Soundtracs: +44 1372 845600.

A report in one of Burma's national newspapers, the English-language *Myanmar Times*, says that, unlike the more usual highly-formal broadcasts heard on the country's state radio, the new station's programmes will be geared towards light entertainment—with both Burmese and Western music being played.

The new station, which will broadcast on 99MHz, will be run from Rangoon's City Hall by the capital's City Development Committee. Apart from local news and entertainment programmes, the station will, for the first time, feature on-the-spot traffic reports. To achieve

this, the committee plans to have reporters spread around the city, reporting on the traffic situation via walkie-talkies.

Currently, Radio Myanmar, the state broadcaster established in 1946, serves the whole country, with programmes everyday in Burmese and eight ethnic minority languages. Broadcasting also twice a day in English, from 8:30am to 9:15 am, and 1:30pm to 3pm, it provides national and foreign news, features, and musical programmes, along with commercials for entertainment, educational and business enterprises.

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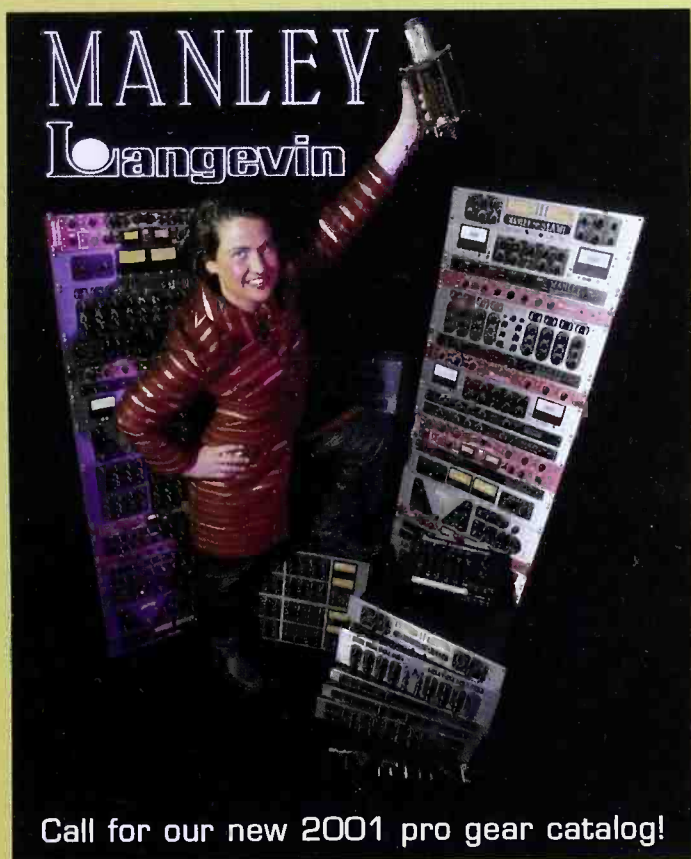
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APPOINTMENTS

Aphex Systems has appointed Keith Jahr to the new position of operations manager. Jahr brings over 20 years experience in consumer and MI sales and management as well as being a musician, recording engineer, FCC license holder and radio talk-show host.

Klotz Digital has added Jim Armstrong to its sales team as sales engineer. He will concentrate on operations within the US market and aid in broadcast product design and development, market research and technical presentations to broadcast groups. Armstrong has previously served with Burk Technology and Gentner Communications.

Crown Audio has announced Blake Augsburger as president, reporting to Mark Terry and responsible for overseeing and directing the entire Crown operation. Augsburger has spent time with NY's Hipotronics and the



Swiss Haefely Test as VP in engineering, operations and world-wide sales and marketing.

Soundtracs has announced the departure of sales and marketing director John Carroll after around 30 years with the company. Departing amicably, Carroll is to remain involved in the annual DAMSTY charity sailing event while contemplating his future professional opportunities.



UK: A new initiative a London's Town House studios offers an intriguing alternative to the established Soho-centred postproduction scene. Located somewhere west of Kensington, Town House Vision offers a 'one-stop-shop' for low-budget television productions. The facility is centred on an extended Digidesign ProControl surface including Edit Pack with a Bryston-PMC LB1 surround monitoring system, and includes a Foley area designed with the assistance of freelance Foley artist John Swanscott (son of Ted Swanscott) that doubles as an ADR area. Running the facility, Julian MacDonald commented, 'Some people were frustrated by what they were being offered in Soho. Lower-budget projects were being rushed through premium facilities and weren't getting the best service so we decided to offer an affordable alternative by using Pro Tools.' In discussing its conception, MacDonald makes a parallel to the sea change experienced by audio recording with the emergence of increasingly affordable technologies. 'Although it was reckoned to be possible to apply Pro Tools to a setup like this, I believe we were the first people to approach Digidesign to build one,' he says. Since opening in January, Town House Vision has hosted *The Inbetweeners* for Universal Pictures and was recently busy with *Boxed* and its all female direction-production team. Coming up are projects for the likes of the National Geographic and Discovery channels and an animated feature. 'It's a real asset to have EMI behind us,' he continues, 'and it's good for them to be seen to be pushing things forward. We're looking towards tomorrow's talent and working methods. Town House Vision, UK. Tel: +44 20 8932 3200.'

start until June 1980, the move to establish a new radio station in Rangoon is seen as bringing the capital, with its 5.5m inhabitants, more up to date with the outside world.

Sondor's new super Nova

Switzerland-UK: British-based Projection & Display Services has become the first customer for a new Nova 'location' projector from the Swiss Sondor specialist. Co-developed with P&D, the 35mm Nova projector breaks down into four flightcases (inset): two housing the projector itself and one each containing the lamp house and rectifier. Assembly by one person takes approximately 20 minutes. Performing to the same specification as the Studio Nova (including 24fps-25fps, x2 projection, x10 shuttle), the location model can be assembled by one person in 20 minutes. Its sound heads are LED analogue and Dolby SR-D.

Summertone, UK. Tel: +44 1923 263220.

Pro Audio A to Z

World: The first comprehensive and definitive listing of all the world's leading audio manufacturers and distributors—*The Pro Audio A to Z*—is to appear as a second volume. The 300-page volume has since become an invaluable source of reference for anybody in the business of professional audio, particularly for manufacturers seeking new distributors and dealers, and vice versa.

Launched in September 2000, and produced by CMP information—publishers of *Studio Sound*, *Pro Sound News* (Europe, Asia, USA), *Installation Europe*, *Systems Contractor News* and *EQ*, *The Pro Audio A to Z* brings together key market contacts from a multitude of information sources. The eagerly awaited second edition will be published in September 2001 and will feature all the new contact details for companies that have re-located, changed their company name or come into existence in the past 12 months. Contact Jeremy Theobald: jtheobald@CMPinformation.com

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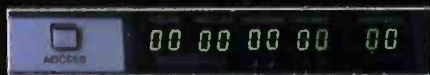
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HOUSEWORK

Every capital city has a post community with a supporting infrastructure. **Zenon Schoepe** goes to Stockholm, where skilled hands make light work of the Housework

MOST PEOPLE passing the front window of Housework's postproduction facility in a plush side of Stockholm won't quite understand what they see each day on their journey to and from work. A perfectly normal nice art deco building with people often standing in the window drinking coffee and some sort of large construction as a backdrop. When you get to actually go inside things aren't immediately much clearer, for standing on the large showroom floor of the old former chemist's shop is what amounts to an enormous box. In it are two 5.1 Genelec systems and Pro Tools with ProControl studios complete with adjoining overdub booths that earns Housework its living predominantly in commercials.

There's more than a smattering of Swedish style here

but it transcends anything you'd find in an Ikea catalogue, such as the remarkably underexploited use of MDF, in its 'natural' unpainted state, as the outer 'skin' feature surface of the box. It's good enough to have made it into local lifestyle magazines.

'We didn't want something that looked integrated in to the place, we wanted to make it look as if something had landed in the building,' says Housework's owner Janne Anderson. 'At the same time we didn't want to interfere with the building too much as it has a number of period touches that are worth preserving.'

'I hate it when people over design a place and then feel obliged to wear certain types of clothes, that's all too upright for me. Things need to be calm like you're in a library or a restaurant.'

Designed by Sweden's leading acoustic design guru

Ingemar Ohlsson, aided by architect Erik von Matern and constructor Olle Nilsson, it's a triumph of ingenuity and elegance over the relatively common problem of how to create a studio in an environment that doesn't want to be disturbed too much.

The studios stand on insulating blocks made up of a composite of wood and stone that isolates and floats the structure above the substantially solid floor of the building. THX approved air conditioning conspires to create a relaxed and quiet working environment with quite remarkable isolation—because you can see most of the outside walls of the studio you suspect, quite incorrectly, that the structure will be more vulnerable in this respect. It amounts to a wonderfully insulated and isolated studio cocoon.

Apart from this Swedish endeavour, Anderson is also a development partner in an editing company in Santa Monica where he has a room and office where he tackles sound design and general Housework style projects for American clients. His time is split between LA and Stockholm, and his company has existed in one form or another for around 12 years driven always by Anderson's interest in getting involved with varied work.

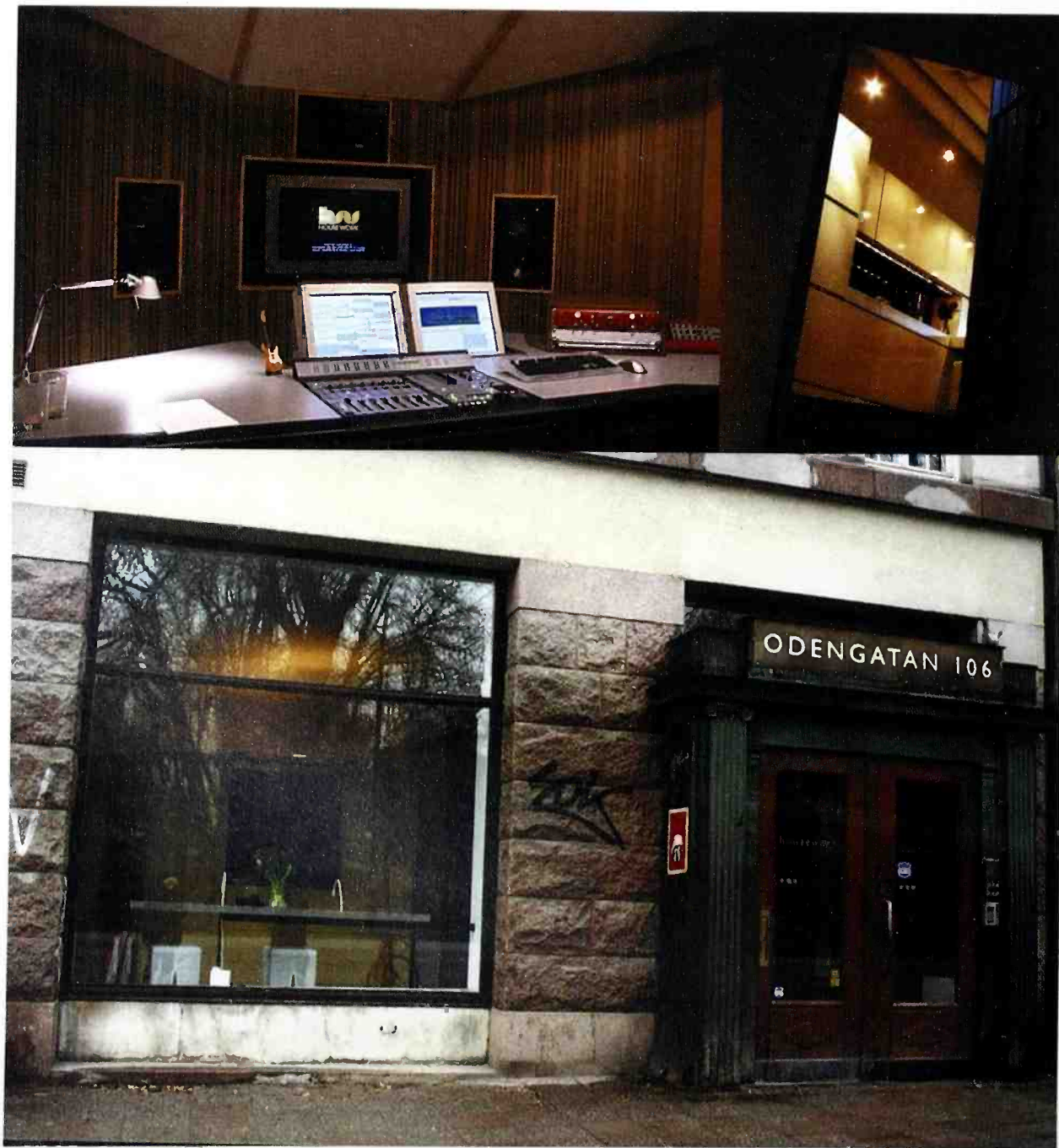
'The thing that we do that makes us special is the people we have and that means we can take on different types of job from arranging and conducting a string quartet, sound design and keyboard music, mixing and all the types of work that involves combination and collaborating between different disciplines,' he says adding that the rooms are set up for linking and collaboration. 'What feeds me is doing different combinations of work so that we don't just end up doing the same sort of thing every day.'

'I look for relationships with producers and directors who are interested in doing cool work,' he says.

Some 70% of work load is for European commercials for TV and cinema with the remainder attributed to long form. There is always one longform project going through at any one time with the facility arranged to run around the clock if required.

'Going to the US as an arrogant European you tend to think that we can do things better but you realise that the Americans are really very good at certain things and you can learn so much from them,' he continues. 'I try to absorb that and bring it back here and apply it. The Americans do Foley really well, there's a culture for it and it's mind blowing. Now everyone that works in my business of post sort of dabbles in Foley and we can move some things around and edit it so it works but it's not the same as an experienced Foley artist actually moving the mic to picture when doing clothes sounds to give three different frequencies of movement. They're used to mixers not having all this editing equipment and the Foley artist is effectively premixing himself. And the mixers are good and the whole process is very production line oriented. They tend to have guys who are exceptional in one particular area of expertise whereas in Europe we have to be more multiskilled.'

He says there are also significant differences in approach to film-making across the Atlantic and where-



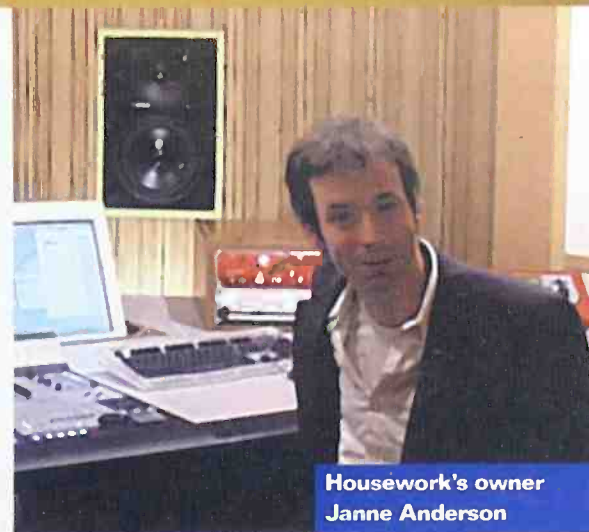


as the Americans see their work as a business performed for a client who gets whatever they want, the Eastern Europeans, on the other hand, regard the process almost completely as art. He says the remaining Europeans recognise it as art but also understand the importance of the business aspect and that they ought to at least try to make some money out of it.

Housework has been operating from its present site for three years following its location at two previous sites for Anderson's company. The two main rooms are identical small 5.1 configurations. 'Much of the stuff we do here has been print mastered in a larger room for level checks and our results translate up to film and down to TV extremely well if you've got good people engineering,' he says. 'And if you want to do flash stuff, sound design and mix movements, we are much better equipped to do it here than they are in

the studios we use for print mastering.'

Anderson ran 5.1 monitoring in his last facility, however, the previous place ran THX approved Apogee monitors and the new build has seen a move over completely to Genelec. 'We talked about the choice of monitors for a long time,' he explains. 'I fell in love with Genelecs long ago but for a lot of people from old school music mixing find it hard to move up to Genelecs because they think they sound too nice and because they feel they get lost in the beauty. I believe that a good mixer will learn any monitor as long as it's within professional standards. The trick is learning how the speakers translate to what you're delivering and I hear a lot of detail with the Genelecs that doesn't exist in other monitors. For the operator it's a trick and craft to get a feel for how his work translates to kicking movie theatres or down to TV.'



Housework's owner
Janne Anderson

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FACILITY

The speakers in the rooms are Genelec 1032s on the LCR and 1031s in the rear with 1092 subs, not the most enormous models then but, importantly, to the scale of the room according to Anderson. 'We can achieve sound pressure levels that feel the equivalent of a movie theatre—you can do film mixing at 85dB. It's the high-end spec that we were looking for because we wanted to be able to do that sort of work. You can put on a DVD in there and dial up an action sequence and it really moves air with the big Genelec subs,' he says. 'I've got an identical Genelec set up in my room in LA but without any of the acoustic treatment and design that we have here. While it sounds great, I feel good about the enormous difference that the design makes to the sound. I really feel I've had my money's worth on it, you can see and hear where the



money went. You can keep turning up the volume without realising how loud it is getting and there are just these "little" Genelecs in there.



'I actually tested the largest Genelecs against the old Apogee system and the main difference was the kick from the Apogee horns because they're more like a PA system,' he continues. 'That's good for that archetypal cinema experience but it hurts your ears. When I go to a Hollywood mixing stage and hear the sort of levels they're working at it scares me and I don't want to do that. I can live without that and the kick from the horns.'

The difference in dynamics, attitude and the rate of throughput between Housework's mainstay of commercials work and that of longform projects requires flexibility but they can be connected. 'Commercials can be an awful lot of fun and it leads to other stuff,' observes Anderson. 'What often tends to happen is a commercials director gets offered features and their sound guy here gets to make the journey with them.'

'If an interesting longform project comes up we look at it as a team, because everyone has to be involved one way or the other, and decide whether it is something we think would be fun or that we would want to do. Once we make that commitment we know that if we run in to problems then we all know that we agreed to it.' Staff co-ordination is less of a problem than it might be because the company is very small and they keep talking to each other so everyone knows what's going on.

Housework has two main engineers (Magnus Andersson and Eric Thorsell) plus an assistant with the plan being to progress to four engineers and two assistants in the very near future. This expansion coincides with the creation of two new rooms at the back of the building—one, a small assistant room for prepping and transfers, the other a smaller version of the main rooms with an identical Pro Tools system but without the acoustic treatment that differentiates them. The latter will be dedicated to longform work to cut some slack for the two main rooms with more sound design 'toys' to add 'more colours to the palette' and a second Kyma system.

Anderson's background is in music, he got into sequencing early and branched in to music for picture culminating in Logic Audio before his switch to Pro Tools with version 4.0. The facility still runs Logic in the rooms for sequencing despite the presence of five

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Housework is a beta tester for the Rocket Network and see enormous potential for running it within a facility rather than over the Internet. 'I evaluate the soft-

ware we use continuously,' he says, 'We're always on the lookout for something that will do a job better. Financing that is not really the issue because Pro Tools is expensive but not if you compare it to the cost of a Capricorn or an SSL desk and it's minuscule in comparison to how much you spend on building costs.'

Projects include work for English, Norwegian, Finnish and the occasional German agencies and production companies. 'For the English agencies we collaborate with post houses in Soho (London) and we're not precious about it because it doesn't matter that we're not the finishing facility,' explains Anderson. 'We'll accommodate the client and if they're happy maybe they'll come back. I'm sure other places have their edges as well but we're good at things too and pricewise we're

probably a little cheaper than Soho. Our commercials hourly rate is £170(UK).'

Long form work is by definition more complicated in charging structure and Anderson states that it's important to set ground rules with what can become interminable projects. 'We don't promise to work on it endlessly until the client says he's happy basically,' he says. 'You have to define points at which they can confirm that we're doing what they want us to do and they can sign on it. That way in a month's time when they change their minds we know where we stand.' He adds that if someone tells you that their job will look really good on your show reel then you know they can't pay you.

'One of the things that is handy about being where we are is that there's an editing company (Stockholm Postproduction) with three Avids in the basement here and we collaborate with them on projects,' he continues. 'We're networked to them so they can fire us the picture and we'll sound design for it. It's one of the main reasons we're in this building and it means that I don't have to own any video machines as they've got a massive machine room but I pay them every time I need to use one. We don't have to invest in new video formats, we're an audio facility, but we'll layback to the machine of your choice.'

'We don't often work together but for the more complicated projects it becomes a bigger deal to be able to go from the off-line up to an audio room and show them what's happening,' he continues. 'In those instances the ability for the picture and sound guys to be able to talk and discuss the work can make a big difference.'

'A lot of people have tried this sort of combined approach and it's a hard deciding how you collaborate but it's also about how you are perceived—whether it's an audio facility with video or a video facility with audio because they'll get hired by different people. Clients also want to be able to choose their video and audio people separately. The set up here involves separate companies and we work together when it makes sense, not because we have to,' he concludes.

A lot of thought and attention has gone in to the making of Housework which exudes all the vibe of a busy, productive and clearly 'in demand' facility. Pleasant people in pleasant surroundings and Stockholm's not bad either. □

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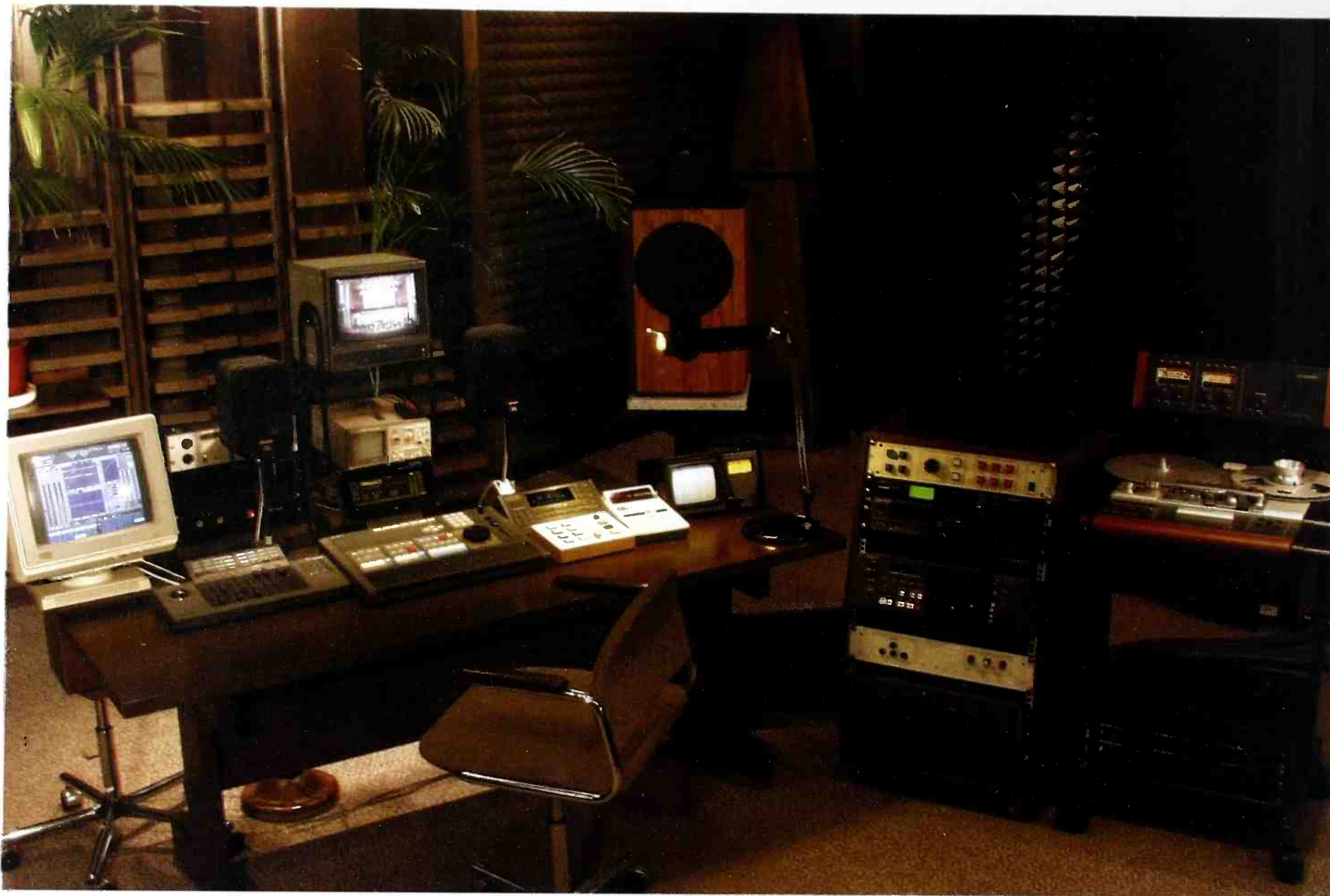
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CZECHS IN THE POST

The magnificent Rudolfinium is the keeper of the flame for orchestral recording in Prague. Hollywood has taken notice but don't expect to use the President's Office as the lounge just yet, writes **Dan Daley**

IT'S NOT EVERY DAY that you go looking for a recording studio and find a work of art. That was the case, though, when following the directions to the Rudolfinium, home of the Czech Philharmonic Orchestra. 'You can't miss it,' says Elena Suchankova, a jazz singer who has volunteered to act as interlocutor for a visit to Prague's stateliest musical edifice—which is saying a lot for a city where an entire Baroque-period museum is devoted to composer Antonin Dvorak and where tourists are barraged by leaflets touting multiple performances of Mozart and Chopin works in every church, every night. At the height of the season in summer, cellists and violinists race between churches to fit in as many as three performances a night.

As for the Rudolfinium, you can't miss it. As you follow the street that hugs the bend of the Vistula River, where Prague's Old Town and Old Jewish

Quarter meet, the Rudolfinium comes into view and within a few steps the grand building's size blots out the view of the massive Prague Castle across the river. Built in the 1870s, the Rudolfinium is home to a 1,100-seat concert hall and home to the Czech Philharmonic, which gave its first performance there on 4th January, 1896, and over the next century has hosted composers, guest performers and conductors including Mahler and Rachmaninoff. The spear-carrying statuary which guard the building's southern entrance have witnessed their share of problems, from Czechoslovakia's birth as a nation in the aftermath of World War I to its unwanted status as a protectorate of the Third Reich in the next war (during which the Rudolfinium was appropriated by the Wermacht for office use), to the bloody Prague Spring of 1968, when Warsaw Pact tanks brutally repressed Communist Party chairman Alexander Dubcek's tentative attempts to relax the

Soviet Union's hold on the country's already limited freedoms, to the bloodless Velvet Revolution of 1989, when playwright Vaclav Havel helped lead the country towards democracy. The Czech Republic was created three years later.

Meanwhile, the Rudolfinium remained the vital music centre of Prague, continuously occupied by the Czech Philharmonic, regardless of who was occupying the rest of the country.

Directly underneath the stage of the main auditorium, named for Dvorak, is the Rudolfinium's recording studio, presided over by Oldrich Slezak, who like many hopeful musicians came to one of Prague's many conservatories to study music—he plays bass—but who caught the recording bug when he started working at FHS, a film sound studio there in the seventies.

Oldrich is heavy-set, with a trimmed reddish beard and owlish round glasses that give him a professorial

look. He has a relentless penchant for small Churchill cigars. He is married to one of Prague's leading chanteuses, Marta Balejova, a beautiful woman and an indication that he gets out of the studio at some point each day. 'I learned about recording large orchestras at the film sound studio,' he recalls. 'But the real education was here,' referring to the massive 24m x 32m x 14m stage upstairs which holds the 120-seat Czech Philharmonic and its 140-voice choir.

The studio exists in its own demimonde beneath the stage. A recording setup of some sort for the Rudolfinium's stage has existed since the 1950s, when Supraphone was the state-owned recording studio and classical label (whose catalogue was purchased by Sony in the nineties). The current control room, though, came about as part of a large renovation of the entire building in 1992, which restored its many rooms—including one always reserved for the sitting President of the Czech Republic—to their original specifications. Not only the sonic majesty of the halls but the aesthetic magnificence of the entire building was rescued from a period of deterioration under the Communists—as Slezak walks through the grand entrance hall with its sweeping staircase, he notes with visible disdain that the previous regime had used it for a basketball court and gymnasium. This renovation also resulted in recording capability being allowed for in a second, smaller (10m x 24m x 6m) music auditorium, Suk's Hall, and in a chamber for small Baroque-type ensembles.

The 8m x 8m x 3m main control room was designed by the Prague acoustical firm of Soning, with a typical compression ceiling whose lowest point hovers over a Solid State Logic 4040G console (with Total Recall) before rising up to allow viewing of the two television monitors which are connected to remote-controlled cameras, the visual connection between the subterranean control room and the stage. The rear wall is fitted with custom RPG diffusers; the walls are fabric-covered and handle absorption duties along with copious amounts of egg-crate-type foam applied to the ceilings and parts of the walls. A pair of large B&W Matrix speakers are the main monitors, and smaller ones have been added to create a relatively new surround monitoring array, the direction that Slezak thinks that classical music will move towards, particularly since Sony's SACD format has now added

multichannel capability. Slezak, also a mastering engineer (see sidebar), likes the sound of Sony Direct Stream Digital approach. In fact, despite having been brought up on tubes and analogue tape and equipment, he likes most things digital for classical recording—the higher the resolution, the better, he says. Though the studio has a pair of Sony 3348 digital 24-track decks, Slezak prefers the sound of the two 24-bit Tascam DA-series MDM-type 8-track digital recorders he has in a rack to the right of the console. 'We have recorded several projects for the Octavia label using DSD and the Tascam recorders,' Slezak says, including work for noted Japanese conductor Tomoyoshi Ezaki. The studio, however, does not own its DSD system; Ezaki rented it himself from Sony in Japan and brought it to the Rudolfinium. Other digital equipment in the control room's racks behind the mixing position includes Lexicon's 960L multi-channel digital processor, as well as a Lexicon 480L, an Eventide H-3000B multi-effects unit, a tc electronic Finaliser, and a Sony SDP-1000 digital compressor-limiter-EQ, but also a few key analogue pieces, including an original Urei 1178 compressor. One other set of analogue equipment also adorns the control room: two large tropical plants on either side of the console whose fronds bend inwards towards the centre of the monitor field, and which are under the constant glare of grow lights. 'It's nice to have something like that living down here with you,' Slezak says fondly of the plants, which he and his two assistant engineers have kept alive and healthy for six years so far.

Upstairs, the stage of the Dvorak Hall has a grid of microphones slung above it, as well as around the hall's edges, to capture the 4s delay the space generates.

Slezak's favourite microphones for the stage are the Neumann TLM170, of which he has 10, and the Schoeps CMC 5, of which he has numerous variations, most of which are the dozen MK4 versions. He will vary their placement in the hanging taut-wire grid based on who is performing, but he is able to capture most performances with as few as six microphones over the stage and a couple more in the rear of the hall. There are 48 tie lines running between the hall and the control room, though some are also used for talk-back purposes.



The Rudolfinium has numerous small practice rooms, most fitted with Czech-made Petrof pianos but three which have vintage Steinways. The small chamber music hall has an AKG 451 setup semi-permanently in it, but Slezak isn't particularly fond of the room, noting its parallel walls. 'We don't even link it to the main control rooms,' he says.

Slezak also has a small mastering studio, next to the main control room, used mainly for editing, with a Ramsa DA-7 digital mixer in it. He expects to put a digital audio workstation in the room by year's end.

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The Czech Philharmonic accounts for nearly three-quarters of the Rudolfinium's studio's work. The rest comes from rentals of the facilities, usually by visiting orchestras which want to record their own work, but increasingly from Hollywood film score work. At \$130 (US) per hour for the hall and studio, about half that rate for stereo film sound mix time in the control room, and far lower costs for musicians than in unionised Hollywood (or for that matter even Vancouver, Hollywood's main Canadian competitor for such work), using Eastern European symphonies and halls has become a cost-effective way for Hollywood to get lush and organic scores for their films. For instance, the television series *Young Indiana Jones*, which ran in the US in the mid-nineties, had its score done by the Warsaw Philharmonic; just after the end of the Communist period in the region, brilliant musicians and equally magnificent acoustical spaces were suddenly available for, relatively speaking, next to nothing, compared with what the score recordings would cost if done in the US or Western Europe.

The Rudolfinium has benefited from this turn of events, and Slezak says the studio's technology and

ADK Mastering

OLDRICH SLEZAK IS ALSO a mastering engineer, having learned that craft as he did engineering, by trial and error and reading the magazines, as well as reading the liner notes on his favourite records and noting the mastering engineers. (Bob Ludwig is his personal favourite.) Aside from his regular gig as the chief of studio at Prague's Rudolfinium, home of the Czech Philharmonic Orchestra, Slezak also is a mastering engineer at a commercial mastering facility, ADK Prague, across the Vistula River towards the east side of the city.

Slezak works there with a Sonic Solutions system, with v3 software and an array of digital and analogue outboard gear, listening through B&K monitors set on either side of a window that floods the 6m x 8m room with natural light, illuminating the widely-spaced RPG diffusers on the rear wall. Porous sandstone tiles on the front-end parts of the side walls, designed by Soning, the same acoustical design company which designed the Rudolfinium's control room, are an interesting combination of a hard and soft-reflective and absorptive surface in a single material.

The studio is part of a larger company, owned by Jiri Mosner and Petr Pilar, which also does audio tape and CD-R duplication. Combined with a packaging operation for the discs and tapes, it is the quintessence of small-town multimedia operation. The vast majority of the company's work is for domestic Czech record companies and artists, and in a country of about 10 million and a city

of 1.2 million inhabitants, with several dialects between them, the music market is not one of Europe's larger ones.

But barely a decade into a democratic present, ADK's mastering division, opened in 1999, gives the Czech Republic its third mastering facility, whereas before 1989, there was but one, and it was state-owned. And business is on the upswing, a combination of home-grown rock 'n' roll, ethnic music, catalogue remastering and classical and opera have been ADK's mainstays. The fall of Communism opened the gates from a single-state-owned record company, Supraphone, to a proliferating number of entrepreneurial ones and acquisitions of existing catalogue material as larger Western labels, such as Sony Music, seek out more international markets. And the Czech Republic is as good as any for that. As Slezak notes, 'Since the end of state monopolies, there has been an explosion of small independent record labels. As the economy continues to improve, people go out and buy more records. And people in this country are transitioning now to the CD from vinyl and cassette tapes, so that's creating a demand for CDs and CD-Rs.' (There are currently three CD manufacturing plants in the Czech Republic.)

But not all of these new labels have either the awareness of what mastering is, and-or the money for it, even at the 1,200 *karounas*, the equivalent of USD\$40 per hour, that ADK charges. 'But we teach them about it,' says Slezak.

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DAT is the main format that comes through ADK's portals, whether it's for mastering and-or duplication. There is a bit of analogue 1/4-inch, and CD-R is beginning to make some headway as a mix format, though even the entry-level professional burners are still economically out of the reach of most Czech musicians.

The studio has a vintage Revox 7 1/4-inch 2-track deck, modified for mastering with 1/2-track and full-track headstacks. A Sony APR 5003 and a Genex 8500 are two other in-house formats.

A second small mastering room across the hall, also with a Sonic Solutions system and an old Lyrec 2-track deck, is expected to become a DVD authoring suite at some point in the future, says Mosner.

Both he and Slezak are excited about the impending acquisition of several aging Studer A-80 2-track decks from the dismantled Czechoslovakian state radio operation. Those machines, once refurbished, will work both in the mastering studios and as the basis of a rental operation that ADK also aims to develop.

The Czechs may have spent a few decades out of the loop during the Cold War. But with their studio infrastructure reawakening at a time when such a diverse array of equipment is so widely available at affordable prices, Slezak is looking forward to the future. As much as he likes the vintage equipment he grew up with, he says without hesitation, 'Digital is the way it's going to be going here.'



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the hall's overall level of organisation has reached a point where he wants to start actively marketing the facility in that direction, rather than waiting for the work to come its way. However, just being there has resulted in several major film score credits for the Rudolfinium's studio, including the films *The People Versus Larry Flynt*, which used Dvorak's *Requiem*; *Iron Giant*, whose score was composed by Michael Kamen; *The Bunker*, with Russel Currie's score; and *Cinderella*, among others.

The usual procedure has been for US film composers to hire Czech-based producers, letting them both supervise the recordings and act as the contractor for the musicians. 'What the Hollywood film people are really looking for is not just a less expensive way to record orchestras, but also the prestige of the name,' says Slezak proudly. 'I mean, there is something to be said for being able to have the screen credits say that you recorded Dvorak's *Requiem* in the same hall Dvorak used.'

Like his counterparts in other countries behind the former Iron Curtain, Slezak has become the jack-of-all-trades in his fief. He learned microphone technique and recording principles in the apprenticeship manner, and the same seems to be going for marketing of the studio, which he is also supervising. He has had to wait a long time to get this facility to where he wanted it; first they waited out the departure of the Communists, then the inevitable fluctuations in leadership of the Philharmonic itself, and then through a period of refitting the orchestra, which desperately needed new instruments, and the renovation of the hall and the rest of the building. But now he's beginning to get the equipment he wants and needs to be competitive as the global film market continues to grow. He expects to shift recording to a random-access hard drive system in the near future, upping the resolution to 24-96. And finally, new brochures and a marketing strategy that's still being refined in his mind, but of which there is no doubt that it is the next priority.

'There's a lot of things that are happening in music that this place is perfect for,' he says. 'You can have a wonderful orchestra and a wonderful place to record them in, and you can do it very effectively. Things have changed in the Czech Republic. We're ready for the rest of the world now.'

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Canopus DV Storm SE plus

Integrating digital audio and video editing on a single computer is becoming increasingly affordable as well as practical. **Rob James** investigates Canopus' DVStorm video cards

LOCATED IN THE CARINA constellation, Canopus, pronounced (kuh-NOH-puhs), is the second brightest star in the sky. It is also the name of an American company responsible for a range of graphics and video editing cards.

This market used to be divided into (relatively) low-end analogue and digital capture cards and high-end multi-stream DSP cards. The most common format was MJPEG (MotionJPEG) at various levels of compression for off-line and sub-broadcast on-line, all the way up to uncompressed. But the last year or so has seen the emergence of a new, affordable breed of cards working in DV or MPEG2 formats and able to cope with two or three simultaneous video streams and one or more graphics layers in real-time (not to mention several audio tracks). DV uses a fixed-ratio compression scheme whereas there are various MPEG2 options. However, MPEG2 is really a delivery format and DV is arguably much better suited to editing. DVStorm is one of this new generation and uses DV25 as its native format, but with an unusual twist. DV uses 4:1:1 colour mapping for PAL and 4:2:0 for NTSC. DVStorm upsamples in real-time into 4:2:2 and all internal editing is done at this level. This and the use of YUV colourspace rather than the more common RGB make for excellent chroma and luma keying and high-quality filters.

DV25 4:2:0 and 4:1:1 should probably be considered sub-broadcast in postproduction work. However this does not apply to DVStorm. It's up-market sibling DVRExRTPro, comes with analogue component I-O which exploits the full 4:2:2. People are already using this for full broadcast work. (Dubbing the output direct to BetaSP or DigiBeta)

The primary requirement for DV editing on a PC is a means of getting DV in and out—a FireWire-IEEE1394 interface. The other essential is a Codec (Coder-Decoder). This setup converts DV into con-

ventional analogue video for viewing or recording and also encodes analogue video into DV. Codecs may be implemented in software using the PC processor or software and hardware using a codec chip or chips. Canopus eschews the popular C-Cube DVxpress chip originally designed for MPEG compression applications, since it considers it has limitations for DV use. Instead, it uses alternatives from Sharp and Sony.

Divergent design philosophies become more apparent in the approach to real-time working. At one extreme we have native processing, doing everything in software and at the other, fixed DSP processing. Canopus' approach is scaleable. DVStorm's capabilities depend partly on the PC's processor(s) and the amount of RAM. The graphics card is responsible for video overlays and may contribute to processing transitions. DVStorm's real-time abilities will increase with every PC upgrade.

Digital video filters and effects involve number crunching huge amounts of data which haemorrhages resources in a native processing system. At present levels of processor power, real-time abilities in a purely native processing systems are severely limited. With the opposite approach, doing most of the work in proprietary DSP, the feature set is ultimately defined by the card which may be rapidly outmoded.

The Canopus way of doing things, with some clever hardware assistance, feels like a good compromise.

Before editing can begin the material must be captured, either in complete reels or by logging the required shots and batch capturing them. Device control is the first hurdle. DVStorm clears this with both of my, slightly 'awkward', cameras.

Storage is now less of an issue and it is far more convenient to capture entire reels. This also puts less strain on the camera or deck. However, breaking down a reel of perhaps 200 shots is laborious and time consuming. Ideally, it would be possible to automatically identify shot changes within Premiere and I have heard rumours of a plug-in that does this. Unfortunately I haven't managed to locate it—yet.

Storm Navi provides an automatic logging function before capture in order to generate a batch list. This list is used in Storm Video or Storm Edit to digitise the selected clips. Unfortunately, this results in a lot of thrashing the transport backwards and forwards even where clips are consecutive. It also takes an unnecessarily long time. A scan and capture option



REVIEW

for simple projects, is inadequate for complex work.

For off-line editing and sophisticated sound, work Premiere has EDL export options including various flavours of Sony, CMX and GVG plus Premiere generic and OMF.

Attempts at importing a generic Premiere EDL into Steinberg's Nuendo proved fruitless. A cursory glance at the relevant user group bulletin boards reveals I am not the only one experiencing problems. Whether Premiere or Nuendo is the culprit I neither know nor care. Hacking the EDL around in a text editor might provide a solution if I could determine what Nuendo objected to, but I had hoped I'd left this sort of thing behind years ago.

My one real criticism applies equally to DVStorm's rivals. There is a lack of choice when it comes to editing software-hardware combinations. Adobe Premiere is bundled with all the major hardware players offerings. At least Canopus adds its own, somewhat basic, Storm Edit, but to my knowledge this is currently the only alternative. (Basic in this context means less than ideal for composing intensive activities such as commercials and pop videos.) Not that there is anything intrinsically wrong with Premiere or Storm Edit but excellent alternatives exist which might better suit some users. For example I would love to try using Speed Razor, Fast Purple, Avid DVXpress and especially Vegas Video with the added horsepower of Canopus. Even where alternatives can be used with files captured in the Canopus codec format, the real-time performance boost is lost.

The real-time functions provided by DVStorm mean greater productivity and less frustration but are only really integrated into Storm Edit and

Premiere (via a plug-in).

Tiny, affordable dv cameras and the rapid consumer take up of DVD are fuelling a revolution. The missing ingredient, recordable DVD, has arrived at last and is dropping in price in the same way we experienced with CD-R, both hardware and blank media. There is one big difference in DVD authoring. MPEG2 video is a variable rate compression format. For optimum results scenes with a lot of detail and movement are given more

DVStorm. Editing has become pleasurable with the filters, chroma and luma key performance all very useable and impressive. The real-time play-out to DV proved to be a 'real' time saver. More to the point, the picture quality was subjectively better than the opposition. Whether this is due to the chip-set, 4:2:2 processing in YUV colour space or a combination of factors, I don't know but it certainly helps. DV Storm's other ace in the hole is stability.



bandwidth than stills or talking heads. Encoding MPEG2 for Commercial DVDs is a multi-pass process with manual control over the bandwidth on individual shots and other aspects of the process which takes considerable expertise to do well. MPEG2 encoders at the Storm level currently do not approach the subjective quality obtained by a good operator using a multi-pass encoder. That said, Canopus' example is one of the best. A software-only version is supplied with the card and there is the option of a daughterboard which is reputed to provide a similar standard of encoding but faster.

I had a lot of fun with Canopus'

This machine is more than a video workstation. I am also running Nuendo and Wavelab for audio. The age of proper, fully integrated, audio-visual workstations is tantalisingly close to reality. If Vegas Video could take advantage of DVStorm it would have already arrived. □

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DVSTORM HARDWARE consists of the DVStorm PCI card and the StormBay breakout box which fits into a half height 5 1/4-inch disk space. All necessary cables are supplied including a 4-pin to 4-pin IEEE1394 for connecting a DV camera or deck.

Software makes up the rest of the package. The ubiquitous Adobe Premiere in v6.0 guise is the main application. Canopus also provides Storm Edit, a more basic editor, Storm Video, the capture and output component, Storm Audio for audio-only capture and Storm Navi. Navi is used for scanning tapes and scene logging. 3D effects

come courtesy of SoftXplode. Also included are Canopus' software MPEG encoder, Boris Graffiti LTD, Sonic Foundry ACID Style and a trial version of SpruceUp.

DVStorm was supplied installed and working on the Red Submarine PC. For the sake of completeness and comparison with other video solutions, I put it in another machine to check everything I'd heard about its relative ease of installation. Unlike some other systems with comparable capabilities Storm proved to be pleasantly co-operative. Canopus recommends picking a PCI slot which does not share resources with the AGP

graphics slot and, if possible, avoiding IRQ sharing. Even better if IRQ 9 or above is free. In order to display video on the computer monitor(s) the graphics card needs to be capable of supporting overlay. In this case, DirectDraw. A small application, Storm Test is supplied to check this. In the event, I had no problems whatsoever with the installation and Storm is happily co-existing with an RME Hammerfall audio card and Adaptec SCSI card. Unlike all the other video workstations I've used, this one seems reluctant to crash. This is not to say it doesn't happen, they all fall over sooner or later, but it is encouraging.

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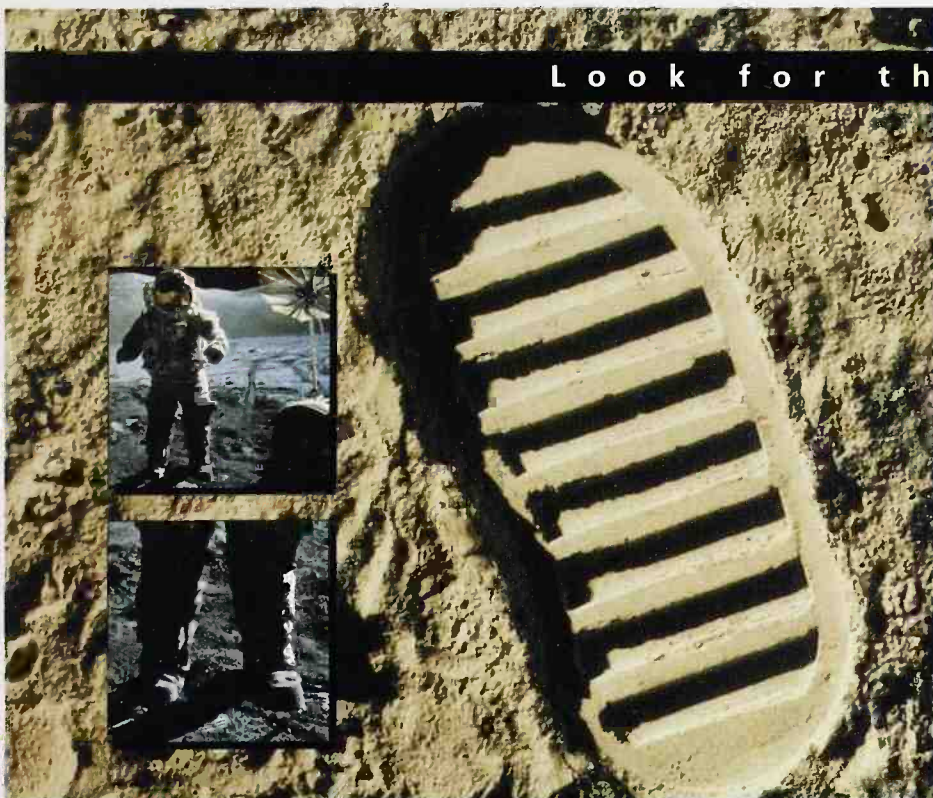
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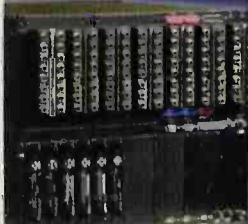
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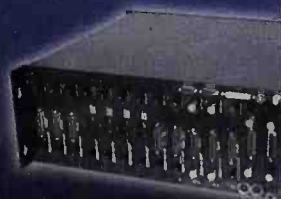
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SLS S8R

Studio Sound's 'bench test' loudspeaker reviews continue with the SLS S8R. **Keith Holland** reports

THE SLS S8R IS A 2-way passive loudspeaker comprising a 200mm plastic-coned woofer with integral phase plug and, somewhat unusually in a studio monitor, a 125mm long ribbon tweeter which radiates through a shallow, 2-dimensional horn. The drive units are mounted vertically with the tweeter beneath the woofer. The cabi-



net has external dimensions of 480mm high by 265mm wide by 290mm deep, and has a rear-facing bass reflex port. SLS specify power handling figures of 125W rms and 500W peak (AES), and a maximum continuous output of 110dB at 1m distance per cabinet. Each loudspeaker weighs 11.25kg.

Fig.1 shows the on-axis frequency response and harmonic distortion for the S8R. The response is seen to lie between ± 3 dB limits from 70Hz to 20kHz with an approximately third-order low-frequency roll-off giving -10dB at around 40Hz. The low-frequency harmonic distortion is commendably low with all harmonics lying below -50dB (0.3%) at frequencies above 60Hz. There is a peak in second harmonic to -34dB (2%) in the

mid frequency range however. Fig.5 shows that the directivity in the horizontal plane is fairly wide and well controlled with no evidence of mid-range narrowing and no lobing below 15kHz. The vertical off-axis responses are less good however. Fig.6 shows that the high-frequency response falls rapidly with angle above and below the loudspeaker axis, being 10dB down at 10kHz at 15°. This is a direct consequence of the 125mm long ribbon acting in a similar manner to the column speakers used in PA systems; the vertical strip radiator creates a horizontal 'fan-shaped' directivity pattern. Also seen in this figure is the characteristic interference notch at the crossover frequency. The step response of the S8R is shown in Fig.3 which demonstrates very good driver time-alignment with the high frequencies arriving less than 0.5 milliseconds before the mid frequencies. Fig.4 shows very little evidence of echoes in the power cepstrum except for some low-level activity after around 0.5

milliseconds. The acoustic source position (Fig.2) is seen to move to just over 1.5m behind the loudspeaker at low frequencies which is less than many ported designs, and the waterfall plot (Fig.7) shows that the low frequencies decay very rapidly, although there is some ringing evident at 400-500Hz.

Overall, the SLS S8R is a commendable performer. The unusual choice of a ribbon tweeter leads, inevitably, to some compromise in the vertical directivity which any potential users should bear in mind; these loudspeakers should definitely not be used on their sides. Apart from this though, the smooth, flat, extended frequency response, accurate transient response and low harmonic distortion should win many friends. □

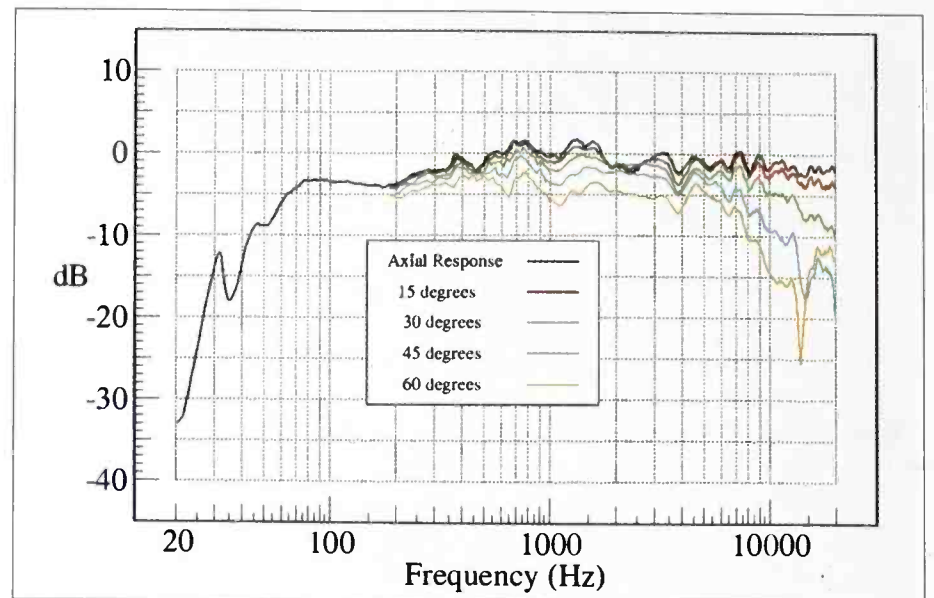


Fig.5: Horizontal Directivity

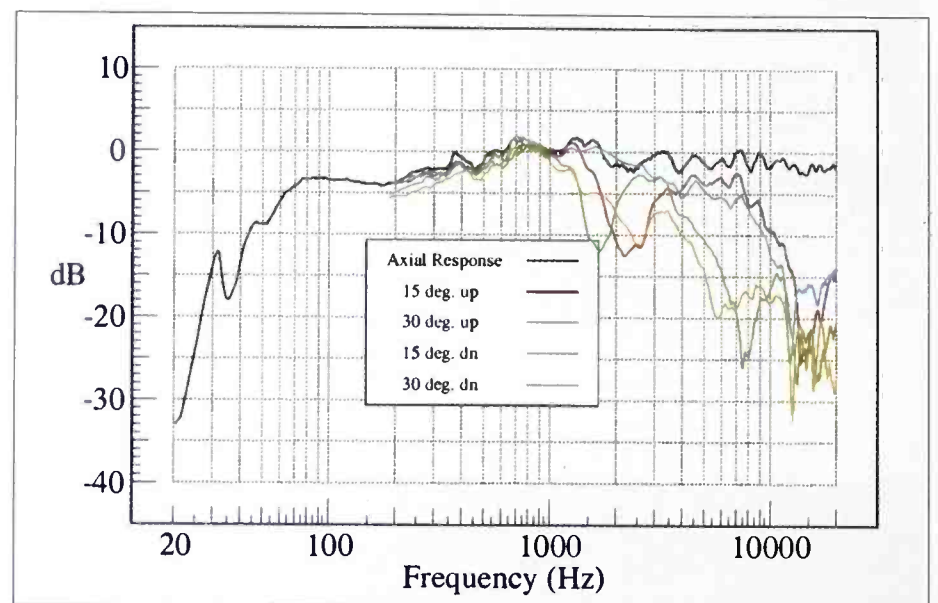


Fig.6: Vertical Directivity

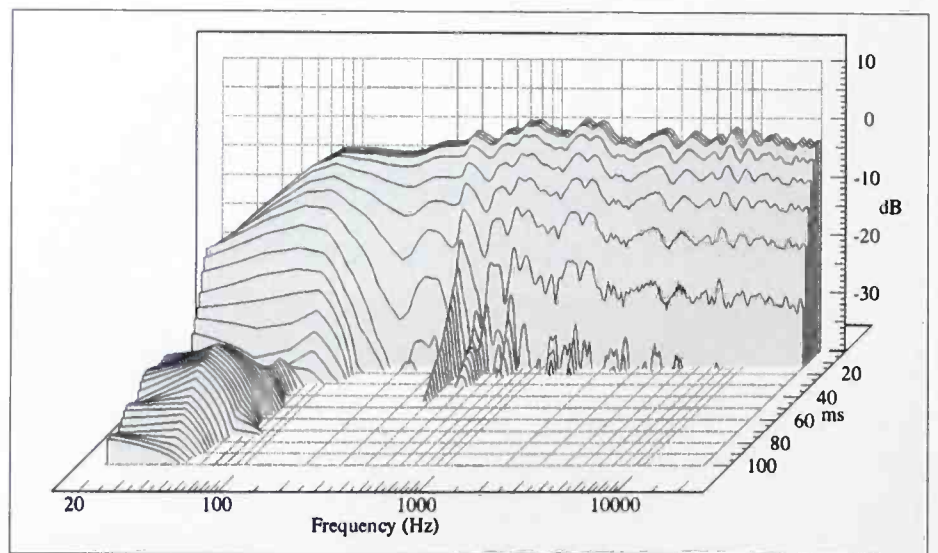


Fig.7: Waterfall

Contact

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Methodology

Studio Sound, April, page 14.
Net: www.studio-sound.com/archive/apri98/r-tannoy.html

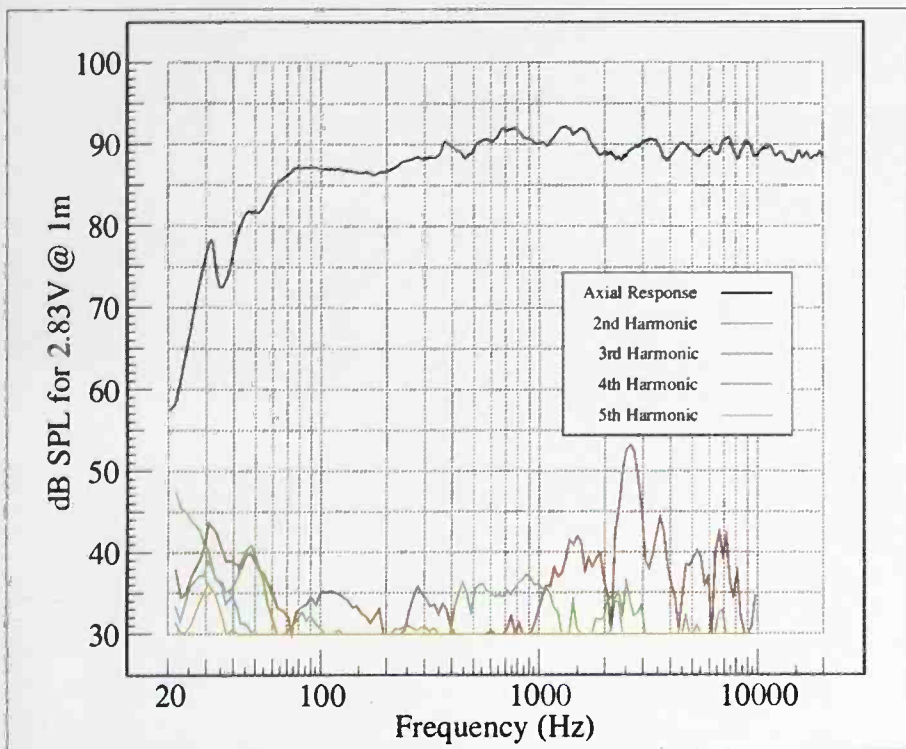


Fig. 1: On-axis Frequency Response and Distortion

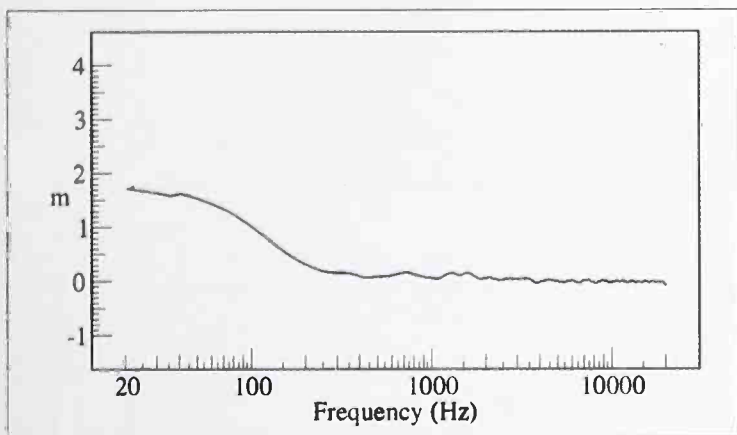


Fig. 2: Acoustic Source

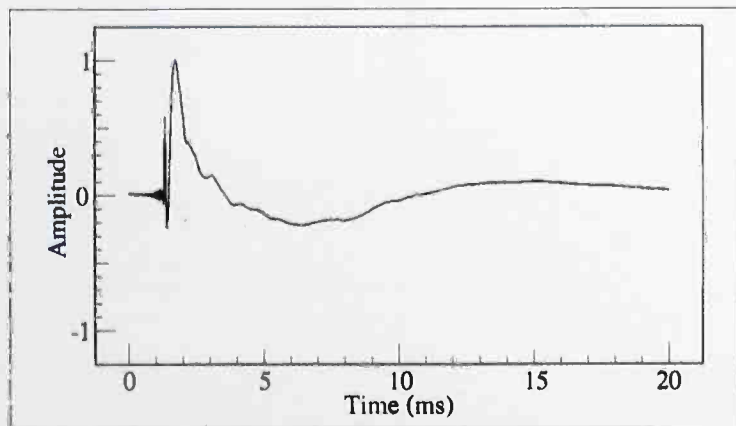


Fig. 3: Step Response

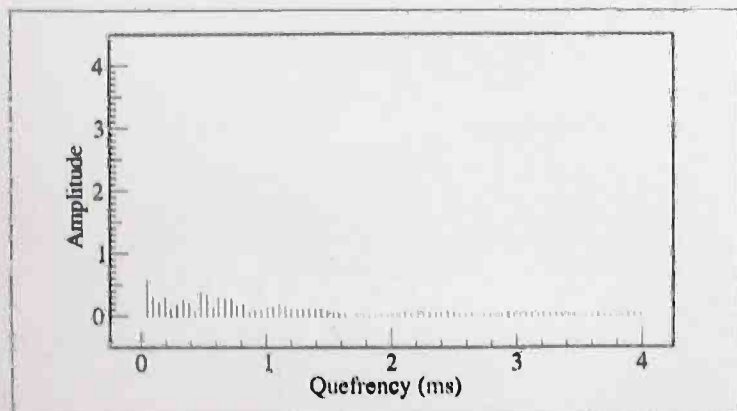
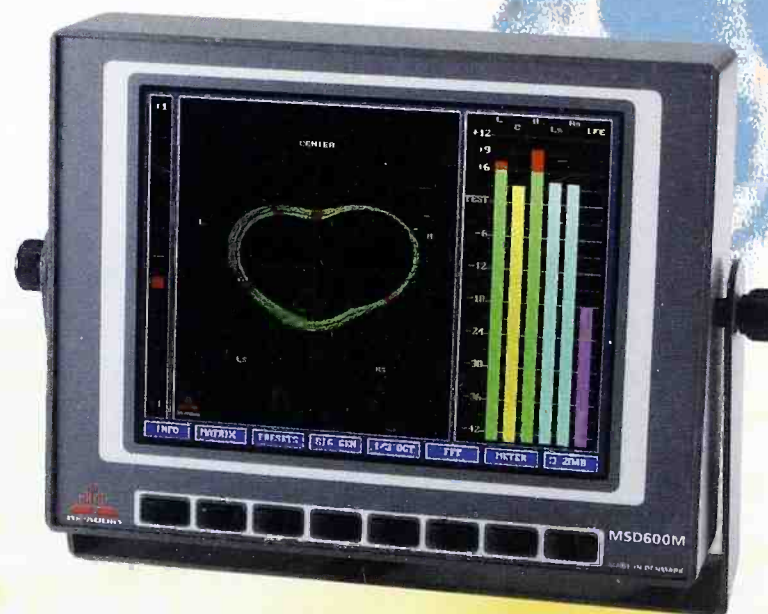


Fig. 4: Power Cepstrum

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Mackie FR Series M800



Studio Sound's 'bench test' amplifier reviews continue with the Mackie FR Series M800 power amplifier. **Paul Miller** reports

MACKIE, AS MOST engineers will already know, manufactures a wide range of mixing consoles, mic preamps, active speakers and subwoofers plus, for the last few years, a complimentary range of power amplifiers. Mackie also has a well developed sense of humour, as evidenced by the opening lines to the M800's technical addendum which begins '...the technical writer responsible for the M800 owner's manual has been slapped silly with a rolled up newspaper...'. But then Mackie has the reputation for taking its products more seriously than itself, which is no bad thing in my view.

And the M800 power amp, baby of the range though it is, remains a very serious hunk of hardware. Finish and build quality are both excellent while the design itself incorporates a variety of features designed to help it interface as slickly as possible with the widest possible range of speaker systems. Fig.4 demonstrates its various HP and LP filters in action, including the variable 2nd-order Bessel low-cut that acts continuously from 10Hz (off), 35Hz (orange trace) to 170Hz (green trace).

This attenuates the amplifier's LF response to match the specification of a partnering bass speaker. After all, Mackie argues, there's no point overdriving a stage monitor with LF it cannot reproduce.

By contrast, a variable high-frequency boost attempts to compensate for the first-order roll-off beyond 3kHz or so in the power response of a partnering compression driver-horn speaker. With +3dB points at 2kHz (black trace), 4.5kHz (red trace) and 6kHz (blue trace) this will certainly encourage a 'brighter' sound depending, of course, on the position of the listener. Otherwise, the maximum +15dB HF boost will place added stress on the compression driver's motor system while not, on the face of it, influencing its directivity. I'd use this facility with caution, particularly as excessive HF beyond 18kHz or so may not be directly audible even while it's cooking the driver.

Other features are more traditional, including balanced (male and female) XLR inputs, unbalanced jack inputs, Speakon NL4 and 4mm speaker connections plus stereo, mono and bridge mode operation. There's also a switch-

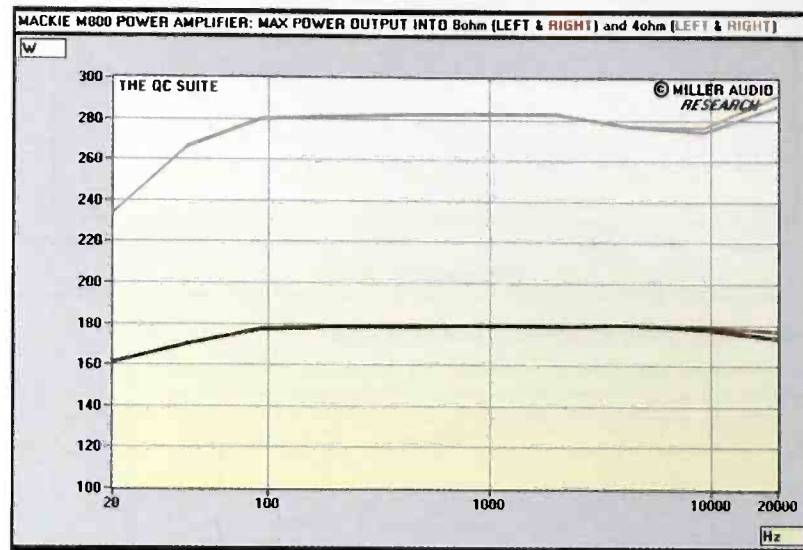


Fig.1: Power output vs frequency

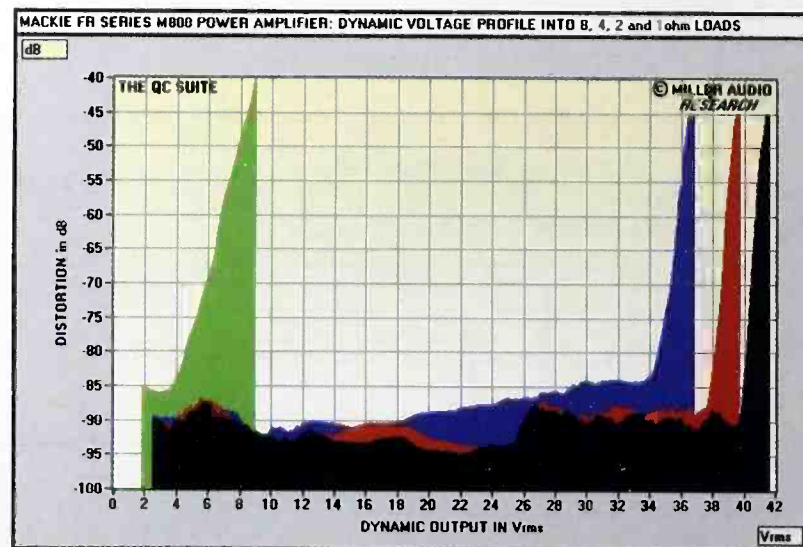


Fig.2: Dynamic power output

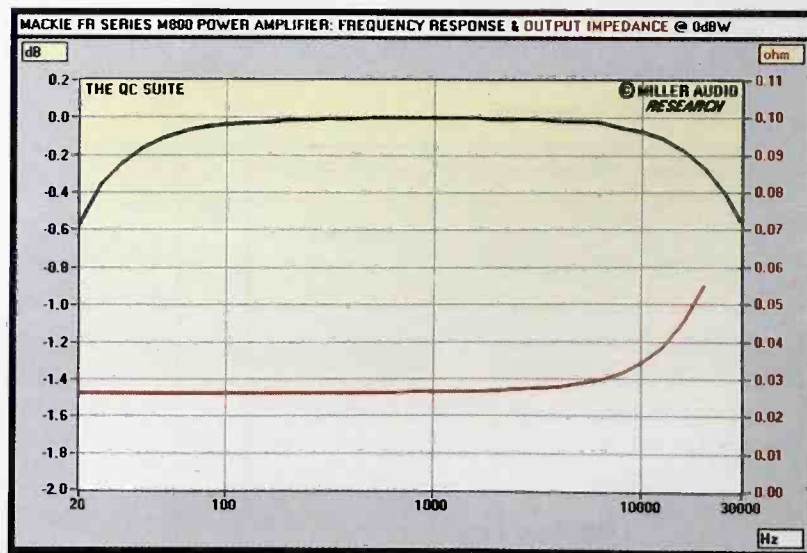


Fig.3: Distortion vs power output

	20Hz	1kHz	20kHz
Max Continuous Power Output	160W	179W (150W)	170W
0.1% THD into 8Ω (2-channel)	235W	285W (225W)	280W
0.1% THD into 4Ω (2-channel)			
Response @ 0dBW	-0.6dB	0.0dB	-0.25dB
Balance @ 0dBW	0.0dB	0.0dB	0.0dB
Crosstalk @ 0dBW	-100dB	-87dB	-65dB
Dynamic Headroom (IHF)	+0.8dB (215W)		
Maximum Current (10msec, 1% THD)	18.4A		
Output Impedance	0.025Ω ($<0.035\Omega$)	0.025Ω	0.055Ω
Damping Factor	320 (>250)	320	145
Balanced Input (Driven Unbalanced)			
Total Harmonic Distortion, 10W/8Ω	0.001%	0.001% ($<0.025\%$)	0.009%
Total Harmonic Distortion, 1W/8Ω		0.002% ($<0.025\%$)	
Total Harmonic Distortion, 50W/8Ω		0.001%	
Total Harmonic Distortion, 150W/8Ω		0.002%	
S/N Ratio (A wtd, re. 0dBW)	87.7dB		
(re. 2/3 power)	106.6dB		
Residual noise (unwtd)	-75.5dBV		
Total System Gain	+28.14dB		
Input loading	20kΩ		
DC offset	+3mV / +4mV		
Serial Number	(21)EN10468		
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Mackie FR Series M800 Specifications (rated specs in red)

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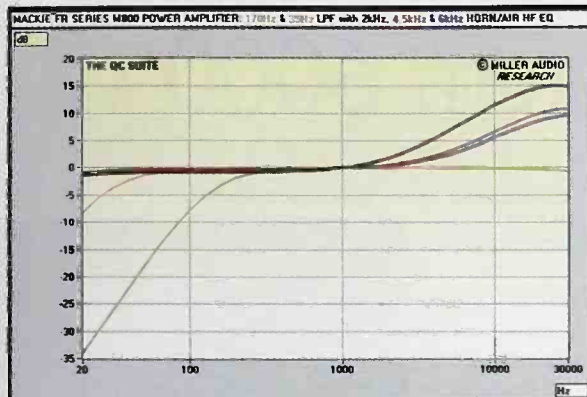


Fig.4: Distortion vs frequency

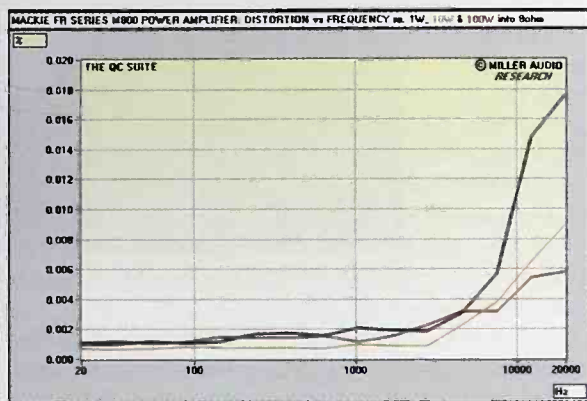


Fig.5: Frequency and output impedance

able limiter, which I'd recommend be used with the Horn EQ facility, if only to prevent a rash of extended HF clipping harmonics from finishing off the tweeter cabinet. Otherwise, the M800 easily meets its specification (which varies from 2x140W/8Ω to 2x150W/8Ω, depending on which brochure you read) at ~175W and ~285W both channels driven into 8Ω and 4Ω, respectively. There's some shortfall at low, bass frequencies, as Fig.1 indicates, but the M800 still has a respectable power bandwidth.

Under dynamic conditions, this output increases to 215W, 390W (9.9A), 675W (18.4A) into 8Ω, 4Ω and 2Ω loads but falls to 81W (9.0A) as a function of Mackie's protection circuitry into very low 1Ω loads. The impressive load tolerance of the M800 is revealed by profiling its dynamic *voltage* output as in Fig.2. The action of its protection circuit is equally obvious.

The M800 forms part of Mackie's FR or Fast Recovery series, a legend that refers to the amplifier's speedy return to normal operation having been plunged, albeit momentarily, into clipping. Ordinarily, once power transistors are driven into saturation, this causes a charge to accumulate in the base of the device(s) causing it to latch or stick on, slowing the release from clipping as power levels fall. The M800 includes a proprietary mechanism to drain the excess charge or, indeed, prevent saturation in the first instance. Neither does the amplifier run especially warm, thanks to the combination of three parallel pairs of MJL21193/94 bipolar devices per channel, all mounted on a polished, T-section heatpipe that's ventilated via a level-sensitive DC fan.

Negative feedback is employed sparingly and yet the M800 enjoys both low levels of distortion and a usefully low ~0.025Ω output impedance from 20Hz-2kHz. This is reflected by the red trace on Fig.3 along with the full (8Ω) frequency response of the amplifier (black trace) showing a -0.6dB drop at 20Hz and -0.25dB at 20kHz with all HP/LP filters disabled. Distortion typically remains <0.002% through bass and mid-range frequencies up to 150W/8Ω, increas-

ing slightly at higher frequencies.

However, as Fig.5 indicates, crossover distortion contributes to a higher treble distortion at low power, typically 0.018% at 20kHz/1W/8Ω (black trace). With increasing power (orange and red traces, respectively), crossover and HF distortion drops back to just 0.006%. Combined with a mere -87dB crosstalk (1kHz), low -87.7dB noise (re 0dBW) and accurate channel matching, the M800 returns the sort of performance expected of costlier competition.

Indeed, while testing the M800 I had no idea of its SRP and, to be frank, was surprised at the very generous £500 (UK) ticket. Sure enough, there are beefier 2U, 19-inch rackmount amplifiers available. But none that offer this level of build and finish, with a substantial

2x175W power output, +18.5A current reserve, HP-LP filter options and impressively consistent performance across the bulk of its dynamic range. The Mackie M800 offers good quality engineering where it counts with a high degree of implied reliability and comes heartily recommended for studios and bands that are keen not to trade quality for a shoestring budget. □

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NEW TECHNOLOGIES

Oxford Pro Tools Plug in

Sony's Oxford team has developed a Pro Tools TDM plug-in based on the EQ algorithms used in the OXF-R3 and DMX-R100 consoles. Employing 48-bit processing it offers continuous control of frequency, gain and Q values with redithering of the plug-in output and 'de-cramping' maths to eliminate distortion in the gain envelope at higher frequencies up to 26kHz. Said to be the first of a new range of plug-ins the EQ is 5-band fully

parametric with high- and low-pass filters with adjustable slopes. An optional George Massenburg Labs 8200 emulation is available which is said to reproduce the control ranges and responses of its analogue outboard units. Sony, UK. Net: www.sonyplugins.com

Phantom powered active ribbon

Royer Labs is introducing the 'world's first' active ribbon microphones. The microphones are phantom powered and address the ribbon microphone concerns of gain and impedance matching. The new models contain head amplifiers (fully balanced, discrete designs using



tc electronic System 6000 v2

The planned improvements to tc's flagship surround processor are well underway in the v2 upgrade. **Dave Foister** takes the first of two tours of the new facilities

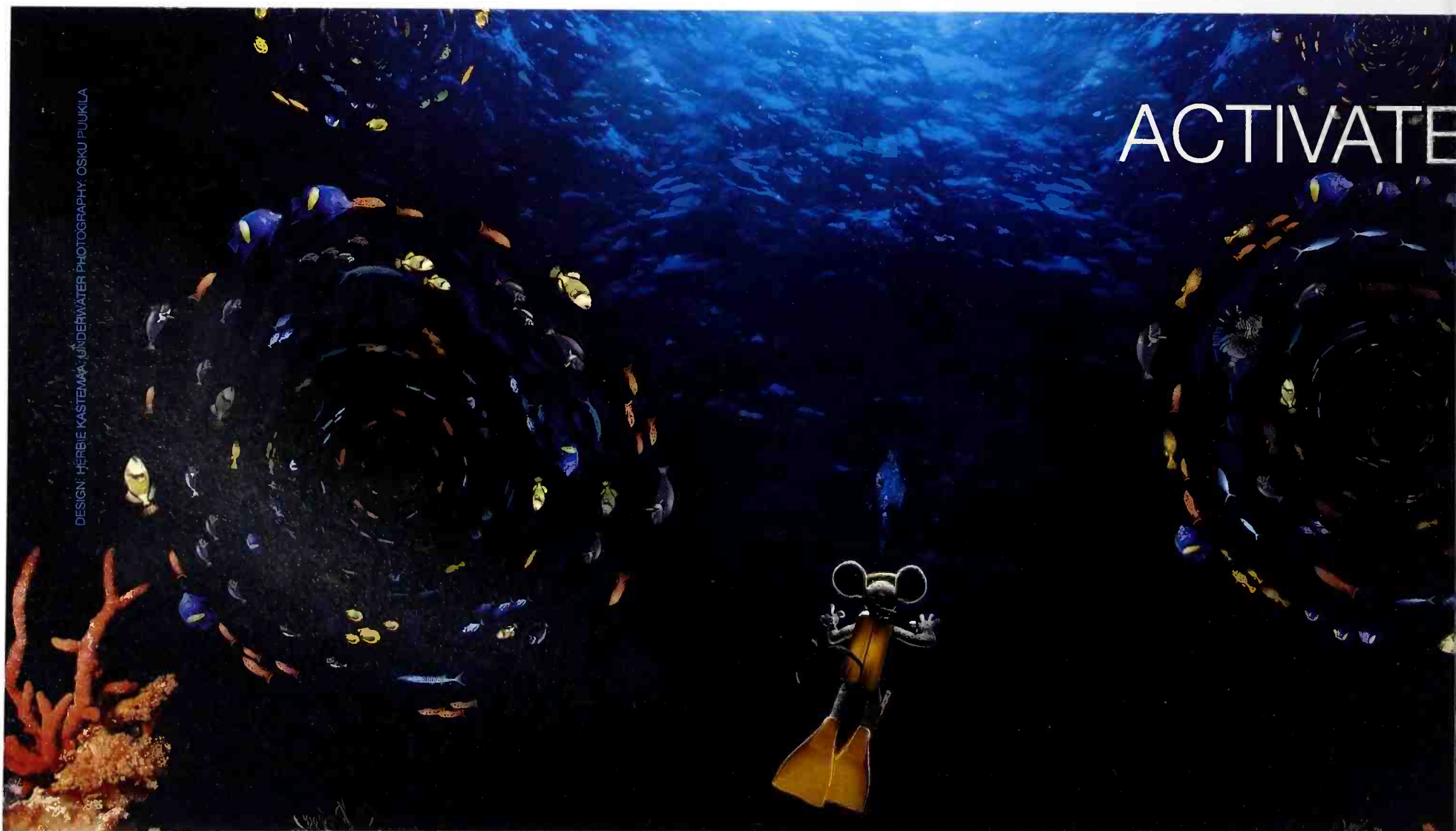
SIGNAL PROCESSORS MOVE ON constantly, both in terms of what they can do and what you want them to do, but you don't have to throw your old one away any more when they do. Lower-end boxes might have built-in obsolescence, but the top-end stuff these days is open-ended and easily upgradeable. tc electronic pioneered the software-based mainframe idea with its M5000, and is really putting its money where its mouth is with the System 6000. It's little more than a year ago that we looked at the introduction of this multichannel, multi-engined processing platform, but already there have been several upgraded software versions, not to fix bugs but to add features. With the recent introduction of v2.0 it's time to look in detail at what's now available.

System 6000 was launched as a full-blown 5.1-capable processor, and came out of the box with some full surround reverb algorithms and very flexible 5.1-channel dynamics processing. The reverbs covered a broad enough range to meet a lot of needs but couldn't hope to match the huge variety on offer from the existing stereo algorithms, and the mastering fraternity was left waiting expectantly for the multichannel EQ. The pitch and delay bank was empty, although a whole bank of M5000 presets provided the effects—but only in stereo. The additions en route to v2 fill in the holes comprehensively, bring

the surround reverb capabilities up to the same level as the stereo ones, and add several new processes beyond the palette of the original altogether.

The extra stuff isn't only in the surround domain. Stereo reverbs for both music and post each acquire an extra bank, making use of the VSS-4 true stereo reverb algorithms. These do what so few stereo reverbs do: place a stereo source convincingly in its stereo reverb field, not by simply following its panned position but by tailoring the early reflections to reinforce the original stereo image. This works very well, adding to the depth of the image in a very natural subtle way, and makes a significant difference to the reality of the overall picture. Input sources can be positioned in several places in the reverberant field, including some adjustment of front-back distance.

But there's a much bigger difference in the provision of surround reverbs. The Music Surround bank originally had only two presets in it, although with the vast range of adjustable parameters that was less limiting than it sounds; now it has 43, and the 'film' presets similarly now number 41. Both are divided into presets that use VSS-5.1 Reverb and those that use VSS-5.1 Source, and the difference is simply in how signals are sent to the algorithm and what the intention is. VSS-5.1 Rev accepts a full 5.1 signal, either a complete stem or mix or



one derived using surround-panned auxes or the onboard 5.1 panner, and generates a 5.1 reverb field that does for the surround-panned locations what VSS-4 does for stereo images. VSS-5.1 Src has just four inputs that will probably be derived from independent auxes or groups, and their signals can be placed in a full 5.1 reverb field in much the same way.

The range is now enormous, with the familiar palette of breath-takingly convincing spaces from tiny to vast with lots of wacky variations. The basic surround technology proved itself with the original release, and the new algorithms simply confirm the impression and expand greatly on the flexibility.

Both banks of surround reverbs include the 5.1 panning preset, an algorithm that takes up to eight inputs and pans each independently into the chosen position in the 5.1 surround field, not just around the perimeter but anywhere within the square. The standard tc Icon remote controller can do all this by using two faders for X and Y co-ordinates, but it's made much easier with the new SP-1 joystick, an additional small black box that hooks up to the control system via MIDI and works smoothly

and with immediate response.

The Film Surround bank also makes increased use of the VSS-SR algorithm, a novel approach that produces a 2-channel output signal designed to decode on to 4-channel Dolby SR. Ten presets provide a good range of spaces for this, which should appeal to those involved in TV Dolby Surround production.

EQ across 5.1 channels is now in place. This comprises six channels of 4-band EQ with choices of parametric or shelving bands, with the enormously useful feature of being able to link the main five channels for matched settings. The LFE channel remains separate in both cases, with its own set of EQ bands, but the facility to apply tc-quality digital EQ across five surround channels is something that mastering and post facilities desperately need. Combined with the existing multi-channel, multi-band dynamic processing, this turns the System 6000 into a surround Finalizer, and indeed there are presets in the Mastering bank bearing the familiar name. This in turn gives rise to presets to be used as starting points for DVD mastering, film to video transfer and general 5.1 mastering applications, all with the same flexibility and ease of operation as the original MD5.1 dynamics—multiple freely-assigned sidechains, ganged controls where required and so on.

There's more: substantially more, in fact, as new ideas keep occurring to tc. Algorithms for turning stereo into surround, surround into binaural, and 5.1 to 4-channel are all there with a host of other new goodies, but they'll have to wait until next time. □

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NEW TECHNOLOGIES

ultra-low noise FETs) and are as sensitive as condenser microphones, eliminating the need for ultra high-gain preamplifiers. The electronics also impose the optimal load on the ribbon element, meaning the microphones perform consistently regardless of the input characteristics of the following mic preamp. Impedance mismatching loads a ribbon improperly, causing loss of low-end, body and sensitivity. With the new active series, this problem is eliminated. In addition, the ribbon element cannot be damaged by phantom power, electrical glitches or miswired cables and, due to the low-impedance design, the microphones can be used on extremely long cable runs with minimal signal loss. The new microphones are based on Royer's current models and use the same ribbon transducers as found on the R-121 and SF series microphones. Royer Labs, US. Tel: +1 818 760 8472.

Emagic Mac OS X

Emagic has presented an integrated suite of its professional software and hardware products for Mac OS X including Logic Audio 5.0, and drivers for the Unit8 MkII, AMT8 and MT4 MIDI interfaces and the EMI 216 audio interface. The production suite will support many of Mac OS X's new features, such as memory protection for increased system reliability, the new graphics engine with transparency



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Mutec Smart Digitals

Away from the glitz of consoles and workstations, unsung heroes fill the 'I didn't even know what one of those was, much less needed one' category. **Rob James** feels the need

MUTEC'S SMART DIGITALS series of digital convertors and distributors may lack the celebrity status of more visible kit but they aim to carve a solid niche in a supporting role.

The point at which you discover one of these devices is necessary often comes immediately after considerable expenditure on other equipment. Further expense at these times is always unwelcome, so that these Mutec units are competitively priced eases the pain. I had three of the range for this review; the Smart Clock (digital audio master clock), Distributor ws (wordclock and super clock signal distributor), and the Distributor ae (AES-EBU signal distributor).

Smart Clock generates word clock. It can also generate Superclock (wordclock x256) and output both in a number of physical connection formats. With an optional card, Smart Clock will also generate PAL or NTSC black and burst video syncs.

BNC connections are switched in pairs. The pair of front panel connections are good for accommodating the inevitable 'guest equipment' involved in most sessions. Format selection for the front panel sockets is set by slide switch between video, word clock and super clock. For the rear mounted ones, selection is made using internal switches so a little pre-planning will be required to avoid taking the lid off too often. The rear BNCs and XLR have an extra option marked SMART BUS. This is an internal signal that enables the number of outputs to be expanded by connecting one or more Distributor ae or Distributor ws units. When daisy-chained using the Smart Bus signal, all outputs are phase synchronised and delay compensated. Once the internal switches are set, operation is simplicity itself. Just select the reference sampling rate using the rotary switch.

Distributor ws may be used as a stand alone word clock distributor or to expand a Smart Clock. However, it is more than a simple distributor. Each pair of outputs



can be internally set to provide either word clock, x256 Digidesign Superclock or Sony DSD (Direct Stream Digital) (word clock x64) output. This considerably enhances its appeal. As with Smart Clock, once the internal selections are made, operation is simple. When Smart Bus is used to synchronise to a Smart Clock the supplied cable should be used to ensure phase accuracy.

The Distributor ae is similarly versatile. It will derive an 'audio black' sync signal from an AES-EBU stream and distribute it or to take an AES-EBU audio source, compensate for jitter, level and edge shape, and distribute the result to up to six destinations. Sources anywhere between 32kHz and 108kHz at up to 24 bits are accepted. As with The Distributor ws, the supplied cable should be employed when using the Smart Bus function. To avoid unpleasant surprises, all outputs are muted if the



error rate becomes excessive or the input is lost.

Each is 1U-high and just under half-rack width. Optional rack ears extend the width to fit a single module into a rack. A side-by-side frame to accommodate two units is in development.

Smart Clock has a total of eight BNC outputs; there are also co-axial and optical (TOSlink) SPDIF and an AES-EBU XLR output on the rear panel. The front panel has a rotary switch to select sampling rate with a Test Mute position between each frequency. Rates of 32kHz, 44.1kHz, 48 kHz, 64 kHz, 88.2kHz and 96kHz are supported. A slide switch selects the output format of the front panel BNCs, word clock, video (if fitted) and super clock. All outputs are phase synchronised.

Generator accuracy is quoted at 1ppm which complies with AES 11 grade 1. I cannot objectively verify this but I have no reason to doubt it.

Distributor ws also has a total of eight BNC outputs. On the front panel a 4-position slide switch selects source format between word-super clock, AES-EBU, SPDIF and Smart Bus, indicated on four green LEDs. Further slide switches select the output format of the two front panel BNCs.

Distributor ae has a 4-position slide switch to select source format between audio-clock, audio-clock, Smart Bus and test mute. Audio-clock mode accepts and distributes AES-EBU audio or blankframe signals. Audio-clock converts an incoming AES-EBU audio signal to blank frame.

With Smart Digitals, Mutec has produced a useful range of problem solvers. The internal selection of output format for the rear sockets is slightly irritating but on the plus side this makes you plan the installation properly. The only real omission on Smart Clock is any of the pull-up and pull-down options used primarily in sound for picture work.

Apart from the units covered here there are three variations of format changer in the Smart Digitals range. These cover TDIF1 to ADAT, TDIF1 to AES-EBU and AES-EBU to ADAT all with sample-rate conversion and other features. Whether used as a quick fix, or as components in a major installation, the Smart Digitals are well worth bearing in mind. □

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WaveFrame, US.

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Emagic, Germany. Tel: +49 4101 495 320.

Licence free wireless beltack

The first product launched by new company Digital Talkback is the DTB-2001 wireless beltack system which is based on DECT technology. It is said to have the 'massive' advantage over other systems of being licence exempt in the UK as well as the rest of the EU and many other territories. The system avoids competing with already clogged radio frequency networks and over 100 users can use the system in a single location, with no frequency management or time-consuming and complex setup necessary. It's said to be a case of plug-in and go. Digital audio transmission also enables all packs to be full duplex and ensures audio quality. Each beltack has its own dedicated base station, and each base station can be integrated with either 4-wire systems, standard two-wire 'party line' intercom systems or even both at the same time. Digital Talkback, UK. Tel: +44 2476 617743.

dCS 974

dCS has released the dCS 974 real-time sample rate and format convertor. The 2-channel unit covers PCM sample rates from 11.025kHz to 192kHz and offers PCM to DSD and DSD to PCM conversion. Quad AES input and output interfaces for 176.4kHz and 192kHz are provided which will be of particular use to users of the latest generation SADIe high-resolution DAWs. The DSD-4 feature, also available on the dCS 904 A-DC, packs two channels of DSD into four AES3 data streams, enabling DSD to be recorded onto any digital recorder offering eight channels of 16-bit, 44.1kHz storage. The dCS 974 can convert data packed in this format to SDIF2 or SDIF3 for loading into standard DSD



recorders or editors and can also convert this data to PCM at sample rates from 44.1kHz to 192kHz. Multiple units can be sample synched in PCM or DSD mode for surround sound conversion work.
dCS, UK. Tel: +44 1799 531999.

Stereo to surround processor

Z-Systems' z-K6 K-Surround Processor creates a 5.1-channel output from a conventional stereo source. The z-K6 creates a dedicated centre output, a 0.1-channel LFE output, and derives the surrounds based on the natural ambience that already exists in the recording. Nothing 'artificial' is said to be added and the resulting 5.1 output folds down to stereo without compatibility problems. The latest addition to its series of Digital Detangler Port audio routers, the z-128.128r enables studios to integrate and reconfigure their digital audio workplace and accommodates up to 128 stereo inputs routing in any combination to a total of 128 outputs. Asynchronous sources and destinations can be 24-bit AES-EBU or SPDIF at sampling rates to 192kHz. Crosspoint assignments can be selected via a dedicated serial port, using the company's dedicated hardware remote or networked MacOS and Windows control software. The z-128.128r is modular in increments of 16x16, rear-panel D-sub connectors require breakout cables



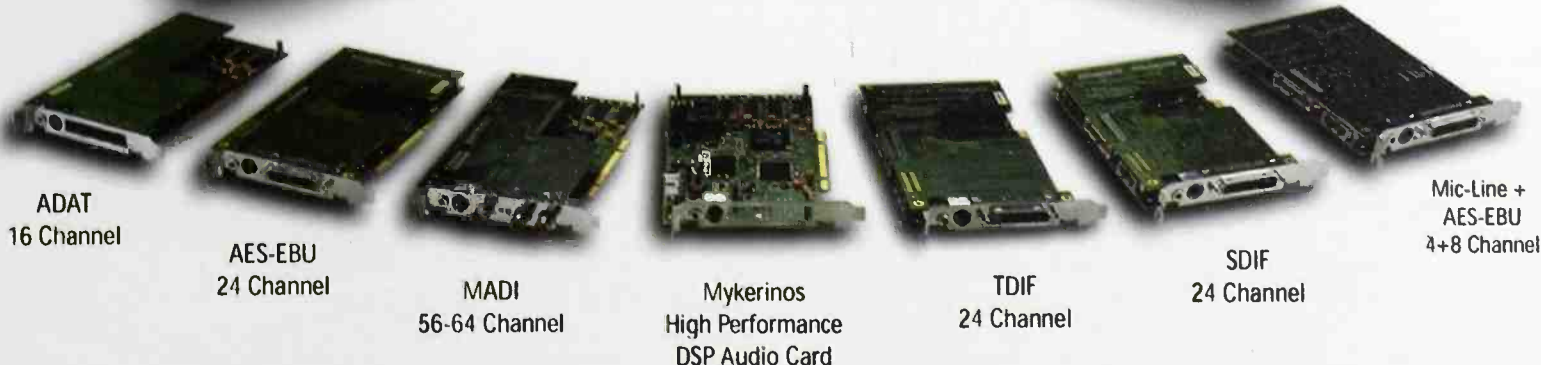
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TC Helicon VoicePrism

If Antares' Auto-Tune began the voice-processing revolution, VoicePrism is ready to further it. **Dave Foister** is on song

MEET THE NEW APPROACH to the voice channel. TC Helicon is an interesting amalgam of Denmark's tc electronic and Canada's IVL Technologies that has combined to produce the VoicePrism, a new twist to voice treatment that goes way beyond the standard channel strip concept.

The VoicePrism box is unlike anything else; it's certainly not an immediately-identifiable tc front panel, as it takes up 2U of space for a relatively small range of controls. On the other hand the speed around it and the amusingly helpful graphics show strong tc links, as does the overall quality of the signal processing. But it's the nature of that processing and the ease with which it's controlled that make the VoicePrism what it is.

The mundane bits are fairly predictable yet very well done. The box is basically a single-channel vocal processor, so it has a flexible compressor, two freely-configurable EQ stages that can be pretty much anything you want, and two effects modules that can add chorus, flanging, various types of delay, or reverb to the signal. All of this is very useful no doubt; but it's the harmonisation facilities that establish this as a

might be and can offer some big useful effects. Alternatively, and not for the first time, MIDI can be used to control which notes it adds to the lead, and there are two ways of doing this. One allows each harmony line to be controlled by a single note on a given MIDI channel, so that a split keyboard or a sequencer can run the complete BV section, while the other accepts incoming chords and harmonises to the current chord until it changes. Both these have their obvious uses for carefully-planned intricate harmonies, although the equation between the time taken to work out the programming and the time taken to get somebody to sing the harmonies needs careful thought. Probably the most interesting mode is the automatic scale harmonisation, where a nominated key and one of six scales (three major, three minor) are used to dictate how the unit will behave given any note in the input signal. There's also a custom scale function where you tell it what notes to allow.

The proof of a device like this is how easily it can be made to do what you want; how readily it will track a real vocal and how convincingly it will harmonise. Although I still find it a little mind-boggling that this can



specialised vocal processor and open the door to stuff that almost nothing else can do.

The simple compressor has the necessary flexibility and basic setup to deal effectively with vocals. Threshold, ratio, attack and release are variable, and gain makeup is automatic. Gating is simpler still, and both work well with vocal tracks with the minimum of fuss. Two effects blocks offer a traditional selection of effects: simple chorus and flanging; shortish mono, stereo and ping-pong delays, in either a flat version or one with the characteristic HF roll-off of tape-based effects; and a selection of reverb algorithms available only on the second block. The reverbs cover studio, chamber, club, hall and arena simulations, all with a simple set of four variable parameters; not much compared with the modelling tools on offer in a top-end reverb, but the quality reflects the fact that it says tc on the front and compensates for the restricted opportunities for adjustment.

But all this is secondary to the main function of adding harmonies to a single vocal line. VoicePrism is able to generate four harmonised signals in real-time, and the processing power of the unit has been primarily devoted to making this work fluently and simply under complete user control. Gone are the days of simple fixed pitch shifts, or of one line vaguely attempting to follow the lead at some semi-appropriate interval of time and pitch—this can do all four, fast and seamlessly, with no less than four ways of making it do its stuff.

The first is after all the simple fixed shift, although with four available it's less of a waste of time than it

be done at all, I was impressed to find that from a standard preset given the appropriate scale, VoicePrism immediately provided superb musical and natural harmonies to the first voice track I stuck into it, sounding better than the actual harmonies the singer concerned had put on during the session. Factors like the actual tuning of each note and the timing of the note starts can be adjusted and randomised for more realistic effect, and each voice can not only be adjusted for level and pan but can have its gender controlled, from deep male up to alien. From this it goes without saying that the shifted voices only sound strange and munchkinised if you want them to; otherwise they're completely natural.

This is impressive stuff. I was prepared for it to be temperamental, to be musically compromised, or to give away its presence in some artefact of the sound (a bit like a real singer in fact), but it does none of these things. For straightforward parallel harmonisation, the stuff of so much pop vocal arrangement throughout its history, VoicePrism can almost certainly provide what most backing singers would do naturally, and do it more quickly. And it doesn't have to warm up, never gets a frog in its throat, doesn't care what the headphone mix is like. □

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Tel: +45 8742 7000. **Fax:** +45 8742 7010.
tc electronic, US.
Tel: +1 805 373 1828. **Fax:** +1 805 379 2648.
Net: www.tcelectronic.com

NEW TECHNOLOGIES

identical in pin-out to those used by Tascam DA-Series MDMs units, and Z-Systems supplies pin-out designations or prefabricated AES-EBU breakout cables. Z-Systems, US. Tel: +1 352 371 0990.

Sanken CUB-01 boundary mic

Sanken has introduced the miniature CUB-01 unidirectional condenser boundary mic designed for field and studio recording. It is said to overcome the limitations of previous boundary microphones and, at just over an inch in diameter, it is easy to conceal. It features a square-shaped capsule housing the diaphragm which enlarges the effective area of the diaphragm while the cardioid pattern minimises



background noise. The CUB-01 is available in black or beige and in various configurations.

Sanken, Japan. Tel: +81 35397 7092.

Lawo's SAM

Lawo's Slim Audio Matrix (SAM) is a versatile routing system for applications where high bandwidth and high routing performance are required. Designed for mid-size to large applications, high packing density minimise dimensions and weight with a 512 x 512 router fitting in a 19-inch rack. Matrix modules can be easily combined for specific projects to keep engineering and installation simple and an installed system can be easily expanded. The matrix offers a routing capacity of up to 2048 mono channels and beyond, a wide choice of I-Os, a decentralised and scalable audio infrastructure and networking/interlinking of several systems. SAM includes a fully or partly redundant design as an option. Numerous monitoring and control mechanisms guarantee dependable operation and additional alarm contacts and status displays allow surveillance. All modules are hot-plugable. Lawo, Germany. Tel: +49 72 22 10 02 27.

Nagisa active monitors

Majeel Laboratories has launched the Nagisa Active Reference Monitoring System which uses a Floating Error Cancellation Technique (FECT). Initially there are two different models, the L-A10 Pro and the L-A20 Pro, and both are active with an amplifier output of 100W and 150W respectively. An overdrive safety feature protects the drivers and the amplifier from sudden high-input levels by shutting down the speakers which can then be re-powered using an ordinary flashlight. The entire range is magnetically shielded and has balanced XLR inputs with an option available for a digital input in the near future. Majeel Laboratories, Singapore. Tel: + 65 878 0491.

Dual role CD-R

Tascam has introduced the CD-RW4U CD-R/RW machine which can operate as a standalone or integrated via USB with a PC or Mac. Convertors are 20-bit and the machine has SPDIF I-O and an automatic SRC. It has analogue and digital input level controls, recording buffer, Track at Once and Disc at Once modes, synchronised recording and fade in and out. A wireless remote is included together with B's Record Gold CD writer software for both platforms. Tascam, UK. Tel: +44 1923 438880.

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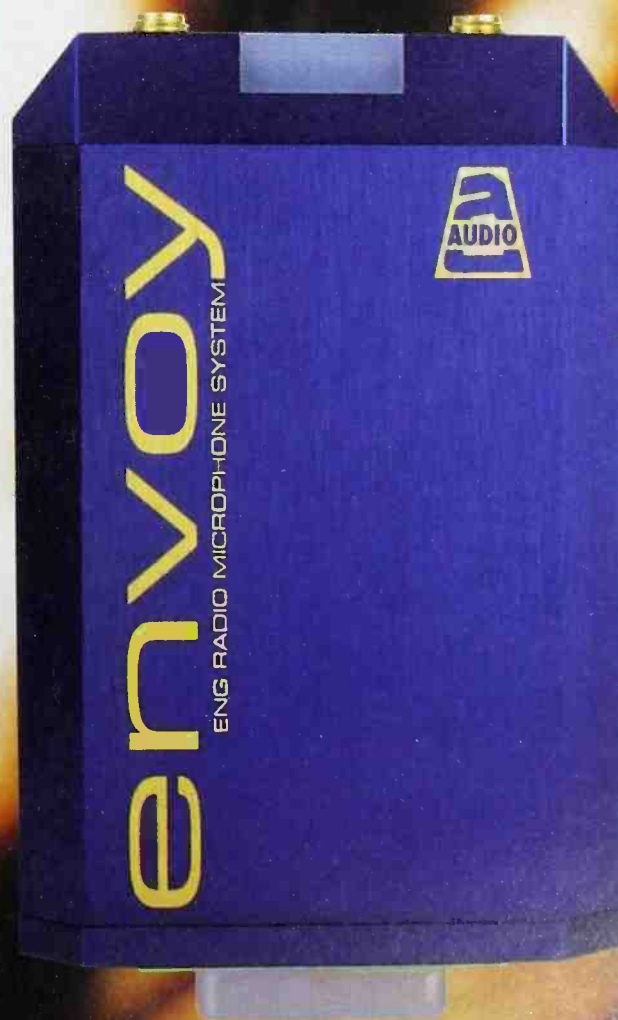
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DCS-88 CobraNet module

CobraNet licensee Whirlwind has introduced the DCS-88, an 8 I/O digital audio network box with a low power core. Using the CM-1 CobraNet module, the small, brick-shaped unit features eight analogue inputs and outputs, as well as a CAT-5 input and output. In combination with the CM-1, the DCS-88 features proprietary software, and a front-end developed by Whirlwind. Because of a low power core, the unit can be supply power to the CM-1 remotely, with



standard CAT-5 cable. Providing up to 34 channels of digital audio I-O, the CM-1 is designed to be integrated into signal processors, amplifiers, and self-powered loudspeakers. Whirlwind, US. Tel: +1 716 663 8820.

PRODIF A from SEK'D

The PRODIF A is the latest addition to the line of SEK'D digital audio cards. With one ADAT I-O, eight channels of 24-bit can be transferred to and from digital mixers, multitrack-recorders or A-D/D-A convertors. The hardware is prepared for the new ASIO-in hardware feature, which allows any ASIO-Software to access the card's memory directly. This further reduces CPU-load. This feature will be available with one of the next driver-updates. SEK'D, Germany. Tel: +49 7946 776 11.

AC/line cable

The RPLC09 is the latest addition to the Reference Laboratories family of AC/line cable. Used primarily for

Steinberg Wavelab 3.04

The search for the Holy Grail of software editors moves forward with a discovery in Germany. **Rob James** files a field report

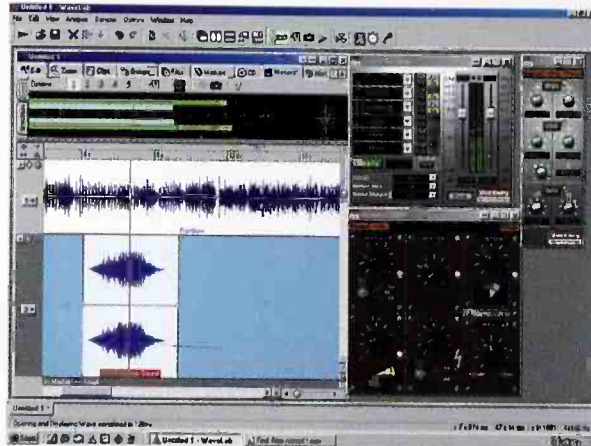
ONCE IN A WHILE I come across a piece of software that 'sticks'—an application I keep going back to when there's a bit of real work to do. Like you, I'm always looking for the perfect answer, for something that does everything I want without loads of features I don't need, is easy to learn, fast and, of course, rock solid.

Coming back from la-la land, one product I keep returning to is Wavelab. It provides a thoroughly capable mono-stereo wave editor, multitrack 'montage' editor and comprehensive CD ripping and burning. But then, so do several others. Wavelab's appeal begins with the interface. This is as intuitive as any and, perhaps more important for some, easy to re-learn after a break. For stereo projects not involving picture it does almost everything I need, but not too much. I love the relative simplicity after all the heavyweight, surround capable, 24-bit 96kHz big guns. In some ways, notably metering it is more powerful, yet more accessible than considerably more expensive offerings. A halfway decent vectorscope, simultaneous vu and peak metering with adjustable ballistics and five presets should give the flavour.

Setting up blank projects for specific purposes like CD burning is easy. Once accomplished throwing a bunch of tracks onto CD in a thoroughly

professional manner becomes the work of moments, not the usual chore.

I don't intend to give a blow-by-blow account of Wavelab's capabilities but there are a number of interesting highlights, especially for people unfamiliar with the current version. These begin with useful recording options such as Start on Sound, Stop on Silence and automatic markers on pauses and silences. Jog and shuttle at up to 4x play speed in either direction. Mouse zones—which split the waveforms into six areas with a different (and logical) mouse function in each—reduce the amount of



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tool changing, often very tedious in other applications. The Info line displays the function accessible in each position together with any other options available by double clicking or clicking in conjunction with CTRL, ALT or SHIFT—A great boon for occasional users and those with bad memories. Comprehensive right-click functions add still more functionality without heading for the drop-down menus or keyboard shortcuts.

As an aside, how on earth do Mac users manage with only one mouse button? It's the one thing that drives me mad every time I use one! I know it is possible to add after-market 2-button rodents but this always seems a bit of a bodge.

Each clip can have up to 10 VST effects slots and the master section allows up to six VST, Direct-X or Wavelab plug-ins to be applied. Vector automation of level, pan and send levels are just sufficient without adding too much to the complexity. Different colours for the rubber bands would be nice.

A pencil tool allows for waveform drawing if you get really desperate. This is one of those tools which can get you out of trouble when all else fails. Strangely, some of the heavyweight packages do not include it.

Wavelab feels all of a piece, with a consistency often absent elsewhere. There are good reasons for this. The bigger the application the greater the number of people who have to be involved in programming. Bloated office suites are perfect examples of this. No matter how much care is taken project managing the software team there are always annoying discontinuities, things which work one way in one screen and then differently in another. Wavelab is principally the work of one man, Phillippe Goutier and I think it shows in the interface. Which is not to say elements of the program do not come from other sources. For example, the EQ, mas-

ter section and time-stretch come from Spectral Design and Track Marker Support comes from RME, responsible for the excellent Hammerfall card.

By today's standards Wavelab has comparatively modest system requirements making it ideally suited to laptop use. Conversely, on my Red Submarine PC it absolutely flies, even with scrolling track display. This is part of the secret of its appeal. Responsiveness on a fast machine comes very close to that of a 'dedicated' hardware editor but with all the advantages of native processing. The usual strictures apply if using lots of power hungry plug-ins but rendering is always an option if things get really out of hand.

Through long and bitter experience I have found one rule always holds good. Never buy v1.00 of anything. Wavelab is now on v3.04c and updates are still arriving at sensible intervals. The recent ones mostly add support for new CD recorders and address some really esoteric bugs. It is rather reassuring to look at the list of fixes in previous updates. There is no such thing as bug-free software but when a product becomes mature, the incidence should reduce to a tolerable level.

Wavelab has all the advantages of relative simplicity coupled with considerable power when you really need it. Supporting sample rates up to 192kHz and up to 32-bit float, the real delight is the speed at which real-world tasks can be completed, even when the user is not especially familiar with it. If you need a competent and productive editor-mastering package, Wavelab ought to be on the list. □

Contact:

Steinberg Soft & Hardware, Germany.
Tel: +49 40 210330. **Fax:** +49 40 211598.

NEW TECHNOLOGIES



active stage monitors and loudspeakers, the cable contains balanced signal and power elements in their own jackets within an outer sleeve. Both elements are colour-coded and insulated by PE and PVC. The outer jacket is produced from a compound PVC which gives the RPLC09 a great deal of flexibility. The cable also has its uses in the lighting market because of its 110Ω and 220V dual compatibility allowing it to support products such as scanners and bulls eyes.

Reference labs, Italy. Tel: +39 071 710 8471.


TITAN New Version

Synchro Arts has released version 2.5.1 of its TITAN soundtrack conforming solution. Designed for operation with Pro Tools and AudioVision, TITAN 2.5.1 automatically corrects sync errors that occur when autoconforming soundtracks. TITAN adjusts the position of manually or autoconformed audio regions to sync precisely to a work track. The software incorporates Fix Sync, Flash Cutter and Flash Conform facilities. Fix Sync can correct the sync of audio that has been delayed by unknown amounts after passing through signal processing devices. Flash Cutter instantly reconfirms audio in Pro Tools sessions from EDLs, to time code or entire sessions according to a change list. Flash Cutter avoids having to re-cut and rename edits manually, in situations when tape is used to

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Audio Ltd Envoy

The changing face of ENG teams is promoting a new brief from manufacturers of radio microphone systems. **Neil Hillman** looks to camera for Envoy

N'VOY, N. MESSENGER; and the message is certainly loud and clear—if radio microphones are currently the biggest market in audio, sound for camera systems are the fastest in-sector. And if you get past that marketing-speak gobbledegook, it means quite simply that to stay ahead in the game, manufacturers must turn their attention to new applications for their products. It may also mean that those products are not always operated by a soundman.

News gathering for some time has devolved to 'cameraman and reporter' teams, and by and large for most things covered by news crews it has been proven to work. The latest offerings from manufacturers with some foresight has seen systems designed to integrate seamlessly into a camcorder—the Pastega RMD 34 system is a superb example of this type; true diversity, capable of slotting straight onto the back-plate of any of the major camcorders, and a no-compromise, well engineered package. It is against this back-drop then that Audio Ltd enters the picture with its Envoy system.

Audio Ltd has an enviable reputation within the location recording fraternity, built around the success of the RMS 2020 pocket transmitter systems, considered by many drama recordists to be their first choice. The Envoy however will need to appeal to both the technical manager and the multitasking cameraman if it is to gain as much ground as the hugely popular 2020 system.

Audio Ltd's claim is that the Envoy system—comprising the TXBLUE pocket transmitter, the HXiR hand-held stick mic transmitter and the CXiR diversity receiver—sports a range of features that far exceeds those of any similar ENG product; certainly there some unique points of interest.

The CXiR is the smallest true diversity receiver in the world and is designed to slot into Sony SX, Philips LDK120 and Ikegami HLV77 cameras, while all mechanical switching has been eliminated by using an infra-red remote control unit, the SwitchiR; a key-fob device akin to a car's remote locking transmitter, which offers access to all of the user-settable functions on both the CXiR pocket transmitter and the HXiR hand-held mic. With just four buttons, an LCD and a simple menu system, the SwitchiR gives full control over every parameter that might need changing, setting, viewing or adjusting.

These are: Audio Frequency—checking and changing of the 32 switchable UHF channels; Audio Level: to change the gain on the HXiR and the output level on the CXiR; A Low Frequency cut (on-off) on the HXiR transmitter; receiver and transmitter battery status and the status of the battery in the SwitchiR unit itself; a battery-check for 6LR61 9V batteries; the ability to remotely turn-off the transmitter; an infra-red disable and finally, a check for the user-identification and for the serial number of the unit. Pretty compre-

hensive by anyone's standards—and Audio Ltd's are reassuringly high in these units.

Once fitted to the camera, high-intensity LED indicators on the top of the front face and in between the two SMA antenna connectors, allow the status of the receiver to be observed even on the brightest of days, with powering being taken from the camcorder's own 12V supply through a Y-corded power and audio lead. The plugs are, of course, all different; an HRS colletted plug for the power from the camera, a Lemo 6-pin to connect to the output of the receiver, carrying power in and audio out, with a male 3-pin cannon plug taking audio into the cameras chosen input. The CXiR can also serve as a stand alone receiver by employing a 6-pin Lemo adaptor, which can then be used with those cameras that don't have a dedicated slot for a radio receiver.

The TXBLUE pocket transmitter is unashamedly RMS 2020-like, with an uncluttered arrangement of facilities all on the top face: a 6-pin Lemo socket for the personal microphone to plug into, an SMA antenna connector and the distinctive recessed and perspex-covered slider switch arrangement for manually changing channels between Frequencies 1 or 2—the 32 available channels are selected as 16 intermodulation-free pairs at the factory; LF cut in or out and the master on-off. A final rotary switch allows for the selection of either a 0dB line-input or mic gain sensitivity. These controls are however merely duplicates of those accessed by the SwitchiR key fob.

The attention to detail by Audio Ltd is also apparent in the HXiR hand-held transmitter. It uses interchangeable condenser microphone capsules from the Schoeps Colette range, with a suspension designed in collaboration with Rycote to minimise any handling noise. The transmitter antenna itself has been incorporated into the battery compartment, leaving an overall look of sleekness. The 32 frequencies, spread over a 24MHz bandwidth, are powered through the ether by means of a 1.5V AA battery slotted into the battery compartment at the base of the handle, which gives up to 2½ hours of continuous use.

I could at this stage start to describe the specifications of the units, but I won't, and it's not through laziness. Suffice it to say, if this was a real Envoy—traditionally someone below the top-ranking ambassador status of the RMS 2020, but above the *Chargé d'affaires* status of most of its rivals—this budget priced sound for camera system will certainly be the one to watch. □

Contact:

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Tel: +44 1494 511711. **Fax:** +44 1494 539600.
Net: www.audioltd.com



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transfer audio from any editing system to a Pro Tools system, and an OMF transfer is not a practical option. Flash Conform uses an EDL and preloaded sound files to generate a conformed session in an instant. Synchro Arts, UK. Tel: +44 20 8823 9100.

PC Software ISDN and IP Codec

AudioTX Communicator is a Software-only ISDN Audio Codec, compatible with CDQ Prima, Telos Zephyr, Glensound, Dialog, Philips and other well-known models. The software enables live bidirectional audio connections in broadcast quality using only a standard sound card and ISDN card in a PC. ISDN operation is MPEG 3, MPEG 2, G.722 and G.711. Communicator is also able to establish live audio connections over IP networks—from linking studios over a standard company LAN-WAN network to larger ATM networks and leased lines and even over the Internet using ADSL, DSL, T1, Cable Modem or other high-speed connection. MDO, UK. Tel: +44 121 248 0200.

Aphex 207 mic pre

Aphex' Model 207 dual-channel tube mic preamp is said to combine the best attributes of tube and solid-state topologies. Derived from the Model 107, the new, enhanced version is based on the patented Reflected Plate Amplifier (RPA) circuit, and now includes the MicLim peak limiter used in Aphex' high-end Model 1100 tube preamp. Other features include new front-panel design and operator controls, XLR and ¼-inch I-O connectors, onboard mixing between mic and instrument-level inputs, and internal power supply. MicLim works on the microphone's output signal before any amplification takes place. Aphex, US. Tel: +1 818 767 2929.

ORTF mount for cardioids

DPA has added to its range of mic accessories with the addition of the CXO4000 mounts for different stereo recording techniques using cardioid mics. The CXO4000 holder is said to be ideal for stereo mounting of DPA's compact cardioid mics, such as types 4021, 4022 and 4023s. It enables the cardioids to be mounted in either a coincident XY stereo configuration or a near-coincident ORTF combined time and intensity difference stereo configuration. It is possible to use the CXO4000 in both XY and ORTF at the same time (with four microphones) to compare the setups, or to record both stereo systems and make the choice of which one to use afterwards. It is even possible to mount one of the systems facing backwards in order to make a compact surround sound microphone setup. The CXO4000 is made in black anodised aluminium with extremely durable ethyl propylene rubber rings. A thread adaptor is supplied within the holder shaft, allowing attachment to three of the most common international standard threads. DPA, Denmark. Tel: +45 48 14 28 28.



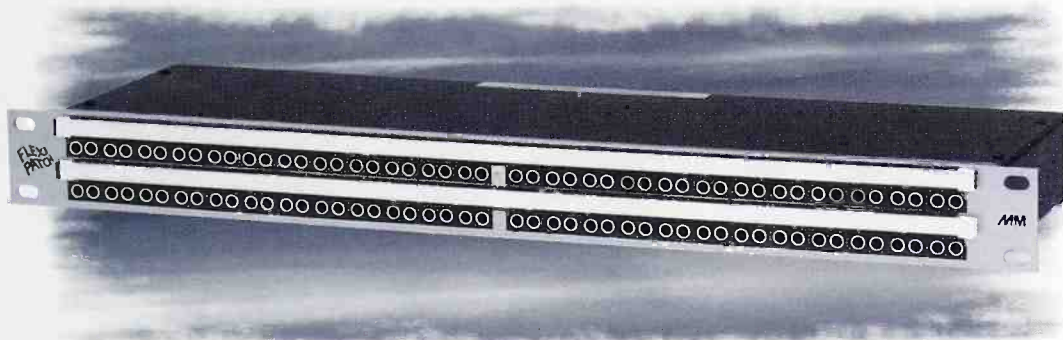
Three-channel amp

Bryston's 6B-ST 3-channel power amplifier is comprised of three completely independent modules packaged into a single chassis. Each of the three modular channels is capable of delivering 250W into 8Ω or 400W into 4Ω and each module functions independently with its own electronic circuitry, connections, and independent power

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TL Audio VP-1

The ongoing mixing-'n'-matching of channel features, circuit topologies and price points brings us the VP-1. **Dave Foister** reckons it's a milestone

IF THE CHANNEL STRIP in a box is an opportunity for a company to show off its strengths, whose would be most interesting? High on the list would have to be TL Audio, whose quickly-acquired reputation covers the whole spectrum of analogue processing, in particular anything with a valve in it. Consequently the latest offering in the multi-process line, the VP-1, is enough in itself to satisfy the most ardent valve fan, to heat your studio complex, and to keep a valve factory in business for some time.

TL has made no attempt to squeeze its suite of devices into an unnecessarily small box. The VP-1 is 3U-high and finished in the familiar deep blue, complete with the obligatory TL Audio mesh grille to let the heat out. It

has to be this big because it comprises an unusually full set of devices, on top of which each device is fully featured with no scaling down to make it fit. In fact some have more features on than you would take for granted on a stand alone. The complete chain consists of a choice of two input preamplifiers, a variable high-pass filter, an expander-gate, a de-esser, a compressor with a choice of behaviours, comprehensive 4-band EQ, and a peak limiter; it can optionally be rounded off with a 24-96 digital output. With all the possible bits in circuit, the signal path contains no less than seven valves—six triodes and a pentode—which should be enough to satisfy the most ardent fan of the thermionic way of doing things.

Two of these are in the input stage alone, although there's an alternative if preferred. There are actually two mic preamps in the VP-1, one valve and the other discrete solid-state class-A to give a choice between classic warmth and neutral clarity. The difference is distinct and useful, and a shrewd move to broaden the unit's appeal. The line input and obligatory front-panel instrument input use neither of these circuits. Gain is switchable in 10dB steps with a ± 15 gain trim and 30dB pad, and a fully-variable high-pass filter runs all the way up to 1kHz.

Dynamics follow, with a full chain of three devices, all useable simultaneously but independently switchable. A basic expander-gate offers variable threshold, attack and release and does a good functional job; this is followed by a useful de-esser, with variable frequency, bandwidth and depth. Each of these has its own LED gain reduction meter and offers surprising flexibility within an all-encompassing package like this. Next up is the all-important compressor, which in standard mode is based on TL's successful C-1 design. The usual selection of adjustments is provided, with the time values typically uncalibrated, and the gain make-up stage is where the third valve lurks. The twist here is that there's an alternative control element to the standard TL transconductance ampli-

fier in the form of a good old-fashioned optical gain circuit. The additional palette of possible characters offered by this choice is typical of the deceptive simplicity of TL's designs, and is the kind of thing you only rarely see even on dedicated compressors. A hard/soft-knee switch completes the picture, and the gain reduction of the compressor alone can be shown on a standard TL round vu meter.

The other four valves are in the equaliser—one per band in a circuit that has upper and lower shelving bands and two full parametrics. This makes it reminiscent of TL's full-blown EQ-2, rather than the Ivory

EQ with its valve input stage and solid-state EQ circuits. The control ranges are also very similar to those on the EQ-2, but

just different enough to suggest that this is not the same circuit. The same degree of flexibility and characteristic sound are there, combining subtlety with a healthy ability to put up with some really extreme settings without complaining. A final touch of versatility is added by a switch that places the EQ before the compressor rather than the obvious panel-layout way round. The final processing stage is a simple peak limiter, featuring nothing beyond a threshold knob and a light to show it's working, and this works pretty transparently too.

The last bit is the optional digital output, which was not fitted to the review sample although the front-panel controls are there as standard. These show a standard choice of four internal sample rates and external clock, and word lengths of 16, 20 and 24 bits that TL describes as 'properly dithered'. An LED meter shows digital output levels and overs independently of the analogue vu, and the output appears simultaneously in AES-EBU, SPDIF coax and SPDIF optical formats.

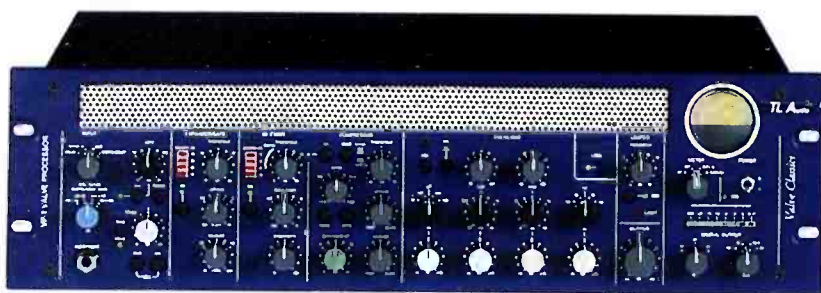
There's more; but it's detail and it's more important to say that the VP-1 is everything you'd hope it might be. These are the circuits and features—and the sounds—on which TL Audio has built its reputation, and they haven't been compromised to cram them into this all-in-one box. The trademark combination of real controllable valve warmth, low noise and distortion, simple operation and understated processing power is there in spades, and there are many who will need no persuading that this is a box worth having. If you haven't yet experienced what TL represents, then it's all here in one convenient package that's much more than a taster. □

Contact:

TL Audio Limited, Audio House, Progress Road, Sands, High Wycombe HP12 4JD, UK.

Tel: +44 1494 511711. **Fax:** +44 1494 539600.

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NEW TECHNOLOGIES

supply. The 6B-ST features a 3-position gain selector for balanced or single-ended inputs, a polarity switch on each channel, and a remote 12V power trigger input with a delayed output feature.

PMC, UK. Tel: +44 1707 393002.

8400 update

Version 1.0 software for Orban's OPTIMOD-FM 8400 digital processor adds Purist 2-band processing, clock-based automation, PC remote control software, support for Ethernet networking, and improvements in the 5-band processing algorithm. These enhancements come in addition to previous version improvements, which included passwords to protect the processor from unauthorised access, low delay monitoring for presenter headphones, full implementation of the GPI remote control, and pilot-tone reference output for RDS/RBDS generators. The OPTIMOD-FM 8400 has a patent-pending 'multiplex power controller' that makes it compliant with the ITU 412-7 regulations currently enforced in many European nations.

Orban-CRL, US. Tel: +1 510 351 3500.

Sound level monitoring

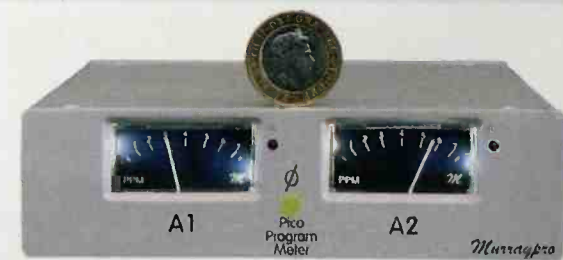
Developed for the stringent sound level monitoring laws in Europe, the Argos Sound Leveller and Hera Recorder/Controller combine to make an affordable, dedicated limiting system. As well as keeping audio levels under control it also monitors and records events over a 14 day period. Data is time-stamped and saved to PC creating a log for local inspectors. The Argos leveller features speed selection, built in Pink Noise Generator, in-line test button, and three connection/detection sources—mic (supplied), line or speaker (up to 1800W/8 Ω). A Mode selector switches between normal (automatic) and 'hold' which sustains threshold level between quiet pauses. I-Os are on balanced XLR and unbalanced phono. Setting switches for Argos are located behind a removable plate. When linked, the Hera will record any removal or tampering. Argos will also operate as an independent standalone limiter.

As a standalone unit the Hera can be used as an accurate db meter and recorder with a cut off device featuring level warning and power cut off via relays. Also available from Apex are the high-end PE Series parabolic and GX Series graphic equalisers.

Net: www.apex-audio.be

Pico programme meter

Murraypro has released the diminutive stereo Pico Programme Meter as its answer to the need for a miniature, high-specification, audio Peak Programme Meter



(PPM). Housed in a 160mm x 45mm x 180mm robust metal case the Pico offers looping XLR audio inputs, stereo Phase indication, +8 dB peak LEDs and internal mains power supply. The meters are illuminated by white LEDs, which give a clean and actinic light, resulting in exceptional visibility.

Murraypro, UK. Tel: +44 208 943 1920.

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DON'T FORGET ABOUT DRE

A recent *Los Angeles Times* survey identified Dr Dre as the man most likely to sell the largest number of records in the next seven years. **Lisa Roy** talks to him about what he does best

ONE RECORD COMPANY EXECUTIVE, of the 22 who took part in the *Los Angeles Times* survey, said that Dre—who won a Grammy in February for Producer of the Year—might be the greatest talent in the music business right now. Hip-hop is the most dynamic sound in pop, and he's the king of hip-hop... You work it out.

It came as no surprise that catching up with Dr Dre is a bit of a challenge. After all, he's been busy putting final touches on a mix for Eminem's side group, D12, making beats with Busta Rhymes, working on a

new single with Eve and Gwen Stefani, and producing a soundtrack for a major film, *The Wash* (in which he also stars with Snoop Dogg).

As I walk into the famed Record One in Studio City, his production manager Larry Chatman is juggling phone calls but greets me with a warm smile—Dre is on his way. He invites me into the control room where Dre's Dream Team is already warming up. Ensclosed in Studio B, engineer Veto (aka Mauricio Iragorri) is tinkering on the SSL 8000, while Mike Elizondo, bass player, and Scott Storch, the

expert on keys, file into the studio. The activity seems normal, even mundane, until Dr Dre walks into the room when the vibe shifts up a level of energy, and respect to his creative talent is evident to even the casual observer.

Contrary to media reports that his recording sessions are filled with drugs, alcohol, and gang warfare, all I saw was positive energy, professional vibe, creativity, and solid business. After completing a call with his protégé Eminem (aka Marshall Mathers), where he was advising the young rapper on some crucial business decisions, Dre turned his attention to the interview at hand and gave *Studio Sound* a glimpse at what it's like to make a record with this talented artist-producer-engineer-actor-director.

Dr Dre can be described as many things—a catalyst, an astute businessman, an innovator—but perhaps the most interesting description of the man, born 35 years ago as Andre Young, is his description of himself as 'a motivator'. 'I'm a very good motivator,' he insists. 'I direct well. I'm a person that will spend three or four hours working on one line of a song to get it correct. I have to be able to work with artists who are ready to go through that torture.'

Some of the artists that have signed up for his unique brand of 'torture' are Snoop Dogg, Eminem, and the hardcore rap band NWA, which Dre founded in the mid eighties with fellow rapper Ice Cube and signed to Eazy-E's Ruthless Records.

Although he had been rapping and DJing since growing up in one of LA's roughest neighbourhoods, Compton, he's surprisingly realistic about where his truest talents lie—and that's in production. In addition to being credited with inventing gangsta rap, he's responsible for creating his own musical style: G-Funk. This patented, often-imitated style of music immediately became the defining characteristic of the entire generation of music. There are few that would argue that from the introduction of G-Funk, Dre's sounds and rhythms shaped the future of rap music, while impacting its history at every turn.

One of the key moments in Dr Dre's career came in 1992, when he founded Death Row Records with his friend Suge Knight. This became a platform for his obvious production talents. He released only one solo record for Death Row, the critically acclaimed, *The Chronic*. While the production values behind G-Funk dominated the hip-hop world for the next four years, collaborations with stepbrother Warren G and the immense success of Snoop Dogg's 1993 debut *Doggystyle* cemented Dre's name on the list of some of the most powerful and influential men in the music industry.

Unfortunately, all of this success did not prevent the eventual collapse of the record label in 1996 amid financial difficulties and creative differences—not to mention a lengthy murder trial for the label's star, Snoop Doggy Dog.

The businessman in Dr Dre had matured through all the challenges and obstacles of the eighties and



Dr Dre

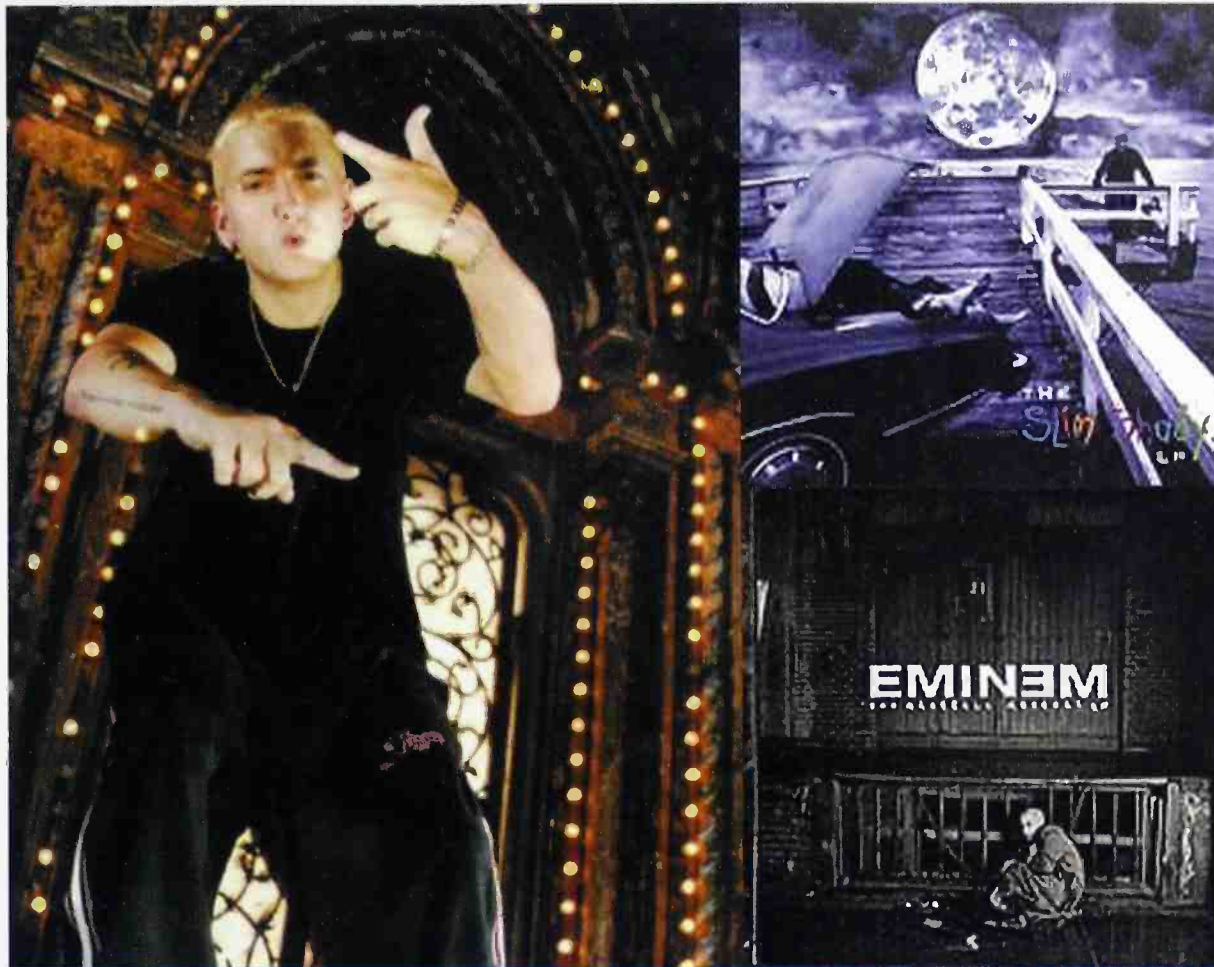
early nineties. His instincts served him well when he made the decision to bail from Death Row Records almost a year before its ultimate demise. Eventually, he formed Aftermath Records and turned his production, mixing, and writing energy toward a young rapper he found in Detroit called Eminem. This collaboration not only resulted in Eminem's 1999 debut record, *The Slim Shady LP*, and the multi-platinum follow-up *The Marshall Mathers LP*, but also a Grammy for their collaboration on 2001's 'Forgot About Dre'.

Dre explains, 'Forgot About Dre' was actually Marshall's idea. He said I have an idea for a song, I just need some music to it. So he sent the chorus to me and then we went to work on our music. We recorded it at Granny's House Studio in Reno, and then we put the song together in a couple of hours.' The collaboration also garnered him a Grammy for Producer of the Year.

'That was big,' he confides. 'I love the fact that I didn't have to go on stage and give a thank you speech. I didn't have anything written down. As it turned out, when they called my name for Producer of the Year, I just stood up. That's going to be the perfect ending to my life story.'

Perhaps he should start preparing his acceptance speech for next year now because an Engineer of the Year Grammy is certainly not out of the question for the technically savvy Dre. He humbly admits that, although he defers to his engineer of choice, Veto, on certain things, he himself is the man behind the board for the majority of the projects he works on. His roots in recording began in a small studio in the back of a club in Compton where he used to DJ.

'I would just come in there during the week and just try to create my songs, just messing around, seeing if I had it. I would play them in the clubs on the weekend and I would get good responses, so I just kept doing it and it became my profession.' He continues, 'I learned how to engineer basically from that club. I also learned a lot from this engineer, Donovan, at Audio Achievements in Torrance. We used to work together a lot, and I eventually started working by myself on mixes. I wanted it to sound a certain way and I felt nobody was going to be able to dig in my brain and get the sound out that I wanted except me. Everyday I would learn something new. I'm actually



Above: Eminem. Top right: *The Slim Shady LP*. Right: *The Marshall Mathers LP*

still learning with all the new technology.'

Through the years, as any engineer would, Dre has defined his choices in audio gear. He's candid about his love for any and all Solid State Logic consoles, as well as the Studer A827. He always uses Quantegy 499 tape. His mic of choice is the Sony C800G, which is the only mic he ever uses on vocals. When recording vocals with the Sony mic, he runs it through a Neve 1073 mic pre, and then through the SSL compressor and a dbx 160, but he admits to very little EQ on the vocal.

Dre explains: 'I usually record vocals flat. The only time I EQ when recording is if I know for a fact that

I'm going to want it to sound like that during the mix.' He continues, 'When I want a little more crispness out of the mic, I use the 1073 EQ with just a little high-end. I don't use too much compression; maybe 4:1 with the outputs set to zero. I usually do my compression afterwards. I like the compressors on the SSL. I usually have the ratio up to about eight or 10 on a lot of things.'

Dre, a die-hard fan of analogue recording, is one of the few producer-engineers left in the world that have not jumped on the Pro Tools bandwagon and, true to form, he makes no apologies for that.

'I tried digital a couple of times and I don't really



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INTERVIEW

like it. There's just something about it. For me, it's not fast enough just yet. I tried to record into Pro Tools and got one of the best Pro Tools operators down to record the music, and it's just not me. Not yet,' he concludes. 'We had the Sony 3348 in the studio, and I tried a couple of songs on it and it didn't give me the sound I wanted. The kick drum started sounding transparent. It wasn't good.'

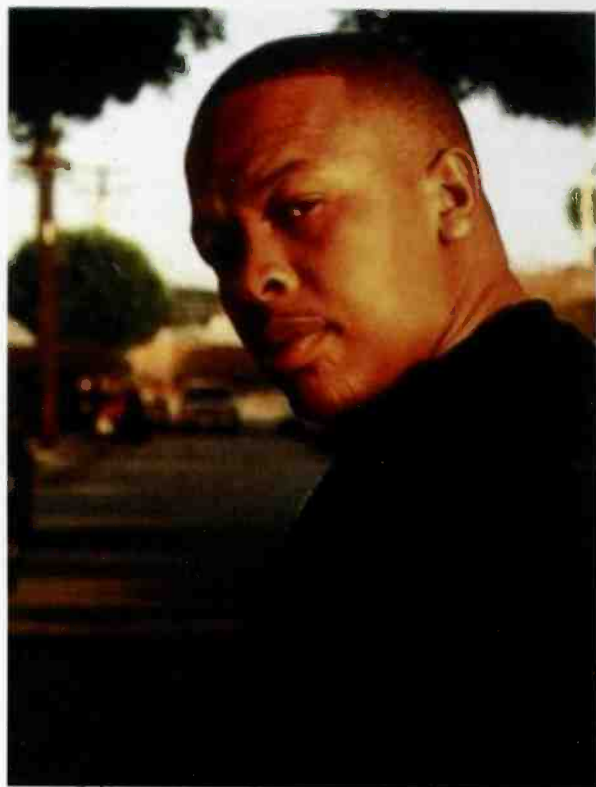
When it's time to mix down, Dre makes the unusual choice of mixing straight to DAT, so you can imagine that the DAT machine is a key element in any studio he chooses to work in. Dre's DAT machine preference is the Panasonic 3800.

The question on every young rapper's mind though, is what gear does Dr Dre turn to make his signature

beats? Engineer Veto explains that there's a laundry list of toys that make a Dre session complete.

'The brain of the whole thing is the MIDI sequencer, the Akai MPC3000. We use the Korg Triton keyboard. Usually that's the controller—the Nord Lead and Korg's MS2000. Lately we've been trying out the Alesis Andromeda A6. SST actually recommended a Waldorf cue, and we seem to like that one as well. They let us try it for a day and we said, "Yes, we'll keep it!" You might also find a nice array of vintage keyboards on hand, including those by Rhodes, Wurlitzer, Moog, and Roland. But Veto says what you won't find in use on a Dre session is a lot of outboard gear.

'We don't use a lot of outboard gear,' Dre concurs.



'I doctor the vocal as far as de-essing and maybe some low-end EQ for the kicks. We use a lot of EQ on the console and all the limiters. Most of it comes out of the SSL and into the quad compressor. I like the sound of it on the mix bus. That's the SSL quad compressor in the centre of the console.'

Dr Dre knows his way around the studio and in and out of a 'tool box'. This credits to once having his own studio, complete with an SSL 4000E-G. 'We did a lot of Eminem's first record at my home studio. Actually the first song we did together, "My Name Is", was done there,' remembers Dre. Eventually he removed the studio from his home and is now vocal about his love and support of the professional, commercial facility.


'I kind of got tired of having a home studio because you get to the point where you want to feel like you're going to work. Plus, sometimes you have to work with people and there's just some people you don't want in your house,' he laughs.

This love for the commercial recording facility has Dr Dre hanging out on a regular basis at LA recording hotspots like Larrabee West, Encore, and, of course, Record One. 'We mix almost everything

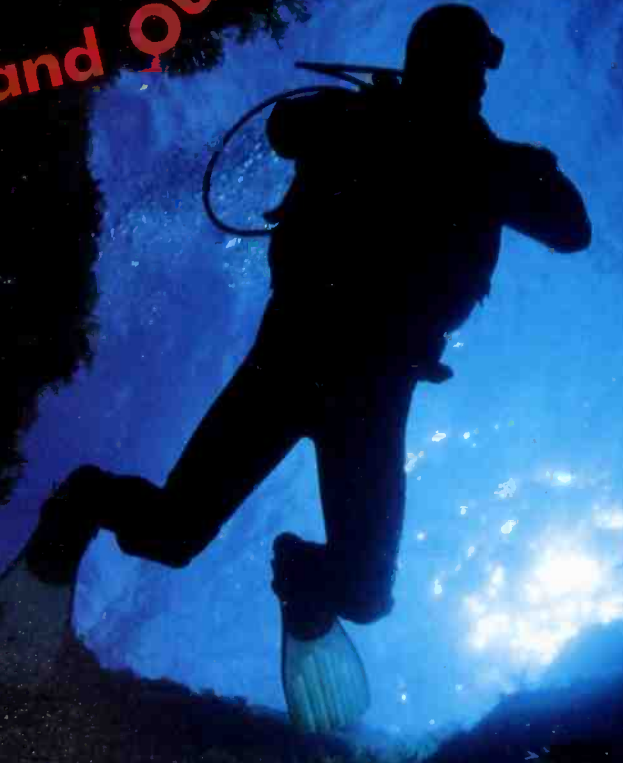
at Larrabee West. I just like a studio that's comfortable, has a lot of space, and, very important, has a lounge with a kitchen,' he shares. 'The equipment is important, but, to be honest, I'm still working on the same board I worked on since 1990. The important part is who's pushing the buttons.'

Dr Dre has just finished pushing the buttons on a new project, D12, the first act on Eminem's label, Shady Records.






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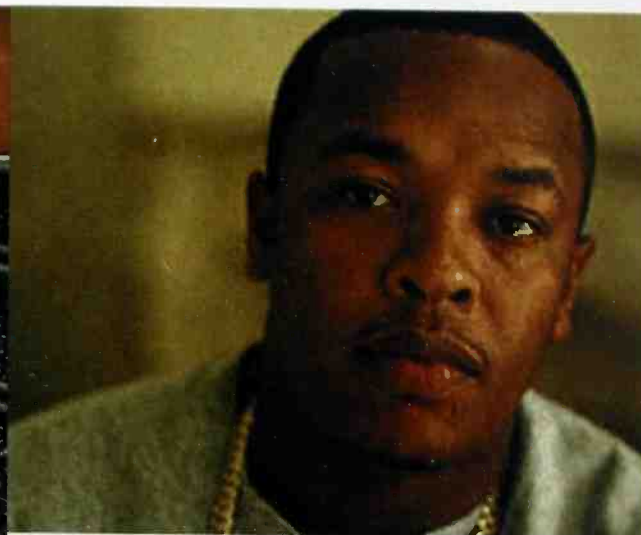
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'D12 is an incredible group,' he enthuses. 'All the guys in the group are great musicians. They all have really crazy personalities, you know, and I love working with them. I think they're going to be a big group. Eminem is the sixth member in the group.'

Also on the horizon for Dr Dre is his first foray into surround sound mixing. 'I'm going to record and mix my next record in 5.1, so it gives me a whole new world to work with. Hopefully, then people can just throw it in their DVD player and have a little blast of entertainment.'

One thing that's evident about Dre is that he strives to keep his audience entertained regardless of what he's doing. He wants the records he makes to stand out and intrigue the fans long after they first listen. He ensures this, he says, by putting what he calls his 'sprinkles'

into the mix. He explains: 'People come up to me on the street and say, "I hear something different every time I listen to your record". That's what I like to hear—that's the sprinkles.'

Even when he's self-producing, he challenges himself constantly. 'I really take a lot of time on each song and make sure it's okay—I'm my worst critic. I want to make sure it's right.'

During the making of his current release, 2001, Dre would assemble intimate listening parties simply to gauge their reactions. 'That's the difficult part when you're producing yourself. I take it home. I listen to it. If it works for me, then I play it for different friends and family members and hopefully they dig it. So it was a big process.'

The multi-faceted Dre has put plans in place to

expand his empire by adding two more talents—acting and directing—to his already impressive resume. Dre fans can look forward to a Snoop-Dre reunion with the release of a movie they're currently filming together, *The Wash*. The power duo will also collaborate on the soundtrack of this 'dramedy'. Dre spills another interesting tidbit—he's going to direct a movie within the next year.

'The first movie I'm doing is called *Raincoat*. It's all about condoms,' he muses with a grin. Acting is a true passion that he intends to explore fully in the future. 'I want to do a really big movie and have it come across really good. I want it to have the same feeling that my records give people. This movie is going to be interesting.'

We would expect nothing less from The Doctor. □

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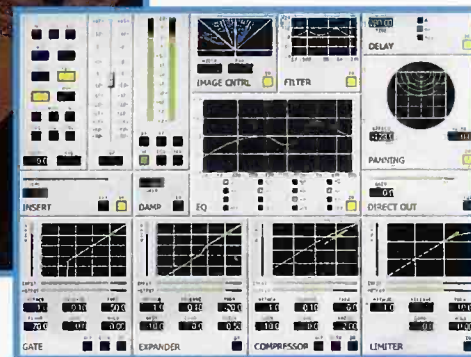
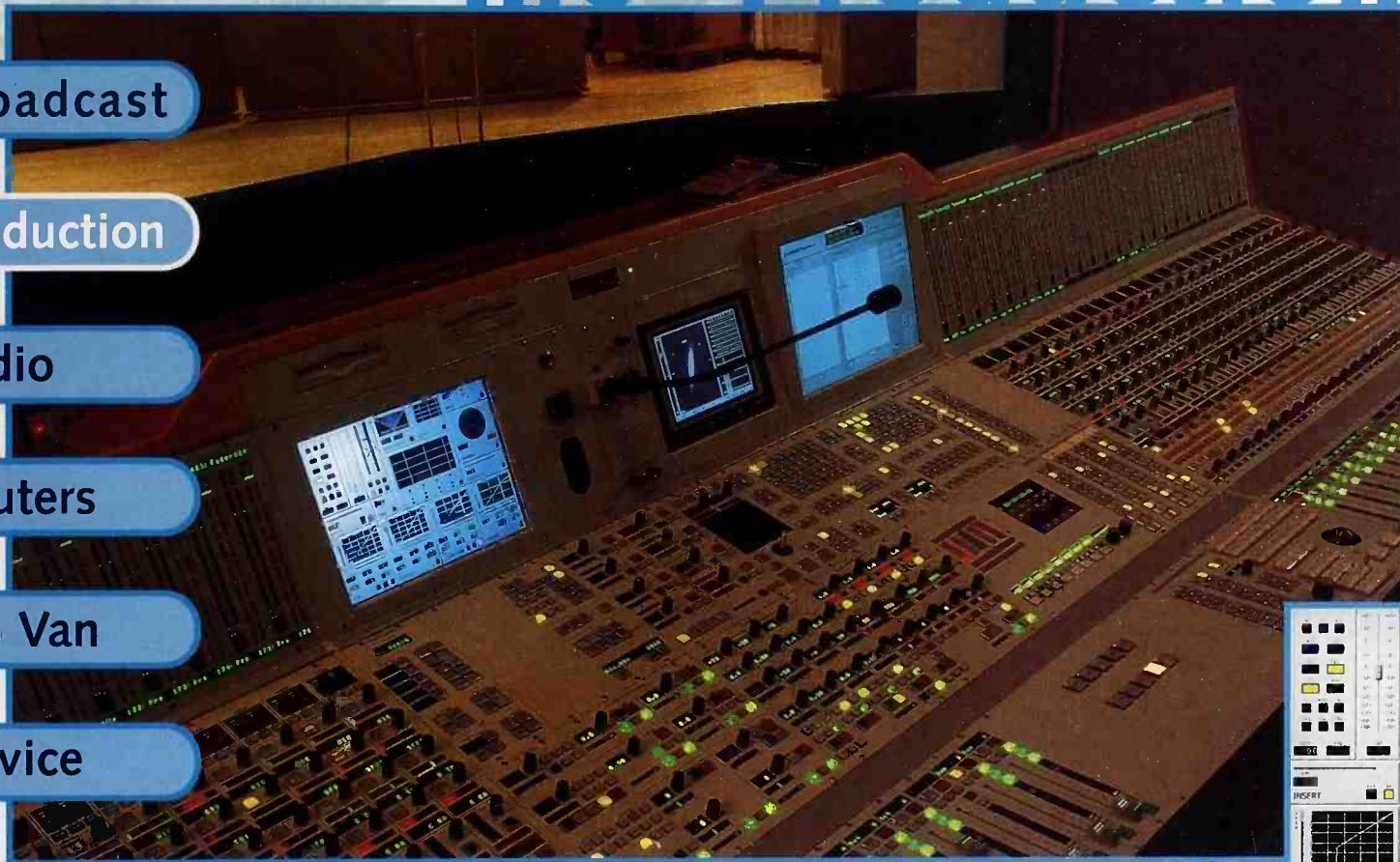
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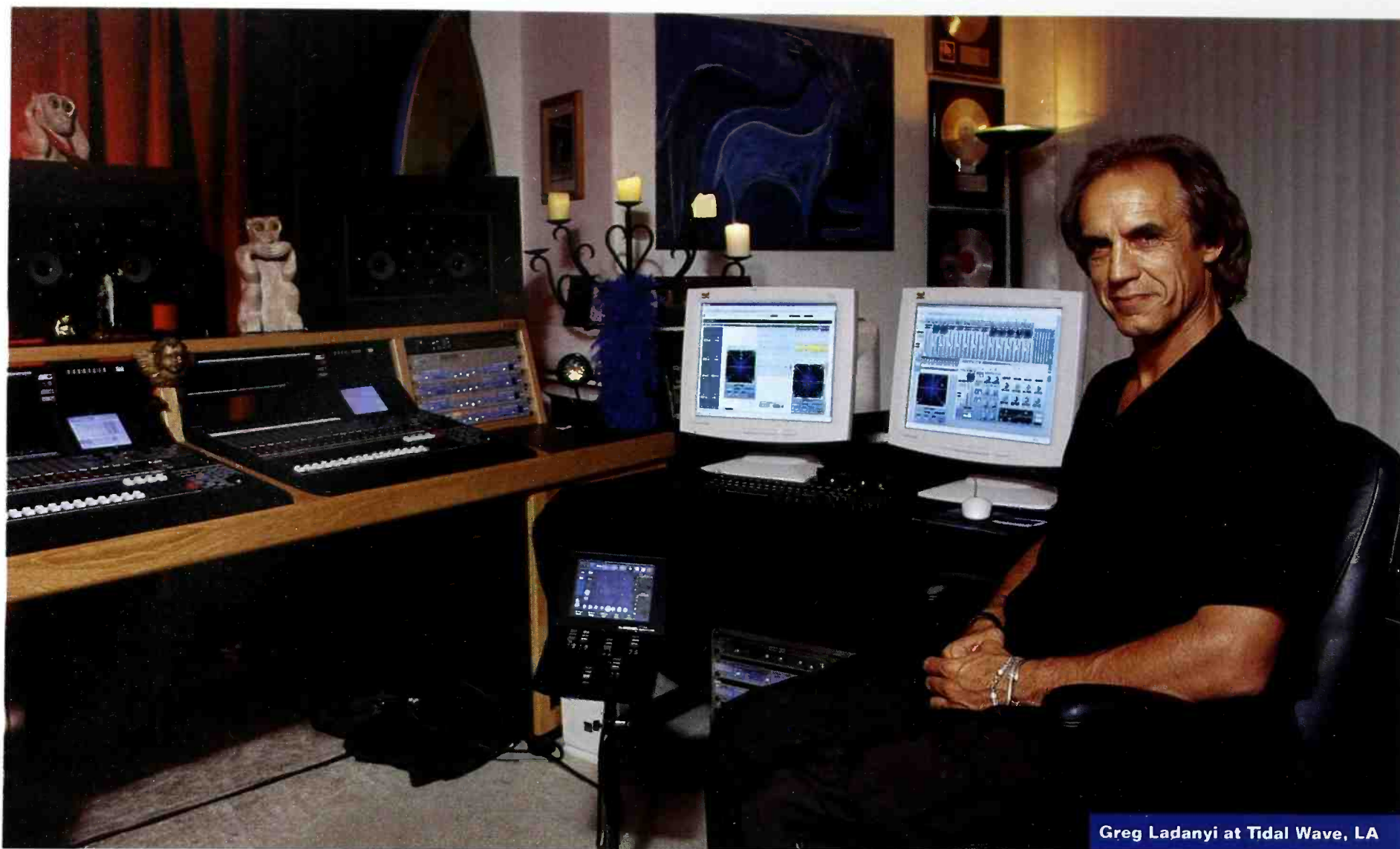
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Greg Ladanyi at Tidal Wave, LA

RUNNING BEYOND EMPTY

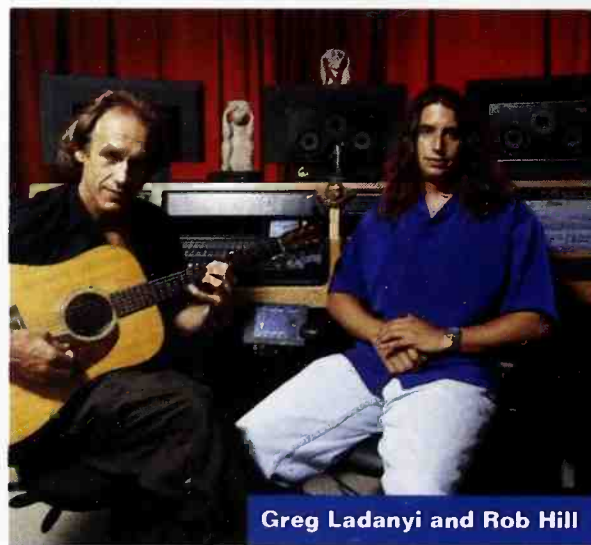
An unconventional recording at the time of its release, Jackson Browne's 1977 classic, *Running on Empty*, is making news again with its DVD-A remix. **Mel Lambert** talks to Greg Ladanyi

FOR SINGER-SONGWRITER Jackson Browne, the 1977 live album *Running on Empty* represented a watershed. Known formally as a creator of haunting, evocative ballads recorded by other artists, *Running on Empty* allowed Browne to showcase his own talents, by creating a sonic tapestry of a barren life on the road. Browne's musical story of a road tour featured not only live arena recordings, but also intimate hotel room and lounge sessions—10 songs of all-new material.

For recording and remix engineer Greg Ladanyi, the album 'marked a pivotal point in my career'. Eventually, he was involved as engineer/co-producer on two of the artist's albums—*Hold Out* and *Lawyers In Love*—as well as working later with Los De Abajo, Jaguares, Warren Zevon, Fleetwood Mac, Asia, Don Henley, Toto, and REO Speedwagon. (He won a Grammy for Best Engineered Album for *Toto IV*.)

This past spring, Ladanyi returned to the 24-year old tapes to prepare a 5.1-channel DVD-Audio mix of

those classic tracks. Working at his private LA studio, Tidal Wave Entertainment, the producer-engineer brought in Rob Hill from Steinberg North America to co-engineer the session and oversee the use of a fully-



Greg Ladanyi and Rob Hill

loaded Nuendo surround sound workstation that handled unload, assembly and remixing of the 24-96 material. This project marked the first time Ladanyi had mixed in 5.1. 'The album is a patchwork of various live performances,' he offers, 'with a loose, rough-edged feel. Working in 5.1 brings the listener into the total experience of the hotel rooms, the bus and lounges, putting them inside the music with Jackson and the band.'

How were the tracks for Running on Empty recorded on the road?

The majority of the live dates were recorded to a Studer A80 24-track 2-inch at 30ips, non-Dolby. Normally, we just took a line-level feed from the stage directly to each track, with not much control over levels. Jackson still owns that same [Studer] machine, so we went to his private studio, Groove Masters, to transfer the tracks directly into Nuendo at 24-96. We had around 150 reels of tape.

The concept for the *Running on Empty* live album was that it would be all-new original material—most

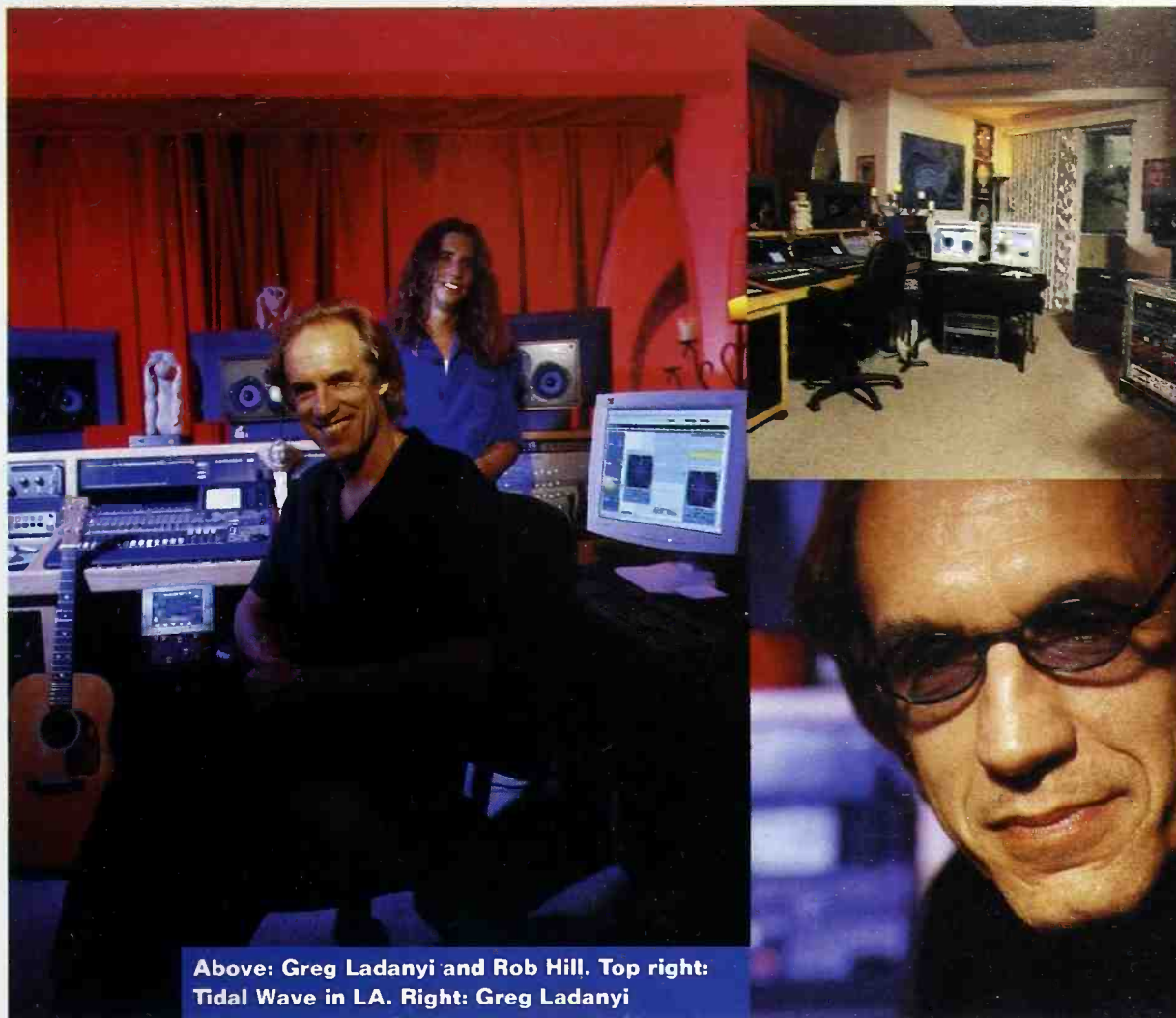
of the songs were being rehearsed the night before. At the beginning of 'Running on Empty', for example, you can hear Jackson faintly having a conversation with Danny [Kortchmar, guitar player]. He sings the first line of the first verse to let him know what was going on, and then counts 'one, two, three, four' into the song. You get to hear that on the DVD-A version. It's very special.

The hotel tracks [notably 'The Road', recorded in Room #301 at the Cross Keys Inn, Columbia, MA, plus 'Cocaine' and 'Shaky Town', recorded in Room #124 at the Edwardsville, IL, Holiday Inn] were recorded with the Record Plan truck at 15 ips, non-Dolby. And 'Nothing But Time' [tracked on a Continental Silver Eagle bus 'somewhere in New Jersey'] was recorded on a Revox 2-track because there was no room on the bus! It was a simple mix of Jackson and Danny [Kortchmar] on guitars, and Craig [Doerge] on Wurlitzer; we overdubbed bass drum—Russ [Kunkel] playing a cardboard box—and other percussion after bouncing the two tracks onto the Studer 24. But the lead vocals and guitars were all live.

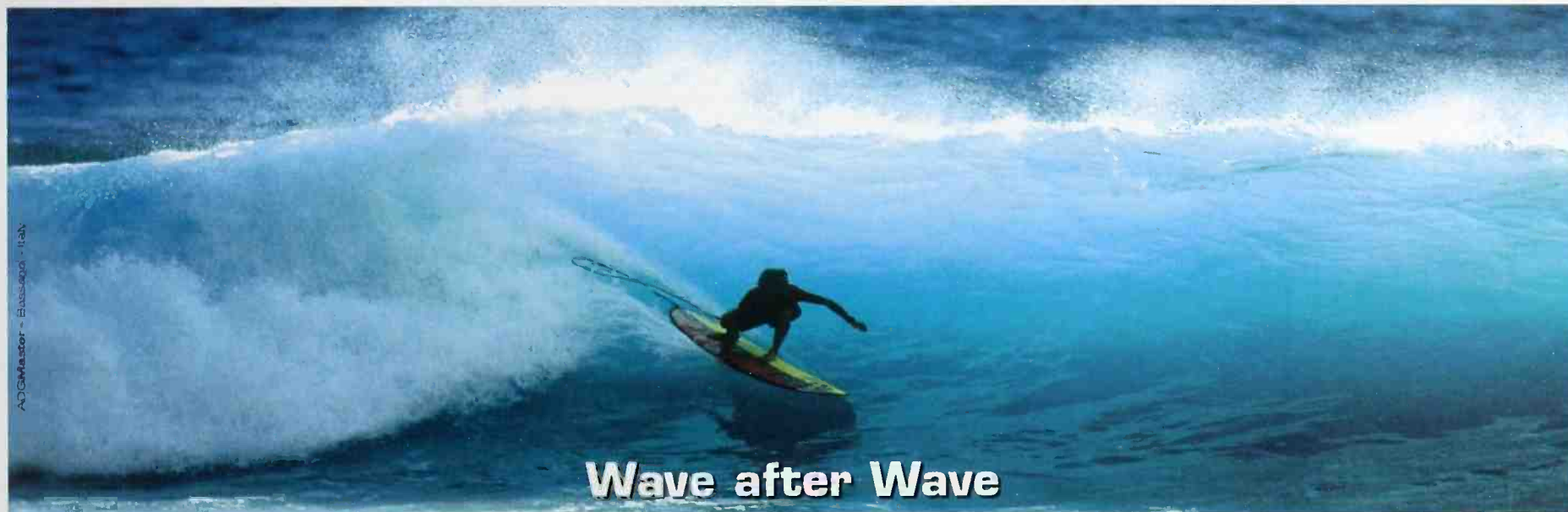
At Groove Masters we used the studio's Neve 8078 console to give us a nice warm sound. We tested the signal path with and without the Neve and found that it warmed up vocals and guitar very nicely—added a little harmonic distortion. We used the Nuendo's A-D converters because we didn't have any others that sampled at 96kHz; but they sound great!

Were there any problems with those vintage 24-track masters?

No, we just had to re-lube them; no baking of the tapes—it wasn't necessary.



Above: Greg Ladanyi and Rob Hill. Top right: Tidal Wave in LA. Right: Greg Ladanyi



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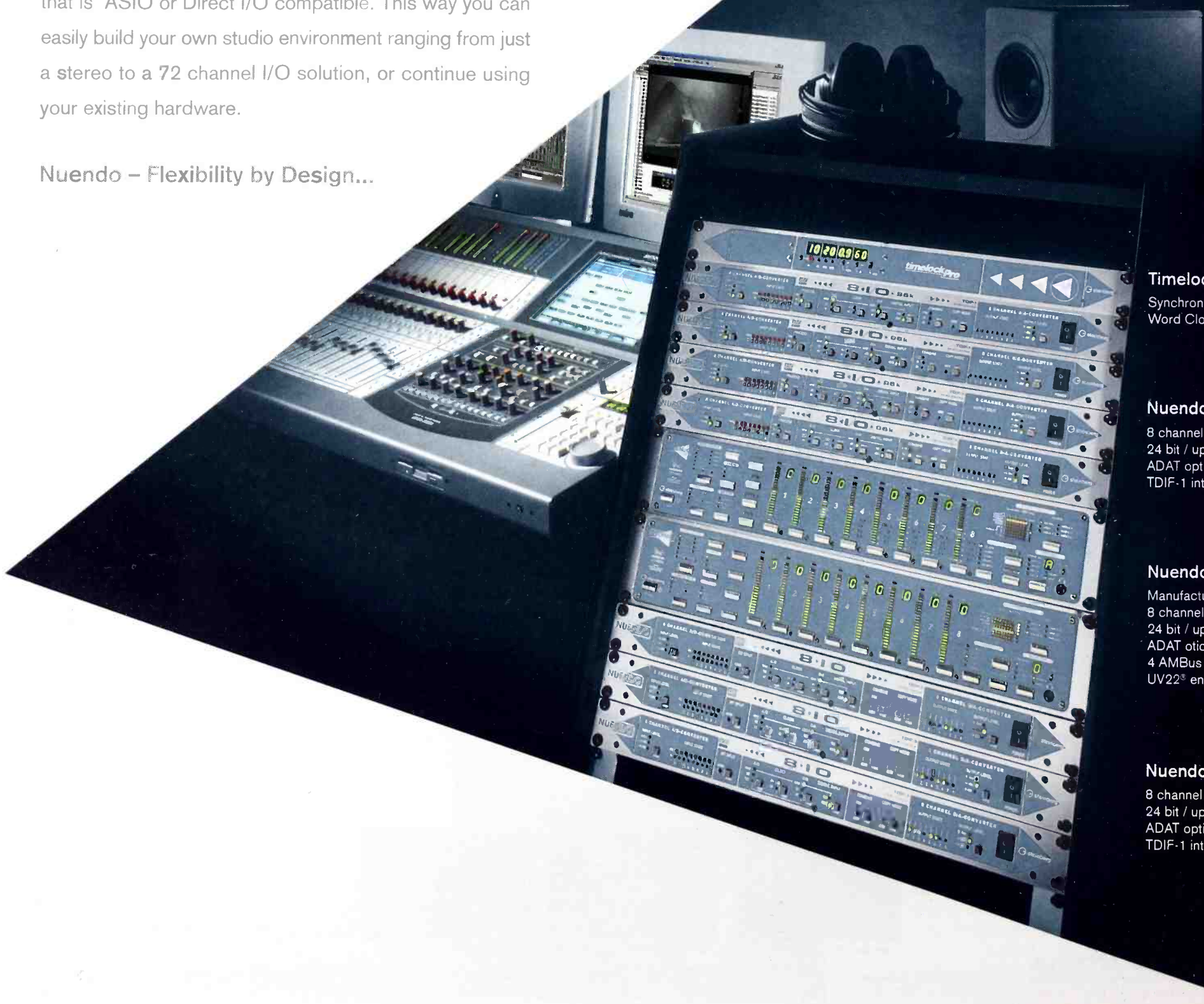
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RECORDING

Was all track assembly, editing, processing and mixing performed within Nuendo?

Yes. It is a fully live recording. We broke out different elements to give us around 60 tracks. For example, we needed a guitar ride at a certain point, so we just copied that section to a spare track, processed it and wrote separate fader moves—it's a different way of making records.

We took some of the longer intros from the master tapes, and used some of it as ambience. The audience was miked with just two shotguns, so we



Steinberg Nuendo at Tidal Wave, LA

didn't have too many options.

Aside from some outros and little conversations we picked up from the multitrack masters, we followed the original running order and song lengths. No other songs were added. But we have material that is more audible on 5.1-channel DVD-A, because you have more discreet locations. On 'Cocaine', 'Shaky Town', 'Rosie' and 'Nothing But Time', there are conversations amongst the band that you would not hear on the stereo versions, without it being really obvious.

Nuendo's automation is tremendous—the ability to create parts or passages by pasting and copying, setting and printing EQs and reverbs. All this is more exhausting on an analogue console.

How did you set up the 5.1-channel mix?

Our original idea for the album was to surround the listener with sound and to make it appear as if you were actually inside the experience—which means that the DVD-A can take full advantage of 5.1-channel playback. We mixed on Westlake monitors powered by Hafler amps. The LCR and surrounds are BBSM-5s, while the LFE is an Lc8.1 subwoofer.

For the live concerts we wanted to put the listener inside the audience—with the band coming from the front speakers, just as they would at the con-

cert—while for the tracks recorded in hotel rooms [and on the bus] we wanted to duplicate the musicians' positions around the microphone, with the listener in the centre of room.

In terms of panning positions, we split the room in half horizontally. The front is not just the three [left, centre, right] speakers, but it is now the front and halfway to the middle of the room. We can produce not just a linear mix with discrete speakers; now we can bring instruments into the room through delays and panning. We now have a 360° soundfield, with full depth

in any direction. We pan elements or create an ambience to add size or impact. We can go way back in the front mix and way back in the rear; they are very separated.

There were creative challenges while treating the transitions from song to song, and even within songs. 'The Road' begins in a hotel room, then mid-way it crossfades to the arena. You can feel the audience come up from underneath you, as the vocals move to the front speakers. It's a very dynamic record.

I don't like vocals just in the centre and hand left and right—it ends up sounding odd, like a film mix. The centre channel is not one of my favourite speaker positions. It creates an illusion of vocals and drums that makes them sound like they have these 'spikes' on them that I don't particularly enjoy—it takes away from the track. For example, on drums I prefer to use my overheads as the main pickup, and then I will open up the mix on the snare and toms as I need them to make that hit be the attack and give presence. Vocals that I want to be in the centre are first in the left and right, and then I open up the centre to where it becomes clear and it doesn't have those 'points'.

What signal processing did you use?

We had to clean up some buzzes on the bass track, for example, using tight EQ notches—you would not hear them

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RECORDING

in the stereo mix, but here with six channels you cannot hide them anymore. So we needed to do a little cleaning up.

I like to use compression as an 'enhancer' of an overall performance. Particularly on vocals, bass and guitars, where it can bring up the bottom end. I prefer to use compression rather than have to ride a track—it sounds more natural if you let the musicians balance the track rather than using the faders.

We used a lot of Steinberg reverb and ambiences, plus Waves and tc electronic plug-ins. The quantity of [all-digital] compressors available on Nuendo is amazing. For [the track] 'Running on Empty' we had 58 tracks of 24-96 audio running with 16 compressors, 10 EQs, three reverbs plus a bunch of delays.

We used different mix techniques, capturing early reflections from the recording environment and placed them in the mix to add a reality around the audience. The tc electronic and Wave plug-ins gave us a palette of ambiences.

We also used an [outboard] tc M6000 processor. You can select the point of origin for the reverb [in the surround sound environment], and then create separate early reflections from one position and late reflections from another. The M6000's eight buses let us move the reverb sends anywhere into the sound field and then, using mixes of early and late reflections, control where—and how—the reverb leaves it.

You have full control over the reverb pattern, with dynamic pan. The delay patterns we created for the drum fill on 'Running on Empty' sound great.

You honoured the positions the band took on stage?

Yes, but in a live arena the sound becomes a mono wash in the sound system—the brain sorts out the directions from visual cues. But we needed to create a definite sense of direction since you are not looking at the band. We retained that placement consistently from track to track. Danny is always over here, Leland over there—that was very important.

But for the live hotel recordings we had the musicians in a circle. During 'Shaky Town' the drums come out of the rear speakers, because that was the layout [consults vintage B&W photograph from the date]. Danny is playing acoustic guitar in the front and Jackson is sitting on the side of the room. We wanted to replicate that room layout.

On 'The Road', we start backstage in an intimate rehearsal room and then move seamlessly into [The Saratoga Performing Arts Center]. Originally, Jackson is in the front and David Lindley is in the back—so the audience is enveloped in guitar, sitting between these guys. And then we come to the crossfade, where you feel the audience come up from underneath you and the drum fill takes you into the remainder of the

song. The position of each musician transitions through the listener to their respective locations on-stage for which we could not do without the Nuendo's multichannel panning and the tc electronic reverb. We also shifted audience mics in time to correct the delay and give us the ambience we were after.

For consistency, we retained the same basic reverb patterns with minor differences when we needed them as added 'flavours'. But each song was recorded at a different arena, so why make them all sound the same?

What made you choose the Steinberg Nuendo for mixing and processing?

I met with the Steinberg Team last January at the NAMM show in Anaheim. Jackson was talking about re-releasing the album in surround sound. I knew about the Nuendo because Rory Kaplan from DTS had clued me in. I needed a full-on 24-96 work-



Rob Hill at Tidal Wave, LA

station—Pro Tools couldn't handle 96, and I'm not familiar with SADiE. Nuendo has all the connectivity; all the plug-ins. It has powerful editing and all the surround sound functionality we needed—I didn't want to use an external console for any mixing.

Nuendo is very easy to operate. You can change system parameters and plug-in settings in real-time while a song is running, and hear what you are changing—there is no stopping, just like in the analogue world. And it offers unlimited undo and a history-process window—you just go back to the beginning of project, all while Nuendo is running. [Ladanyi mixed *Running on Empty* using a dual-Pentium III-1GHz PC outfitted with 512Mb of RAM. The configuration included three Nuendo 8-I-O 24-bit A-D/D-A, and two Nuendo 9652 PCI audio cards with a full complement of plug-ins.]

Did you prepare a separate stereo mix for the DVD-Audio?

We made a separate stereo mix rather than letting [the DVD-A player] do the downmix, because we found it was a compromise. Balances do not have the same relationship if they are mixed by numbers. So we did a separate balance with virtually identical EQ. With Nuendo, you can have both the 5.1 and stereo projects open simultaneously and then A-B between them.

We compared the original and new stereo mixes, and they matched pretty well. Which was our intention. But the running times are slightly different, because some songs were slightly longer on the DVD-A—but not by a lot. We extended some of the conversations—for instance we added some things on 'Nothing But Time'—but nothing dangerous.

What about the LFE channel?

It is my belief that all playback speakers must be able to handle full bandwidth; the subwoofer is there for embellishments. Not all of the playback audience will have the 0.1 channel—I needed to make sure that the mix carries the low energy in the other five speakers. Our LFE was fed from a Nuendo auxiliary send and connected via a 120Hz low-pass filter.

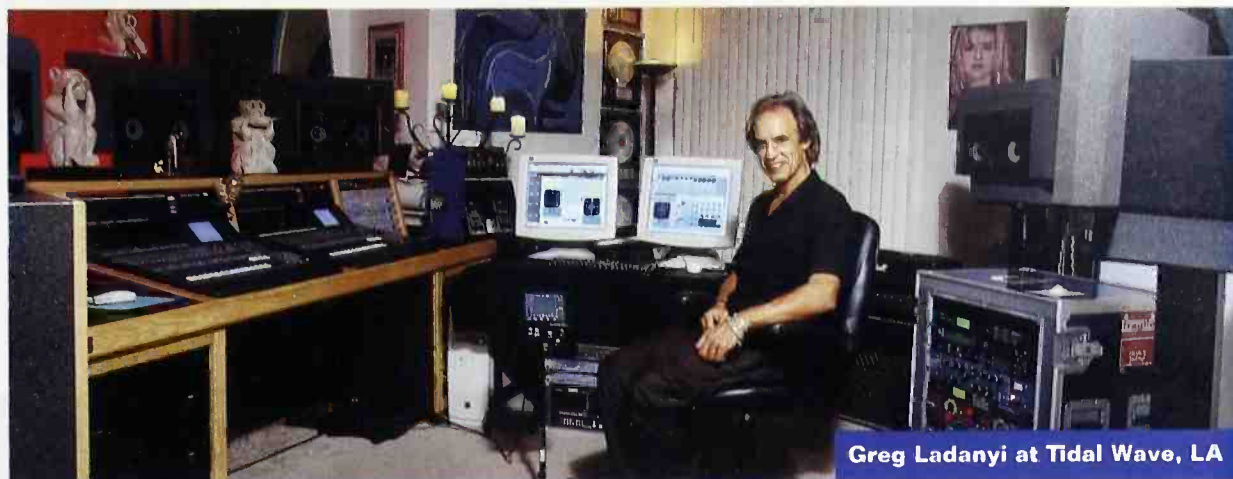
I also use the subwoofer as an effect—on a lot of the endings for this album I will make that last hit come as a massive push from the subwoofer. It creates the rumble of the loud crowd.

If you could have gone back to 1977 what extras would you have recorded?

Six to eight mics in the audience for ambience pick-up. My room miking in the hotel would have been different. The rooms were pretty small with everybody sitting opposite one another. I used two overhead mics; I would like to have used probably four bused to separate tracks.

For drums, the miking probably would not have changed, because I like to keep it simple. And we had to close-mic everything to reduce leakage from the stage. But one reason the record sounds so good is because we used small amplifiers and kept the sound on the stage as low as possible. But still letting the band play at a good level so that they were making a live record and not just playing in a 'live' studio.

Since the stage and monitor levels were not out of control, we could get good vocal, drum and instrument sounds. We used mono magnetic pickups on the piano that we could have replaced, but in general the sound was tight and realistic. □



Greg Ladanyi at Tidal Wave, LA

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OLD GREY WHISTLE TEST

Having guided a generation of British music lovers through their adolescence, *The Old Grey Whistle Test* is back on DVD to accompany their middle age. **Kevin Hilton** tunes in



Left: *The Old Grey Whistle Test* 'star-kicker' logo. Middle: Andy Hewitt at 2nd Sense Studios adding commentary for delivery to Abbey Road Interactive

TELEVISION MUSIC SHOWS are notoriously difficult to get right; they are usually something very much of their time and do not always sustain as time moves on. In Britain, *Top of the Pops (TOTP)* has beaten the odds and is still on the air, although it is now one of many chart shows across both analogue and digital channels. *TOTP* may be heading towards its 40th year of regular broadcast on the BBC but its influence has waned and it is still what it has always been, a reflection of what is in the charts rather than what is truly new and innovative in modern music.

Which is why the 30th anniversary of *The Old Grey Whistle Test* is a far more significant event. Radio is the prime medium for hearing new music but unless it was someone like Wolfman Jack or John Peel, it is unlikely that we remember where we heard something or who played it. Music on television is different. We are more likely to recall a programme because of the visual impact, carrying a particular memory with us through the years.

For music lovers of a certain age, *The Old Grey Whistle Test* provided countless memories and often broke new and more 'difficult' bands in the UK. In 1977 the BBC was inundated with calls when *Whistle*

Test screened the promotional film for 'Bat Out of Hell', leading to Meat Loaf and his cohorts appearing live on the show. Likewise Alice Cooper, Talking Heads and The Wailers made significant appearances in the *Whistle Test* studio with the trademark 'star-kicker' logo as a backdrop. When the BBC marked a previous anniversary and chose not to show Lynyrd Skynyrd's 'Freebird' there was an outcry, so strong was the impact of that performance.

Any attempt to encapsulate the flavour of a programme that ran for 17 years and consequently has a huge and hugely impressive archive of both some of the most influential and some of the wackiest rock acts of the seventies and early eighties was always going to be a thankless task. Many would not be satisfied unless a series of TV programmes or videos was prepared, chronicling in minute details the story of contemporary music through the *Whistle Test*.

This would of course be impossible, for a number of reasons. Economics dictate that while there is a ready-made market for such coverage, it would not be big enough to bring in the returns to justify it. Added to that, the show went out live and not everything was recorded. Even if it were, there is the danger that some

over-zealous BBC accountant ordered a batch of video tape to be erased in a mistaken effort to save money. That aside, a great deal of phenomenal material survived and modern technology has made it easier to cram as much of it as possible into a small package.

Prime amongst the BBC's celebrations of *Whistle Test*'s 30th anniversary is a 5-hour, 2-disc DVD set comprising 45 tracks, interviews with six of the most important artists in rock history, special introductions by the show's key presenters, a 'museum' section and an audio commentary by founding producer Mike Appleton. This is supported by *The Whistle Test Years*, a 6-part series on BBC Radio 2, and the publication of *The Whispering Years*, an autobiography by Bob Harris.

Despite being the presenter most closely identified with the programme, the softly spoken Harris, still known as 'Whispering Bob' to a generation of British TV and radio music fans, was not with the programme from the very beginning. When first broadcast, in September 1971, *The Old Grey Whistle Test* was fronted by Ian Whitcomb and Richard Williams. At the time Williams, one of the six presenters featured on the DVD, was assistant editor of music paper *The Melody Maker* and worked on only the first series of *Whistle Test*. He went



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on to work for many of the 'quality' British newspapers and currently writes about sport for *The Guardian*.

Most of those who watched *The Old Grey Whistle Test*—which took its name from the Tin Pan Alley maxim that if a new song was whistled by one of the old, grey doormen or janitors that worked for the music publishing companies, then it was sure to be a hit—would be hard pressed to remember Williams, let alone Whitcomb. With his pulse-like voice and genuine enthusiasm for the music, it was the furry-faced Harris who became synonymous with 'seventies rock and his laid-back intros are as memorable as the music itself.

Selecting the tracks for a *Whistle Test* compilation must be a classic best job-worst job scenario, shifting through some wonderful material but all the time with the thought that whatever you choose, someone is going to say 'Yes, but what about...'. This task was entrusted to Jill Sinclair, a highly experienced music TV producer who has a personal history with the *Whistle Test*. She joined the show in 1977 as a production assistant, working on it and a number of other BBC music programmes for five years. She then developed her own project, *Pop Quiz*, and worked on the weekly music review series *Eight Days A Week*, before joining commercial TV station Tyne Tees to help launch Channel 4's *The Tube* (1982-7), a live show that took TV music to both new heights and depths.

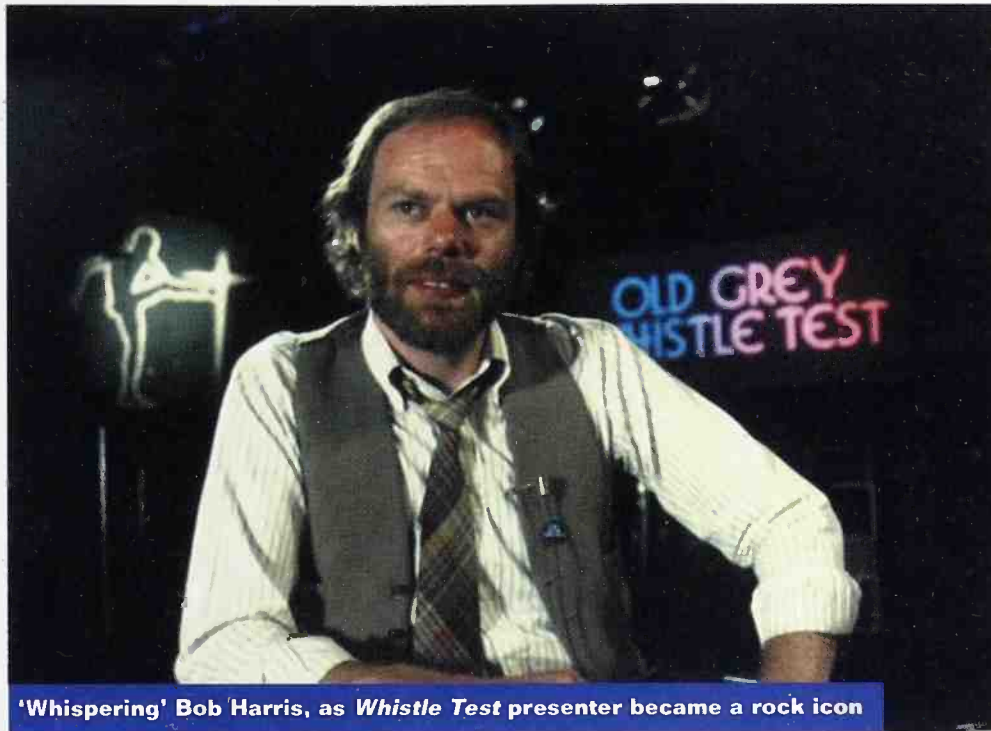
After working on a variety of music shows for the commercial sector, Sinclair was asked by the BBC to return to the Corporation to produce the *Whistle Test* anniversary DVD. 'They asked partly because I have an emotional attachment to the programme,' she explains. 'It's been an absolute treat because it was a chance to re-live my youth and realise what a fantastic time it had been.'

Initially the plan was for only a three hour DVD but this began to disrupt Sinclair's sleep patterns: 'I keep waking up at night asking myself how I could possibly choose between Alex Harvey and Little Feat or Emmylou Harris and Bonnie Raitt.' Sinclair persuaded the BBC to increase the running time in an effort to get as much as possible into a single release. 'A few of the clips I looked at seemed very familiar to me,' Sinclair adds, 'but there were others that I hadn't seen for 25

years. The idea was to create a mix of the familiar and the rare, footage that had never been released or that hadn't been seen much.'

Some of the more familiar tracks almost chose themselves, while Sinclair's task was aided—or maybe even hindered—by giving six of the show's presenters five choices each to include both favourite tracks and those they considered historically important. 'This gave us the backbone of the DVD and accounted for several hours of music,' Sinclair says. 'I chose another 10 clips, looking at classics, interesting rare material or just things that viewers would be dismayed at if they were omitted.'

Whistle Test's classic period is arguably the seventies, a decade that began with long indulgences and concluded with the short pithy sound of rebellion,



'Whispering' Bob Harris, as *Whistle Test* presenter became a rock icon

although the rambling track did not disappear completely. 'Everybody remembers Lynyrd Skynyrd on *Whistle Test*,' says Sinclair, 'but they're lucky to be on the DVD really. For every 'Freebird' or 'Rosanita' we could have fitted in three other tracks. Those two, and Meat Loaf's 'Paradise by the Dashboard Light', are over 12 minutes long each and exclude others—but many people will think they have to be there.'

The six presenters—Williams, Harris, Annie Nightingale, Mark Ellen, David Hepworth and Andy Kershaw (the last three brought in during the mid eighties in an effort to update the show's appeal, a time when

the title was officially shortened to *Whistle Test* even though fans had been calling it that for years)—were recorded giving reasons for their track selections and generally reminiscing about working on the show.

As well as live performances and, where acts either couldn't or wouldn't come into the studio, imaginative collages of old film clips to accompany album tracks, *Whistle Test* was also known for its interviews with leading artists. Six of these are included on this compilation: Williams speaking to Elton John and Bernie Taupin and Mick Jagger; Harris interviewing Keith Richards, Robert Plant, John Lennon and Bruce Springsteen. 'These are all extraordinary in some way,' Sinclair observes, 'either because the person concerned looks so young or wrecked or is very unguarded in what they're saying.'

Sinclair is of the opinion that these interviews are very different to the kind of production-line, sanitised star love-in chats that are common on TV music shows today. 'It was a different time back then,' she explains. 'An artist could feel free to talk without fearing that a tabloid newspaper would take what they'd said out of context. Also there were no PR minders, as there are today, and consequently the interviews are very chatty and informal. We've edited these interviews because this is a DVD for music lovers. Once you've seen the interviews and marvelled at how some of the subjects are able to talk and breathe at the same time, you may not watch them again but the music will be played again and again.'

A common extra on DVD is the audio commentary, where those involved in a production fill in the background, explain how something was done or just generally reminisce. Mike Appleton was the founding producer of *Whistle Test* and remained the guiding light of the show for many years; his influence has also been felt on numerous other BBC TV music programmes. Over three sessions Sinclair recorded Appleton on DAT, terrified that she wasn't doing it correctly. However, she did hit the right button and Appleton provided around two hours of material, describing the TV landscape at the time, how the show came about and many anecdotes about booking artists. Steely Dan were all set to appear but were turned away at the gates of TV Centre due to a one-


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Countdown to *The Old Grey Whistle Test's* 30th anniversary celebrations

day strike. Consequently *Whistle Test* has no record of Fagen and Becker.

A central part of the DVD specification is Dolby Digital or DTS 5.1 multichannel sound. Lovers of digital surround may be sorely disappointed by the *Whistle Test* DVD as it is mono—but this is in keeping with Sinclair's intention to be as faithful to the original programmes as possible. 'It was all mixed live to air,' Sinclair

explains. 'I think the live mixes are impressive because there is an element of warts and all, so I wanted to preserve that. It's also a testament to the engineers who worked on the show and their BBC training. In 1971, Edgar Winter came on to play 'Frankenstein' and it is unlikely that anyone on the team was familiar with the band or the track; but it was mixed well by a guy who the previous day was probably working on *Blue Peter* [the BBC's long-running live children's programme].'

In situations where a sound-track is in mono, great efforts have been made to reconstruct it in 5.1. This was considered for *Whistle Test* but the idea was soon rejected. 'We were talking about doing that at the first meeting,' says Sarah Layish-Melamed, producer at Abbey Road Interactive, where the DVD was authored. 'But we thought that the purists might not appreciate the efforts to put the sound in 5.1 and then decided that there was no point.'

Not all the performances hosted by *Whistle Test* in the early years were recorded but those that were, were laid to either 2-inch Quad or 1-inch video tape. These have been archived on either Betacam or D3, thereby ensuring a good master. 'The quality of 2-inch was good

Artist and song track listing

Alice Cooper	'Under My Wheels'	1971
Elton John	'Tiny Dancer'	1971
Curtis Mayfield	'We Gotta Have Peace'	1972
Randy Newman	'Political Science'	1972
Kris Kristofferson & Rita Coolidge	'Help me make it through the Night'	1972
Bill Withers	'Ain't No Sunshine'	1972
Focus	'Sylvia/Hocus Pocus'	1972
Rory Gallagher	'Hands Off'	1973
John Martyn	'May You Never'	1973
The Wailers	'Stir It Up'	1973
Roxy Music	'Do The Strand'	1973
The Edgar Winter Group	'Frankenstein'	1973
New York Dolls	'Jet Boy'	1973
Tim Buckley	'Dolphins'	1974
Captain Beefheart	'Upon the My O My'	1974
Little Feat	'Rock 'n' Roll Doctor'	1975
Dr Feelgood	'Roxette'	1975
John Lennon	'Stand By Me'	1975
The Sensational Alex Harvey Band	'Give My Compliments to the Chef'	1975
Lynyrd Skynyrd	'Freebird'	1975
Emmylou Harris	'Amarillo'	1976
Bonnie Raitt	'Too Long at the Fair'	1976
Tom Waits	'Tom Traubert's Blues'	1977
Orway & Barrett	'Really Free'	1977
Talking Heads	'Psycho Killer'	1978
XTC	'Statue of Liberty'	1978
Blondie	('I'm Always Touched By Your) Presence Dear'	1978
Val Doonican & Charlie McCoy	'Stone Fox Chase'	1978
Meat Loaf	'Paradise by the Dashboard Light'	1978
Tom Petty & The Heartbreakers	'American Girl'	1978
The Police	'Can't Stand Losing You'	1978
Bruce Springsteen	'Rosalita'	1979
Iggy Pop	'I'm Bored'	1979
Tubeway Army	'Are Friends' Electric?'	1979
The Specials	'A Message to You Rudy'	1979
The Damned	'Smash It Up/I Just Can't Be Happy Today'	1979
The Ramones	'Rock 'n' Roll High School'	1980
PIL	'Careering'	1980
The Teardrop Explodes	'Reward'	1980
U2	'I Will Follow'	1981
Nine Below Zero	'Stone Fox Chase'	1981
Japan	'Ghosts'	1982
Robert Wyatt	'Shipbuilding'	1983
REM	'Moon River'/Pretty Persuasion'	1984
Simply Red	'Holding Back The Years'	1985



CD-R

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FIRST WE LISTEN

POSTPRODUCTION

but there were accidents in storage and some of the tapes had creases in them.' This was the case with one particularly well remembered clip, a very young Talking Heads performing 'Psycho Killer'. Sinclair was prepared to go with the second track they performed, 'Don't Trust the Government', but the preferred song was rescued through the DVNR (digital video noise reduction) system, which is used to clean up and restore damaged video tape.

The minimal audio postproduction done for the DVD was also largely a case of correcting any noticeable faults or smoothing over inconsistencies. 'Some level correction was needed,' says Sinclair, 'especially when you've got someone as loud and ebullient as Andy Kershaw before cutting to "Whispering" Bob Harris, who then quietly introduces Talking Heads.' This

smoothing of the joints was done during a one-day session at 2nd Sense Studios by Andy Hewitt, an ex-BBC sound supervisor who works regularly on another archive music show for the Corporation, *TOTP2*.

All the material for the DVD arrived at 2nd Sense on DigiBeta. Sections that required attention were lifted off and loaded into an Akai DD1500. After the repair was completed, the section was laid straight back to the master DigiBeta. Andy Hewitt explains that this was the only way to attend to five hours of material in a single day's booking. 'Jill's main concern was that the sound should be authentic to how it was at the time,' says Hewitt. 'It could have been in 5.1 but Jill wanted a valid piece of documentary history that just happened to be on new technology.'

The commentary was also edited at 2nd Sense. 'As



it was recorded by the producer onto DAT in a number of differing locations, we were matching and compiling the recordings and making sure that the stories were clearly told,' Hewitt explains. The finished commentary was delivered back to Abbey Road as a complete timecoded DAT. The location material of the presenters also had to be sweetened, as it had been recorded using radio mics. The recordings were matched through the studio's Yamaha 02R console and an ancillary DVMax unit.

Hewitt describes the methodology behind the DVD as fairly traditional. Sinclair assembled and edited the material on tape, creating what is known as a straight-lay. This was done at TV Centre in west London, largely so that Sinclair had access to the BBC library if she needed any additional material. Once this was done, meetings were held at Abbey Road with Sarah Layish-Melamed, designer Mark Taplin and DVD author Kathy Evans. Taplin took the seventies rock 'n' roll look of the programme to design the menus, decorating them with gaffer tape and wires. Once it was realised that all the material could not be accommodated on a single DVD, it was split over two discs (a DVD 9 and a DVD 5), arranged chronologically, 1971-77 on Disc 1 and 1978-86 on Disc 2.

As well as this straight time-line approach, viewers can access tracks on a random basis or from the interviews or the presenter sections. The star-kicker logo is used as the 'white rabbit' key, which links from one piece of footage to another. There is also a text section giving background on the artists as there are some bands that many viewers will not be familiar with.

All the material was encoded: the video as MPEG2 and, even though it is mono, the audio in Dolby Digital, making for a compressed sound-track. This was authored on a Spruce system running on Windows NT. Kathy Evans says that each authoring system works well for different elements; the Spruce is regarded as particularly good for subtitles.

The various features and different ways of accessing the material on this DVD made for a complex authoring process; Sinclair finished the straight-lay in March and the DVD itself was finished by mid-July. With five hours of video, two hours of audio commentary and five hours of subtitles, Sinclair thought that it would take around six months to compile and is still surprised at how quickly it came together.

After wading through 200 video cassettes, it became clear to Jill Sinclair that there is much more material that could be realised; but future compilations depend on the success of this anniversary DVD. 'Once the BBC understands the value of this archive, there could be others,' she says. Sinclair is also certain that this DVD will act as an *Old Grey Whistle Test* for the format itself: 'This could be a turning point for a generation, getting them into the technology.' □

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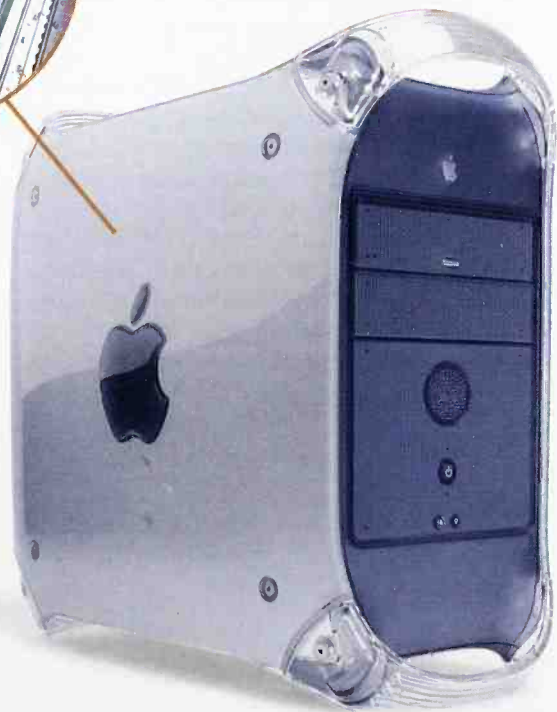
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MODERN MONITORING

Taking advantage of the measurements accumulated by Genelec in the process of setting up its monitoring systems, **Christopher Anet** and **Aki Makivirta** have correlated the performance of professional control rooms around the world. Here are their findings

WHEN SPEAKERS ARE PUT in a room all sorts of acoustical interactions occur. The criteria that define the performance and quality of a speaker are completely different from those defining the acoustical behaviour of a room and both must be taken into consideration when setting up speakers. After all, you cannot stop listening to the room effect with its reverberation time and diffuse reflections, or ignore any large dip in the speaker-room response at a specific frequency. The interaction of the speakers and the room are responsible for the overall monitoring condition and ultimately determine the quality of the recording process.

That is why a vital part of Genelec's customer service is to provide on-site measurements and worldwide calibration of our large active monitor systems and over the years Genelec has built a large database from this service. To get a detailed picture of current control room trends and quality, we analysed measurements taken between 1997 and 2000 in 30 different countries. Focusing on 3-way systems we took a sample of 164 control rooms representing large recording studios, postproduction houses, broadcast studios, private music composing studios and mobiles. All data analysed were speaker-room responses, after the speakers had been calibrated, and the best possible results obtained.

As monitoring quality is becoming more and more critical, when multichannel materials become widely available and the number of channels increase, this study reveals that room acoustics still need improvement particularly in small rooms.

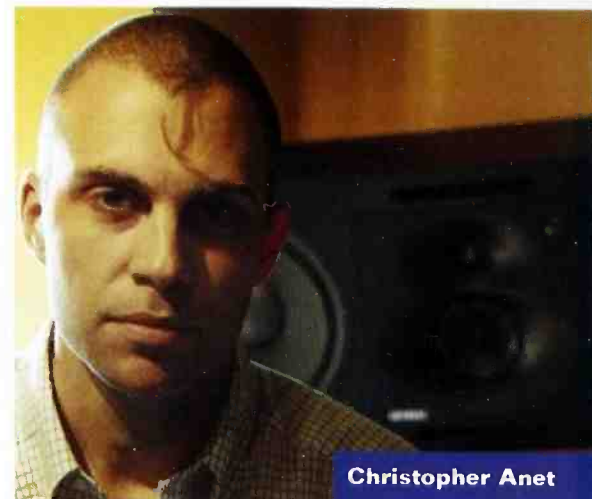
Leading organisations have drawn plenty of excellent standards and recommendations on professional audio reproduction, but in reality compromises often have to be made. The ITU, EBU, ISO, AES Technical Committee, German Surround Sound Forum and Japanese HDTV Surround Forum have all written extensively on the quality of monitoring conditions. Some of the important issues relating to our study include the magnitude response and its accepted deviation at the listening position; the dynamic range of the monitoring system, as well as the maximum room background noise level, the sound isolation between rooms and so on; the idealised speaker layout and positioning for stereo and multichannel configuration; the overall tolerance for the accepted reverberation time across the spectrum; and the specifications on SPL and frequency response.

All rooms were measured with a MLSSA measurement system that uses an MLS sequence (16,383 samples, 217ms long, 75kHz sampling rate). An impulse response was stored for each speaker, and the results presented here were extracted from these impulse responses. The measurement procedure or apparatus did not change, and the monitor loudspeakers installed

were all factory calibrated to have precisely the same response. The only variable in our measurements is the monitoring room.

Each impulse response contains the natural propagation delay before the impulse begins. This recorded section is an indication of the quality of the measurement (signal-to-noise ratio) and the measurement distance. The listening distance analysis only took into account monitors having their acoustical axis directed toward the listening position, and impulse response measurements recorded in a single position, without moving the microphone (250 measurements fulfilled this criteria). The distances estimated in this manner correspond to the precise actual listening distances.

The analysis of the reverberation time RT_{60} in small highly damped rooms is difficult because of sparse room modes and sometimes a systematic decay as in large rooms. Having investigated various methods, a nonlinear fitting technique by Karjalainen *et al* was used in both full-band and octave-band. High RT_{60} is not desirable in control rooms. Control rooms with very short RT_{60} were introduced in the sixties, but most people find them uncomfortable and tiring when working long hours. With multichannel control rooms, the question of adequate RT_{60} opens again with direct energy and localisation cues coming from all directions.



Christopher Anet

An interesting aspect of the monitoring conditions is the frequency response at the listening position. The 'room operational response curve' is defined as the $1/3$ -octave smoothed magnitude response. The German Surround Sound Forum has proposed an acceptance window centred at the mean value calculated over the frequency range 50Hz–16kHz. If the amplitude spread of the distribution is small and stays within this window, it indicates that a control room is well designed and that monitor integration is excellent whatever the room type, volume and application. As the spread increases, the quality of the monitoring conditions worsens.

The level aligned magnitude values from all responses were collected. The median, 50% and 90% percentiles of this distribution were then extracted to demonstrate how frequently rooms comply with the acceptance window.

Both comb filtering effects produced by boundary reflections and standing wave pressure minima are displayed as notches in the magnitude response. These notches can seriously deteriorate the monitoring conditions. A lot of essential music information is placed below 200Hz, and the loss of a specific frequency region there will destroy the musical tonal balance. The notches were analysed for frequencies between 40Hz and 1kHz (the search frequency band). To identify a notch, a detection level was increased until 10 deepest minimums were found. The centre frequency and maximum depth of each notch was recorded. Ideally we should not have any notches. This is the case in many well-designed rooms. However, others display serious notches at low frequencies.

Many rooms have non-symmetrical layout, which leads to a different response from left and right speakers at the listening position. Hence, the overall imaging and placement of sound sources is compromised and difficult to optimise. The stereo imaging can almost disappear or become unfocused. To assess the similarity

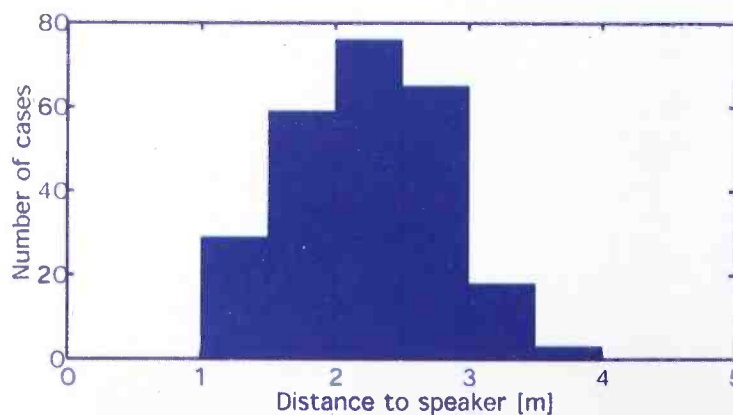


Fig. 1: The distribution of listening distances, all speakers including surround (N = 250)

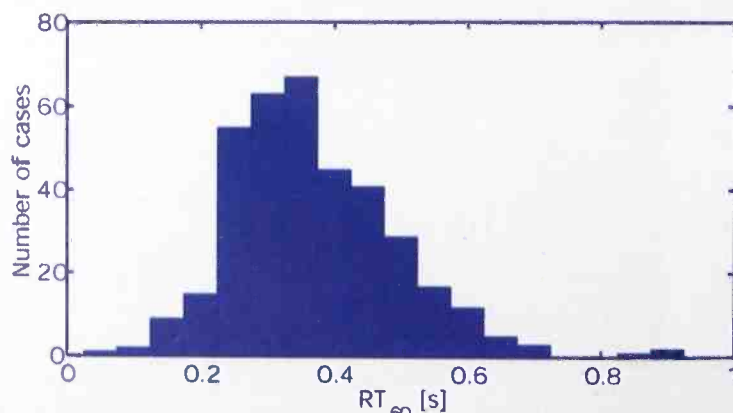


Fig. 2: Distribution of full-bandwidth reverberation time RT_{60} (N = 372)

Channel	Stereo	L/C/R	5-channels
	R = 79	R = 15	R = 8
L	2.36	2.66	2.68
C		2.66	2.71
R	2.39	2.66	2.72
SL			2.70
SR			2.69

Table 1. Mean listening distances of individual channels for LR stereo rooms, LCR triplet rooms and 5-channel surround rooms. Distances are in metres, and R is the number of rooms

of the magnitude responses of monitors in a room, we compared them, pair-wise, in three groups: the left-right (LR) stereo pairs in a room; the left-centre-right (LCR) triplets compared to the centre channel (front LCR triplets are found in multichannel rooms using typically 2-way systems as surround speakers. As this study concentrates on 3-way systems, we did not include these surround speakers); and in 5-channel systems, we compared the front monitors (LCR triplets) and the surround-left/surround-right (SL/SR) pairs separately for clarity of results.

Signal-to-Noise Ratio and Listening Distance (Table 1)

The dynamic range in a measurement was typically 60dB (varying from less than 40dB to over 70dB). This measured dynamic range contains the noise contributions of both the measurement apparatus (insignificant here) and the room.

The listening distances for the studied 3-way moni-

tors range from 1.2m–4.2m. The average listening distance is 2.49m (Fig. 1).

A typical listening distance of a 3-way main monitor in a stereo configuration is 1.5m–2.5m. This is shorter than the listening distance for LCR triplets and 5-channel surround systems that are about 0.3m longer. The various standards for stereo and multichannel listening recommend distances is between 2m–3.4m for some, and 3m–6m for others. Our measurements show that the practical listening distances are shorter than recommended.

Reverberation Time

Using the Nonlinear Fitting technique, the mean reverberation time RT_{60} is 380ms from 200Hz–4kHz (Fig. 2).

As the frequency increases, the RT_{60} becomes more controlled in all rooms measured (164 rooms).

Most rooms show reverberation times that conform to present standards and recommendations for high-quality monitoring rooms, but there are large differences related to the use of absorption or diffusion to control the reverberant decay field. Certain rooms show extremely long reverberation time at low frequencies (larger than 1s), far beyond acceptable values for a professional control room environment.

Magnitude Response (Fig. 3)

The overall listening position frequency balance for loudspeakers aimed at the listening position (250 speakers) is represented by $1/3$ -octave smoothed frequency response deviations (Fig. 4). To obtain these distributions, each frequency response is normalised to the mean level between 50Hz and 16kHz as proposed by the German Surround Sound Forum (SSF). The SSF proposed room operational curve limits, set

relative to the 50Hz–16kHz mean of the median of distributions, are also shown here.

The 50% variation limit is within the proposed (SSF) limits for frequencies above 130Hz, and the 90% variations limit for frequencies above 400Hz. This was expected, since at low frequencies a speaker frequency response is dominated by the modal response of the room. Also, as quite a few rooms lack good acoustic design at low frequencies, the spread of the 90% variation limit increases significantly below 300Hz. The presence of low-frequency notches is displayed as a larger spread of the low frequency variation.

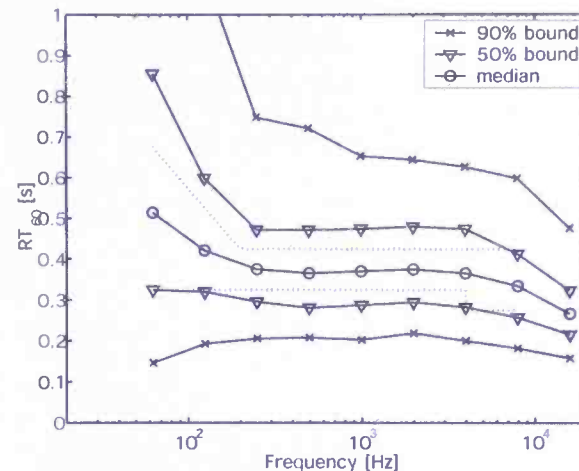
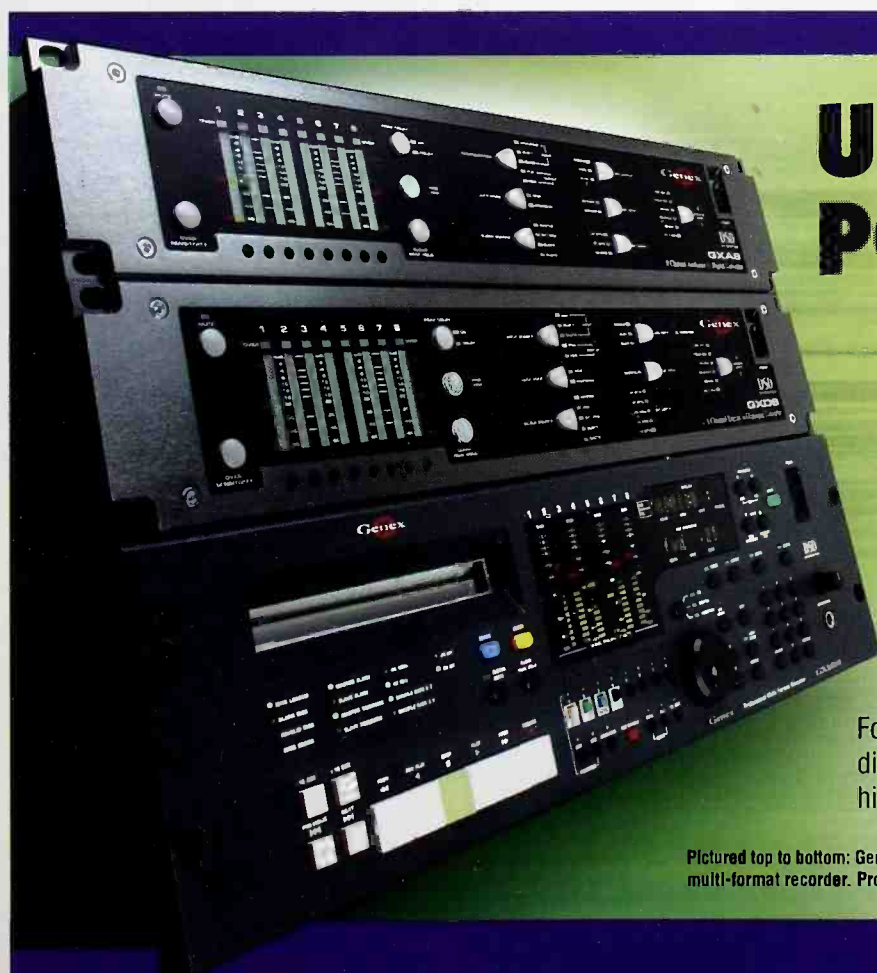


Fig. 3: 90% and 50% bound limits and the median for reverberation time RT_{60} in octave bands (N = 372). German Surround Sound Forum limit shown (dotted line) centred at the median of mean RT_{60} levels



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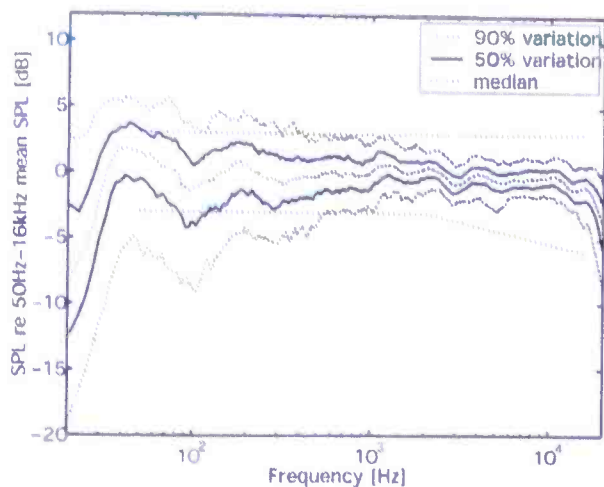


Fig.4: 1/3-octave smoothed sound pressure level measured at the listening position (N = 250) for speakers aimed at the listening position. 50Hz-16kHz mean level normalised to 0dB. Also shown are German Surround Sound Forum proposed limits (dotted line)

At higher frequencies, the variations are very well behaved, and within the proposed limits. However, only 5% of rooms show straight response up to 20kHz. The responses generally suffer loss of level above 16kHz, because most control rooms have excessive damping at high frequencies. This also demonstrates that it is important to precisely aim speakers toward the listening position.

Frequency Response Notches below 1kHz

To demonstrate low-frequency response notches, we studied measurements taken at the listening positions for those speakers having their acoustical axis directed toward this listening position.

Some reflections can be very strong, about the same level as the audio signal itself, hence the median notch depth is 14.2dB, but 30dB notches are not uncommon (Fig.5). This is significant and the energy that is totally missing will seriously alter the reproduction quality of the monitoring.

In our material the most typical notch frequency is 100Hz (Fig.6). As this frequency is quite important in the music spectrum, it would be important that room designers implement in-depth knowledge of the interaction between speakers and room in that frequency region.

Please note that our data contains information about the 10 deepest notches in each impulse response measurement, and not all notches. Some, but not all, notches up to -6dB level are included. Some rooms show deeper notches, and the shallower notches come from better rooms.

Results of magnitude response match

To examine the magnitude response matching after calibration, we studied 105 rooms, out of the 164 rooms, that had speakers with acoustical axis aimed at the engineer's position. The pair-wise comparison included 243 speakers with eight 5-channel surround setups (40 speakers), 15 LCR triplets (45 speakers) and 79 LR stereo pairs (158 speakers).

LR Pairs

The level difference of LR pairs in 2-channel rooms (Fig.7) shows a very good agreement, which confirms that most stereo rooms have a symmetrical layout, at least above 1kHz. Note that if there was a very strong and identical reflection interfering with the direct sound from both left and right speakers, the pair matching would display a close to 0dB level difference. In other words, the figure below does not represent the actual frequency response at listening position (for that see magnitude response).

The speakers used in this study have carefully controlled radiation characteristics at mid and high frequencies, minimising room effects, and resulting in improved in situ pair match. At low frequencies, where the room modal response dominates, the spread of the distribution increases.

In addition, we found 50% of systems show a mismatch of more than 2dB below 1kHz, which is likely to affect auditory imaging, localisation ability and probably reduce the sharpness of stereo imaging. Once again, lower frequency modal responses are often poorly controlled in studios, and that will lead to mismatch in the above LR pair analysis. Large object such as consoles, tables, large equipment racks and so on, will start to interfere with frequencies below 1kHz, where the mismatch becomes larger.

LCR Triplets

LCR triplets are found as front speakers in multichannel reproduction rooms using typically 2-way systems as surround speakers. (Fig.8)

The 90% variation for the LCR triplets increases below 400Hz and above 10kHz. The 50% variation is within a ± 3 dB window for frequencies above 1kHz (except for frequencies above 15kHz), and in a 6dB window below that frequency (shown here is the LC pair match only).

Compared to stereo LR pair match, LCR triplets produce a larger variation because the comparison is made with the centre speaker. This is valid because in multichannel systems the centre speaker is receiving an

increasingly important role in forming the sound stage. However, in typical stereo installations the layout is fairly symmetrical for the left and right speakers, whereas the centre speaker usually has differing radiating condition from the other two front speakers.

5-Channel Surround Setups (Figs. 9-10)

These use 3-way speakers for all five audio channels, so control rooms are fairly large. An LCR triplet in the 5-channel reproduction system was calibrated to have a proper subjective balance during acoustical calibration. This was repeated on the paired SL/SR speakers. The front channel match was studied separately and not compared with the surround channels.

Loudspeaker Geometry

In many stereo control rooms, monitors are not focused on the listening position, so the engineer is not in the best place to monitor his work. Most standards recommend that the speaker axis should be orientated toward the listening position. Some designers advise directing the acoustical axis behind the listening position, forcing monitoring with off-axis response. Even with modern constant directivity design approaches, monitor loudspeakers are typically optimised for on-axis response.

For surround monitoring there is a significant dis-

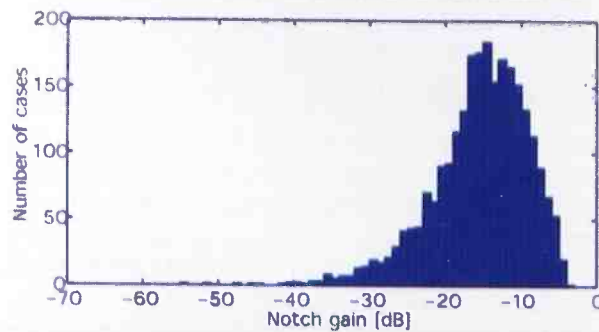


Fig.5: Notch depth for the 10 deepest notches within a frequency band from 40Hz-1kHz. Bin size is 1dB. Median notch depth is 14.2dB (N = 250)

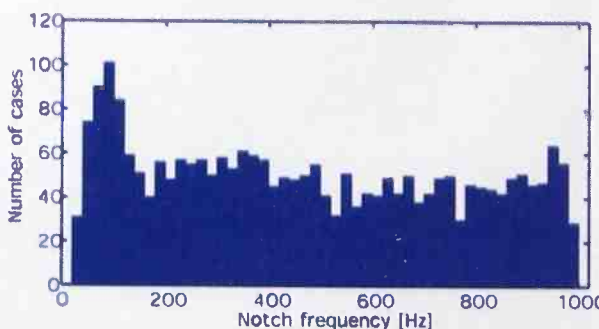


Fig.6: Notch frequency distribution, bin size is 20Hz (N = 250)

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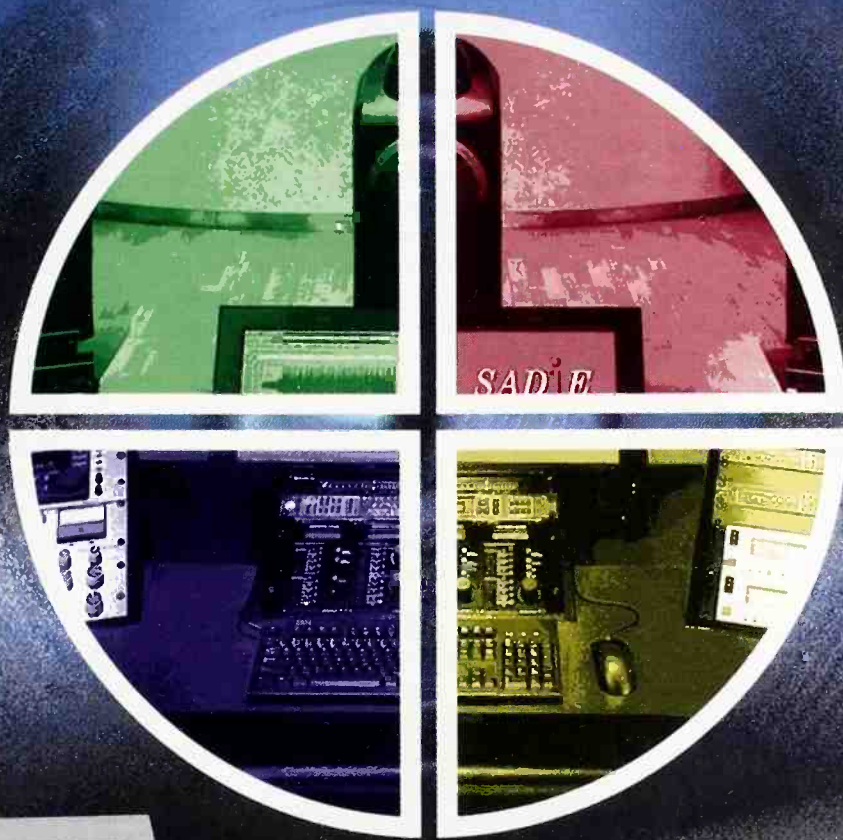
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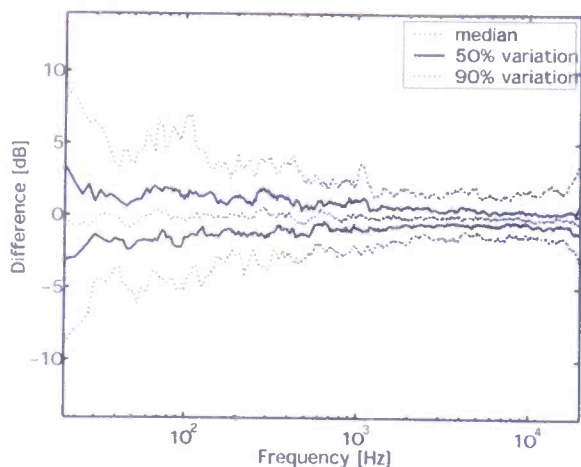


Fig. 7: 1/3-octave smoothed sound pressure level difference of LR pair in LR stereo systems (N = 79)

crepancy between the recommendations for speaker placement and what actually happens.

First, the widely accepted configuration for the 3/2-surround format places the left and right speakers at $\pm 30^\circ$ and the surround speakers at $\pm 100^\circ$ - 120° relative to the centre speaker. Though the three front speakers are almost always placed according to the suggested angles, the surround speakers are often placed beyond the 120° from the centre.

Second, all speakers are supposed to be on the same horizontal plane at the engineer's ear height (nominally 1.2m), or at maximum 10° inclined above this level at an equal distance of 2-4m. Some recommendations allow the surround speakers to be inclined up to 15° . The acoustical axis of the 3-way speakers is rarely at the recommended 1.2m height, but typically elevated up to 15° and pointing down-

wards. Most large rooms have monitors placed above the listening height, which brings the acoustical axis 0.5-1m above the listening level. This reduces low order floor reflections and is particularly relevant to flush-mounted speakers with a large front baffle.

As for the surround speaker height, some standards recommend the same height and vertical tilt for surround and front speakers, while others recommend only surround speakers to be placed higher. In our survey surround speakers are frequently placed higher than front speakers. Very few rooms have five identical speakers in a surround setup. Surround speakers are typically not of the same type as front speakers.

When standards mention room size, the exact location of the speakers is not defined, although a minimum distance from neighbouring walls is recommended and the importance of symmetric placement emphasised. The recommendation for speakers to be placed at least 1m away from walls appears too optimistic. In that case, if the wall behind the speaker has insufficient absorption, a $1/4$ -wavelength notch at 86Hz would be generated by the reflection off it. This would cause a severe irregularity in the free-standing system bass response. Increasing the distance would bring down the notch frequency. Together with the recommendation for the operational curve to extend down to 50Hz, a minimum distance would be 2m. This proves the value of flush mounting even for small 2-way monitor systems as providing sufficient absorption to remove a wall reflection at low frequencies is difficult and expensive.

Speaker size or front baffle size is also not covered in the recommendations about the parameters affect-

ing speaker placement, although it is recognised that large speakers may have to be placed high. The current recommendation of 1.2m height for the acoustical axis can lead to floor reflection notches in the 80Hz-120Hz frequency region, causing deterioration in the bass frequency response.

The result of mean RT_{60} of 380ms is interesting. However, that single value does not reveal the increase in reverberation time toward low frequencies caused by insufficient bass trapping and improper room geometry. Also, some 'professional' rooms with almost no acoustic treatment exhibited near constant reverberation time over the whole frequency band. Even if recommendations allow for larger RT_{60} below 200Hz, too many control rooms obtain too high RT_{60} in that region. This indicates

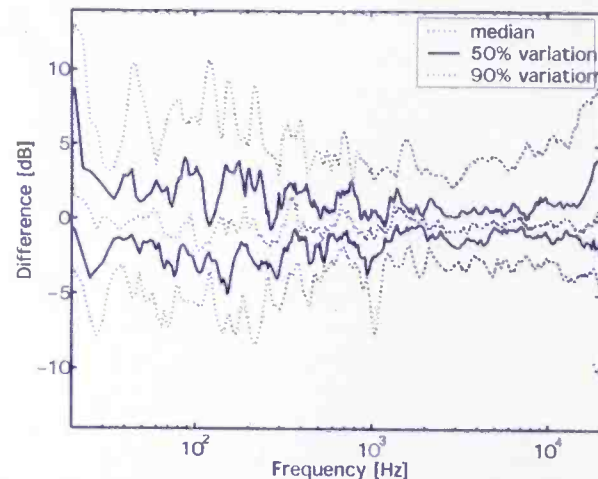


Fig. 8: 1/3-octave smoothed sound pressure level difference of LC pair in LCR systems (N = 15)

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that there is still a great need to improve the quality of monitoring room design.

Most of the notches found in our study are produced by low order reflections. Room modal response begins to dominate below 200Hz where the wavelength becomes large compared to the size of objects in the room.

The reasons for notches in the frequency response are typically: first-order floor reflections, often accentuated because of the placement of woofers relative to the floor; interaction of the console with the first order floor reflection; incorrect front wall design (for example discontinuities in the front wall, such as non-flushed windows, large TV screens or cavities); insufficient front wall bass trapping in soft front wall construction, leading to reflections from the hard wall behind the speaker (this creates an LF notch at the frequency corresponding to the $\frac{1}{4}$ -wavelength distance from the speaker's front baffle to the hard front wall behind it. This distance can be larger than the depth of the speaker cabinet); with free-standing monitors, there is reflection as above from the (front) wall behind the monitor; sustained standing waves (the notching can be severe and lead to irregularities in the response at the mix position).

Most of these issues could be solved with a better understanding of these phenomena and relevant solutions applied to the control room design.

The magnitude response of an individual monitor loudspeaker should be flat to within (2dB in anechoic conditions using $\frac{1}{3}$ -octave smoothing. All monitors included in this study fulfill this requirement.

In-situ frequency response measured at the engineer's position using $\frac{1}{3}$ -octave smoothing should be flat within ± 3 dB from 50Hz to 16kHz with some level reduction allowed at high frequencies (AES, EBU). The 50% distribution limits in stereo rooms remain consistently within ± 3 dB bounds also at low frequencies. This is clearly the demonstration of a fairly good speaker-room interaction.

In multichannel rooms, the 50% distribution limits indicate a good frequency response control above 1kHz but an increasing distribution below this frequency. There are still frequent failures in low frequency design of monitoring spaces and the management of low order (early) reflections. In multichannel rooms the number of omni-directional low frequency radiators seriously complicate the room design at low frequency. The constraints on speaker placement and angles severely restrict the design of room geometry.

Most large modern control rooms can achieve adequate low-frequency damping with properly designed acoustic treatment providing very high-quality monitoring spaces. Small control rooms with free-standing monitor systems, compromised acoustical treatment and strong modal coloration do exhibit large variations at low frequencies.

According to recommendations the magnitude response difference between front loudspeakers in anechoic conditions should be less than 0.5dB within 250Hz-2kHz [AES]. Monitor speakers included in the present study fulfill this requirement.

The pair match of the stereo pairs and SL/SR pairs is typically better than that of LCR triplets. One reason is that the centre channel is exposed to different radiating conditions than the left and right speakers, and the match is calculated by comparing the left and right speakers to the centre speaker. The left and right speakers have very similar and symmetrical radiation conditions in modern designs. It is difficult to design similar radiating conditions for the centre

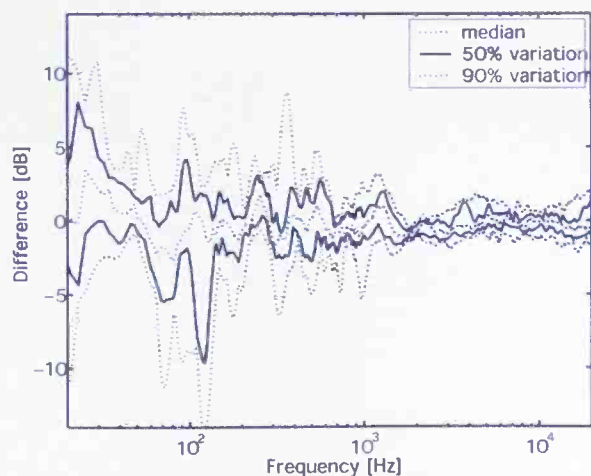


Fig.9: $\frac{1}{3}$ -octave smoothed sound pressure level difference of LC pair in 5-channel surround systems

speaker in the middle-axis of the room. Many installations have large computer screens, racks, and so on, placed centrally near the engineer's position. These objects create strong reflections causing comb filtering at mid and high frequencies.

In the case of LCR triplets (with 2-way speakers as surround) we typically have small 5.1 rooms with short listening distances and compromised layout and equipment positioning. The compromise of the space and volume is clearly visible in the pair-match results.

The directivity control of the waveguide structures incorporated in the 3-way speakers is apparent in measurements of the 5-channel setups. The pair match of the LC and RC pairs is very good above 500Hz demonstrating minimal low order reflections at the engineer's position.

New approaches to multichannel monitoring room design are needed to produce environments capable of accurate reproduction. Better control of directivity in the loudspeaker may also decrease problems in poorly designed environments, but will never be a substitute for a carefully designed room. Flush mounting proves once again a valuable method of decreasing low-frequency problems due to reflections off the nearest walls.

The mismatch in tonal balance and spectrum between the various speakers in multichannel rooms seems an increasingly important issue. Each engineer and room designer should pay the utmost attention to this so that the final material translates well outside the production rooms. □

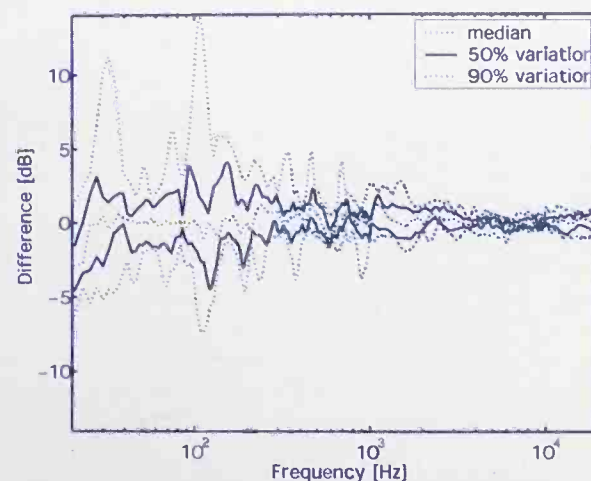


Fig.10: $\frac{1}{3}$ -octave smoothed sound pressure level difference of surround LR pair in 5-channel surround systems

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A BRIEF HISTORY OF VIDEO EDITING

Video editing has come a long way since its exotic and expensive origins in the late fifties. **Rob James** explores the archive

WE ARE CONSTANTLY bombarded by sophisticated moving images through film, TV, computer games and the Internet. So ubiquitous and familiar have they become, it's sometimes difficult to remember just how young video editing and compositing is.

Magnetically recording the necessary bandwidth defeated engineers for many years after television broadcasting began. Instead, 'tele-recording', a rather more sophisticated version of pointing a film camera at a TV screen, was pressed into service for recording and editing pictures. In broadcast, tele-recording persisted even into the eighties. The resulting film was edited in the conventional manner and a telecine machine used for transmission. The process is still in use but, ironically, where film is the distribution medium. Many effects in current movies are produced using computers and location acquisition using HDTV (high-definition television) is already being employed—most notably by George Lucas for the latest *Star Wars* opus.

Videotape recording arrived in 1957. Ray Dolby—a name now inextricably linked with audio—was one of the Ampex development team behind the first practical videotape recorder. This behemoth used 2-inch tape and a recording technique known as Quadruplex. The machines were enormous, noisy and required a high level of engineering support for maintenance, alignment and operation. Editing could only be performed with a razor blade and sticky tape. In order to cut the tape 'on the frame' (to avoid picture break-up or worse), the magnetic pattern was 'developed' using fine iron filings suspended in solvent or a 'pelicle' which contained fluid and filings between thin, transparent membranes. This enabled the operator to see the control track pulses and measure back to where the gap between frames occurred for the long diagonal cut. Mechanical editing was costly (in tape) and precarious. The first progression from scissors used two or more play-in machines and a switcher-vision mixer feeding a recorder. Early multi-machine controllers used a control track for synchronisation although, until the development of time code, the level of editing precision was highly dependent on the skill of the operator.

The next generation of recorders, using a helical head scan, were also developed by Ampex. Bulk and stringent environmental requirements were reduced but the editing process did not change. In the late sixties to early seventies, with the dawn of time code and

emergence of affordable computers, editing controllers rapidly advanced. Insert editing meant shots could be recorded out of programme order and the gaps filled in later. An EDL (edit decision list) could be generated and stored for future use. However, one major practical limitation remained, the only way to insert or remove a sequence was to copy the tape from the insert point onwards or redo the entire edit. Copying is undesirable for the same reasons as analogue audio—degradation. Digital recording formats ameliorated the degradation but, by the nineties, the writing was on the wall for purely tape-based editing.

Everything described so far can be labelled 'on-line', making editing decisions on broadcast quality recordings.

Broadcast on-line machines have never been cheap and even the current generation requires considerable maintenance, regular head replacement and so on. On-line tape editing is an intensive business. Hourly rates are high which creates budgetary pressure on schedules. While rapid on-line tape or nonlinear editing is still fine for some applications—news, sport and events—a more considered and time-consuming approach is preferable.

As sub-broadcast helical-scan machines became much cheaper, off-line editing systems were developed. These mimicked the on-line process but the product was an EDL. This was taken to an on-line suite and the original material conformed to match the off-line edit. Some bright spark had the idea of applying this process to film editing, saving the cost of work prints. However, linear tape off-line always seemed cumbersome to film editors used to the random-access nature of film.

Ten years or so ago the first, astronomically expensive, nonlinear off-line and hybrid on-line editing systems appeared. At last there was a way of editing and re-editing video or film without copying or physically cutting material. Nonlinear editing kit has taken years to become reliable, let alone affordable. But, and it is a big but, these systems leverage develop-

ments in mainstream computing. Moore's Law states, in effect, computers double in power every 18 months and, so far, this seems to be holding good. The practical result is on-line systems delivering broadcast quality and even HDTV pictures now cost less than a rudimentary off-line 10 years ago. Hard-disk transmission systems and desktop video are a reality. Tape is rapidly being relegated to an acquisition and archiving medium.

There are obvious parallels with DTP (desktop publishing) and pro-audio. Video editing no longer

requires heavy engineering infrastructure, controlled environments and stratospheric budgets.

Coming right up to date, DV25 (digital video) has brought near-broadcast quality to off-the-shelf personal computers. If higher quality picture is a requirement, shoot on something better, off-line using DV and conform the original.

Notwithstanding reservations about the ultimate quality of DV a surprising amount of broadcast programming is now originated in this format.

One thing hasn't changed, however: top-class results still require technical and artistic skills that remain as rare and precious as they ever were. □



But there had always been another way.

Film editing, apart from reversal stock used for news and current affairs, had always been an 'off-line' process. The physical film the editors cut and re-cut was and is not the original location film or the show print transmitted or seen in the cinema. Key numbers are printed along the edge of the camera negative during manufacture. These are reproduced on the rush or working prints used by the editors. When the edit is finalised the cutting copy is passed to a 'neg cutter' who faithfully reproduces the 'cutting copy' by editing the original negative. Show prints are generated from the cut negative.

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THE VIDEO ARCADE

The decision is made, the market research complete, the business plan looks viable... you're going into video. **Rob James** asks the question: now what?

AS WITH ANY NEW ROOM, before purchasing equipment, the starting point for a video suite is analysing the process, the areas you intend to work in, how you will add value and the formats you will need to handle and produce.

The first determinant is whether you are handling short-form or long-form projects. Long-form video requires a strategy to deal with large amounts of raw material. For a 50-minute 'film' there may be 10 hours or more of rushes. Two approaches keep storage manageable—or at any rate affordable.

The first is to edit 'on paper' to eliminate a lot of material before digitising or edit lower quality, off-line pictures which require less storage. In this case, the product of the creative editing process is an EDL (edit decision list) that will be used to conform the original material to match the off-line decisions. In general, long-form projects use relatively few effects and com-

plex compositing so it may prove more cost-effective to use one system for off-lining and another for conforming and finishing.

In short-form work—such as commercials and pop videos—the storage implications are less significant even with uncompressed video. However, short-form projects often use highly sophisticated effects. While many of these are now available on 'modest' systems, there is a price to pay in terms of rendering time—for example, a seriously complex five-minute piece can literally take hours to render (process the video in non-real-time).

This mirrors the position of certain digital audio processes of a few years ago. Early PC-based and Mac-based audio workstations either contented themselves with simple EQ and so on, or used additional DSP boards to produce rapidly-rendered or real-time effects. Processor power has increased to the point where there is now an ongoing argument over whether proprietary DSP boards are either necessary or desirable. Exactly the same thing is happening in video, and similar



arguments rage about acceptable levels of compression for different purposes.

Uncompressed HD (High Definition) is the most demanding on all aspects of a system. The huge data rate mandates SCSI RAID arrays for storage and also requires major processing power or lots of time is needed for 'crunching' effects. At the opposite extreme—often referred to in Europe as 'VHS quality'—storage is not a big issue and processing requirements are reasonable. Perhaps the best com-



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Ronald Prent has had success as a recording engineer working with such artists as David Bowie, Police, Elton John, Def Leppard, Iron Maiden, Peter Maffay, Jule Neigel and Fury in the Slaughterhouse. He has also mixed award winning albums for Guano Apes, Kane, Rammstein, Pur and Scorpions.

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VIDEO FOCUS

promise for many purposes is DV25 (25Mbit digital video) This format is now widely used in domestic camcorders but is also used by the professional DV-CAM. The modest data rate and large market make for wide choice and lower costs.

What practical technical discussion would be complete without some consideration of standards? ITU-R 601 is the generally-accepted standard for broadcast video. In any case, one issue to watch is colour mapping, usually expressed as 4:2:2, 4:2:0 and so on. The numbers refer to the sampling frequency ratios used to digitise luminance and colour difference or RGB signals in component video. A detailed discussion is outside the scope of this article but higher sampling ratios are desirable where a lot of effects (especially chroma keying) and com-

positing are involved.

FireWire (IEEE1394) interfaces conforming to the OHCI (Open Host Controller Interface) have produced a big fall in the cost of getting DV video loaded into a PC.

Within the PC environment things are less straightforward. One might think, quite reasonably, a DV stream captured by one piece of software using an OHCI input would be playable by any other. Not so. The AVI files that result from capturing DV clips are



often specific to one hardware and-or software manufacturer's codec, although conversion software is becoming available.

A similar problem arises with EDLs as there are many different types with varying features. The supported features will be most relevant when off-line editing with complex effects. If the EDL only supports simple fades, any complicated (and time-consuming) effects will have to be re-created from scratch.

When conforming in other facilities, make sure the software produces suitable EDLs—one of the Sony or CMX types should be fine for simple editing while an Avid list is currently likely to be the most acceptable for more complex work.

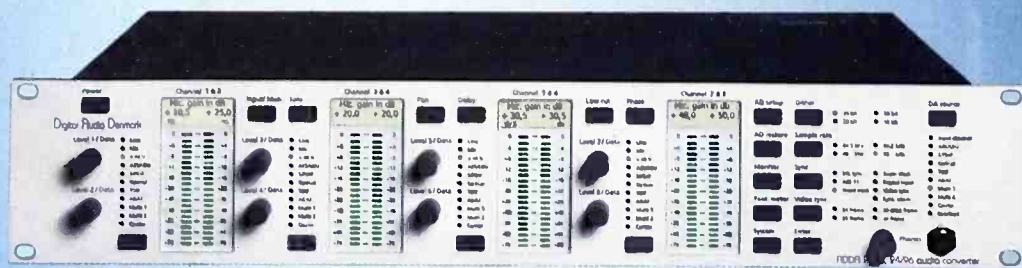
If you intend to produce finished product 'in-house', for broadcast it will probably be required on some form of videotape. DV is sometimes accepted but DigiBeta or one of the other 'normal' broadcast formats is the heavyweight (and cost) answer. Mastering for DVD is regarded by many as something of a 'black art'. (Remember the early days of CD mastering on NTSC U-matics?) As the cost of recordable DV drives falls this is set to change dramatically. If you simply want to produce VHS cassettes, mastering on DV tape is more than adequate. For web streaming there are a variety of software solutions.

All PCs (and Macs) have one form of DSP co-processing already installed—the graphics card. Some manufacturers exploit the graphics card's processing for video. The real choice is between a very high specification PC or a lower spec machine with a proprietary video card. Both approaches have their adherents and critics. I think it depends on application. For simple cuts-only editing native processing is perfectly satisfactory. For more sophisticated work, colour correction and so on, extra hardware will eliminate a good deal of rendering and thus wasted time and frustration. Since a lower specification PC may be used the overall difference in cost is not great.

The other big choice is software. The most common applications suffer the same problems as many audio packages, an abundance of whizzy features which are used once in a blue moon, while basic editing functions are often clunky and inefficient. Video plug-ins are just as popular as their audio cousins and like them vary in utility and cost.

Many of the better editing packages are tied to a particular manufacturer's hardware. This proprietary attitude is one sign of an immature market. Some enterprising company will soon develop an 'open standard' for video capable graphics cards that will mean rapid progress with higher sales volumes and prices falling still further. □

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THE VIDEO PROJECT ROOM

Observing where and how facilities invest is eternally fascinating as proven by a number of sound for picture post rooms appearing in recent years. **Rob James** discovers why

ONE REASON for the recent mushrooming in the number of sound for picture post rooms is the falling price of setting up. Some people are still spending upwards of £1m (UK) on a single post room, but thanks to current digital consoles and workstations almost anybody can now get in on the act and many of the new audio rooms have been built by companies previously specialising in picture.

When video editing was a linear process, there was a natural progression from finishing the edit to final mixing of the sound, often while further picture enhancement was going on elsewhere. Nonlinear working has already changed this. Even when the picture is of off-line quality, the relatively modest bandwidth required by sound means that this is often on-line at the picture edit. As a result, the dividing lines between picture edit and sound mix are now less distinct and sometimes all but invisible.

However, editing rooms are rarely if ever built with sound as a priority. Even where the room is quiet enough, thanks to remote siting of noisy computers and other kit, it is unlikely to be ideal. Building relatively modest sound rooms has allowed editing houses to offer a complete and highly-flexible service and given a number of benefits to both facility and client—the client doesn't have to traipse about and can negotiate a fixed cost package for the whole postproduction process while the facility offers complete packages without having to 'buy in' services. Control over the whole process avoids the difficulties of moving a project between facilities with different standards.

Some sound post facilities watched these developments with alarm while others (in a position to do so) allied themselves with suitable partners to offer similar package deals or built video editing rooms. Thanks to the overall growth in business few have been harmed.

Video editing and finishing equipment has reduced in cost to the point where it is an option for almost anyone. This almost exactly mirrors the position with music recording a few years ago—with all the same implications (see *Town House Vision*, *Soundings* p14). I chart the real rise of the small project studio from the point at



which DAWs and CD duplication became readily available and DVD is almost at this point.

For some years, off-line editing has been potentially, at least, a 'back-bedroom' activity, although cost of equipment maintained a degree of exclusivity but this is no longer the case. More systems capable of sophisticated finishing work as well as off-line editing are now easily within reach. For full-on broadcast this means around £150,000 (UK) for a complete room. For less demanding markets, with distribution on DVD and web streaming, the cost drops to perhaps a tenth of this. Major broadcasters like the BBC in the UK, are buying low-end video editing systems by the hundred. For now, finishing will still be done in 'proper' facilities, but for how long?

If anyone can edit in a bedroom, and broadcasters are buying the technology for their own use why should an audio studio owner be considering a video or audio visual room?

Service and environment are two major factors. Although you can record a best selling record or edit an award winning film in a bedroom, not everyone

wants to. Successful operators in the audio business know understanding their clients, excellent service and an attractive working environment are absolutely key. From what I have seen in some lower-end video editing facilities I believe they have a long way to go in these areas. Many resemble offices with rows of workstations in the same room. Even where there are separate rooms these often are Spartan and industrial with little attention paid to clients' creature comforts.

Many years ago I wrote a report for a small London TV production company. The subject: Whether to buy into sub-broadcast video equipment. One of the conclusions supporting investment was the likelihood it would become almost impossible to sell music recordings without accompanying pictures.

It's taken almost 30 years but this is now pretty true. MTV on cable or satellite, the success of DVD and MP3 are symptoms of a large, profitable audience for music with pictures which has no desire to pay for music only.

A glance down my local high street reveals four video shops and one last 'record' shop which survives on mail order. Even this stocks a large number of DVDs and videos. The other multiple retailers have reduced their CD shelf space to stocking the Top 20 albums and little else. The space that used to be occupied by CDs is now given to DVDs, many of which are music titles.

If recorded music's future is inextricably linked with pictures, who is better placed than sound studios to exploit its opportunities? It may be a heretical thought in this image obsessed age but sound carries most of the useful information whether pictures are present or not. An interesting number of 'talking books' are merely soundtracks of TV programmes. On the other hand, silent films are now rare. The point being that if you can produce good material in sound only, you already have many of the skills required to produce audio-visual material. In any case there is plenty of talent around to help. Check out your local film school. Far-sighted independent record companies have already bought into this idea. Studios that choose to ignore these developments do so at their peril. □

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YOU, ME, AV AND A PC

Attractive in principle, efficient in operation, setting up a suitable AV PC system may prove more demanding than it sounds. **Rob James** compares DIY and specialist assemblies

WHAT DO YOU WANT from a piece of professional equipment? This question produces a broad consensus of answers. Acceptable performance, adherence to accepted interface standards, compatibility and reliability are all near the top of the list. Convenience, low maintenance, a shallow learning curve and appearance are also prominent as is cost-effectiveness.

Contrary to popular belief, PCs are perfectly capable

of meeting these criteria if treated as a professional equipment purchase with realistic expectations of performance.



Despite this, some otherwise sane and intelligent audio and video professionals, myself included, do exactly this when it comes to PCs and then bemoan their fate when they do not live up to expectations.

Why do we do it? Because PCs are 'different'. Until recently specialist audio and video system integrators were rare. PCs sold in the high street seem like commodity items—they seem 'safe'. Self building from parts holds the glittering allure of lower cost and the enthusiast's satisfaction in doing-it-yourself.

Over the last 10 years I have bought PCs from high street shops, by mail order from household names and built at least five from scratch. This has been a highly educational experience but if I costed the time and effort properly, the real price is many times the initial outlay.

Now there is a real alternative—buy from a specialist supplier of PCs for audio and video. The better

examples are not just selling boxes but supplying complete solutions for specific purposes, often with guaranteed performance criteria, number of tracks, simultaneous video streams... The headline price may be higher but you know who to kick when anything goes wrong.

After spending a ridiculous amount of time struggling with a PC built for video editing from mail ordered components, I finally decided the time had come to test this theory with a system from Red Submarine

Computers with a Canopus Storm editing card.

Within half an hour of arrival the system was assembled and running and I was editing. In fact I did more useful work in the next two days than the preceding month! The Storm uses the PC processor and graphics card to augment its own DSP. The result, at least on this machine, is responsive editing with an impressive array of sensible effects, colour correction, chroma key and all available in real-time—there was no waiting for rendering, no lock-ups and no crashes.

My system is also set up for audio with Steinberg's Nuendo and Wavelab. It runs a ridiculous number of tracks and-or plug-ins with real stability. Taken as a whole this is the most productive PC I've encountered. Do the video edit in Storm or Premiere, export an AVI and use it to do the sound tracklay and mix in Nuendo.

A dual-use audio and video workstation at very modest cost is now reality.

Build quality is excellent. Best of all it is almost silent. Red Submarine uses quiet power supplies, special processor fans and hard-disk mounting sleeves to make this the quietest PC I have ever encountered. There is even a gasket on the drop down front cover. Subjectively it is quieter than some fan-cooled rackmount reverbs.

New and improved PC components are constantly appearing so there is little point in detailing the specifics of the system. Suffice to say, Red Submarine chose appropriate and high-quality parts throughout. A years' 'pick up' on-site warranty and a 'ghost' disk with the complete machine configuration are included along with a detailed checklist and performance statistics. Not only does this machine look like a professional piece of kit it behaves like one. Mount it in the rack, wire it up and start work.

To help evaluate specifications and for those who still want to do it the hard way the following may help

of meeting these criteria if treated as a professional equipment purchase with realistic expectations of performance.

To qualify this statement, let's look at the way we select a 'conventional' piece of equipment. Brochures are scrutinised, reviews read avidly and often on-site demonstrations are organised before the decision is finally made. What we do not do is wander into a high street general electrical retailer and throw down the plastic, or mail order bits and get the tool kit out.

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VIDEO FOCUS

avoid the worst pitfalls.

Always buy the best quality case and over-specify the power supply. Cases vary from paper thin and badly designed to industrial strength works of art. For audio use in the same room, quiet power supplies are a must. The motherboard is the heart of any PC. Decide on the audio and video hardware and software first then choose a suitable mobo. The same applies to the graphics card. Many of the audio and video card manufacturers have compatibility lists of motherboards and graphics cards on their web sites for precisely this reason.

Until recently conventional wisdom was that Intel processors were the only safe way to go. This is now demonstrably untrue with many successful AMD Athlon-based machines being used for audio and video. The latest dual-processor Athlon systems are looking particularly promising.

Processor cooling fans vary from cheap, noisy and inefficient to highly effective and almost silent. Heat kills electronics and can cause all manner of (unexplained) problems—you choose.

Memory, RAM, should always be identical. Two SIMMs or DIMMs (Single or Dual In-line Memory Modules) from different batches or manufacturers may have identical specifications but still cause problems. Given the fall in price it is probably worth paying a little extra for branded memory with better security features such as buffered, registered ECC if the motherboard supports it.

For ultimate performance, SCSI hard-disk drives are still the way to go. They are no longer a mandatory requirement unless you are working with uncompressed video, however, as EIDE drives have developed to the point where they are more than adequate for video and audio use, and are considerably more cost-effective.

Many so-called FireWire drives and some RAID arrays connected via SCSI actually use EIDE disks. However, similarly specified drives from different manufacturers are not equal. Certain drives perform well in AV applications but be aware that some drives are quieter than others. Utility software is available to set up some IBM drives for lowest noise or highest performance.

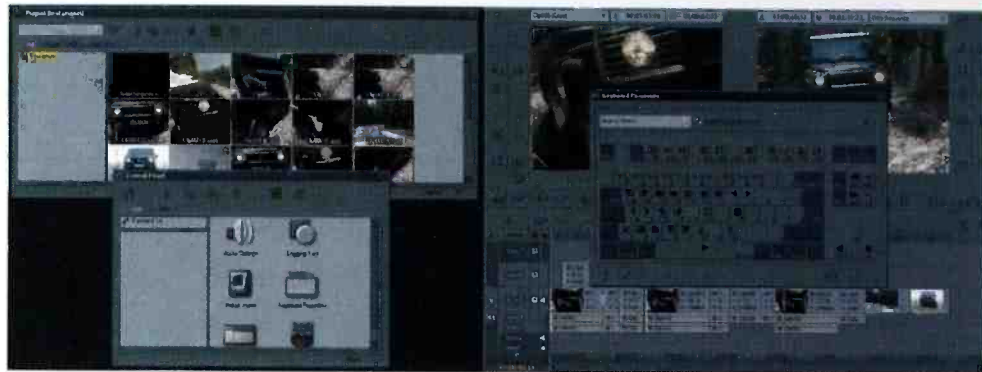
EIDE RAID controllers are becoming popular. In my experience, performance benefits are marginal but this does offer potentially greater security and a way of connecting more drives. The choice of operating system will be dictated by applications and hardware you want to run. Where supported Microsoft Windows 2000 Professional is the best option. BeOs and Linux are arguably more reliable but very little audio or video software or hardware supports them. The industrial operating systems used in manufacturing process control are better still, but even less well supported.

After assembly the real fun begins. You might—naively—assume that all the necessary software would be included by the component manufacturers. More commonly, the next few hours, days or weeks will be spent swapping cards from slot to slot attempting to find combinations which work, looking for specific drivers to make one item work with another and downloading updates to operating system, drivers and applications.

Not to mention adjusting settings to optimise the machine for AV use.

I would like to think I have a certain amount of skill at this by now but I'm forced to admit the Red Submarine machine works better and faster than any of my efforts. Not because the components are better than I would use, but because of the outfit's knowledge of what works well with what and the myriad esoteric tweaks that can help optimise a system.

Once working as it should, there remains the question of maintenance. It is probably tempting providence to say



so, but I have machines that have been working perfectly happily for years with no software or hardware maintenance whatsoever. Surfing the Net and installing games or 'free' software can be a quick route to trouble on any machine. If it isn't broken don't fix it is a good maxim for PCs. However, frequent backups remain vital and regular disk de-fragmentation is good practice for AV use.

PCs for professional use can now be purchased with confidence. Providing the supplier is carefully chosen, this is by far the most cost-effective option. If you still want to build your own PCs you're in the wrong job! □



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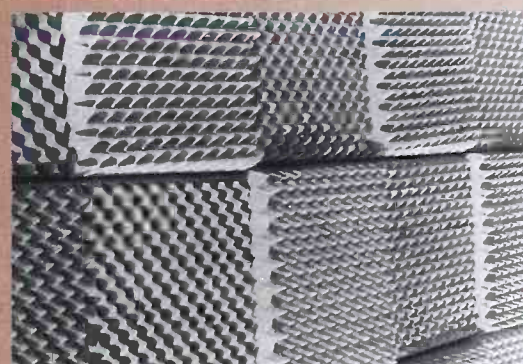


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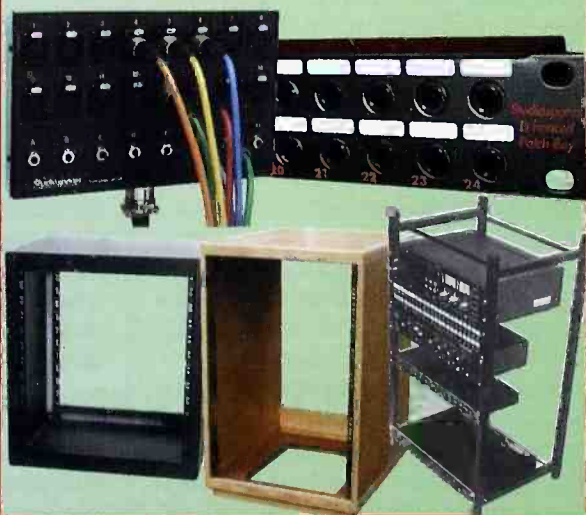
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A new spin on music production

Building on the music industry's failure to learn from the Copycode copy protection effort, Macrovision is set to repeat the mistakes of the SDMI, writes **Barry Fox**

HERE WE GO AGAIN. While one side of the record industry's mouth says the world needs the better-than-CD quality you get from DVD-Audio and Super Audio CD, the other side is planning to use an anti-copy system which could degrade the sound of music. Of course the music industry is hurting from CD-burning and MP3 ripping and cloning. Of course the message has to get across that if artists aren't paid they don't make recordings. So there will be nothing to copy. But is it really the answer to risk compromising the quality of CDs?

The music industry's Secure Digital Music Initiative has spent nearly three years trying to agree on Phase 2 watermark technology that would let people copy CDs onto a PC and portable memory player for personal use, but stop them sharing it freely on the Internet round the world. The SDMI recently gave up because its members could not agree on a technology or strategy. Now Macrovision, known for video anti-copy systems, has announce SafeAudio, a much blunter instrument. SafeAudio stops music getting from a CD to the PC's hard disk. Clearly worried about adverse reaction from the audio industry, Macrovision will not discuss how it works. Bad mistake...

The Macrovision technology is based on work done by TTR Technologies of Israel. Although TTR has filed several patents, they are well hidden. But, bingo, I found the one on a 'copy-protected audio compact disc'. It tells how the record company will add bursts of noise to the digital audio signal, by deliberately giving some of the music code 'grossly erroneous values'. Additionally the error-correction codes on the disc, which would normally play mathematical tricks to correct the digital errors, are themselves distorted.

So error correction fails leaving gaps in the music.

A consumer CD player automatically plays a trick called interpolation or concealment to bridge these gaps. It looks at the music on either side of the gap and builds a replacement section. A PC's ROM drive does the same only when playing music for listening. But the PC's ROM drive cannot repair the digital data going to the hard disk, so either the hard disk copies nothing, or it records a nasty noisy sound. TTR's patent claims that 'occasional error-concealment will not audibly degrade the quality of the CD', and if the noise is well-tailored 'error concealments are definitely inaudible when played on an ordinary CD audio player'.

Of course this immediately begs the question, what is an ordinary CD player? And how is TTR so sure that no-one will hear the effect?

Macrovision claims that the changes made to the music are not 'discernible' and tests prove that SafeAudio gave no problems with '99+%' of existing CD players. To back this claim, Macrovision says it spent six months playing discs to 1,000 listeners, and unnamed 'golden ears' at two of the major record companies, who could not hear anything nasty. Without telling anyone, a major record label sold 100,000 music CDs in California to see what happened. 'There was no increase in return rate or complaints' says Macrovision's VP of audio technology, Heinz Griesshaber.

Macrovision has earned a good reputation over the years for checking compatibility, so that original videos play properly on most VCRs, DVD players and TVs, but do not copy. But high-quality audio is a different ball game and the pat-on-head, we-know-best, reassurance on sound quality reminds of the SDMI and Verance. The SDMI never would identify the golden ears who could not hear the Verance watermark, or define the test methods used. This caused Verance and the SDMI a lot of grief. Now we have Macrovision not naming the record companies who tested the system, or the golden ears, and not giving details of the test methods either.

Says Steve Harris, editor of *Hi-Fi News* magazine:

'You can't blame the record industry leaders for being obsessed with copy protection. They see their very survival threatened. But audiophiles invest thousands of pounds in equipment to get the best sound, and the result is wholly dependent on the quality of the disc. I'd like to see — or rather hear — whether the results really are not discernible on an audiophile system. It would be ironic if quality were worsened in the quest for copyright security.'

The only way the audio and hi-fi fraternity will be reassured that the SafeAudio process is not adding anything discernible is for respected listeners-engineers to hear a variety of music with and without the process (blind testing of course)—like comparing the taste of water with and without an additive.

Verdicts from unnamed ears did not satisfy on the SDMI-Verance watermark so there is no reason to suppose it will satisfy here.



The remix monkey

As they redefine professional audio and the audio professional, surround and Internet applications are about to take on new significance, writes **Dan Daley**

IDIDN'T BUY into the 5.1 surround-music hype, and despite the fact that, finally, a decent number of titles are in the chute for this Christmas, I'm still not convinced that there's a huge market for it. What I did have high hopes for, and made the effort to search out examples of, was Internet audio. From the day, about five years ago, that I sat in Philip Glass' studio in lower Manhattan and watched David Bowie do a live, interactive webcast performance, I saw this as the next logical collaborative step in both the evolution of the recording studio and the distribution of music.

As it turns out, neither 5.1 music nor the deep involvement of recording studios in Internet audio has yet come about on any significant scale. But there's one more reason 5.1 music and Internet audio (music or whatever) are in the same pot at the moment. It speaks to the entire issue of quality, and that could determine the role of the recording studio in the future of the commercial audio business.

The way audio sounds on the Internet is a relative thing. Compared to a well-made-and-mastered CD through a Bose speaker system, it doesn't sound very good; compared to those cheesy little chips in Chinese-made greeting cards that play 'Happy Birthday' when you open them, Internet audio does sound good. The reference benchmarks of digital sound are now splayed all over the place. More and more, Internet audio is being developed and delivered from wider sources, varying from recording studios to spare bedrooms. I wonder, though, why more of it hasn't been done and isn't being done in studios? Because since the audio that's going through the Internet pipeline isn't all music, and much of it originates from corporate and other non-entertainment sources, the need for professional audio techniques and technologies isn't recognised. I mean, speaking from the perspective of your average, non-engineer bloke, if your idea of quality is determined by the wide spectrum mentioned above, it's understandable that when the boss says we need some new sounds on the web site, you peruse *Macworld* and see which desktop software is the cheapest. Corporate IT and marketing departments are not in constant communication. When marketing makes a decision to create a new broadcast commercial, it will turn automatically to an outside agency, which will turn to professional studios as the primary resource. When IT decides the web site needs refreshing, it assigns whoever is not out at lunch.

This lack of awareness of what professional people and facilities can bring to a project is about to get another test. Surround music has been the Emperor's New Clothes for about three years now, generating new 6-channel products and system revisions but little in the way of an economically viable market niche for studios and engineers. With the release of what will likely be several hundred titles from AOL Time Warner's and Vivendi-Universal's vaults for Christmas, and the updating of Sony's SACD format to encompass multichannel audio, this is likely going to be surround music's best shot at



Fighting talk

While much attention is lavished on new formats and how to gain consumers' confidence, it's often older technology that meets most of their needs, writes **Kevin Hilton**

becoming something other than a small audiophile niche. And there are lots of studios out there now that have implemented some degree of surround monitoring and mixing capability, and a corpus of literature compiled about how to do it. So many of the pieces are in place.

Here's the problem, and it's too different from what happened to Internet audio. In a word, it's upmixing, the use of a technology box, such as the tc 6000, to create artificial multichannel mixes. Faux 5.1, as it's being derisively called, isn't a joke; record labels have decided that the cost of actual remixes to create 5.1 music discs correctly is prohibitive, and now that there's a way to cheaply create 5.1 music mixes—à la the way older mono recordings were 'electronically rerecorded for stereo' 25 years ago—the exigencies of contemporary entertainment business economics come relentlessly into play. Think about it from an A&R guy's point of view: Your industry is tanking, your new megacorporation is trying to cover the costs of massive, global consolidations and merger-acquisitions, and the president of your label has directed you to prepare 40 titles in surround to test-market the format. The choice: spend between \$10,000 and \$20,000 per title remixing from discrete tracks in a 5.1-equipped studio with a top engineer, or hire someone with a black box who can bring it in for a few hundred dollars a title. Under the circumstances, which route do think gets chosen?

It's one thing to have a difference of opinion as to whether home recording has had a positive or negative effect on the quality of music. It's a completely subjective issue. With the proper degree of squint, the same can be applied to audio mastering, long regarded as inviolable audiophile territory occupying the highest ground in the business, but in reality a pinnacle woefully too small to address all the music seeing the light of discs these days.

But I think it equally reasonable to draw a line somewhere, and upmixing is that line. This could truly reduce music mixing to a back-room operation, no more sophisticated than burning a CD-R. This is where the common interests of Internet audio and surround can converge, and in the process benefit the entire pro-audio industry: In the first instance, a lack of knowledge about what studios are and what they can do was at work; in the second, a lack of action on the part of the pro-audio community to explain the long-term implications of handing remixes over to chimps in hopes of squeezing a few more dollars out of physical media. In both cases, the answers are proactivity and education. The International Recording Media Association (IRMA), a trade organisation of media manufacturers, had a campaign about two years ago called 'Where'd You Hide The Cassettes?' to promote the analogue cassette format and remind the world that it was far from dead. It would be a useful thing if the various studio and engineer associations—SPARS, APRS, GrammyPro and so on—could jointly figure out a way to let the world know that music has been as good as it has been because there were professional people and facilities there to ensure it. The tooting of a collective horn is hereby called for.

DESPITE THE INCREASINGLY FAST PACE at which modern technology develops, some things never change that much. The general perception is that there is an inexorable shift towards optical disc; this is certainly seen in professional circles but even here, tape is hanging on. Swedish Television recently upgraded its news operation, integrating nonlinear editors with computer servers, media management equipment and a newsroom system. Despite this, its source material is still good old videotape.

Many productions are still transferred back to tape for transmission despite the proliferation of server-based play-out systems, underlining the fact that nonlinear technology is not all powerful. Similarly, it was generally believed that in the consumer market VHS would cohabit with DVD, providing the low-cost time-shifting recording capability that, until recently, the optical disc could not. Re-recordable DVD was considered to be problematic and, ultimately, prohibitively expensive.

That is all changing now as manufacturers fight to produce re-recordable DVD machines. While DVD itself is based on a standard core specification, three DVD re-recording formats are squaring up for the fight, inviting unwelcome comparisons with the home video format war between VHS, Betamax and, initially, V2000 during the early eighties.

DVD-R (recordable) was introduced in 1997 for professional authoring purposes and as such is a write-once technology. DVD-RAM appeared in 1998 and has been used in the corporate and industrial sectors. It is now being backed for both the professional and consumer markets by Hitachi, JVC, Toshiba, Samsung and Panasonic, which is due to launch a \$1000 home recorder in October.

This will be a straight VHS replacement, recording on discs holding up to 9.4Gb of data. A second re-recordable format, designed from the beginning for audio-visual purposes, is DVD-RW, launched in Japan during November 1999 when Pioneer introduced its DVR-1000. As well as recognisable video-like machines, Pioneer produces DVD-R/RW drives for computers and is joined in its support of the format by Apple, Compaq and Sony.

DVD-R/RW can accommodate DVD-Video Recording (VR), a new applications format for writing data that was approved by industry body the DVD Forum last year. This enables a range of multimedia and editing functions but a major problem is that existing DVD players (so-called legacy machines) do not recognise VR discs; a firmware upgrade is required for compatibility.

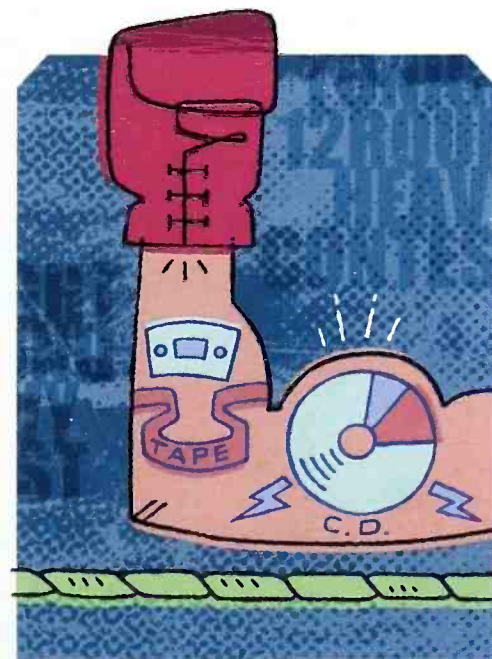
Pioneer released its third generation DVD-RW machine, the DVR-7000, in June; and while it had hitherto restricted the format to Japan, it says the DVR-7000 will be available in other markets 'within this fiscal year'. But both Panasonic and Pioneer are being pre-empted by Philips, which is due to introduce its DVDR1000 recorder to the general European market this month at an expected price of around £1,500.

This is the first product of a new format, DVD+RW,

which was developed from the existing DVD-RW system. Philips is promoting DVD+RW as '2-way' compatible, as it is able to play on existing machines, and is highlighting the incompatibility problems of the Pioneer machine. Philips is leading the DVD+RW Alliance, joined by Dell, Hewlett-Packard, Ricoh, Yamaha and, once again, Sony. Against them is the fact that the DVD Forum does not recognise DVD+RW.

Sony initially hedged its bets by signing up for both -RW and +RW, in July it announced that it was to introduce a DVD recorder, based on -RW (and in fact OEMed from Pioneer) during September. Even though this and other machines are beginning to appear on the consumer market, it is felt that the majority of people will be put off by the high cost as much as the confusion. A US market analyst has said that the market needs to 'coalesce' before consumers begin to understand it.

Some within the industry are of the opinion that Philips and Sony have got 'greedy' and are trying to take a larger slice of what was originally thought would be



a small market with defined niches. JVC is concentrating its RAM products in the professional sector and has no current plans for consumer machines. It is seen as particularly suited to pro-audio due to its write and verify function. Working against RAM is its incompatibility with RW and that fact that it is not immediately recognisable as a DVD.

Expectation of another format war is mostly likely spurious. John Bamford, product manager at Pioneer GB, is not convinced that RAM versus -RW versus +RW is a re-run of VHS-Betamax. 'That hinged on problems in getting the right software,' he says. 'Betamax owners caught a cold because the video rental stores did not stock the format. DVD Video is compatible with every machine—the problem only begins if you want to play something you've recorded on a friend's machine. Ultimately it's going to be a luxury toy that may sell only 10,000 to 15,000 units. Recordable computer drives is where the real market is.'

The ease of use, durability and greater capacity of optical disc obviously makes it preferable to videotape but until the market decides exactly where it is going, it is unlikely that people will be throwing out their VCRs or library of VHS tapes quite yet.

DR JOHN'S VIDEO LIBRARY

VIDEO RECORDERS

The video recorder has had a short but spectacular history of less than 50 years. **John Watkinson** looks at the principles

DURING WORLD WAR II, the analogue audio tape recorder was developed in Germany. After the war the technology was made available in products from a variety of countries. One major supplier of machines was Ampex in the US. The story goes that Bing Crosby was pleased with his audio recorders because recording saved him singing his prime time show several times, once for each time zone in the US. He then suggested that it would be pretty good if it were possible to record television in the same way. In making that remark, Bing had no idea about the relative difficulty of video recording in comparison with audio, but he did know what he wanted.

The rest is history. Ampex solved all of the problems one by one and were able to introduce a monochrome video recorder in the mid fifties. One of the biggest problems was getting enough bandwidth. Audio can get by with a mere 20kHz, whereas video requires at least 4MHz, more for really sharp pictures. Everyone knows that speeding up the tape increases the bandwidth, but to get from 20kHz to 4MHz needs a fearsome speed. The BBC built an experimental machine called VERA (vision electronic recording apparatus) that used fixed heads and a high linear tape speed. The tape was steel and the machine had some of the attributes of a bandsaw.

Ampex overcame the high tape speed problem by using rotating heads as shown in Fig. 1. In early machines, a headwheel having four heads rotated transversely to trace the heads across a 2-inch wide tape, leading to the name of Quadruplex. If the tape simultaneously

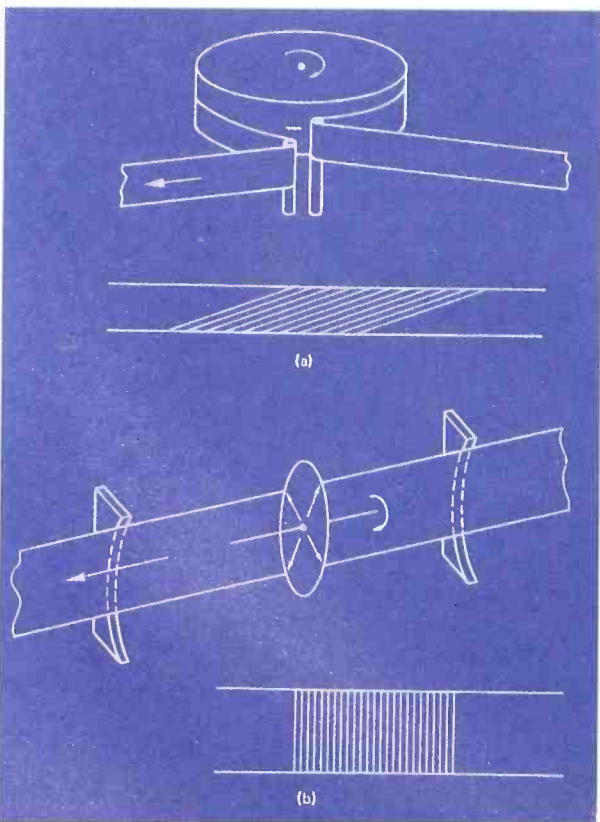


Fig. 1: Types of rotary-head recorder. (a) Helical scan records long diagonal tracks. (b) Transverse scan records short tracks across the tape

moves along, transverse tracks are laid down side by side. When the geometry was perfected, one head would finish a track just as the next head started another. One transverse track was not long enough to hold a whole picture, so the picture was built up from several segments, with the head switch taking place during the horizontal blanking period.

Unlike audio, video signals have a DC component representing the average brightness of the picture. Conventional magnetic recording cannot reproduce DC and is not suitable for video. Instead a modulation technique had to be developed. Analogue video recorders to this day use frequency modulation or FM. Fig. 2 shows that the video input to be recorded is supplied to a VCO (voltage controlled oscillator), such that defined levels such as sync tip, blanking and peak white have defined frequencies. In FM, it is easy to record DC because this is represented by a constant frequency. On replay, the FM signal is fed to a limiter or clipper that takes only the centre crossings of the signal and rejects any amplitude variations.

It was found that the non-ideal frequency response of magnetic recording caused distortion of FM recordings, at it was found necessary to develop an accurate equaliser that cancelled out the head response. Noise was also a problem because it shifted the position of the zero crossings. In FM this is worse at high frequencies because the zero crossings are closer together so that the shift is a bigger proportion of the signal period. As a result the noise floor rises with frequency. It was found that a constantly sloping low-pass filter does not distort an FM signal, but it simply causes the demodulator to use more energy from the lower sidebands than from the upper. This means that the noise at high frequencies is reduced.

The Quadruplex format was refined with better tapes and heads and this allowed a wider bandwidth to be recorded. This made it possible to record subcarrier to produce colour pictures. The Quadruplex format served well for many years, but it had the problem that the segmented recording made variable speed or freeze frame almost impossible. Tape cost was also high.

The development of helical scanning (Fig. 1) made it possible to fit one complete field onto a single slant

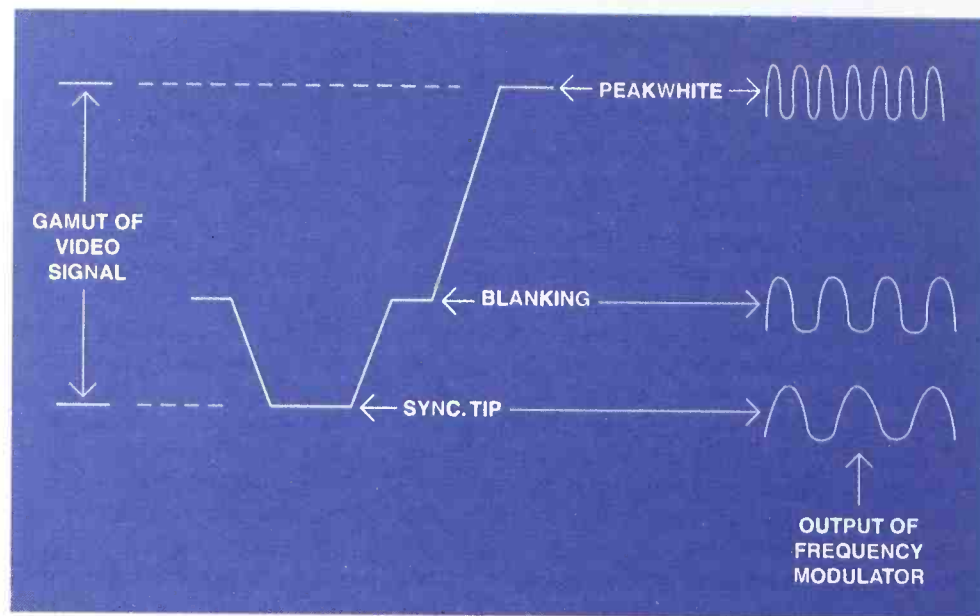


Fig. 2: In analogue video recorders the video voltage modulates the frequency of a carrier

track. There are several possibilities for helical scan. In the C-format, the tape wraps almost completely around the drum, making it possible to use a single head. In the U-format, the tape wraps 180° round the drum and two heads are needed. As the tape and the head are both moving, the track angle is a resultant vector and changes with tape speed. If the tape is stopped, the heads attempt to repeat the same track, but don't quite manage it. In VHS, the result is a noise bar in the picture where the heads lose signal between tracks. In professional machines, heads were developed which could deflect up and down the axis of the drum driven by a sawtooth waveform so that entire tracks could be followed. Such machines could give broadcast quality pictures from -1 to 3x speed.

Fig. 3a shows that in azimuth recording, used in rotary head tape drives, the transitions are laid down at an angle to the track by using a head which is tilted. Machines using azimuth recording must always have an even number of heads, so that adjacent tracks can be recorded with opposite azimuth angle. The 2-track types are usually referred to as A and B. Fig. 3b shows the effect of playing a track with the wrong type of head. The playback process suffers from an enormous azimuth error that serves to attenuate crosstalk due to adjacent tracks so that no guard bands are required. Since no tape is wasted between the tracks, more efficient use is made of the tape.

Professional machines recorded the PAL or NTSC composite signal in its entirety using wide bandwidth recording to accommodate the colour subcarrier. However, this was expensive and designers looked for a way of recording colour pictures with less bandwidth which would allow tape consumption to be reduced for consumer and industrial products. The solution was the colour-under technique shown in Fig. 4. The video bandwidth is split in two by a filter. High frequencies are

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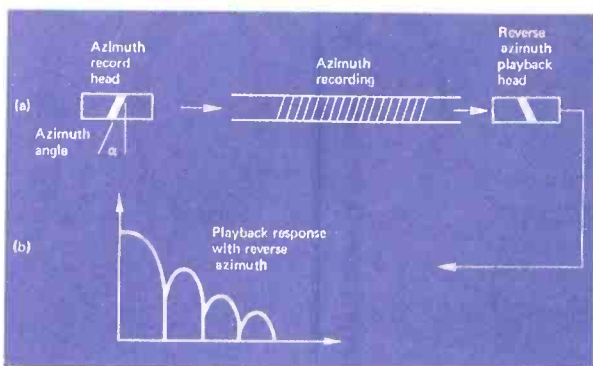


Fig.3: In azimuth recording (a), the head gap is tilted. If the track is played with the same head, playback is normal, but the response of the reverse azimuth head is attenuated (b)

considered to be colour subcarrier and are down converted to a lower subcarrier frequency and directly recorded. The rest of the video bandwidth is recorded with FM. The FM carrier acts as bias for the reduced frequency subcarrier.

Formats such as VHS, Betamax, Hi-8 and U-matic all employed colour under recording. This was fine for consumer purposes, but something better was needed for ENG (electronic news gathering). In the BetaCam format, the recording is not composite, but component. This requires three signals of unequal bandwidth. In BetaCam the solution was to use pairs of heads working in parallel to lay down track pairs on the tape. In one track the luma signal is recorded, but in the other track the two colour difference signals are recorded one after the other using time compression. In time compression

the signal is sampled at a certain rate and stored. The samples are read out of the store at twice that rate, and so are compressed into half the time. This solution has the advantage that if the bandwidth is reduced for economy, the result is just a slight softening of the picture, whereas with composite recording the subcarrier would be lost.

The development of high energy tape led to a general improvement in analogue video recorder quality. Higher energy means bigger replay signals which reduce the effect of noise. Using metal particle tape,

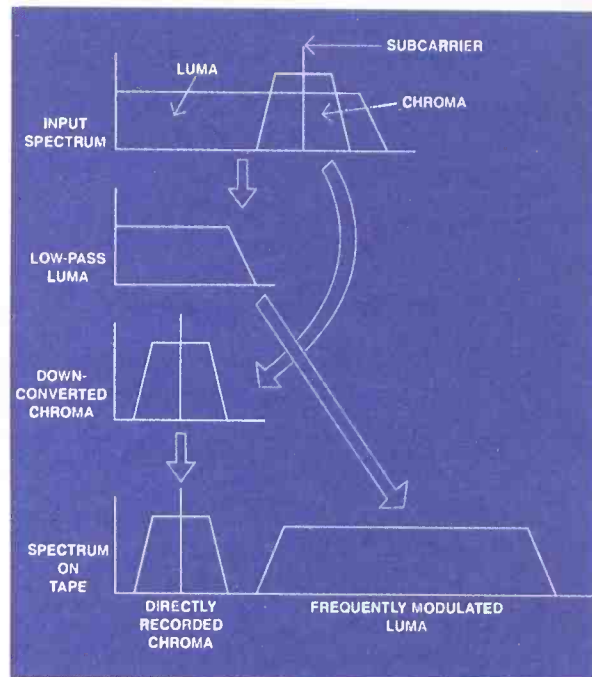


Fig.4: Wider principle used in consumer analogue VTRs allows colour with reduced bandwidth for economy

BetaCam was transformed into BetaCam SP which had adequate performance for production purposes and became very popular.

In all video recorders, the heads turn at high speed and strike the tape intermittently resulting in shock waves that travel through the tape. These waves have the effect of varying the head to tape speed resulting in some lines being slightly shorter or longer than they should be. The phenomenon is known as timebase error. Timebase error can also occur in portable machines if the attitude of the transport is changed. Whilst most monitors can display pictures having timebase error without difficulty, it is difficult to edit and process such signals. Consequently professional VTRs are fitted with timebase correctors which are designed to stabilise the irregularities in the replay signal.

The Quadruplex format produced relatively little timebase error and this could be corrected using variable analogue delay lines. These consisted of transmission lines built with inductors and varactor diodes. By changing the voltage on the diodes, their capacitance would change and alter the amount of delay. The control voltage was obtained by comparing the video syncs off tape with ideally timed ones from a local generator. With helical scan machines, slow motion would cause large timebase errors of several lines, and this was beyond analogue technology. Digital timebase correctors were developed for these machines in which the video is converted to data stored in RAM. The readout of the data can be made at a time corresponding to a reference signal. If several machines with timebase correctors are supplied with the same reference, it will be possible freely to cut between the video signals for production purposes. □



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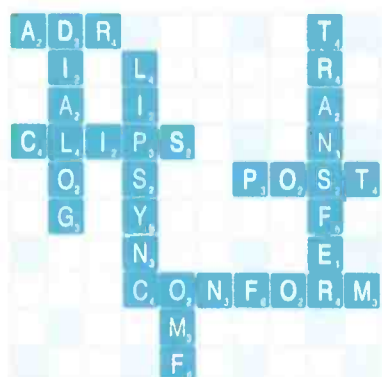
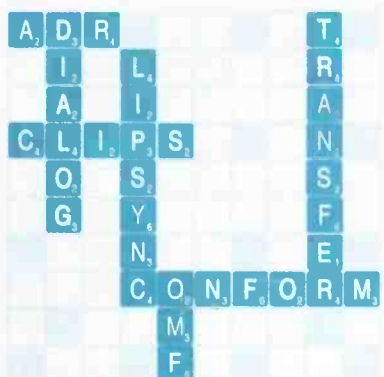
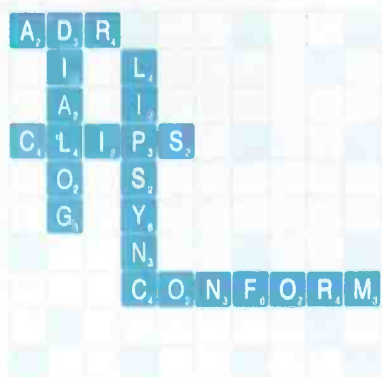
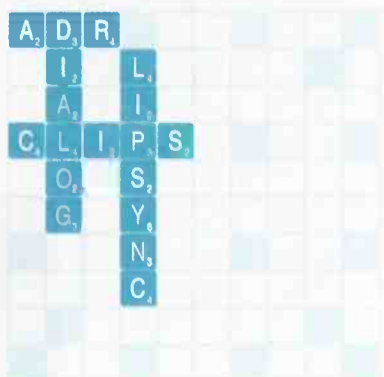
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MIC MECHANICS

Following the history and maintenance of yet another batch of classic microphones, **Ashley Styles** studies some less well-known types. Essential information for owners and opportunists

AS WELL AS valve microphones, US manufacturer Altec has also produced other valve-based equipment, probably being best known for the 436 series of valve compressors. The microphone type in question here however, is the popular 160A, its shape being very similar to a stretched out Coke bottle. The electronic design is based around the 6AU6 pentode, with the majority of the components being located within the power supply unit. Indeed, apart from the valve, the only other component within the mic body, is a cleverly designed feedback-gain control capacitor, which uses the brass capsule connector tube as part of that component. It is interesting to see how many microphone designs of this era, used pentode valves, as opposed to the more popular triode types that were to follow.

The type 21B capsule, with a small diameter (approximately 12mm) diaphragm, is an omni design. This is mounted in an ideal position on the end of a long thin pedestal. There are therefore, no local acoustic reflections or shadows to diffuse the sound being picked up by the capsule, other than a small collar on the capsule socket. Hence, this enables the microphone to capture an uncoloured audio signal.

For specific testing and calibration purposes, I use a range of Bruel & Kjaer capsules and an original valve B&K preamplifier together with its associated power supply. Among my collection I also have an MKD type MV101 valve 'measurement' microphone. Although marked MKD, I believe this model was manufactured by Neumann Gefell being almost identical to the MV630 model. This uses a capsule that looks, and in construction, is much like that of similar size-type models from the B&K range. As with many calibration-measurement type microphones, use for sound recording is not always favourable. It depends on the capsule type fitted.

The B&K, together with a Neumann M50, which I have modified to give an extended LF response together with reduced self noise, enables me to carry out very

accurate testing of a microphone's performance. Fortunately, in most circumstances, I am in a situation that enables me to make direct AB comparisons between a client's microphone and my own reference microphone of the same type. This makes testing far more precise and accurate. Discrepancies in gain are instantly apparent and comparison of frequency response can be conducted on a cancellation basis—subtracting the output

of the faulty microphone, from that of the reference microphone. Taking into account of any gain imbalance (adjusting for a null, say, at a reference frequency of 1000Hz). This method gives an audible indication of the discrepancies between the faulty and reference microphone. I find this far more helpful in diagnosing a fault, rather than looking at a frequency plot.

Prior to the introduction of semiconductor electronics, Calrec, famous for its mixing consoles and Soundfield microphone(s), was one of only a few high-quality British microphone manufacturers. In its early years, Calrec manufactured valve microphones, an example being the CM1050 model.

It also manufactured valve microphones sold under the brand name Fi-Cord, an example being the FC1200 model.

Unfortunately, the smaller Calrec microphones do not receive the status that they deserve, let us not forget



Reference valve type B&K, together with modified Neumann M50



Inside and outside view of the Hammond M100

that the BBC used them on a regular basis for many years, an excellent recommendation for any product. Therefore, should they go faulty, then they certainly warrant repair. Unfortunately however, the nuvistor-based electronics manufactured by Calrec were encapsulated in a semi-transparent resin. The principle of this design was an attempt to help eliminate dampness penetrating the electronics, which could have otherwise caused noise problems. It is, therefore, almost impossible to service many of these microphones. It all depends upon the access to the components that are faulty. I have, with the owner's consent, carefully cut away resin-encased electronics to replace defective components or rebuild the unit completely. The capsules, because of the nickel used to make the diaphragm, suffer from the same corrosion problems as the early Neumann KM54.

The Hammond M100 is a miniature omnidirectional microphone with electronics based around a nuvistor design. Another British microphone, the M100 was normally available as a stereo pair with a single power supply.

The M100 is capable of surprisingly good results. Although they may not be the quietest of models—having an omni pickup pattern—they are quite useful as

ambient microphones on drums and so on. The only real problem, is the susceptibility to dampness and corrosion of the capsule. Fortunately, access to the components within the microphone is very good and although the capsules are no longer available, they can be refurbished.

The Hiller M59 is a fine miniature cardioid microphone manufactured in Hamburg. Being so robust and of physically small size, it was regularly used by the BBC. The valve used is the same as that in the very early Neumann M49—the directly-heated cathode, type MSC2. This valve is unfortunately no longer in production.

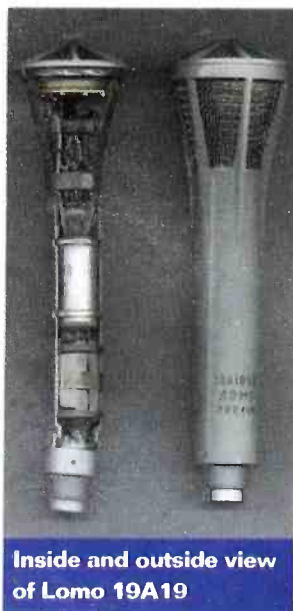
The output impedance of the microphone is very high and so the transient response and HF performance will suffer when used with long cables. This is the main problem associated with microphones that use a remotely-housed impedance-matching transformer. The AKG C60 is yet another microphone that works on this principle, so to maintain the excellent transient response and HF performance of this microphone, it is advisable to use the shortest lead possible between the microphone and adaptor, using a longer lead now that the impedance is down to 50Ω or 200Ω, to reach the power supply.

(Modifications are available, for further information, refer to the Neumann M49 section of the Masterclass series in *Studio Sound*, June 2001.)

There is a surprising number of microphone manufacturers around the world and the Lomo brand is a fine example of Russian microphone technology. The company manufactured many valve models, some of quite interesting design, it then went on to produce semiconductor models. A new company—Nevaton—was formed after the decline in production of microphones by Lomo.

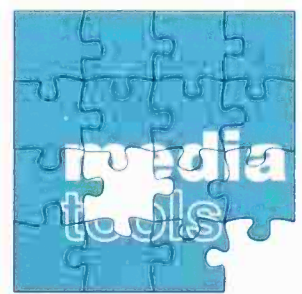
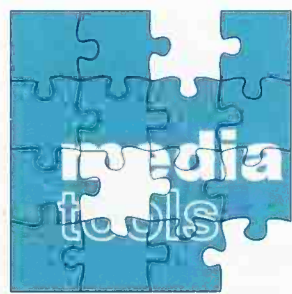
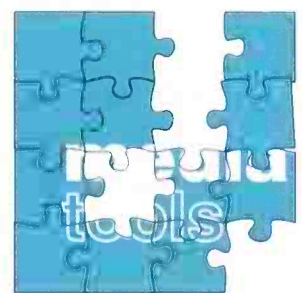
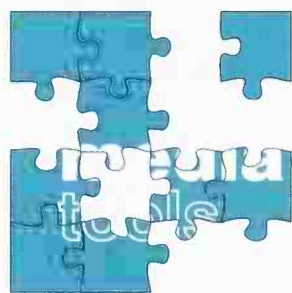
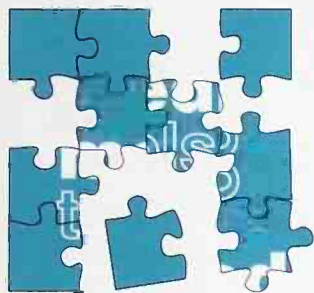
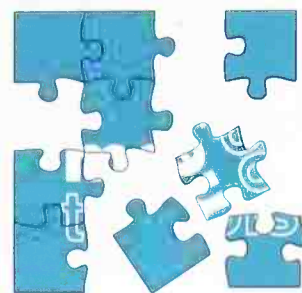
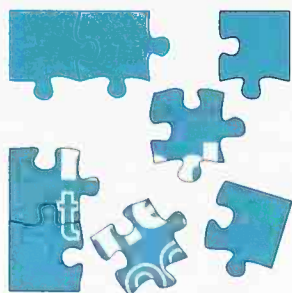
One of Lomo's older models, the 19A1 (looking more like an egg or a miniature Neumann M49) is an excellent performer. Using a miniature plug-in, low-noise triode and a substantially large audio transformer, together with a large cardioid capsule, the sound quality of this microphone is superb.

I remember a Lomo-type 19A10 coming in to me for repair. This was to be a strange microphone and I could not quite see the reason for its design complexity. It



Inside and outside view of Lomo 19A19

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Ad Index

AKM	50
Aphex	5
Audio Ltd	41
Audio Service	31
Audio Technica	64
A to Z Directory	97
Brauner	70
Buzz Audio	14
Calrec	51
Cedar Audio	OBC
C-Lab	12
Digital Audio Denmark	76
Digidesign	65
Digital Talkback	20
DK Audio	33
Dolby	25
DPA Mics	43
EAR	68
Emtec	75
FAR	58
Fletcher Electro	77
Focusrite	17
Friend Chip	30
Funky Junk	27
Genelec	36/37
Ghielmetti	70
Gold Book	94
HHB	42,62/63,67,74
IBTS	94
Interbee	85
Junger Audio	61
Klein & Hummel	57
Klotz	71
Lawo	53
Lexicon	21
Lynx Video	24
Mackie	IBC
Manley	13
Marantz	19
Media Tools	87&89
Merging Technologies	39
Microtech Gefell	35
Mosses & Mitchell	45
Mutec	29
Neutrik	31
Pastega	55
Raycom	31
Richmond Film Services	80
Sadie	69
Sascom	59
Sintefex	10
Solid State Logic	IFC
Sonifex	49
Soundcraft	73
Soundtracs	9
SPL	26
Steinberg	56
Studio Spares	81
Studio Technologies	57
Tascam	11
tc electronic	18
TL Audio	52
Total Audio Solutions	15
Waves	23

looks like a very short AKG C12 and offers the equivalent of a complete remote polar pattern control. I say equivalent, as the microphone uses a large capsule with both front and rear diaphragms, working against a common backplate. However, that is where the similarity to conventional designs end. The signals from the two diaphragms are then handled by two separate pre-amp-impedance convertors within the microphone body, and sent out to the power supply. Within the power supply, through the use of transformers and rotary switches, the two signals are combined by summation and subtraction to obtain the desired directional characteristic required. This enables you to have any polar pattern from omni, fig-8 through to cardioid, in either direction.

A more popular model, the 19A19, is also a fine unit. Similar in shape to an ice-cream cone, this is an end-firing microphone using a capsule much akin to that of the AKG C12. Combined with the use of a miniature low-noise triode valve, the microphone is capable of producing a very 'far' sound, together with the delicacy and low-level detail that you would expect from a 'quiet' AKG C12.

These microphones, together with their associated PSUs, are fairly tough. The only weak point would appear to be associated with some of the connectors.

Sony's best-known old valve microphone is the C37a—nothing to do with the excellent C37 tape machine manufactured by Studer. Sony has produced many other valve microphones in the past and of course, the more recent C-800, designed as the successor to the C37a. Through the years, the C37a was superseded by its modern semiconductor equivalent (C37p). However, as with many items of valve equipment, the original C37 is still a highly respected microphone and many are still in everyday use all around the world. The electronics are based around a 6AU6 pentode-type valve, adding to the character and sound quality of this unit. The audio matching transformer, together with the EQ control, is housed within the power supply unit.

You must not forget the modern C-800G, with its built-in cooling system looking much like a Neumann U47Fet with a heat sink protruding from halfway along its case. The heat sink, being a part of the cooling system that cleverly reduces the running temperature of the valve enables the microphone to produce lower noise and distortion figures.

The STC 4108 (28-LYA), manufactured by Standard Telephones & Cables, is a fine example of the hybrid technology used during the early sixties. Because of the low capacitance of condenser-capacitor capsules, say 30pF to 150pF, only a valve or FET is suitable for the job of impedance conversion. At the time of manufacturing the 4108, there were few, if any, semiconductor devices that could be used for this purpose. If they were, the STC 4108 would have probably been a semiconductor model, like its successor the STC 4136.

The impedance conversion, within the 4108, is carried out by the ever-popular Telefunken AC701 valve, the signal then passes through to a germanium transistor (GEC TK23c) driving the output transformer.

We now see a form of hybrid technology being used again today (in the Neumann M149 for example), where a valve is used for the impedance conversion and semiconductor technology being used to generate the balanced audio output feed. Sadly, for the valve purists, hybrids are seen as systems that are not doing justice to what might have been gained through the use of a using valve-only electronics.

The STC 4108 microphone used a screw on cardioid capsule, with a nickel diaphragm. The capsule housing, type 107A, used on the 4108, has both a cardioid and omni pattern stamped on it, with the cardioid stamp being 'highlighted'. It would appear that another omni capsule was intended to be manufactured, however, it would seem that this sadly never became a reality. Are there any omnis out there?

The connectors used on the 4108, were of the early Cannon type, with the microphone connector using the same 6-pin/insert type as that used by AKG on the C12a, C412 and C414 microphones. The audio and mains connectors are also of Cannon manufacture. Great care needs to be taken of all these connectors, as they are now obsolete.

It can generally be said that most parts within a power supply can be replaced with modern day equivalents. There are, of course, components that cannot be replaced, these being some types of valve rectifiers and purpose-built mains transformers—large smoothing chokes.

Many PSUs were limited to 220V/110V AC working (such as the Neumann N52a). In cases such as these, especially where these units have been used for many years on the older British standard 250V AC mains, the transformer will have been working well in excess of its design criteria.

My own Missing Link range of replacement-upgrade PSUs use a specially designed multi-tapped mains transformer, 90V through to 250V AC, allowing the units to be used in most parts of the world. The required HT and LT voltages for the specific microphone type to be used with that particular model of

power supply are then being controlled-regulated by the PSUs circuitry. The connectors, to the microphone, being either Amphenol-Tuchel or Cannon, again depending upon the model of power supply. Both types of connector being readily available.

For the sake of safety, I would recommend that any power supply with the old-type mains connectors, 2-wire type—live and neutral with no earth, be changed to accommodate and earth lead. In such cases, the audio earth can always be isolated from the mains earth by a small switch, to help stop or reduce the risk of hum loops.

Finally, always replace or blank-off any missing or damaged 'window' on PSUs that allow you see the mains voltage selection links. This is a simple job and one that could possibly save lives. □



Outside and inside view of the MKD MV101 calibration microphone



Outside and inside view of the Altec 160A

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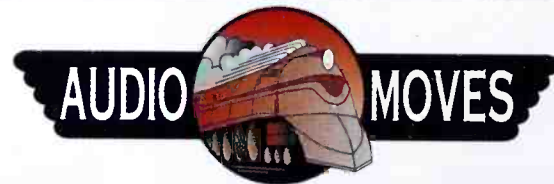
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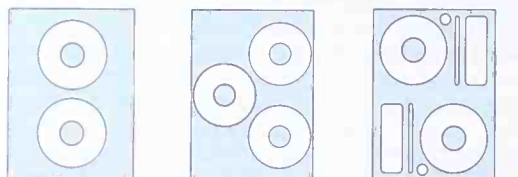
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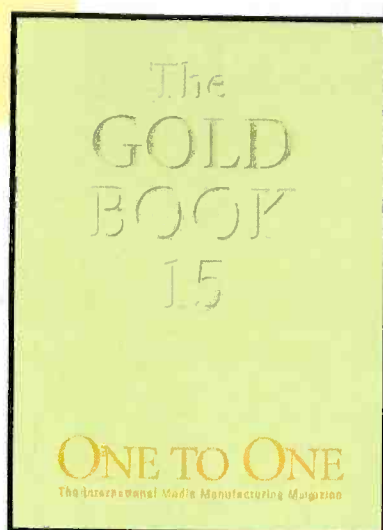
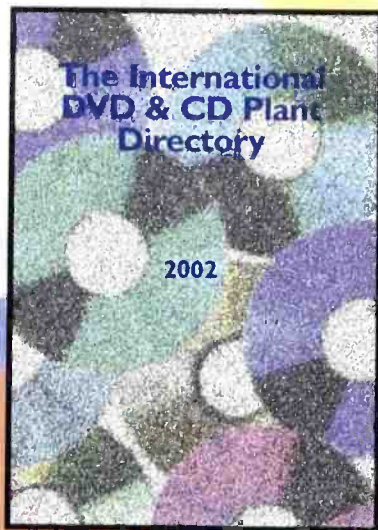
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LETTER OF THE MONTH

Critically speaking

A COUPLE OF COMMENTS occasioned by Phil Newell's article on the Yamaha NS-10M (*Studio Sound*, August 2001).

The small integral speakers in the Neve (and other) consoles of the late sixties were not intended as radio reference monitors, but as PFL and/or reverse talkback speakers. Many consoles only had one dual function unit (a source of impotent fury when a studio performer used reverse talkback when the balancer was trying to listen on PFL). Some had two dedicated units but frustratingly it was usually quite difficult to feed either of them with the mix, and impossible to configure them as a stereo pair.

Phil's well-researched article gives us some fascinating insights into mixers' attitudes to monitoring but has a depressing conclusion. Isn't it time our industry realised that we shouldn't be trying to make loudspeakers sound like other loudspeakers but like the sources which we're trying to monitor?

John L Andrews, Sales & Marketing Consultant, UK

Tim Goodyer replies

If we could do that, we'd have done it by now. Wouldn't we? Instead, somewhere between the limitations of loudspeaker technology, the diversity of sound sources and the demands of the studio environment we've ended up with the attitudes and equipment that make monitoring one of the most vexed topics of audio conversation.

What I hope we will see from *Studio Sound's* published measurements of the NS-10M along with forthcoming measurements of the Auratone is any coherent evidence of why these designs among so many have commanded such widespread use. If there is some consistency in their performance that can be equated to their popularity, we may gain a useful insight into speaker design—and the race to replace the NS-10 will enter its second leg.

Depressing conclusion, John? I'm betting not.

This month's letter of the month wins a free copy of *The Art of Voice Acting from the Focal Press range*

Silence is golden

I AM NOT PARANOID. I am not even angry anymore. Well, perhaps just a little; what I am troubled by is a type of tinnitus which causes problems with certain (really most) TV programmes. Briefly, I can only hear commentary if it is unaccompanied by other sounds—'background' noise. I do not greatly care about TV, but I do like historical documentaries, especially archaeological investigations, but my enjoyment is invariably ruined by that ubiquitous 'incidental music'. If only it were either or both!

Take a typical example: the otherwise excellent *Allies at War*, screened recently by BBC2. To a student of history, the stock footage, reconstructions and factual 'how it can be told' commentary are dramatic enough, but someone in 'authority' has decided to inject more, by allowing some demerited percussionist to run loose with a set of bongos, simulating—one supposes—gunfire and/or bombs. This, for me at least, drowns out the voice-over and completely defeats the object of the programme.

Subtitles? Well, they're all right, I suppose; but while I am reading them, I'm missing the image. Now, I don't suppose for one

moment that I am the only person in the country to suffer thus, and one would suppose that other irate viewers have, like myself, written on more than one occasion, to complain to the TV producers, but if so, the complaints are ignored. For one thing, it surely must be cheaper to make programmes without this nuisance, but even the ads carry it. Isn't simply one more example of how the younger generation is obsessed by noise?

I was recently stopped by a van driver who needed directions, bellowing his request over the full-volume cacophony of his radio. After I did a couple of silent-mouth-workings, he got the message and turned it down. But how could he have heard my directions over the noise?

As a former cinema projectionist, I understand the origin of this disease: it was to paper over the scratchy, hissing gaps in the old days of sound on film, when the sheer novelty made actors gibber 50 to the dozen, and producers were afraid that periods of silence, albeit brief, might cause their audiences to (a) fall asleep, (b) become restless, (c) hurl missiles at the screen and/or the cinema staff, or (d) take their custom elsewhere. I suppose the last was a viable possibility, but this is not so with TV. So why do it?

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London, UK.

12-14

PALM 2001
Nehru Center, Worli, Mumbai, India.
Contact: Exhibitions and Events.
Tel: +91 22 660 3443.
Fax: +91 22 660 4923.
Email: palm@studio-systems.com
Net: www.studio-systems.com

14-18

IBC
RAI Convention Centre,
Amsterdam, Netherlands.
Contact: Exhibitions and Events.
Tel: +44 20 7611 7500.
Fax: +44 20 7611 7530.
Email: show@ibc.org
Net: www.ibc.org



Now established as a major event for audio professionals in the exhibition calendar, IBC is bigger by some 11% over last year and again boasts a well subscribed dedicated audio hall. Amsterdam in September is not to be missed

21-24

AES 111th Convention
Jacob K Javit Convention Centre,
New York, USA.
Contact: Exhibitions and Events.
Net: www.aes.org

29-2 Oct

In The City#10
The Midland Crowne Plaza,
Manchester, England.
Contact: Exhibitions and Events.
Net: www.inthecity.co.uk

October
4-7

Nordic Sound Symposium XX
Bolkesjø Mountain Hotel, Norway.
Contact: Exhibitions and Events.
Email: soundsymp@nrk.no
Net: www.nrk.no/soundsymp

4-8

IBTS Exhibition
Milan Trade Fair, Italy.
Contact: Exhibitions and Events.
Tel: +39 0248 15541.
Fax: +39 0249 80330.
Email: assoexpo@assoexpo.com
Net: www.assoexpo.com

15-16

DVD Update 2001
Hilton Hotel, Barcelona, Spain.
Contact: Understanding & Solutions.
Tel: +44 1582 607744.
Email: DVD2001@UandS.com
Net: www.UandS.com

16-19

Broadcast Radio & TV Equipment Exhibition
Madrid, Spain.

22-25

SATIS
Paris, France.

28-30

CAB
Calgary, Canada.

November
1-3

Broadcast India
World Trade Centre, Mumbai, India.
Email: saicom@bom2.vsnl.net.in
Net: www.saicom.com/broadcastindia

4-11

SMPTE
Pasadena, USA.

8-12

Audiovideo
Jakarta, Indonesia.

14-15

SBES
NEC, Birmingham, UK.
Net: www.sbes.com

15-17

Interbee International
Tokyo, Japan.

23-25

Music Live
Birmingham, UK.
Net: www.musiclive.co.uk

27-30

Radio, TV & Comms
Nizhny, Novogorod.

December
6-8

ICE India 2001
Bombay Exhibition Centre,
Mumbai, India.
Email: exhibitionsindia@vsnl.com

6-8

BCS & Comms India
New Delhi, India.

7-8

Surround 2001
Beverly Hills Hilton, USA.
Contact: Exhibitions and Events.
Tel: +1 800 294 7605 x507.
Net: www.surroundpro.com

Email your event details to Dawn Boulwood:
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for prompt inclusion in World Events

Surely someone, somewhere in the dusty corridors of TV planning is capable of understanding the valid reasons for complaints of this nature? But then again, perhaps not, judging by the level of 'entertainment' on the box.

Frank Burns, Blackburn UK

Mister Marmelade

THE RESPONSE I have had to the article you ran on me is overwhelming (*Studio Sound*, July 2001). I have received some great responses from all over Europe and the US.

The questions reflect an above average readership (as opposed to *EQ* mag, with whom I included my email also). I was impressed with the quality of the photos, as well as the paper—very classy. *Billboard* recently ran one of the same photos, and it was hard to tell it was me. With my face though, it could well have been intentional!

Again, thanks, and if I can return the favour in any way, please call or email.

Dave Pensado, US

The ups and downs of multichannel

I WAS INTERESTED to read Barry's Fox piece entitled 'Love Wars' (*Studio Sound*, May 2001) but he failed to make an important point. BMG's weak argument against putting out recordings with surround sound might have made sense if the only way to play them was with the five loudspeakers that the BMG executive's sister and brother-in-law would not tolerate. However, that is simply not the case. Just as 2-channel sources can and often are played in mono, so multichannel material can be played over 2-channel or even mono systems. DVD-Audio, and of course, Dolby Digital on DVD-Video, such as drew applause at Andrew Evans' demonstration, are designed to reproduce multichannel material with as many or as few loudspeakers as the listener chooses. How else would a DVD player with only a 2-channel output play a movie? In addition, there are other ways to play surround sound than via five loudspeakers (vir-

tual surround or headphone systems).

Just as with stereo, the mixer should check the various likely downmix configurations to make sure there are no problems. Furthermore, again just as with stereo, attempts to cook up more channels than were present in the source ('upmixing'), however pleasing over five loudspeakers, will often be unsatisfactory when downmixed again (remember those pseudo-stereo LPs?).

Kenneth Gundry, Dolby Laboratories, San Francisco

Tools of the trade

I JUST READ the article about the SSL-Pro Tools Studio in Holland in your May 2001 issue of *Studio Sound*. This is the



first time I have given feedback to a magazine, but there are some reasons why I wanted to drop you a line. First of all I really enjoyed reading the article, because I think it reflects totally what's going on right now for producers and studio owners. The same thing happened to me.

Even three years ago, I never thought I was going to do a session without an analogue 2-inch. Now, I can't imagine doing a session without a Pro Tools as the heart of the studio. Not only does it save you so much time, it is also really reliable if one knows how to service Apple and Digidesign products. I sold my 2-inch, and no-one ever asked to record on it since.

Another thing is, that the idea of the Pro Tools in the centre of the console isn't that new. With my and many others thoughts of Pro Tools being the technical

centre of the production, why shouldn't it be in the centre of the room? Most modern studio setups still relate to a time, where the control room and the recording room were strictly divided, and the control room had a standard 'console in the middle—outboard gear behind the desk' setup. When MIDI started to play a role, they just put the computer somewhere on the rack at the back of the control room. Which was still fine, because when it was time to mix, most MIDI edits were done anyway and didn't play a major role at the mix.

With digital workstations like Pro Tools you run into a completely different situation. Doing somewhere between 50%–100% of your mix in the computer, why is someone sitting at the worst listening point of the whole control room?

As the processes of songwriting, tracking, editing, mixing, sound design, start to melt together, the control room becomes a part of that which was earlier done in the recording room. This also means a new design for the control room, for working on modern style music. Even musicians who are not involved in the latest trends of the industry, after working in the studio for a week, all sit around the Pro Tools screen rather than at the TV monitor outside the studio, becoming part of the mixing and sound design process.

I have a double-screen Pro Tools setup in the middle of my Neve series 51. Not only is this very rare, the whole Neve frame is custom built and, at least as far as I know, the only angled Neve frame. On the left side of the console, the setup goes fluently over into a PC which is used as a database for samples and sounds, to transfer WAV's into an Akai sampler via the USB bridge, and for the Nord modular editor.

Behind the desk are the traditional racks of outboard, where one can find a good combination of standards (Lexicon, tc, Focusrite, Distressor, Amek, Tube-Tech) rare vintage gear (Altec 436c, Calrec PQ1061, dbx161, Publison) weird and funky stuff (Sebatron, dbx 503, analogue flanger, phaser) and a good selection of synth modules (Roland, Akai, E-mu, MAM, Jomox).

Nico Berthold, Germany



PHILOSOPHERS TOP 10

- | | | | |
|---|--|----|--|
| 1 | Goethe Get You Into My Life Ⓜ Ⓢ Ⓡ Ⓢ | 6 | Foucault If You Think It's Over Ⓢ Ⓢ Ⓢ Ⓢ |
| 2 | Kant Buy Me Love * * * Ⓢ | 7 | Hulme Make Me Feel Brand New † † Ⓢ |
| 3 | Derrida of the Pack Ⓢ † Ⓢ | 8 | Sartre Say Goodbye * Ⓢ |
| 4 | (Hegel, Yugel) Get Off My Cloud Ⓢ * * Ⓢ | 9 | The Deck of Descartes * * Ⓢ Ⓢ |
| 5 | Nietzsche Love Tonight * * Ⓢ | 10 | Popper Muzik Ⓢ * Ⓢ Ⓢ |

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VOLUME 2

PETER EASTTY

The first of a regular new series of informal *Studio Sound* interviews begins with console designer Peter Eastty facing an eclectic and irreverent selection of questions

PETER EASTTY has been making digital audio signal processors for the last 32 years so he reckons he should be getting it right some time soon. He started with seven years at Electronic Music Studios (EMS) in London creating digital signal processors for the company's in-house studio, used for compositions by Stockhausen, Birtwhistle and Henze. Then came four years at Pierre Boulez' IRCAM (Institut de Recherche et Coordination Acoustique/Musique) in Paris working on signal processor design.

A move to Systems Concepts, creators of the Samson Box processor at Stanford University, began four happy years in San Francisco. A major change saw him join Solid State Logic in Oxford where he began the development of an integrated software-hardware approach to real-time digital signal processing which later became the basis for DSP-based products from both SSL and Sony. After 12 years with Sony, he now divides his time between being chief consultant engineer at Sony Pro-Audio R&D in Oxford and a senior director of the company's SACD team in San Francisco.

Peter can sometimes be seen and heard giving papers at AES conferences and is frequently involved in *ad hoc* audio discussions in the bars and restaurants where audio engineers gather. Among his interests is the study of his two perpetual motion machines, aged seven and nine.

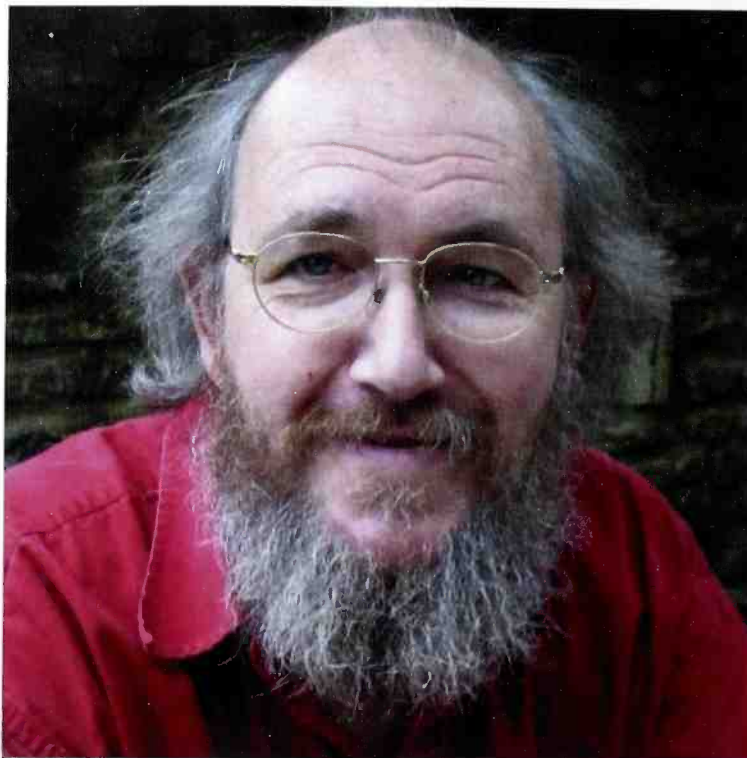
What's the best thing you've designed?

Without doubt the OXF-R3 is the best thing I've worked on. Of course I only 'designed' a small part of the underlying technology. The actual console design as users see it was produced by the team. I guess in a way that's typical of my work in audio. It's nearly all been the result of teamwork. There's something about engineering and particularly audio engineering that attracts good people.

My present work in connection with SACD is likely to be my best. I'm involved with teams of engineers in Oxford and San Francisco working together towards building the best possible audio equipment to make recordings for issue on SACD.

What's the worst thing you've designed?

The DACs on my first big digital machine, the Digital Oscillator Bank at the Putney studios of EMS in the early seventies. Although the digital circuitry, a 64-oscillator, 3-voice, additive synthesis machine with programmable amplitude, frequency, waveform, and so on was a real tour de force for its time. The DACs were totally crap. A 16-bit DAC built by adding together the outputs of a 10-bit DAC and a 6-bit DAC doesn't sound like a good idea, and it wasn't. I know better now but at the time I was surprised that it didn't work!



Which three products have most changed the pro-audio industry?

The combination of the multitrack recorder and the in-line console, and not always for the good. Time code—it may be a filthy compromise full of ugly gotcha's, but without it audio for video would be a very different world. The digital-to-analogue convertor, because that's what made computer music possible and from there on the whole of digital audio became inevitable.

What is wrong with analogue consoles?

Not much really. If you keep them small and manually controlled and test that everything works every day. But a big analogue console ends up with a radio antenna several metres long (called a mix bus) running down the length of it. Digital control of analogue is hard—people have done it but it isn't easy and it isn't cheap and users do expect complete automation, not just faders. And how do you make sure that the whole of a big analogue console is actually working? It's so much easier to make a transparent, big, automated, reliable, digital console than a similar analogue one. But you also have to be able to make transparent, not just 'nice-sounding' convertors and you have to do the processing right with enough bits, proper dither, and so on.

What is wrong with digital consoles?

The more general question is 'What is wrong with digital processing?' And I'm sorry to say that in some cases (not ours of course!) the answer is quite a lot. Basically it all comes down to either not enough silicon or not enough knowledge, or both. There are certainly digital audio products which are engineered to superla-

tive standards but there's also a lot of stuff, particularly inside PCs, which truncates (not dithers) the audio signal to ridiculously small internal word lengths, or doesn't interpolate coefficients, or uses on-screen controls with far too little accuracy or other basically silly techniques. It is possible to make transparent, useable processing, but it usually takes more silicon and more thought than you first believed.

Who is the unsung star of mixing console design?

That's difficult because mixing consoles are big artefacts and they're generally made by teams. But if I have to pick one person it would be the late Colin Sanders, not for designing a console but for designing a team to design a console. The best indicator is that most of Colin's team is spread all over the industry still doing it.

What is the unsung triumph of console design?

The 'producer's panel'. Real money for a table!

If you could change one attitude in pro-audio what would it be?

Okay, this is where I get myself in trouble. It has to be the 'ears versus numbers' battle. On one side we have the search for ever 'sweeter' sounding equipment instead of ever more transparent equipment. I'd like to see engineers start from the position of trying to make artefact-free equipment and then, when they've done that, to try to generate a 'sweet' effect which the user can control. On the other side is the 'it measures OK, it must sound good' fraternity who completely disbelieve the abilities of the trained human ear. Experience says any repeatedly reported audible effect can, in the end, be linked to a measurable attribute of the equipment, but it might take you six months to find it. So in brief, make it transparent first, then add the effect, listen to the equipment and believe what the 'golden ears' tell you.

What three luxuries would you take to a desert island?

A really big Unix box. The BBC World Service. The Pitt Rivers Museum in Oxford.

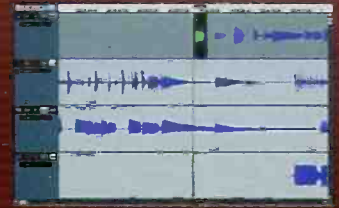
What was the last CD you bought?

The CD version on Deutsche Grammophon of Berg's *Lulu* conducted by Pierre Boulez from the 1979 recording done at IRCAM in Paris. I was working there and I remember with amazement Boulez 'conducting' the segment which involves an off-stage jazz band.

What was wrong and right about it?

How would I know? I'm just an engineer. I have two sets of ears, one for work and one for play. I've only ever listened to this recording with the play set. □

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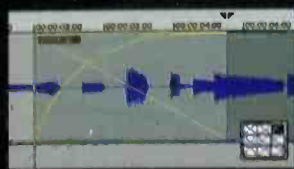
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