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STUDIO SOUND

AND BROADCAST ENGINEERING

INTERNATIONAL PRO AUDIO AND POSTPRODUCTION MAGAZINE

GOING LIVE!

Taking Pink Floyd's Pulse

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Mastering

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To remix or remaster?

Far Eastern Promise

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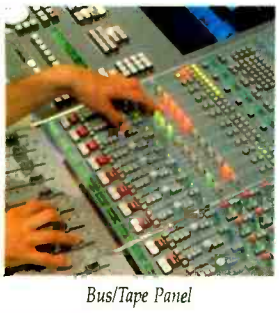

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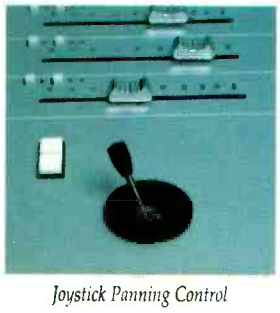
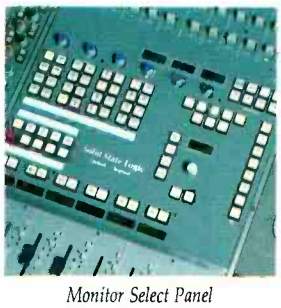


Joystick Panning Control



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Singapore's Far Eastern Promise. See page 29

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His master's voice. See page 69

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un Miller Freeman
A United News & Media publication

System Addiction

Adopting the film *Groundhog Day* as an appropriately unorthodox point of reference, we can see that recording as we presently know it does precisely what *Groundhog Day* does not. While both a sound recording and Bill Murray's unlikely encounters on 2nd February can be termed recursive, only Murray's personal experience of Groundhog Day is interactive—that is, its progress can be affected by Murray's character's input. A sound recording, like a film or still photograph, allows information to flow in just one direction, they are not interactive.

But in every kind of recording, there appears to be an infinite amount of information available. It is impossible to assess, but easy to conceive of the cumulative time mankind has spent poring over still photographs—military intelligence pictures, pictures of dead relatives, pictures of broken dreams... Equally, the study of film and video footage has claimed countless hours of their observers' lives—who can count the impact of the 18 seconds of history as they appear on the notorious Zapruder film of John F Kennedy's assassination? Or the additional attention it demanded when the police 'dictabelt' audio recording was paired up with it some 15 years after the inquest took place?

I have to confess to having some intangible fascination with this curious realignment of time. And recorded audio intrigues as readily as any pictorial medium—perhaps more so. Given the manipulation of people and events that make up any recording session, I—like all pro-audio people—find it impossible to consider the finished work in isolation. Most of us can readily hear edits, overdubs, drop-ins, tracked vocals, signal treatments and so on, and while we strive to retain something of the objectivity of the unenlightened listener, the understanding of these processes ensures that we will never be able to halt our lines of thought.

So what is there in that 3-minute 37-second song? Which musicians were involved? Where was it recorded? What console and monitors are favoured there? Who produced it? What is their track record? Who engineered it? Why were they chosen? Who really shot JFK?

The body of evidence unequivocally establishes the train-spotter element in pro-audio (alongside almost every other business). Whether you consider the issue in pure audio—somewhat abstract—terms or those made tangible by audio trade magazines, consumer audio magazines, lifestyle magazines, music-related television programmes, popular trivia games or simply the conversation that accompanies every damned audio show that is, it is impossible to escape the nebulous nature of what should simply be a matter of 'recording' a song, story or event.

I've done my time in rehearsal rooms, recording studios, photographic darkrooms, and cinema preview theatres—and my time contemplating the ramifications of them all. But these are far removed from the unique quality of the recording process to focus a series of events upon a finite product which can then command an unlimited investment of time and energy in a wide variety of pursuits from research through remorse to pleasure.

Just now both professional and consumer interests are turning increasingly towards 'interactive' media. If we can agree on the power of non-interactive recordings to devour our attention to this extent, we only have to look at the obsessive nature of arcade games to know that interactive entertainment is capable of absorbing our attention in an even more bewildering way.

But then, is not a recording studio simply an exercise in interactive entertainment? Is it not to the obsessively interactive nature of making a record, radio show or television programme that we are already addicted? And if this is so, we need fear the 'interactive future' no longer. We already know that we are lost. ■

Tim Goodyer

Cover: Turbosound *Flashlight* quadrophonic sound system at the Vanderbilt Stadium, Nashville for Pink Floyd's *Division Bell* tour

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World Events

September 1995

● September 6th–9th, **NAB Radio Show (including SBE Engineering Conference and World Media Expo)**, New Orleans Convention Centre, New Orleans, US. Tel: +1 202 429 5350.

● September 7th–8th, **Screen Entertainment Conference**, Conrad Hotel, Hong Kong. Tel: +65 732 1970.

● September 10th–12th, **ECTS**, Olympia Grand Hall, London, UK. Tel: +44 181 742 2828.

● September 10th–13th, **PLASA**, Earls Court 2, London, UK. Tel: +44 171 370 8179.

● September 14th–18th, **IBC 95**, RAI Centre, Amsterdam, Holland.

● September 19th–24th, **Live 95**, Earls Court, London, UK. Tel: +44 181 742 2828.

● September 21st–24th, **Nordic Sound Symposium XVII**, Bolkesjø Mountain Hotel, Norway. Tel: +47 2 79 7730.

● September 22nd–24th, **ShowBiz Europe**, MOC Exhibition Centre, Munich, Germany. Tel: +49 89 47 02 399.

October 1995

● October 3rd–11th, **ITU Telecom 95—the 7th World Telecommunication Exhibition and Forum, PALEXPO**, Geneva, Switzerland. Tel: +41 22 730 5111.

● October 6th–9th, **99th AES Convention**, Jacob K Javits Centre, New York, US. Tel: +1 212 586 5989.

● October 17th–19th, **Vision 95**, Olympia, London, UK. Tel: +44 181 948 5522.

● October 18th–19th, **SoftExpo**, RAI International Exhibition and Congress Centre, Amsterdam, The Netherlands. Tel: +1 303 745 5711.

● October 23rd–25th, **European Cable Communications 95**, Olympia, London, UK. Tel: +44 171 222 2900. ● October 24th–26th, **REPLItech Asia**, Singapore International Exhibition Centre, Singapore. Tel: +1 212 643 0620.

● October 25th–28th, **Broadcast Cable and Satellite India 95**, Pragati Maidan, New Delhi, India. Tel: +91 11 462 2710.

November 1995

● November 1st–5th, **Audiovideo-95**, Lenexpo Exhibition Complex, St Petersburg, Russia. Tel: +7 812 119 6245.

● November 2nd–4th, **Broadcast India 95**, World Trade Centre, Bombay, India. Tel: +91 22 215 1396.

● November 7th, **Sound Broadcasting Equipment Show (SBES)**, Metropole Hotel, Birmingham, UK. Tel: +44 1491 838575.

● November 7th–9th, **Wireless World Expo 95**, Moscone Centre, San Francisco, US. Tel: +1 301 986 7800.

● November 9th, **20th Sound Broadcasting Equipment Show, SBES**, Metropole Hotel, NEC, Birmingham, UK. Tel: +44 1491 838575.

● November 21st–23rd, **Visual Communications 95**, London, UK.

● November 23rd–27th, **9th International Audio, Video, Broadcasting and Telecommunications Show (IBTS)**, South Pavilion, Milan Fair, Milano-Lacchiarella, Italy. Tel: +39 2 481 5541.

● November 28th–30th, **Computer Graphics Expo 95**, Wembley Conference and Exhibition Centre, London, UK. Tel: +44 181 995 3632.

December 1995

● December 5th–9th, **Expo Comm China South 95**, Guangzhou Foreign Trade Exhibition Centre, Guangzhou, Peoples Republic of China. Tel: +86 1 841 5250; US Tel: +1 301 986 7800.

● December 6th–9th, **Communications India 95**, Pragati Maidan, New Delhi, India. Tel: +91 11 462 2710.

January 1996

● January 5th–7th, **Showbiz Expo East**, New York Hilton and Towers, New York, US. Tel: +1 513 8400.

● January 30th–February 1st, **SortExpo 96**, Santa Clara Convention Centre, Santa Clara, US. Fax: +1 303 745 5712.

February 1996

● February 6th–8th, **The ISDN & Broadband User Show**, Olympia 2, London, UK. Tel: +44 1733 394304.

● February 11th–14th, **SIEL 96**, Paris, France. Tel: +33 1 45 22 35 40.

● February 13th–16th, **Expo Comm Mexico 96**, World Trade Centre, Mexico City, Mexico. Tel: +1 301 986 7800.

THE NAB RADIO SHOW, NEW ORLEANS

New Orleans, US. As part of The World Media Expo, this year's NAB Radio Show recognises the 75th anniversary of America's first radio station. Around this theme, the show's 400 plus exhibitors will highlight the latest technology in Digital Audio Broadcasting, data broadcasting, the Internet and automation station operation to an anticipated audience of over 15,000 broadcast, film and production personnel.

NAB will incorporate a number of events including planned visits to a number of New Orleans' radio stations and seminars covering a wide variety of subjects from digital radio through more general new technology issues to station staffing strategies. The direction of the show is kept close to the cutting edge by a 21-member steering committee under the Chairmanship of EZ Communications' Alan Box and made up of experienced American broadcast professionals.

Also under the World Media Expo banner are annual conferences of the American Radio-Television News Directors Association (RTNDA), the Society of Broadcast Engineers (SBE) and SMPTE. The SBE Conference alone will feature five workshops and nine technical sessions. The theme here is 'Face to Face with Change'. The presentations will include the following categories: EAS and Unattended Operation; Digital Technology for Radio; RF for Radio; RF for TV; Digital Technology for TV and Safety and Liability. The speaking programme involves some 40 key people. ■

The NAB Radio Show, New Orleans Convention Centre. September 6th–9th, 1995. Fax-on-demand services: The NAB Radio Show: +1 301 216 1847. World Media Expo: +1 301 216 1847.

March 1996

● March 11th–14th, **DSPx 96**, San Jose Convention Centre, San Jose, US. Tel: +1 203 840 5652.

● March 13th–17th, **Musikmesse and Pro Light & Sound**, Messe, Frankfurt, Germany. Tel: +49 69 7575 6662.

April 1996

● April 4th–7th, **Broadcast Thailand**, Queen Sirikit National Convention Centre, Bangkok, Thailand. Tel: +66 2 503 2199.

● April 21st–23rd, **Midcab & Midsat 96**, Abu Dhabi Exhibition Centre, UAE. Tel: ++971 4 310551.

● April 23rd–25th, **Entech 1996**, Sydney Exhibition Centre, Sydney City, Australia. Tel: +61 2 876 3530.

● April 23rd–27th, **Information Super Highway China 96**, Beijing Exhibition Centre, China. Tel: +86 841 5250.

May 1996

● May 11th–14th, **100th AES Convention**, Bella Centre, Copenhagen, Denmark. Tel: +45 9785 1122.

● May 14th–16th, **Midem Asia**, Hong Kong. Tel: +33 1 44 34 454 44.

● May 25th–28th, **Pro Audio, Light & Music China 96**, Beijing Exhibition Centre, Beijing, China. Tel: +852 2861 3331.

● May 28th–30th, **7th Conference and Exhibition on Television and Audio Technologies**, Thermal Hotel Helia, Budapest, Hungary. Tel: +36 1 153 0127.

June 1996

● June 4th–7th, **Broadcast Asia**, World Trade Centre, Singapore. Tel: +65 338 4747.

● June 10th–15th, **Americas Telecom 96**, Rio de Janiero, Brazil. Tel: +41 22 730 6161.

● June 20th–22nd, **World Lighting Fair 96**, Pacifico Yokohama Exhibition Hall, Yokohama, Japan. Tel: +81 3 3706 5687.

July 1996

● July 10th–12th, **Pro Audio & Light Asia 96**, World Trade Centre, Singapore. Tel: +65 227 0688.

September 1996

● September 18th–23rd, **photokina**, KölnMesse, Cologne, Germany. Tel: +49 221 821-0.

November 1996

● November 5th–9th, **PT/Expo Comm China**, China International Exhibition Centre, Beijing, Peoples Republic of China. Tel: +52 525 592 3257; US Tel: +1 301 986 7800.

● November 7th–10th, **101st AES Convention**, LA Convention Centre, Los Angeles, California, US. Tel: +1 213 258 6741.

● November 15th–18th, **Tonmeistertagung**, Stadhalle, Karlsruhe, Germany. Tel: +49 2204 23595.

February 1997

● February 22nd–25th, **Middle East Broadcast 97**, Bahrain International Exhibition Centre. Tel: +44 171 486 1951. ■

For your World Event to be included, or updated, contact the Editor during your nearest appropriate time window. Fax: +44 171 401 8036. E-mail: cz73@cityscape.co.uk.

International News

In brief

● Focusrite distribution

Focusrite have appointed new distributors in several territories. In Singapore they will be handled by Team 108 Technical Services Private; in Russia by ISPA; in Portugal by Caius Tecnologia Audio e Musica; and in Spain by Media Sys.

Focusrite Audio Engineering, UK.
Tel: +44 1628 819456.

● *Micron* distribution

Audio Engineering, manufacturers of the *Micron* range of radio-microphone systems, have announced the appointment of VW Marketing to handle their sales in several Far Eastern territories. VW, rapidly building an growing client list in the Far East and Pacific Rim areas, will be responsible, initially, for *Micron* sales into Singapore, Malaysia, Taiwan and New Zealand.

Audio Engineering, UK.
Tel: +44 171 254 5475.
VW Marketing, UK.
Tel: +44 1372 728481.

● Galaxy and Valley expansion

Galaxy Audio and Valley Audio are relocating to a 27,000ft² building adjacent to their current factory. The larger space will allow woodworking and finishing capabilities and an expanded engineering lab for product development.

Galaxy Audio, US.
Tel: +1 316 263 2852.

● Changes at Decca

Tony Griffiths is to transfer from Decca's Recording Centre to become a consultant for Polygram International on technical audio and video development. His place as General Manager of the Recording Centre will be taken by David Harries, well known for his work at Air Studios in London.

The Decca Record Company, UK.
Tel: +44 181 747 8787.

● Floyd *Pulse* on ISDN

Prior to the US launch of Pink Floyd's *Pulse* album, Columbia Records staged a competition where winning Floyd fans would get the opportunity to talk directly to the band. This was handled at The Bridge in London where callers from apt-equipped studios throughout the US questioned Pink Floyd members via ISDN links. The Q&A session was recorded and the subsequent launch programme, which featured tracks from the new album, was produced at The Bridge before stereo transmission back to the US via ISDN through apt's *DSM100* Digital Audio Transceiver.

apt, UK. Tel: +44 1232 371110.
apt, US: Tel: +1 213 463 2963.
apt, Japan: Tel: +81 3 3520 1020.

● EAW Australian distributor

Eastern Acoustic Works have appointed Production Audio Services as the exclusive distributor for their ▶

First HDCD Encoders shipped

Pacific Microsonics have announced that the first production versions of the HDCD (High Definition Compatible Digital) professional encoder have been shipped to customers, with full production expected to begin in August. According to Pacific Microsonics' President Michael Ritter, 'Everyone in the recording industry who has had a thorough demonstration of the HDCD process has placed an order for an encoder.'

The HDCD process is an encode-decode system that reduces both additive and subtractive distortions in digital-audio recordings, using a professional encoder in the studio and a low-cost decoder chip in the CD player. The decoder chip is claimed to give significant improvements to the reproduction of standard, non-HDCD recordings, and conversely an encoded CD is claimed to sound better without decoding than a conventional CD.

Pacific Microsonics, US.
Tel: +1 510 644 2442.

Florida, US: The men from Sabine break new ground. The construction has just begun on a new 45,000ft² building near Alachua destined to become Sabine's new facility. It will include office and manufacturing space for Sabine's 85 employees plus room for expansion. The building is expected to be complete within six months. (Left to Right) Doran Oster, President; Gary Miller, Director of Engineering and Robert Rothschild, Director of Sales and Marketing prepare to dig for Victory. Sabine, US. Tel: +1 904 371 3829.

A2D in business

A2D, the recently commissioned British-based mobile-recording facility set up by Doug Hopkins & Gary Stewart, has been enjoying busy times with a wide variety of projects.

On VE Day it was at the Royal Albert Hall for the BBC recording of the *Pavarotti Gala Concert in Aid of the Red Cross*, using a Sony *PCM-3348* with Tascam *DA-88* backup; two *3348*s were used on *Channel 4 goes to Glyndebourne*, which included a live transmission of *Ermione* to NHK in Tokyo; the Stanmer Park Festival in Brighton (three days of rock, reggae and soul) went straight to stereo for *The Pier* for TV; and 24-track analogue SR was used for Frankie Miller's benefit gig at London's Rock Garden featuring Bonnie Tyler, Gary Brooker and Andy Fairweather-Low.

Besides being able to offer such a range of formats, the truck features a custom-built, 48-track, in-line console designed and built by Malcolm Toft Associates.

A2D, UK. Tel: +44 1342 826800.

Axiom for BBC mobile

The BBC's new Digital Sound Vehicle, featuring SSL's *Axiom* Digital Production System, made its first public appearance at the recent ITS Convention in Montreux. The vehicle, which will be used for a wide variety of radio, television broadcasts and location recordings, features a 48-channel *Axiom* console and 48-track *DiskTrack*. The system has 108 remote mic amps, MADI interface and a removable wing to enable the sides of the truck to be retracted for transit.

Gerry Clancy, Head of Operations, BBC Radio Outside Broadcasts, comments: 'The establishment of a fully digital-audio mobile unit is part of the BBC's commitment to the widespread application of digital technology in the production chain. The audio vehicle complements the recently completed Digital, Widescreen TV, OB Control Vehicle, and will provide high quality source material for the Corporation's DAB and NICAM Digital Stereo transmissions.'

One of the first assignments for the new vehicle is audio production for the centenary Promenade Concerts currently under way at the Royal Albert Hall. Besides its internal use for operas and concerts both classical and pop, the mobile will also be available during certain periods for external projects, and according to Clancy there is already considerable interest from some of the classical labels.

Alongside news of the BBC's new mobile comes the announcement of the sale of an *Axiom* system to ABC for use at its New York production headquarters. ABC will install a specially configured Axiom with 24 mono and 24 stereo channels, together with a 48-track *DiskTrack* recorder-editor.

SSL, UK. Tel: +44 1865 842300.
SSL, US: Tel: +1 212 315 1111;
+1 213 463 4444.
SSL, Japan: Tel: +81 1 3 5474 1144.

Thames wins BBC contract

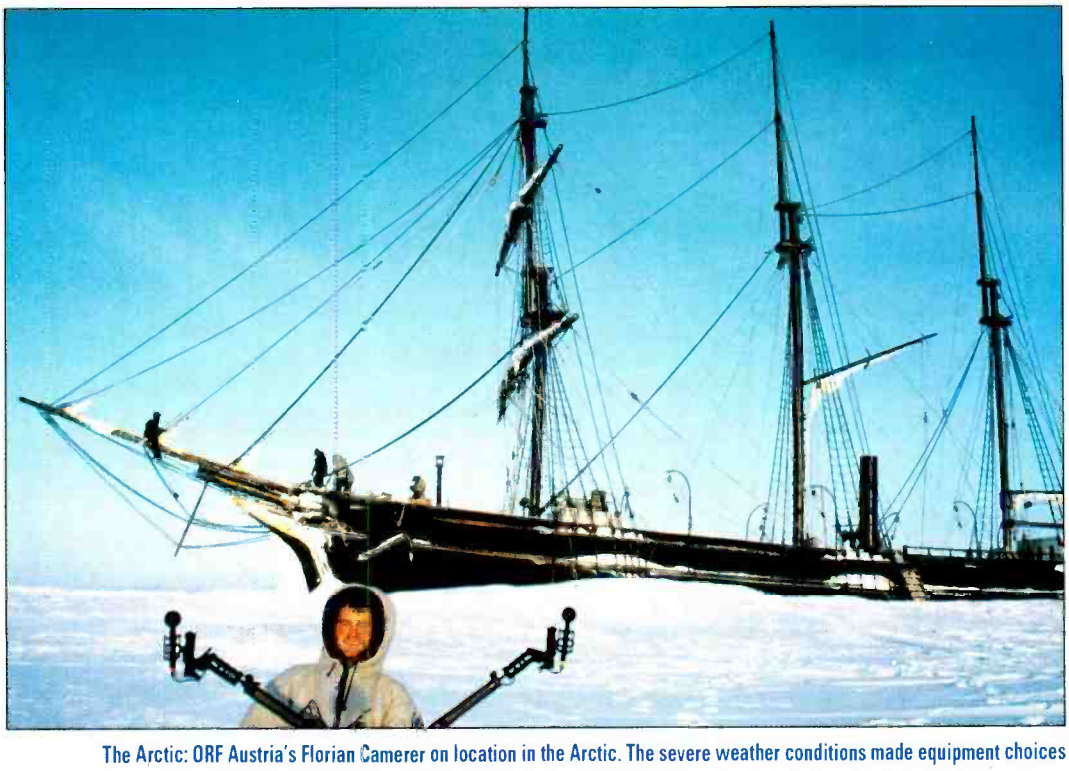
Thames Engineering, formerly part of independent TV company Thames Television, have been awarded the contract to supply, install and commission a new dubbing suite at the BBC's new White City building for BBC Postproduction Resources. It will be used primarily for the popular science programme *Tomorrow's World*. This is the second BBC contract Thames Engineering have won in recent weeks, following the commission for a digital edit suite at Broadcasting House in Cardiff.

All signal routeing and most processing in the new suite will be AES 44.1kHz digital audio. A Yamaha *DMC1000* desk will complement the Avid *AudioVision* with *MicroLynx* edit system. Technical facilities for a commentary booth will be constructed as part of the contract, with other sources including a Nagra-T, DAT, CD (including a CD jukebox) and a *PCM800*. Both video and audio routeing switchers will be provided by Pro-bel.

Thames Engineering, UK.
Tel: +44 181 614 2800.

Mics below zero

ORF Austria have completed an extraordinary project on location in the icefields of the Arctic archipelago known as Franz Joseph Land, 600km from the North Pole. The film-making team called themselves 'The Glacionauts' and for Sound Engineer Florian Camerer it was the third



The Arctic: ORF Austria's Florian Camerer on location in the Arctic. The severe weather conditions made equipment choices particularly critical — a selection of B&K mics and a Soundfield *ST250* withstood the sub-zero temperatures

expedition to the Arctic. To capture the atmospheric background, including sounds of ice cracking, various bird noises and winds of up to 90km/h, Camerer used a DAT recorder encased in a heated bag to cope with temperatures as low as -45°C. Most of the microphones were B&Ks, chosen partly because their nickel diaphragms have a very low temperature gradient compared with other materials like Kevlar which stiffen in the cold, altering the frequency response. Camerer elaborates: 'I used a number of B&Ks—*4006*s, *4007*s and a matched pair of *4011*s—and the omnis proved especially good for atmosphere recording. As omnis are, by design, some 20dB less susceptible to handling and wind noise than pressure gradient microphones, they are well suited to this task.

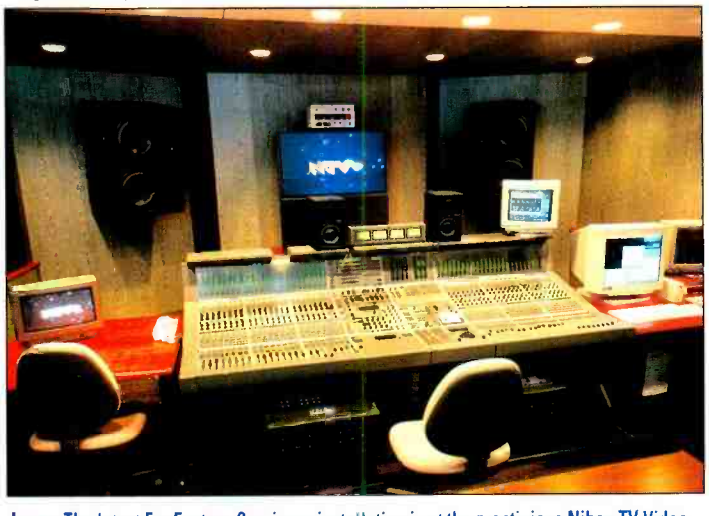
'I made quite extensive use of the *APE* adaptors. Firstly, they altered the directional sensitivity characteristics of the *4006* to varying degrees depending on size. At the same time, the on-axis frequency response of the microphone is altered. With windscreens, you tend to lose highs around 5kHz–10kHz, and I like the way that the *APE*s compensate acoustically for this.

'I created a special mount for the two microphones, forming an AB stereo configuration, which could be carried on my backpack, allowing me to have my hands free. By the way, this strange-looking mount was nicknamed "the fluffy elk" because of the long-haired wind jammers!

'During almost six months of working in the Arctic, I never had one single problem with the B&K mics —they performed without a fault and were reliable partners in even the hardest conditions. They are very remarkable tools for a recording engineer, and should certainly not be left at home when working in demanding circumstances like the North Pole.'

Also included in Florian Camerer's microphone kit was a SoundField *ST250*, which was also found to perform faultlessly down to -30°C. Used for its coincident stereo image and remote adjustment, the microphone was used battery-powered mounted in its Rycote windshield.

Danish Pro Audio, Denmark.
Tel: +45 48 14 28 28.
SoundField Research, UK.
Tel: +44 1924 201089. ▶



Japan: The latest Far Eastern Capricorn installation is at the prestigious Nihon TV Video Corporation where the console will see service in a completely digital postproduction environment on Japanese television work. AMS Neve, UK. Tel: +44 1282 457011.

Contracts

● AMS Neve go East

An all-new audio production facility in Bangkok has installed two AMS Neve Logic consoles, adding to the 25 *Logic*s in the region. The *Logic 2* and *Logic 3* delivered to Loxley Video Post are both fitted with 16-output *AudioFile Spectra* systems. Elsewhere, A-String in Taipei have purchased their second *Capricorn* digital console, and Beijing TV have ordered a 48-fader *Capricorn* and an 8-fader *Logic 3* with 16-output *AudioFile Spectra*.

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

● Turbosound on the road

Heading down under is Australia's first Turbosound *Flashlight* rig, 16 stacks of *Flashlight* and 24 stacks of *Floodlight* for Australian Concert Productions of Sydney. Turbosound rigs were also in use on the recent Glastonbury festival, with 24 flown *Floodlight* enclosures and 15 bass bins each side. Also featured at Glastonbury, on the Avalon Stage, was a system centred on a Soundtracs *Sequel II* from local firm Precision PA.

Turbosound, UK.
Tel: +44 1403 711447.
Soundtracs, UK.
Tel: +44 181 388 5000.

● Fairlight on the map

Recent Fairlight international sales include a 24-track, 24-input, 24-output *MFX3* to the SSL-AT&T-equipped Sound Studio in Cologne and a similar *MFX3* to the Gleseng Team postpro facility in Munich. In France, an *MFX Mini* now complements the *MFX3 Mainframe* in France 2 TV's Lightworks suite, a second *MFX3* has been installed in the La Frette Paris postpro house and Producer James Vacherot has installed an *MFX3* in his Studio Freber audio suite.

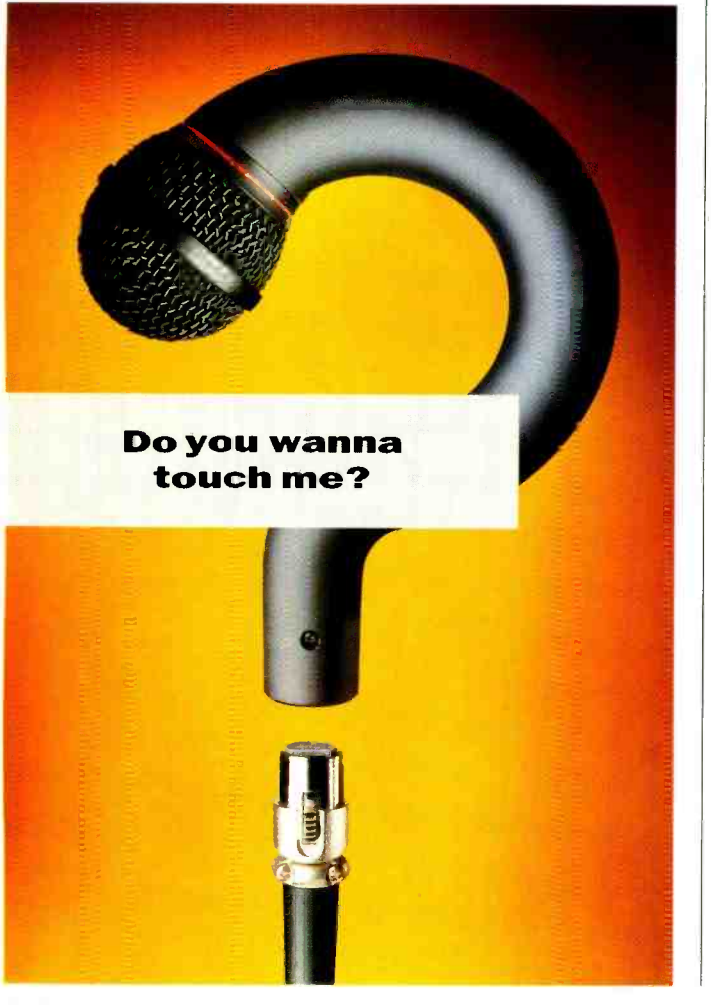
Fairlight ESP, Australia.
Tel: +61 2 212 6111.
Fairlight ESP, UK.
Tel: +44 71 267 3323.
Fairlight ESP, US.
Tel: +1 213 460 4884.

● Seem seem fine

Seem Audio have announced a variety of sales in several territories including Dutch broadcasters: Radio Noord, the regional broadcaster in Groningen, and Dutch National Broadcaster NOB. Radio France have ordered a second *Seelect* on-air console. Elsewhere All India Radio have ordered 13 Seeport mixers, equipped with the new light modules. Seeports have also been ordered by customers in France, Norway and Australia.

Seem Audio, Norway.
Tel: +47 66 98 27 00. ■

UK: CTS Studios Wembley have taken delivery of the first 24-bit D827 multitrack in the UK. This is the first time in the world that the extended resolution Studer will be working with CTS' other new acquisition, the AMS Neve *Capricorn*, and also the first time DASH compatible, true 24-bit, recording and mixing is being made available in a commercial studio. CTS Studios, UK. Tel: +44 181 903 4611. Fax: +44 181 903 7130. Studer, UK. Tel: +44 1707 665000. Studer, US. Tel: +1 415 326 7030.



It's Fun to Learn at the YMCA

Studio Y, Leicester YMCA's 16-track studio and MIDI suite is offering two sound-engineering courses designed primarily as introductions to recording. They assume no previous knowledge, and are ideal for beginners.

Course 1 is a one-evening course, giving insight into the workings of a commercial studio, and providing a basic understanding of the studio's equipment, while Course 2 is a 12-week Certificate Course. This is a more comprehensive, hands-on introduction to the recording process, and covers the basics of the recording chain, right from the principles of sound. Some students may also be offered the opportunity of some work experience during commercial sessions.

Leicester YMCA Arts and Leisure Complex, UK. Tel: +44 116 2556507.

Deutsche Welle go *Dalet*

Deutsche Welle, one of Germany's oldest and largest public broadcasters, are rapidly moving towards full digitalisation of their programmes. A recent move was the acquisition of a *Dalet* digital audio system from Thum & Mahr to produce and broadcast part of their English language programming. This is the first phase in a large project to replace all traditional broadcasting equipment with cutting-edge audio networks.

The goal now is for all audio material to be broadcast digitally by 1997, by which time all newsroom workstations should have direct access to the complete audio archive. The current installation will evolve toward a network with 100 workstations all accessing the station's audio material through a central database, and the initial network of ten *Dalet* workstations is now being expanded to 27, all accessing a central server. The *Dalet* system currently comprises a Hewlett Packard server with a 90MHz Pentium processor, 384Mb RAM, and three fault-tolerant RAID 5 hard-disk arrays for a total 135Gb hard-disk capacity. Deutsche Welle are starting off with 1,200 hours of audio storage.

Thum & Mahr, Germany.
Tel: +49 21 73 96730. ■

In brief

professional loudspeaker systems throughout Australia. Production Audio Services, established in 1982, have offices in Melbourne and Sydney, and already handle lines from Countryman Associates, Crest Audio, Gentner and ProCo.

EAW, Europe. Tel: +44 1223 416660.

● **Audio goes to Cambridge**

Anglia Polytechnic University at Cambridge have a new BSc. Honours degree course in Audio Technology starting in September 1995. Currently a 3-year full-time course, it includes modules on acoustics recording and reproduction (with studio practice), MIDI implementation, computers in music, digital and music technology, and digitally generated music. All modules are supported by extensive practical sessions and workshops.

Anglia Polytechnic University, UK.
Tel: +44 1223 363271.

● **Design FX hire editing systems**

In a new American venture, Design FX Systems of LA claim to be the first company in the industry to offer a comprehensive selection of digital-audio editing systems for hire. They offer rental and support for no less than seven workstations: AMS *AudioFile Plus*, Avid *AudioVision*, Digidesign *Pro Tools*, Fostex *Foundation 2000 RE*, Sonic Solutions, Studer *Dyaxis* and TimeLine *StudioFrame*. The company are also handling the rental of accessories for these seven systems, including hard drives, cables and ancillary gear.

Design FX Systems, US.
Tel: +1 310 838 6555.

● **Chris Hollebone to TimeLine**

TimeLine Inc, have opened their first European sales, marketing and customer services support centre in Wallingford, Oxfordshire. Covering the UK, Europe and the Middle East, the centre will be managed by Chris Hollebone as Director, European Operations. Hollebone has had a well-known career covering top-flight classical, jazz, pop and rock recording including a stint with The Manor Mobile. Since 1980 he has been with Sony Broadcast, being appointed General Manager in 1989.

TimeLine Europe.
Tel: +44 1491 826889.

● **New Drake Sales Manager**

Drake Electronics have appointed Vishnu Vasudeva as Sales Manager of their expanding Automation and Systems Division. Vasudeva was previously Director of Corporate Marketing at the PESA Group.

Drake Electronics, UK.
Tel: +44 1707 333866. ■

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ORF Austria
WDR Germany
NHK Japan
Machine Head
France 2
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Metropolis Audio
Waves Sound Recorders
Hessischer Rundfunk
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Spectrum Films
Modern Videofilm
EFX Systems
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Imagica
NFL Films
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THE WORLD'S FASTEST DIGITAL AUDIO WORKSTATION

Quad & Spendor's alliance for a new loudspeaker range

Quad & Spendor joint venture

Quad Electroacoustics and Spendor Audio Systems have reached an outline agreement whereby Spendor are to design and manufacture an exclusive range of loudspeakers to complement the existing Quad audio components. The new enclosures, designed by Derek Hughes, son of Spencer Hughes founder of Spendor, are to be launched in September.

Spendor Audio Systems, UK.
Tel: +44 1323 843474.
Quad Electroacoustics, UK.
Tel: +44 1480 52561.

Weiss Gambit Series *ADC1*

The *ADC1* is a novel A–D convertor from Weiss Engineering, with a modular internal construction to allow future upgrading and the addition of options. The 20-bit convertor is built into a replaceable module. The line amp and optional mic preamp are also modular. Features include external synchronisation possibilities, remote-controlled, relay-operated, click-free, sensitivity switching, and a separate AES-EBU input for sync and with access to the *ADC1*'s processing. Current processing includes redithering to 18 or 16 bits, with further processing features in the pipeline. Two, 40-segment, bar-graph meters incorporate peak hold and user-programmable Over LEDs, allowing the number of consecutive full-scale samples constituting an Over to be set.

Daniel Weiss Engineering, Switzerland. Tel: +41 1 940 20 06.

Klark Teknik *DN6000*

Klark Teknik have launched a new audio analyser for providing high-resolution, spectrum-time, analysis. Pictured for the first time on *Studio Sound*'s July 1995 cover, the *DN6000* performs real time 1/3-octave and 1/6-octave spectrum, LET, LEQ and RT60 analysis to a resolution of 0.2dB. It incorporates microphone and line-level inputs, with a 20dB trim control to allow optimum visual display.

The *DN6000* is designed to conform to Type 1 specifications of IEC 804 and IEC 651, the standards for integrating averaging sound-level meters. Thirty-two memory positions are available to store spectrum-analysis data and a further 16 positions for LET-LEQ-RT60. Accumulation of measurements can be achieved to build up a composite average—it can automatically analyse a whole evening's or even a whole week's data.

Other features include an internal signal generator, output parallel-printer port and a data-output port to link with the *DN3600* programmable graphic ▶

In brief

● ARX Cinema Pro range

ARX Systems have launched their new Cinema Pro range with the *CP32* Three Channel Electronic Crossover. Aimed at both the cinema and the growing home entertainment market, the *CP32* features a 3-channel 2-way crossover with full 24dB Linkwitz-Riley filter performance. Other features include user variable crossover frequencies, user definable LF EQ for Theile alignments, tamper-proof variable HF level and EQ for constant directivity HF units and-or screen compensation, plus electronically balanced XLR inputs and outputs.

ARX Systems, Australia.
Tel: +61 3 9555 7859.

● RADAR Screen

Latest additions to the Otari *RADAR* system include RADAR-GUI, a new graphical interface which intelligently displays all operator functions and tracks. It requires a specified plug-in video adaptor, free software from Otari, and a RAM expansion to 8Mb, and is retrofittable to existing systems. *RADAR*s using removable disks can now be operated in 'true background backup mode'. This needs an external PC fitted with the Otari CM-24 slot card and connected to *RADAR Store-4*, a storage unit with removable hard disks and an Exabyte drive. Project changeover only requires a few minutes to change drives while backup is performed silently in the background.

Otari, Germany. Tel: +49 21 591778.

● TL Audio *VI-1*

The latest valve outboard unit from TL Audio is the *VI-1* 8-channel interface. Particularly well suited to the new breed of tape-based digital multitrack recorders, the *VI-1* sits between the mixing desk and the multitrack adding 'the warmth of the valve characteristic'. A unity-gain feature allows the *VI-1* to be seamless in operation. The first sale is already assured and will go to Ian Sylvester at Digital Audio Technology in London.

TL Audio, UK.
Tel: +44 1462 490600.

● HHB *Brainstorm*

The American *Brainstorm* range is to be handled exclusively in the UK by industry stalwarts HHB. The line includes the *SR1* and *SR1X* time-code refreshers, *SR2* and *SR2X* time-code refresher/frame-rate readers, the *SR26* time-code distributor-reshaper and the popular *SR15+* time-code distripalyser which allows a time-code stream to be analysed and repaired and can also ▶

DN6000

REAL TIME AUDIO SPECTRUM ANALYSER

Sensitive audio analysis.

The new DN6000 Spectrum Analyser from Klark Teknik is sensitive enough to measure one of nature's quietest creations.

By incorporating the latest DSP technology, the DN6000 provides superb, high resolution spectrum/time analysis, plus all the flexibility, quality and reliability you expect from the world's leader in signal processing.

It performs real time 1/3 and 1/6 Octave spectrum, LET, LEQ and RT60 analysis to a resolution of 0.2dB – and incorporates microphone or line level inputs, with a 20dB trim control to allow optimum visual display.

In fact, the DN6000 is designed to conform to Type 1 specifications of IEC 804 and IEC 651 – the standards for integrating averaging sound level meters.

Thirty two memory positions are available to store spectrum analysis data and a further sixteen for LET/LEQ/RT60. Also, accumulation of measurements can be achieved to build up a composite average. It can automatically analyse a whole evening's or even a whole week's data.

Other features include an internal signal generator, output parallel printer port and a data output port to link with the DN3600 programmable graphic equaliser, allowing auto equalisation.

For further information please contact Klark Teknik or your nearest agent.

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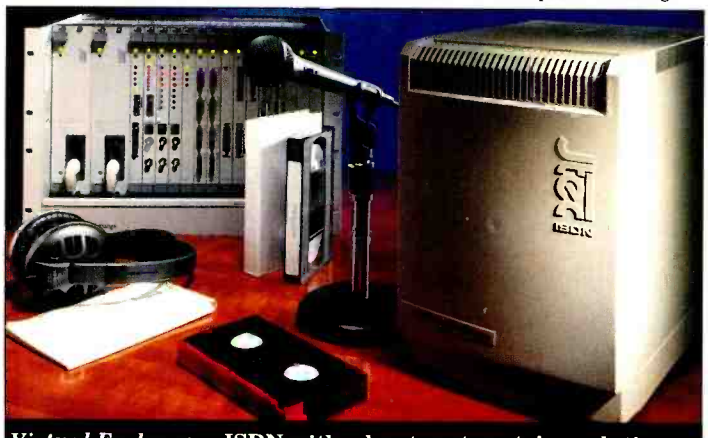
Klark Teknik PLC, Walter Nash Road, Kidderminster,
Worcestershire DY11 7HJ, England. Tel: (01562) 741515 Fax No: (01562) 745371.

equaliser, allowing automatic EQ.
Klark Teknik, UK.
Tel: +44 1562 741515.

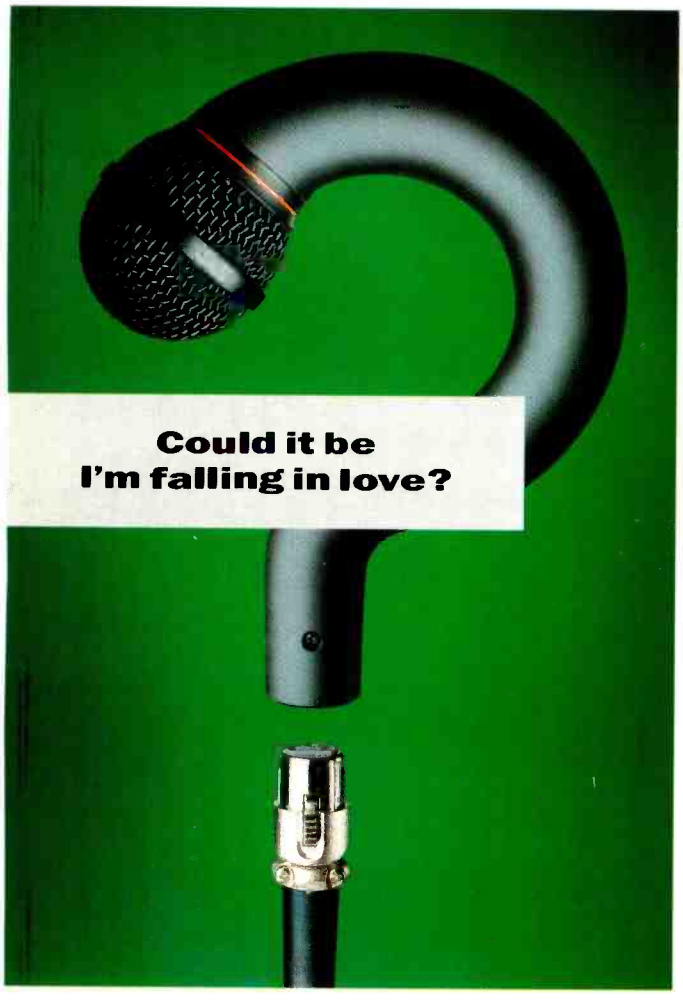
Virtual Exchange

Jtec have launched the *Virtual Exchange* (*VX*), a modular ISDN access controller designed to revolutionise companies' use of both fixed-leased digital networks and ISDN. Developed for use in a wide range of applications it is particularly suited to telecommunications requirements within the broadcasting industry.

The *VX* provides simultaneous voice and data capabilities, and by adding the functionality of a public-network telephone exchange into a Jtec multiplexer provides users with the benefits of ISDN capabilities over leased lines. When used in conjunction with leased lines, *VX* can automatically reroute calls via ISDN as lines become full, and divert calls over the ISDN if leased lines are faulty, with the aim of always providing a least-cost routeing solution. *VX* can also handle channel aggregation of multiple lines to form larger pipes for large file transfer and high-definition video.
Jtec, UK. Tel: +44 1494 473757.



***Virtual Exchange*—ISDN with a least-cost routeing solution**



Telemetrics Digital Bin

The American Telemetrics company have achieved a price breakthrough on digital bins for audio-cassette duplication with the introduction of the *DBS-1000* system. For less than half the price of currently-available systems, the *DBS-1000* provides a complete mastering station and a digital bin capable of 64:1, 80:1 and 128:1 duplication ratios with up to 26 hours of programme storage on hard-disk arrays. Telemetrics see the system as opening up the advantages of digital duplication to a new market of independent duplicators.

The *DBS-1000* system uses Pentium-based computers as CPUs in both *Mastering Station* and *Digital Bin*. The memory bank consists of two RAID hard-drive systems, one for each stereo programme. Convertors are all 16-bit linear, and sampling rates are 44.1kHz for 64:1 and 80:1 and 32kHz at 128:1.
Telemetrics, US.
Tel: +1 408 866 4808.

Midas *XL42* Equaliser

Midas have launched a new EQ, the 1U-high, dual-channel *XL42*. Each channel incorporates not just Midas *XL4*, 4-band, EQ but, effectively, a full channel, from phantom-powered mic preamps to output level and pan controls. Each channel has DIP switches to enable automute-scene control from the automute masters of the XL range of Midas consoles, and multiple units can be daisy-chained together to create custom mixing systems.
Klark Teknik, UK.
Tel: +44 1562 741515. ▶

In brief

provide a printed error report if the unit is connected to an external printer.
Audio Intervisual Design, US.
Tel: +1 213 845 1155.
HHB Communications, UK.
Tel: +44 181 962 5000.

● **Otari *DTR-8* DAT**

Otari's latest DAT recorder is the *DTR-8* 2-head bitstream machine. The *DTR-8* employs SCMS inhibit, parallel I-O, I-O level switching (+4dBu–10dB), 32kHz, 44.1kHz and 48kHz sampling rates, AES-EBU and SPDIF interfaces.
Otari, Japan. Tel: +81 4 2481 8626.
Otari, US: Tel: +1 415 341 5900.
UK: Stirling Audio Systems.
Tel: +44 171 372 6370.

● **Anatek SR-7**

New from Anatek is an 'affordable' digital signal convertor. The *SR-7 is a* 1U-high, 19-inch Canadian unit that supports AES-EBU, SPDIF and optical interface; 32kHz, 44.1kHz and 48kHz sampling rates (flexible 25kHz–55kHz) 20-bit resolution (-108dB THD+n); and various I-O connections including XLR, RCA and optical. Input-jitter reduction and copy-inhibit blocking are also featured. The *SR-7* is expected to retail for $599 (US).
Anatek, Creation Technologies, 3938 North Fraser Way, Burnaby, British Columbia V5J 5H6, Canada.
Tel: +1 604 430 4336.
Fax: +1 604 430 4337.

● **Orban releases**

The *8208* from the American Orban company is a new digital stereo encoder which is due to be launched at the forthcoming IBC. The *8208* is a high-performance unit which operates entirely in the digital domain and is suitable for use in both digital and analogue installations.
Also for release at IBC is v5.1 software for Orban's *DSE 7000* digital audio radio workstation. The new software offers new locate marking and is free to all *DSE 7000* owners.
Orban, 1525 Alvardo Street, San Leandro, California 94577, US.
Tel: +1 510 351 3500.
Fax: +1 510 351 0500.
Orban Europe: 52 Naseby, Hanworth, Bracknell, Berks RG12 7HD. Tel: +44 1344 412342.

● **Avid *Quantum* leap**

Software v5.5 for Avid's *Media Composer* and *Film Composer* digital A-V workstations is expected to ship by the end of August. With most advances concentrated on video processing, v5.5 offers 3D effects and a QuickTime codec running independently of hardware. ▶

AMEK

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System 9098
Remote Controlled Mic Amplifier
by Rupert Neve the Designer

The need for excellent microphone signal quality in contemporary audio production has never been greater. Although the audio path may be fully digitized, the microphone remains the primary interface between the signal path and the real world.

A microphone cannot feed long lines without signal degradation; lengths in the order of 25 metres can degrade performance audibly and even in a normal recording studio, cable runs are often greater than this. Critical importance therefore attaches to the performance of the microphone amplifier, whether its output is in the original analogue form or converted to digital.

The AMEK / RUPERT NEVE RCMA Remote Controlled Microphone Amplifier is designed to provide microphone source audio of the highest possible calibre by raising the level of the microphone signal at source and then feeding the line from an amplifier which has been specifically designed to drive it. Thus the RCMA will be attractive to broadcasters, digital console owners requiring first-quality microphone signals, location recorders and sound reinforcement operators. Various options include simultaneous analogue and digital outputs, a distribution output mode, and remote operation of the software-driven control functions. These, combined with exceptional audio performance, make the RCMA a unique and original product.

Rupert

UK Head Office, Factory & Sales:
Telephone : 0161 834 6747
Fax: 0161 834 0593

AMEK US Operations:
Telephone: 818 508 9788
Fax: 818 508 8619

AMEK Germany/Mega Audio:
Telephone: 06721 2636
Fax: 06721 13537

AMEK Asia:.
Telephone: 65 251 1629
Fax: 65 251 1297


Sennheiser *HD414 Classic*

Sennheiser *HD414 Classic*

As part of their 50th anniversary celebrations, Sennheiser have produced a limited edition *HD414 Classic*, a modernised version of the world's best-selling headphone.

The *HD414* was originally designed in 1968. The headphone was the first open professional model and has sold millions since its introduction.

The *Classic* uses the moulding and physical design of the originals but is fitted with selected versions of Sennheiser's latest drive units employing lightweight Copper Clad Alloy Wire driver coils, Neodymium magnets and OFC leads.

Sennheiser Electronic, Germany.
Tel: +49 51 30 600 366.
Sennheiser, UK.
Tel: +44 1628 850811.
Sennheiser, US.
Tel: +1 203 434 9190.

Uptown *System One*

Launched at Audio Technology 95, the *System One* from the American Uptown concern is a low-cost, self-contained, moving fader, automation system, taking the software and system design from the *System 2000* and *System 990* to produce a self-contained package that patches into the insert points of any console. Initial pricing is quoted at £6,700 (UK) for a complete 24-channel system, including computer.

The automation is based on the *System 990* software, and incorporates all of its features. A mouse-driven user-interface gives full access to grouping, MIDI functions, machine control and all the off-line editing features, and there are special Film and Live Performance automation packages. The system is driven by SMPTE-EBU and is frame accurate, updating all faders and mutes each frame and controlling faders via high-speed communications rather than MIDI to maintain system timing when all faders are moving. Packages are available up to 32 channels, and two boxes may be linked to provide a total of 64 automated faders.

Uptown Automation Systems, US.
Tel: +1 303 581 0400.

Ghielmetti matrix system

Ghielmetti Communications were at the ITS in Montreux with a modular, compact electronic matrix system for digital and analogue audio and video. The system works under a common control surface in mixed service (audio-video-data/digital-analogue) with automatic switch functions under real-time conditions. The modularity is in steps of 8 x 8 up to 128 x 128 in mono or stereo, component or composite.

Control is from a PC via an EsBus interface, with local control from 19-inch panels which may be configured and preprogrammed from the main routeing system control software. It appears that the matrixes can be integrated into an existing broadcast control system and configured to operate under local or external control.

Ghielmetti, Switzerland.
Tel: +41 65 321 195. ■

In brief

Avid have also announced a new Digital Linear Tape backup system for their workstations based on the Quantum ½-inch DLT4000 technology. DLT is intended to offer 20Gb of uncompressed storage, 1.5Mb/s transfer rate and increased reliability over other backup systems.
The new line is expected to be shipping in the third quarter of this year.

Avid Technology, US.
Tel: +1 508 640 3158.
Avid Technology, Europe.
Tel: +44 1753 655999.

● **Crystal chips**

Crystal Semiconductor claim to have developed the world's smallest D–A convertor, the CS4330, providing on-chip interpolation, D–A conversion and switched-capacitor analogue filtering in an 8-pin SOIC package. The convertor, using delta-sigma technology with 128 times oversampling, offers 18-bit resolution and a 94dB dynamic range.
Crystal Semiconductor have also started volume production of the CS4232, the first 16-bit audio codec to combine *Sound Blaster Pro* game compatibility, Microsoft *Windows* Sound System register-level compliance and full ISA Plug-and-Play compatibility. According to Crystal, the device's high level of integration and small-package size makes it the industry's smallest, most cost-effective, multimedia audio-system solution. The CS4232 is at home in motherboard; portable PC; and low-cost, adaptor-card applications.

Crystal Semiconductor, UK.
Tel: +44 1252 372762.
Sequoia Technology Ltd, UK.
Tel: +44 1734 258000.

● **ASC *IS5022* Sound Enhancer**

The IS5022 from ASC is an interesting combination of a problem-solver and an enhancer featuring a selection of processes carried out in the digital domain. Only hazy details are offered about some of the effects, such as the Scratch Suppression (declicking); Stereo Enhancement (a stereo effect created from a mono signal); Spatial Stereo; Noise Reduction and Quantisation Noise Imaging, which claims to shift the quantisation noise outside the audible frequency range. Digital compression and expansion; a digital fader; simple EQ; and sample-rate conversion allowing jitter removal and pitch variation up to 12% without affecting the output sample rate. Onboard convertors are 20-bit for the A–D and a *DAC-7* bitstream D–A.

Audio Systems Components, UK.
Tel: +44 1734 811000. ■

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Oram Sonics *MWS*

John Oram's recently formed Oram Sonics company currently has a trio of rackmount products available, of which we have already looked at two: the *High Definition EQ* (*Studio Sound*, March 1995) and the *Vu-More* metering unit (in May 1995). Here, then, is the third unit which, like its stablemates, tackles a familiar job with an individual style.

The grandly named *Microphone Work Station* (*MWS*) looks on the face of it like any other in the growing army of microphone preamps vying for our attention—and, in most cases, getting it. Having said that, it has already found use in situations as diverse as top studios, the Oscars ceremony and the American Music Awards presentations, so it must have a little something extra.

That extra is a scaled-down version of John Oram's EQ design which, coupled with a high-quality, solid-state, front end (in fact, the whole thing is solid-state, but one somehow feels the need to say so nowadays), produces an almost complete signal path from microphone to multitrack, or from microphone to mix bus in a live application.

The appearance of the *MWS* follows exactly the distinctive Oram house style, which should be familiar by now from the other units. Its pale blue sculpted front panel is thick enough to allow all the controls to be slightly recessed, making the push buttons, in particular, less prone to accidental operation. The signal path follows logically along each channel —there are two—with clear legending to tie together the EQ controls. This is helpful, as the layout might not otherwise be entirely clear; the sweep and gain controls for the mid bands are neither vertically aligned nor any closer together than any other pair of knobs, so the black linking lines make the necessary connection.

John Oram is never one to sprinkle more LEDs about than necessary, although all the important functions are clear. There is an orange power-on indicator, glowing as usual from the middle of the 'O' in Oram; a red LED for phantom power; and a green one for EQ in-out. What does stand out is a pair of output bar meters, built to be visible from some distance.

The preamp section of the unit is as simple as possible, with only the phantom switch, a phase switch and a gain control to its name. The gain control is a solid-feeling click-stop knob, about which my only criticism would be the difficulty in telling exactly where it is. A single spot on the end of a long narrow knob is hard to align with a rather sparse gain scale, although accurate setting is only really a necessity when trying to match the two channels for stereo. Gain range is substantial and the input stage is claimed to be capable of handling up to +22dBm without any pads.

The signal from this stage can, of course, be used exactly as it is, direct to the output, and for straight crossed-pair classical recording this is probably all that would be needed. Used like this, the result is a very desirable preamp, with a full, open, clean sound. It is superbly quiet and, to all intents and purposes, transparent.

John Oram is justifiably proud of his EQ designs which, of course, trace their roots back to the classic *Trident* consoles. The equaliser in the *MWS* is a relatively simple 4-band design with high and low-pass filters, and the whole lot switches in and out as a complete unit. Bass and treble shelving circuits have two switched turnover frequencies, while the two mid bands are swept but with non-adjustable Q. The mid ranges are extensive, with good overlaps with each other and with the HF and LF bands. The high-pass filter is continuously adjustable and, like the one on Oram's *HD-EQ*, is notably subtle and unobtrusive in operation. The low-pass filter is either on or off, but has a useful slope characteristic, rolling off gently at 8kHz and more steeply as the frequency rises.

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

To prove its worth, an outboard microphone preamp needs to be more accurate than those available in one's console; it should be utterly transparent, designed and built to audiophile quality with no hint of character to alter the sound produced by the microphone. On the other hand, an outboard equaliser needs to have precisely those qualities: a distinctive personality and musicality and an ability to manipulate the signal in a special way. The two concepts are strikingly at odds with each other and a unit combining the two must be capable of scoring highly on both aspects. This may be why this particular combination is comparatively unusual and confined to a few top-end manufacturers noted for precision design and characterful EQ —Focusrite and Rupert Neve's circuits for Amek spring to mind. This is the kind of competition John Oram has set himself up against and my experience with the *MWS* suggests that the success it has had so far is entirely justified and deserves to continue. ■

Dave Foister

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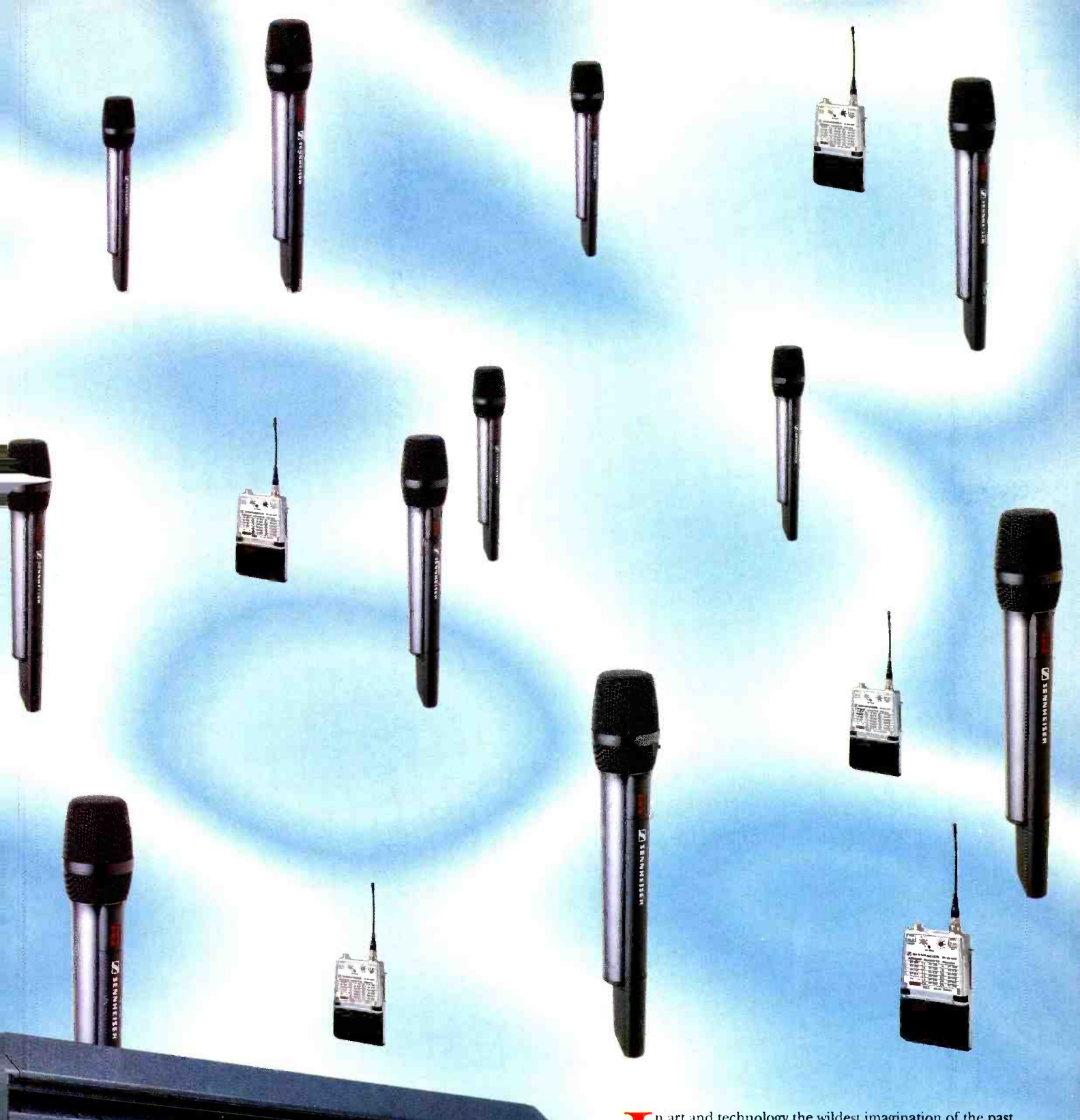
John Oram's *Microphone Work Station* provides an unusual combination of preamp and EQ



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Sanken CSS-5

Sanken's *CSS-5* stereo rifle microphone, specifically geared to the location recordist

Stereo television has brought us many things; from a raised awareness of the importance of audio in conjunction with pictures, to a generally accepted surround-sound format, even if not the one many would choose for music recording. It has also brought a much wider range of equipment for recording in stereo. Once, stereo microphones were the exclusive domain of the music recording engineer and mostly inappropriate for location TV or film work. Specialised stereo location microphones such as stereo shotguns were virtually unheard-of.

All this is changing and one of the newcomers is the Sanken *CSS-5* stereo rifle microphone, specifically geared to the location recordist and with backup accessories to match.

If the shotgun image is extended then the *CSS-5* is an over-and-under, as it has a second cylindrical section below the main tube to carry the electronics. This makes it all quite compact, as the main microphone assembly is fairly short.

The microphone in this review came with a Rycote pistol grip, complete with shock-absorbing rubber mounts and threaded bush in the base, and a channel in the moulded handle for a cable with room for an XLR. This space for a connector is less useful with the Sanken than it might be, as its stereo capability means output appears on a 5-pin XLR which needs, at some point, to be broken out into two channels—unless your setup can handle 5-pin signals right through. It certainly seems that pin wiring for stereo microphones is becoming standardised, which is fortunate in this case as no connecting cable was supplied with the microphone. A quick check revealed that the pin outs are the same as a Sony stereo microphone for which I have a breakout lead.

Also provided is a Rycote windshield, the *Velcro*-fastening fluffy 'Dougal' type. The microphone itself comes in a decent slim case, and, although there are no instructions provided with the review model, a few diagrams printed on the inside of the lid give most of the information required.

Apart from the connector wiring, the main aspect of the microphone which needs a little explanation is the small rotary switch on the back of the lower tube. This has three positions, with Normal in the centre, Mono to the left and Wide to the right. The Mono position produces exactly what one would expect: a highly directional short shotgun. Normal gives a result which once would have seemed a contradiction in terms: a tightly directional, stereo shotgun effect. The Wide position gives a response which even the case's diagrams have difficulty conveying, with an enhanced stereo width on a narrow pickup pattern.

The interesting thing about shotgun microphones in general is that they are regarded as problem-solvers rather than desirable microphones in their own right. They are used to get out of a tricky situation rather than to achieve a pleasing sound; in the applications in which they are most commonly used, their ability to eliminate unwanted ambient noise outweighs the disadvantages of the coloration normally associated with them. For proof of this, think of the last time you saw a shotgun, a rifle or anything other than a first-order microphone used by choice in a studio situation. There is a compromise associated with such specialist microphones which is acceptable in circumstances which demand their directional characteristics but not in 'normal' use. And this compromise applies as much to the most sophisticated rifles as to the most basic.

What we may be seeing in this new market for specialised stereo microphones is an overturning of the old order, with microphones which can get you in that little bit closer without giving that tell-tale coloration. And it seems that the *CSS-5* falls into this category.

In Mono mode the Sanken delivers everything one would hope for from a short shotgun, but with less of the downside. Open it up to Normal stereo and the result is remarkable, with a useful directionality coupled with a clearly focused natural stereo image. The notable point is the tonal rendition, which is every bit as complete and natural as a crossed pair of decent cardioids; there is nothing about the sound which would give the microphone's shotgun design away.

Switching the *CSS-5* to Wide gives a stereo picture not unlike crossed cardioids; there is none of the extreme phasy stereo sometimes associated with wide-configured simple stereo microphones, and, again, the spectral balance remains true and natural. The amount of ambient pickup in this mode perhaps defeats the object of using a shotgun in the first place, but, at the same time, makes it far more versatile.

The Sanken *CSS-5* forms part of what can be described as a new breed of specialised microphones, where sonic quality need not be sacrificed to the difficult directional needs of location work and the requirements of stereo and close perspective are no longer mutually exclusive. My uses of it, in awkward theatrical and location situations, suggests that this microphone solves many of the old problems without any of the familiar trade-offs, giving a sound which no-one would ever know was recorded from a less-than-ideal position—surely the ultimate goal of any shotgun. ■

Dave Foister

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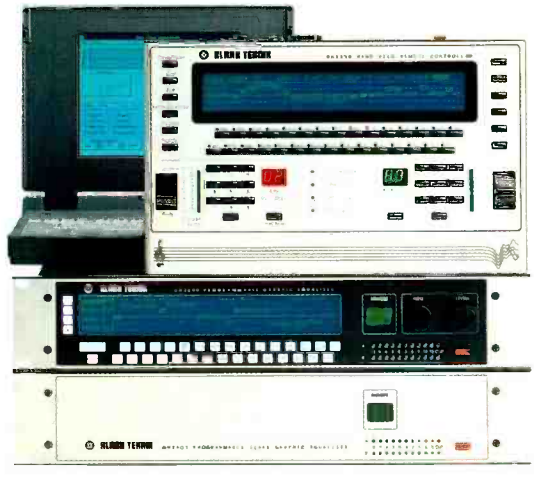

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beyerdynamic *MCE83*

In the short time I have had the *MCE83*, several people I have mentioned this microphone to have expressed surprise that beyerdynamic make a condenser microphone at all. They do make condensers, of course, and have all along, including some very nice top-end, multipattern, models. Good as they undoubtedly are, however, these have never caught the industry's imagination and establish themselves alongside the classics from AKG, Neumann or Sennheiser, and it is indicative of this manufacturer's distinctive approach to microphones that they are immediately associated in many minds with other types altogether, mainly dynamics. The company's biggest quirk has always been their enthusiasm for the ribbon microphone, which as far as I am aware now survives only in the form of beyer's ribbon models and the old BBC PGS design or *4038*, still made by Coles Electroacoustics. In fact, so unlike a typical old ribbon design has been the beyer approach that I suspect there are many who do not realise that their old beyer favourite is a ribbon at all, using it nonetheless as a good example of what a high quality dynamic microphone has to offer.

The point is that however individual their approach has been over the years, beyer have always been considered to be in the upper echelons of microphone manufacturers, even without a high-profile range of studio condenser microphones. The recent launch of the *MCE83* (a sister to the hand-held *MCE81*) may be the beginning of an attempt to balance the catalogue.

The *MCE83* is, in one sense, a reviewer's nightmare, as it is just about as simple as it is possible for a microphone to be. It is a straightforward, end-fire, stick-type microphone, with a relatively small diaphragm, an anonymous black finish enlivened by silver grilles, but no switches, controls or other facilities whatsoever. It is, of course, phantom powered, and has a fixed cardioid polar pattern. It comes packaged in a soft pouch, together with its foam windshield and a sensible, familiar stand-mount. This is one of the resilient, almost rubbery grips, swivelling controllably in a metal base which has a thread adaptor.

In use, the *MCE83*'s lack of adjustable switches turns out to be less of a drawback than might be imagined. To begin with, any problems that might have been brought about by the omission of a pad switch seem to have been forestalled by the sensitivity of the microphone, which is considerably lower than some familiar models. Simple checks using the calibration of my console controls suggest that it is some 15dB less sensitive than an AKG *C414*, for instance. This, of course, makes it ideal for close work, whereupon its other omission begins to make sense, as the proximity effect makes up for the inevitable bass lightness caused by the comparatively small diaphragm and renders a bass-cut switch unnecessary. The only disadvantage of the low sensitivity is a tendency to sound a little noisy, by today's standards, on quiet sources.

The character of the microphone can, perhaps, best be described as light and open. Its top end lacks nothing, lending a natural brightness to the sound which is never obtrusive but maintains the presence of the source. It copes well with a big piano sound, retaining all of the sparkle of the upper registers without sacrificing any more of the depth than its size would suggest, and never giving any suggestion of strain no matter how dynamically the piano is played.

This natural built-in brightness makes the *MCE83* ideal for all kinds of up-front instruments, where a realistic presence is required without recourse to drastic EQ. This is not to say that the microphone is excessively bright or hard, accusations which could never be levelled against it; merely to point out the advantages of its extended, unstrained top end.

The *MCE83*'s cardioid polar pattern seems to be remarkably accurate—I say seems to be as I received no literature or specifications with the microphone at all. Certainly by ear it appears that the off-axis response remained neutral and uncoloured, with even the rear response still sounding reasonably natural. This off-axis behaviour can, of course, be crucial in certain situations, particularly where spill is by definition a problem; any spill difficulties are only compounded by a microphone whose pickup of the ambient sound diverges markedly from the flat.

This is a microphone which could see itself becoming a useful general purpose workhorse. Its overall behaviour is neutral enough to allow its use in a wide variety of applications, and its slight yet manageable brightness lends itself particularly to solo work (or orchestral spot miking when the occasion demands it) while not being so extreme as to preclude more general uses. It also shares the usual advantage of a simple stick microphone in that it is very compact and visually unobtrusive, with a stand-mount that allows it to be placed virtually anywhere without taking up an excessive amount of space or drooping into the instrument at which it is supposed to be pointing. And since the MCE83 commands a sensible position in the price scale, it provides a good medium budget alternative to some of the more familiar microphones in the field. ■

Dave Foister

beyerdynamic's *MCE83*—just about as simple as it is possible for a microphone to be

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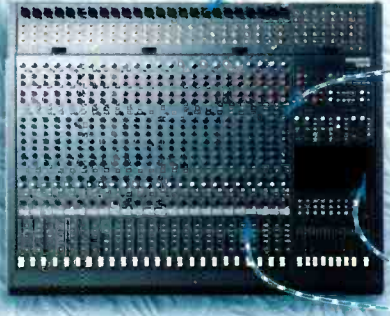

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The Strongroom

The popular belief that project studios are by definition in competition with commercial studios is not held by Strongroom Managing Director Richard Boote. He believes the two can complement each other and has pioneered commercially available project studios at his London complex.

'A lot of studios have built programming rooms in the past 18 months but for five years I've said they're mad if they don't,' Boote asserts. 'You can't say a project room stops someone recording drums for three weeks in your studio and therefore it's a threat, I encouraged it from the start.'

In addition to their Neve and SSL-equipped main rooms, Strongroom now have nine project studios hired out by heavy-duty users who include the CHAPS production team of Phil Harding and Ian Curnow (currently working with East 17 and Let Loose), Orbital, Producer John Coxson, The Beatmasters, Pet Shop Boys, Producer Gareth Jones, Richard Stanard, and Bump and Grind.

Things started on a low key in 1987 when MIDI technology first began to show the promise that would later spawn the project-studio sector and influence the way music is made and recorded.

'We built the first programming room because we wanted to find what this computer-controlled music was all about,' explains Boote.

'We hired it out as an equipped studio in those early days but it was as much for us to discover the new technology,' he adds. 'This wasn't a success because nobody really knew what they were doing then. But it was useful to us for research.'

The idea then took off, the assembled MIDI gear was installed into the new Strongroom Studio 2 and three more project rooms were opened in 1989–90.

Boote built Studio 2 and moved in the MIDI equipment from the programming room when The Beatmasters needed a room. They initially moved into what had been the programming room but then wanted a better room so Boote built three more. Demand was high, but so was the need for more and better equipped rooms with vocal booths—so more were built across the courtyard from the main studio block complete with wiring, air-conditioning, acoustics and decoration ready for the installation of equipment.

'The people who move in have so much equipment that they can no longer work at home,' says Boote. 'Initially they came into our experimental room and realised they could buy their own system. I encouraged this because I never saw the point of keeping it a secret. They bought the stuff, worked at home for a while and then came back to the rooms we'd built.'

Boote believes the arrangement is preferable to the typical home setup for a number of reasons. 'They get a lot of support from the studio—reception facilities, phones answered, packages delivered and sent, tapes organised, repairs and advice on installation. They also become part of everything else that's happening here,' he says. 'They'll all tell you that what they prefer most about working here is the creative atmosphere.'

For the latest Erasure album, Producer Gareth Jones finished all the vocals after three months in his room while Vince Clark prepared all the music at home in his studio. Then they came together for the mix in Strongroom Studio 2. However, Boote stresses that the project rooms are not designed expressly as feeder suites to the main Strongroom rooms.

'The amount of work that comes from the project rooms into our studio rooms is less than it was a couple of years ago because we now get a lot of outside work so they can't always get in,' explains Boote. 'Also, because the project rooms are so good, they are able to do more in them. For example, CHAPS will be in our studios next week for three days mixing East 17 and it will be at a far more advanced stage than it would have been when they first moved in.

'It's also very easy to move from a project room into the studio—out studios are wired up to complement what they have in their own rooms,' he says.

Most of the project rooms have at least two or three *ADAT*s or *DA-88*s and Strongroom Technical Manager Rob Buckler observes a high level of technical sophistication. For example, CHAPS run a 48-channel Soundtracs desk with Saturn 2-inch, Yamaha *ProMix 01* submixer, DynaudioAcoustics *M2* monitoring, outboard by Neve, Urei and dbx, an enormous programming rig based around *Cubase Audio* with Akai samplers *Sample Cell*, 16 tracks of hard-disk audio plus an *ADAT* and synth modules galore.

'In those sorts of rooms you can't bodge it,' says Buckler. 'We went through that process in the beginning with the small rooms and bits of gear. You grow out of it and the project studio has grown out of it because you can't get away with it anymore if you're trying to get as close to the finished product as you can.'

He adds that the benefits of the arrangement over an elaborate home setup centred around fundamental things such as sound insulation, air-conditioning and because the rooms are easier to install and work in.

'More than anything else we've created a community,' states Boote. 'Almost everyone who moved in when the rooms opened are still here, so they must be happy.

'We started it up to research MIDI technology and now there are so many people here doing much more with it than we ever would have done,' says Boote. 'We benefit from it; it's an exchange of information, ideas and new technologies.' ■

Zenon Schoepe

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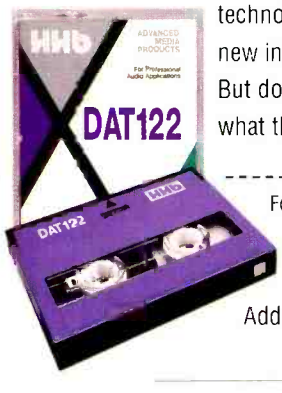

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SS

Gary Bradshaw at the helm of a Yamaha *PM4000* desk for the Simple Minds European tour

Simple Minds

With the exception of The Rolling Stones, 1995 is failing to provide the same level of high-profile touring as 1994. This is not to say, however, that business is slack for the hire companies, particularly those based in Europe, or that the concert-going public is tiring of the rock circus.

Simple Minds are currently completing a successful European tour before leaving for more distant shores and have been out with Capital Sound Hire and a Martin *F2* system. Front-of-house duties have been handled by Gary Bradshaw and his sidekick, Bill Irving, at the helm of a Yamaha *PM4000* desk.

Bradshaw tended to change the arrangement of the *F2*s to suit the venue but the arrangement I witnessed was typical, consisting of a flown array of three horizontal rows of cabinets and eight floor-bound subwoofers per side.

'For this gig the top row consists of HF boxes,' explained Bradshaw, 'the middle row of mid-bass boxes with the bottom row being full-range boxes for short-throw and front-fill coverage.'

Additionally, Bradshaw has been one of the unrecognised early big-league advocates of the BSS *Omnidrive*. 'I started the tour with the standard Capital drive electronics,' he reveals, 'but got hold of an *Omnidrive* after we found the time to set it up for the *F2*. It soon became the overall controller for the main system. I now use the two Klark Teknik *DN360*s in the rack for voicing the main and front-fill systems.'

Bradshaw's processing gear includes the usual reverbs, delays and a large number of Drawmer and BSS gates and compressors.

'The gain reduction gear is mainly for the drums,' he explains. 'I started out by not using much dynamic processing on them and ended up with the gates on virtually everything. Mel Gaynor is a very dynamic player!'

Bradshaw certainly prefers a high-volume mix but recognises the fine line between overpowering the audience and allowing the sound system to accentuate the music's high points without losing its subtleties. To my mind, he complements Simple Minds perfectly.

Rod Stewart

Lars Brogard is currently on the road with the indefatigable Rod Stewart, putting the new Midas *XL4* console through its paces. I sought his comments at the 'Out in the Green' festival at Frauenfeld in Switzerland.

'We have two *XL4*s for monitors and one *XL4* plus an *XL200* for the house,' he explained. 'The regular band line-up is being augmented by a 14-piece string section for this tour which is being submixed on the *XL200* for the house—so there is a lot of mixing to do. There is also a fair amount of Garwood in-ear monitoring in use, so two engineers are a must.

'The *XL4* console is a definite improvement on the *XL3* in terms of sonic quality and flexibility. I find the overall sound is much cleaner. I always felt the *XL3* to be more of a monitor console than a house desk and the *XL4* has addressed this situation.

'There are still some bugs in the automation, though, and the consoles will be going back to Midas during the next break in the tour to be brought up to date.'

Sound equipment for the Frauenfeld festival was supplied by Britannia Row, consisting of a *Flashlight-Floodlight* system for the main PA and three delay towers of *TMS3*s. The main console was a Yamaha *PM4000* with Swiss company Live Sound subhiring in a *Gamble* console and control racks. The installation was overseen by Colin Norfield, who found himself more in the engineer's seat than the mix engineer's. 'It will be nice to get out an do some mixing,' he was heard to comment.

On a general note, 'Out in the Green' is a good example of how more festivals could be organised. It uses one large stage divided approximately 2:1 allowing simultaneous setup and performance. The result is that show timings are almost 'to the minute' with just sufficient pause to give the audience a rest with no necessity to move to another stage.

Swiss EV Pool

A new development in large concert systems in Europe is the Swiss EV Pool. Though still not officially part of Europe, Switzerland would appear to have a place when it comes to sound reinforcement—a situation emphasised by the recent announcement of the Clair Brothers-Audio Rent relationship becoming Clair Brothers Europe. The EV Pool offers a large Electro-Voice system for major concert events in Switzerland using *MT4-MT2* systems and involves the resources of four or five Swiss hire companies.

The first outing for the Pool was the Festival for Europe held in Geneva at the end of June and was under the umbrella of Maxximum Hire from Lausanne—the speaker system design was done by myself.

Left-right stacks consisted of four rows of four *MT2* cabinets (a mixture of 90° and 60° versions), a flown column of *MT4* bass cabinets plus a large L-formation of *MT4-MT2* subwoofers on the ground. The system was divided into long-throw, main and short-throw systems with separate control of EQ and level for each system. Power in excess of 140kW was provided by Crest *8001*, *6001*, and *4001* amplifiers. A central cluster of two *Deltamax* enclosures provided reinforcement for vocals and selected solos.

Stage monitoring consisted of an *MT4* system for sidefills with *Deltamax* and *FS212* wedges. Consoles were standard throughout with two Midas *XL3*s each for monitors and FOH.

The Swiss EV Pool now makes a large EV system available for central Europe and heralds the arrival of a new player in the PA area. It remains to be seen whether the new boy can graduate to the major league. ■

Terry Nelson

The EV Pool uses *MT4-MT2* systems for concerts in Switzerland

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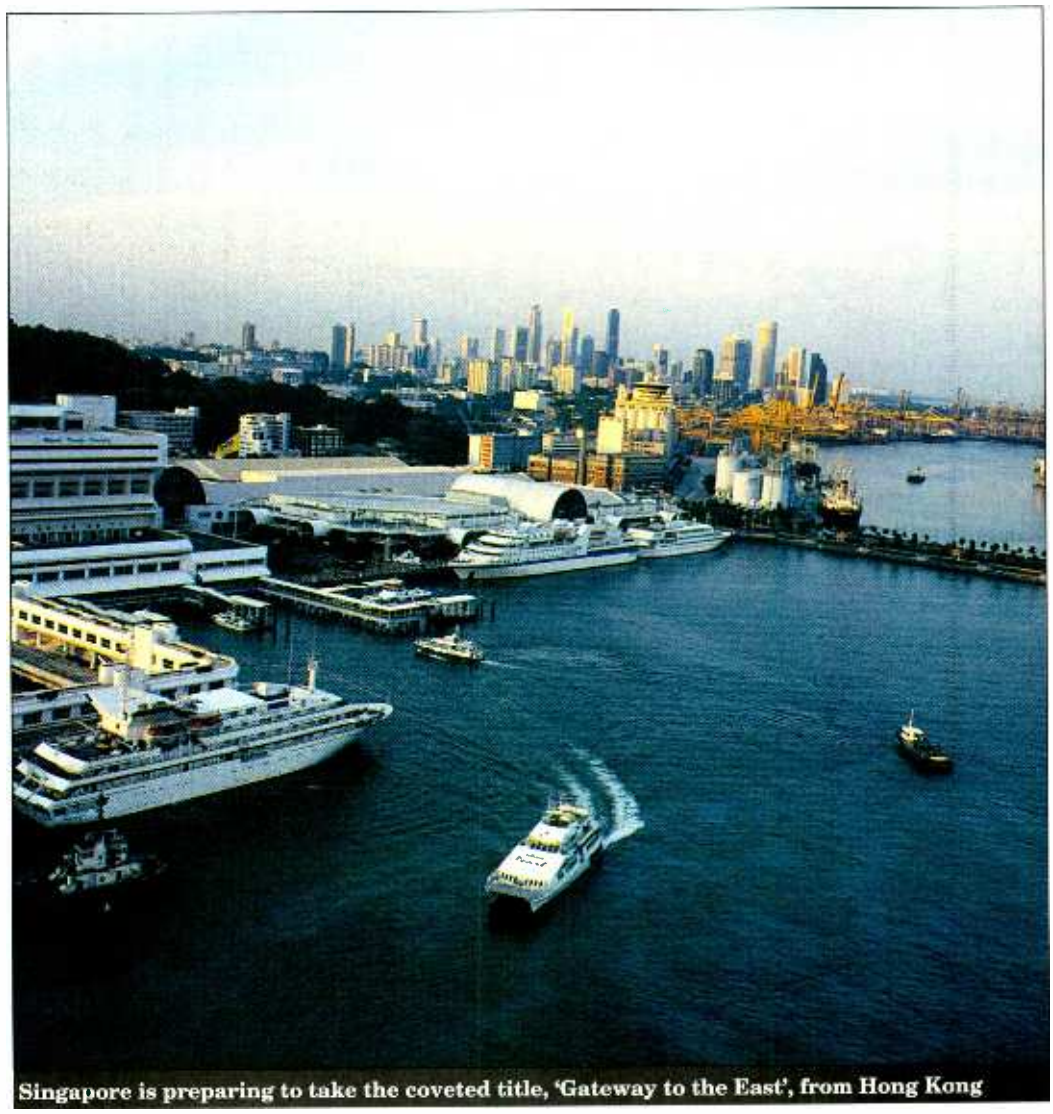
PRO AUDIO & LIGHT ASIA 95



Singapore is preparing to take the coveted title, 'Gateway to the East', from Hong Kong

PHOTO: TIM GOODYER

Representing the fastest growing commercial territories on the planet, Pro Audio & Light Asia 95 proved unmissable for much of the audio and broadcast industry. Blood, sweat and beers by Tim Goodyer

There is a lot of money in Singapore. Consider: last year, through its many and often harsh taxes, the government made a surplus of some S$2bn over and above its forecast balance. The same government has adopted a hard line over cars on the island—a limit of 5,000 on Singapore's roads is currently in force. To operate a car, then, requires you to secure one of just 5,000 10-year vehicle permits which come at a premium and for which there is intense competition. A modest car—say a Honda *Civic*—will set you back a cool £45,000 (S$95,500) while a *200-Series* Mercedes will push the bill towards £200,000. Watching the traffic quickly tells you that most drivers are running Mercs or BMWs or one of the burgeoning Japanese models. And there is a waiting list for those 5,000 road permits...

Yes, there is plenty of money in Singapore—making it a logical venue for a pro-audio trade show such as Pro Audio & Light Asia 95.

Yet Singapore is far from representative of the region it aspires to serve. Strategically positioned between such promising markets as China, Indonesia, Taiwan and Kuala Lumpur (known locally as KL), it boasts the most mature recording, broadcast and film industries outside of Japan and Australia. Other territories trail by varying degrees and are increasingly taking their lead from Singapore. The government are reading the picture well and already offer tax holidays and other concessions to people and businesses prepared to invest in their island. There are already two government bodies, the Economic Development Board and the Trade Development Board (significantly located next door to the World Trade Centre), promoting international trade including audio and video. The agenda is clear: Singapore is preparing to take the title of 'Gateway to the East' away from Hong Kong.

'The Chinese don't trust Hong Kong any more,' commented Soundcraft's Ronald Goh, 'because they think short term.' Singapore is evidently digging in for the long term.

PALA

On the floor of the show, the contrasts between Pro Audio & Light Asia 95 and related European and American shows was evident. Visitors were plentiful, if not abundant (the organisers claim 4,512 visitors from 42 countries with 51% being from overseas), and their enthusiasm for the show and its exhibitors matched only by their appetite for brochures and magazines. While certain jaded Western attendees speculated on the local popularity of *papier mache* art, locals explained the habit away in terms of missing expertise and reverence for the ▶

Western Way. Either way, most exhibitors shipped significantly less bulk from the show than they had to it.

Alongside the expected local visitors were notable numbers of visitors from India and China. Notable by their absence were the Japanese and Australians, although both countries had manufacturers exhibiting, Roland and the Acoustic Design Office, for instance, from Japan and ARX from down under hosting one of very few product launches in the form of their *PowerDrive* and *SX300* power amps, *UltraPro* loudspeaker processor and *CP32* 3-channel crossover.

While the West remains obsessed by the business of technical innovations, Singapore is more concerned with the business of business. PALA is small by most Western show standards and its promise to deliver a 'noisy' hall for the disco and light exhibitors, an 'audio' hall and a 'broadcast' hall is only partly fulfilled. Certainly the noisy hall is thick with output of smoke machines and high-wattage power amps and has a dedicated section promoting the Italians' reputation for nightclub class. But where there are one or two lighting companies hiding in the audio hall, the broadcast hall is unable to disguise its shortage of genuine exhibitors amid the overspill from its noisy neighbour.

Manufacturers are relatively thin on the ground too, giving way to local distributors carrying almost all the major players—in the audio field at least. Local manufacturing is non-existent giving rise to an international parade of who does what best.

'Audio, consoles in particular, come from the UK,' observes Team 108's Kevin Nair. 'The US does audio well too, but most of the nonlinear videos systems seem to come from Canada.'

Studio monitoring was well represented by Genelec, DynaudioAcoustics and Quested Monitoring Systems of whom only Genelec had taken a stand of their own. In the case of manufacturer-exhibitors, the agenda seemed to be one of reinforcing the profile of the more local representation. In a curious mismatch of scale, the likes of AMS Neve, Soundcraft, Sony and Otari were to be found rubbing shoulders with Soundscape and Studiomaster. But the lack of direct representation carried no perceivable penalty as Team 108's showing of Sonic Solutions, Focusrite, Summit Audio and B&K was wont to demonstrate. Of far greater significance was the steady stream of 'behind closed doors' negotiations concerning new or better channels of distribution.

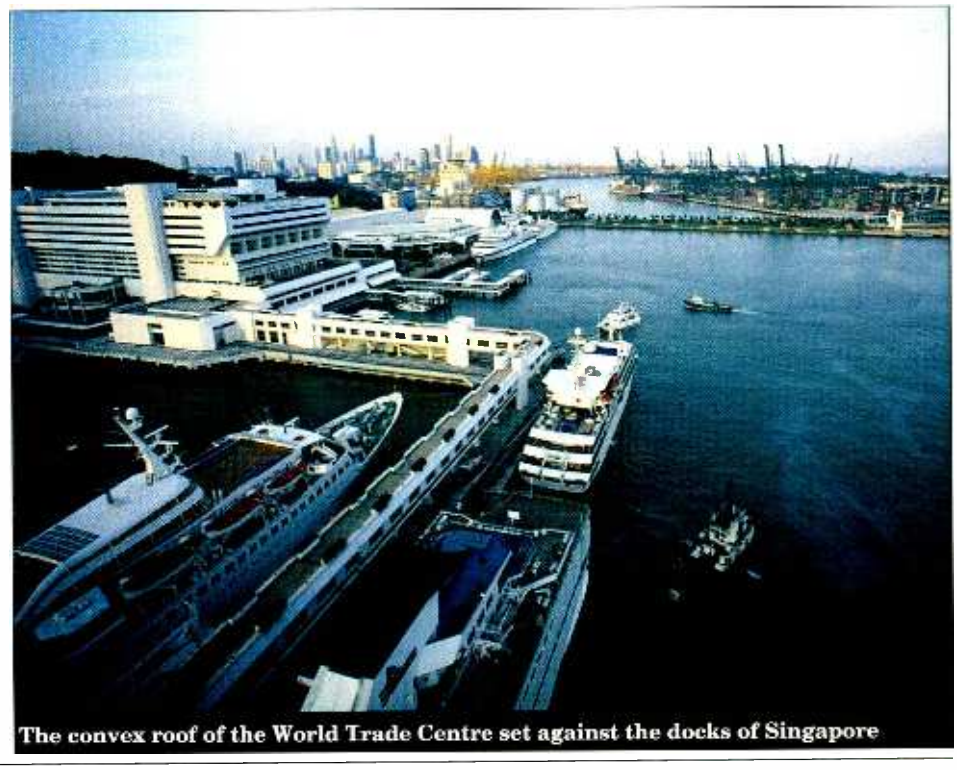
'It takes a while to get accepted out here,' commented Soundscape's Nick Owen. 'We reckon you've got to show your face a couple of times a year including at this show before people are confident you're going to be around next year.'

Most conspicuous by their absence were SSL and

Fairlight. 'We have found this kind of show is directed towards, and attended by, those in the sound reinforcement and lighting markets not to those involved in the postproduction and broadcast markets,' commented Fairlight's Asian-Sales Manager, Graeme Rothwell. 'At the recent SALA show in Bangkok, the "competition" between various PA equipment exhibitors made it impossible to carry on a conversation without shouting, let alone present a professional demonstration of the *MFX3*.' Although most of the power play at PALA related to distribution, there were steady sales of equipment throughout the show. At the prestige end of the scale, AMS Neve secured the sale of a 48-fader, 72-input *Capricorn* console to the Taiwan Platinum Studios music recording facility, but sales seem to have been consistent enough for all of TL Audio's valve outboard units to clear from the VW Marketing stand on the final day. Perhaps this latter observation is more meaningful in the context of the rising popularity of valve equipment in the East as well as the West.

The final aspect of note to PALA was the seminar programme. While certainly not exhaustive, the variety of subject matter and the level of technical sophistication with which it was dealt said much for the ambitions of the local audio, broadcast and postpro operations. ▶

PHOTOS: TIM GOODYER



The convex roof of the World Trade Centre set against the docks of Singapore

PALA represents a significant point of access to the Far East pro-audio market

The Eastern market

To appreciate the present-day business significance of Singapore it is necessary to accept that Singapore itself is a relatively mature market. Certainly, the majority of exhibitors at Pro Audio & Light Asia 95 had their eyes on surrounding territories.

China and Indo-China, perhaps, represent the most undeveloped territories.

Soundcraft's Ronald Goh regards these areas to be good for 15 to 25 years of healthy growth with the first major opportunities arising around installed sound systems.

'Whoever gets there first will set the standards,' Goh observed, and he is not simply talking technical standards here, since inclusion in the buying policies of the Chinese government would represent phenomenal amounts of business. Obviously a culture 'buying into' Western habits would see an explosion of cinema installations, shops and corporate audio-video activity. Once these areas are established, the market will begin to mature and the requirement for the generation of audio and video to higher quality standards will emerge. Finally, the popularisation of media entertainment will give rise to the project sector as it has in the US and Europe.

Satellite broadcasting is a significant element in this growth as Singapore itself readily demonstrates. The arrival of satellite broadcasting a few years ago has done much to raise expectations of quality.

Initially, according to Team 108's Kevin Nair, the local broadcasters believed operating a satellite broadcasting station would be as simple as buying basic equipment and 'making a deal with Buena Vista' for programme material. The reality has been somewhat more complicated both by contrasts between imported and locally generated programmes and by restrictions on what could be licensed and broadcast to a region steeped in the Muslim religion. At present, satellite broadcast is illegal in Malaysia and other overtly Muslim territories, but this is expected to change in the foreseeable future.

Certain territories present more complex scenarios: while regarded locally as being 'closed' to international trade Vietnam, for example, is currently attracting much attention from the US government in terms of international trade. And India—whose film industry is widely acknowledged as being the largest in the world—continues to use alarmingly low technical standards and to hamper its international trade with political restrictions.

'India has been open for six months now,' claims Ronald Goh, contradicting other commentators. 'There is no problem exporting there.'

Whenever and however India opens itself to the potential offered by current audio and video systems there is no doubting that it will offer unprecedented opportunities to the film and audio industries. And if both the government and local industry in Singapore have their way, this small island will be intimately involved in this and many other aspects of pro-audio and video. Which almost assures the future for Pro Audio & Light Asia 95. ■

PHOTO: TIM GOODYER

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THE RADIO STAR

The seemingly intractable problems of current Central European conflict make life more difficult yet more essential than ever for the region's broadcasters. Front line report from East Mostar Radio by Susan Nickalls

In May 1992, Serb forces shelled the radio station in East Mostar, destroying all of the facility's equipment. Several of the station's journalists and technicians were either killed or later arrested. However, Alija Behram, now the station manager, was determined to resume a broadcasting service in the city as soon as possible. Using borrowed equipment, he sent this message to the people of Mostar: 'Do you want us to talk to you and play music?' The answer was an unequivocal 'yes'.

Behram managed to find new premises in a former book shop on the ground floor of what was once a multistory department store. This is now a pile of rubble which totters precariously above the makeshift station. He then appealed to radio stations all over Europe to donate equipment. 'We are trying to shake hands with Europe and hope a lot of good people will accept that hand,' he announced.

Gradually bits and pieces of essential gear found their way to East Mostar. From ZDF in Germany a Telefunken *Magnetophon 12* editor and *HR 3000* hi-fi system along with a Technics *M235X* stereo cassette deck from France. The studio now has two small Soundcraft 8-channel mixers and a Soundcraft *Conrad* 6-channel mixer.

Picking my way through the rubble to witness the determination of these war-torn broadcasters is a revelation. One of the volunteers at the station, Mirsad, takes me on a tour of the equipment, much of which is very dated. He jokes that the Grundig *PS2500* record player was the one Henry VIII used. The Aiwa *LX50* automatic turntable system, he says, was delivered by Julius Caesar who 'thought it might be nice for us'.

Through various organisations and charities—such as War Child, which has connections with MTV—the station has built up a collection of some 2,000 CDs. But Behram still has a long shopping list of near-essential equipment which includes a Sony digital multitrack and a multieffects processor. For now the station has a basic studio setup to which Behram is keen to add on a postproduction facility.

Getting equipment into the city, particularly in the early days of the war, was far from easy. Behram recalls how a new 1kW transmitter was eventually delivered to the station by UNHCR.

'After a long wait, it finally arrived among the helmets and flack jackets. There was great joy among the people around Mostar as now they could hear us. Previously the HVO (Croatian Army) had kept jamming our small transmitter.'

At the time of my visit, Mostar enjoyed a fragile peace and it was possible to transport things in and out of the city. The radio station had recently taken delivery of two antennae to allow them to extend their broadcasting range west, to Croatian islands in the Adriatic, and to the south. However, Behram still needed to raise 50,000DM to build two towers

EQUIPMENT

EXISTING EQUIPMENT

- Drawmer *DS301* (2)
- Drawmer *DF320*
- Lexicon *LXP15*
- Sony digital tape deck
- Audio Technica *800*
- Tascam *AG620*
- Tascam *BR20T*
- Tascam *DA-30*
- Tascam *MTS1000*
- Technics *SL1210 MkII* (2)
- Tascam *688* Ministudio
- Tascam *CD401 MkII* (2)
- Teac *PA-4*

REQUIRED EQUIPMENT

- Audio tape (DAT, cassette)
- Foam windshields
- Headphone (Sennheiser *HD320, HD330*)
- Lavalier mic (Sony *ECM55, ECM77*)
- Mic stand (Sennheiser *SEMS 3235*)
- Portable stereo cassette (Sony *TCD-D10 Pro II*)
- Studio mixer, 16 inputs; telephone hybrid, talkback
- Studio condenser mic (Sennheiser *BF512, BF516, BF530*)

A lighter moment in the troubled Bosnian Radio Mostar—Mirsad Behram on the air

needed to house the antennae on the Mostar hills.

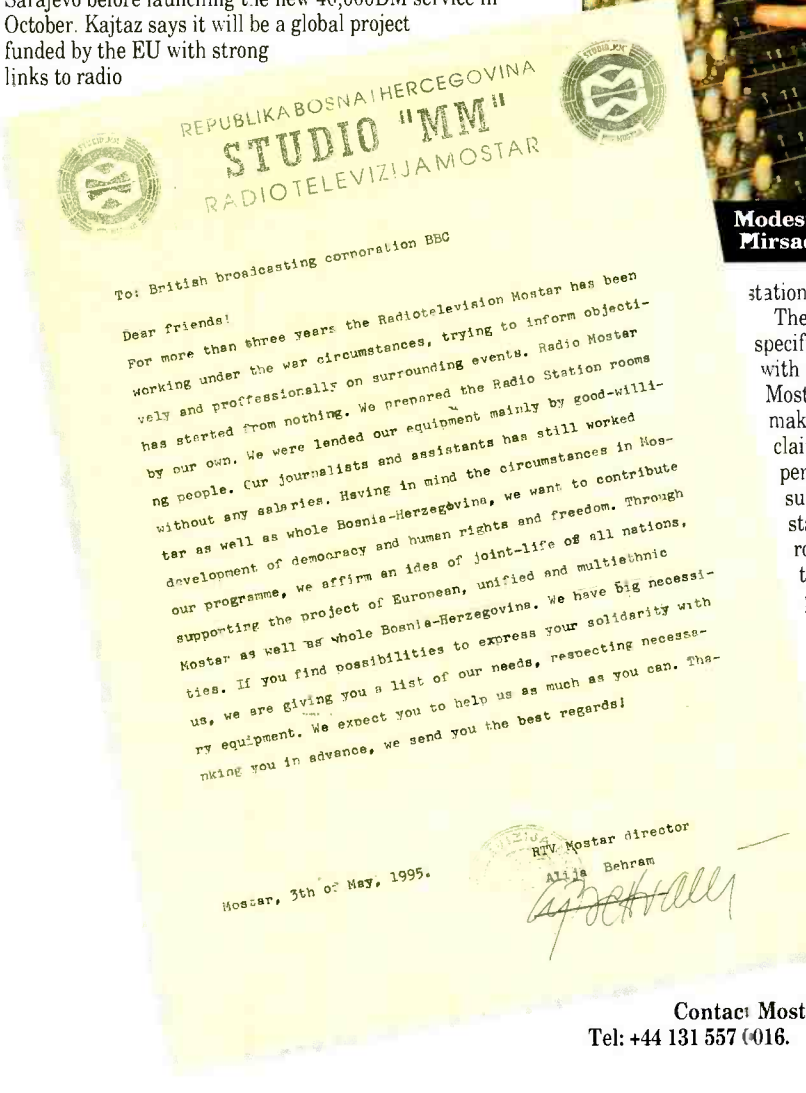
Over the next few months, Behram also had to find new premises for the station. The current owners wanted the building back—in spite of its condition—and Behram had appealed to the local authorities to help the station find a bigger space. In the meantime, Mostar Radio continued to operate on something less than a shoestring. Its only income being from donations and advertisements. It costs DM1 (approximately 50p) for ten words and an extra DM for a music request.

'Today's income,' says Behram, proudly, 'is 70DM.'

All the staff, about 30 volunteers, work for no pay. Instead they receive a daily lunch voucher and a small parcel of humanitarian aid at the end of each month. A mixture of Croats, Muslims and Serbs work together at the station which has a 50km –60km range, and, according to Behram, 80% of listeners live beyond East Mostar. 'This open-door policy is why the station is so popular. We are not burdened by nationalism and give information from all the different sources both here and around the world. Anyone who wants to can come and voice an opinion.'

Broadcasting is one of the few freedoms the peoples of East Mostar still enjoy, particularly the youngsters in the city. Two of the volunteers at Mostar Radio are planning to set up a special youth radio station in a local arts centre. Faruk Kajtaz and Mirsad Behram are waiting for official permission from Sarajevo before launching the new 40,000DM service in October. Kajtaz says it will be a global project funded by the EU with strong links to radio stations all over Europe.

Modest equipment for hard times—Mirsad Behram at the Soundcraft *Spirit*



REPUBLIKA BOSNA I HERCEGOVINA
STUDIO "MM"
RADIOTELEVIZIJA MOSTAR

To: British broadcasting corporation BBC

Dear friends!

For more than three years the Radiotelevision Mostar has been working under the war circumstances, trying to inform objectively and proffessionally on surrounding events. Radio Mostar has started from nothing. We prepared the Radio Station rooms by our own. We were lended our equipment mainly by good-willing people. Our journalists and assistants has still worked without any salaries. Having in mind the circumstances in Mostar as well as whole Bosnia-Herzegovina, we want to contribute development of democracy and human rights and freedom. Through our programme, we affirm an idea of joint-life of all nations, supporting the project of Euronean, unified and multiethnic Mostar as well as whole Bosnia-Herzegovina. We have big necessities. If you find possibilities to express your solidarity with us, we are giving you a list of our needs, respecting necessary equipment. We expect you to help us as much as you can. Thanking you in advance, we send you the best regards!

Mostar, 3th of May, 1995.

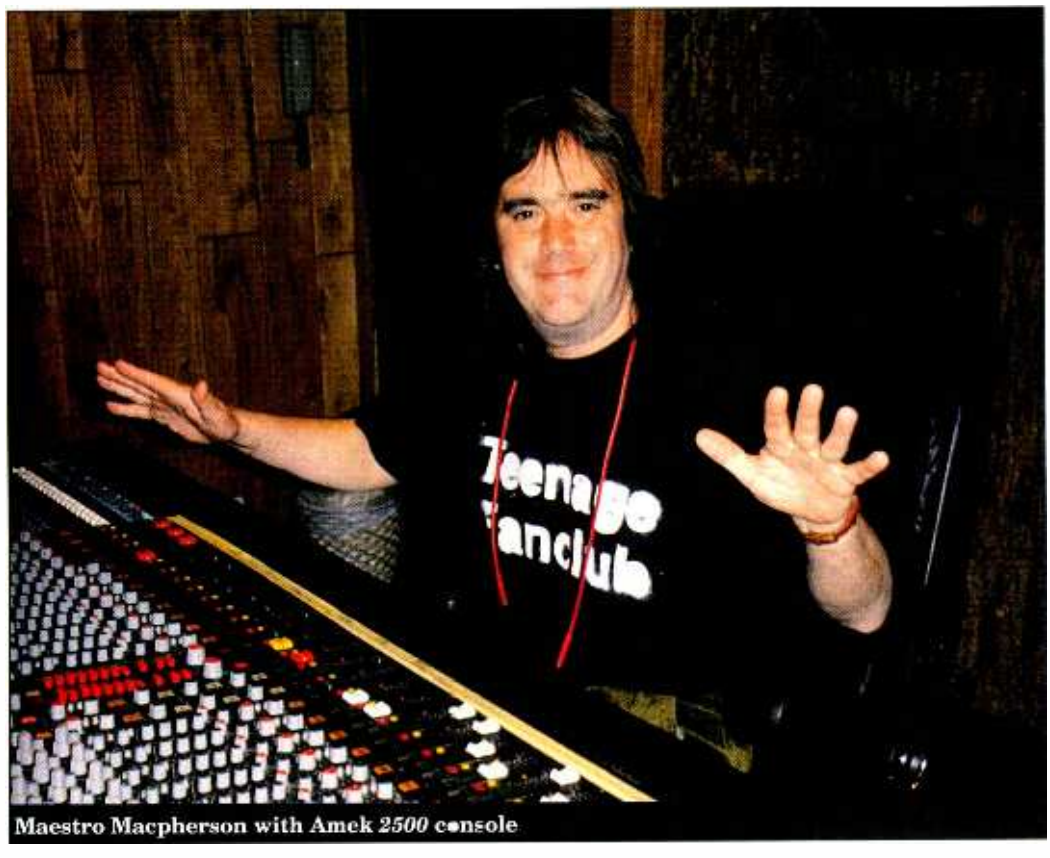
RTV Mostar director
Alija Behram

The station's programming is aimed specifically at 8–13 and 10–16-year-olds, with the youngsters from East and West Mostar also having the opportunity to make their own programmes. Kajtaz claims that the ten hours of broadcasting per day will be augmented by material such as top ten charts from satellite stations in Europe. 'The mix will be roughly 80% music to 20% speech with the emphasis on music without politics, and news. The main aim of the station is to be very funny, play good music and have interesting talks about different things.'

The sentiment—like the spirit of these people—is strong, as anyone visiting the region will attest. And, with a realistic solution to their conflict some considerable way off, we can only wish them well—unless you have redundant equipment you would like to turn into a more tangible form of support. ■

Contact Mostar Radio via Susan Nickalls.
Tel: +44 131 557 0016.

WHO'S MASTER



Maestro Macpherson with Amek *2500* console

To remix or remaster—that is the question facing record companies worldwide. Patrick Stapley looks for answers in the recent rerelease of The Who's massive back catalogue

With appetite for back-catalogue music as strong as ever, the desire to produce better and bolder versions of original material is intensifying. One can, of course, argue cynically that this is merely the result of record-company strategy to squeeze every last penny from their rosters, but the latest trend for taking the restoration process back a stage, by remixing original multitracks, is producing some stunning results.

Over the past couple of years, UK Engineer-Producer Andy Macpherson has become a major exponent of the art, remixing vintage albums for Eric Clapton, Pete Townshend, and The Who.

'The whole thing began in 1993 when I remixed tracks for the Who's 30th anniversary box set,' explains Macpherson. 'This contained a mixture of obscure tracks and a selection of material from various albums. I think the improvements we managed to make surprised a lot of people, and certainly Polydor and the band themselves had no hesitation in getting behind the idea and agreed that we should remix a major portion of The Who's back catalogue.'

In fact, Macpherson, with Coproducer Jon Astley, has now worked through all the Who albums up to *Tommy* (1972) and is set to carry on to the end of the Keith Moon period (*Who Are You* 1978).

The albums are being mixed at Revolution Studios, which Macpherson set up in a small, detached house in Cheadle Hulme, Cheshire in 1975. Much extended over the years, the studio Macpherson describes as 'Tardis-like', has an Eastlake control room fitted with JBL monitors, an Amek *2500* console with *SuperTrue* automation, Otari *MTR-90* multitrack, Mitsubishi *X-800* and three Akai *ADAM* digital 12-tracks.

'A lot of people turn their noses up when you mention *ADAM* and dismiss it as bedroom gear,' says Macpherson. 'but that's total bollocks. Compared to the Mitsubishi the only real difference I'm aware of is the price.'

The Who masters Macpherson has mixed so far have been on either 4-track or 8-track 1-inch—*Tommy* being the band's first album to be recorded 8-track. Taking no risks, all the tapes are baked (courtesy of Ampex) before arriving at the studio where they are transferred to either *ADAM* or Mitsubishi using a hired 4-track, or a *concours* condition 8-track Studer belonging to Astley's father.

Mixes are recorded to an Akai *DD1000* optical recorder in 20-bit via a Prism Sound A–D convertor and later transferred to *SADiE* system for compilation by Astley, who matches rill times (the gap between tracks) and relative levels between tracks to the original records.

The object of remixing The Who has not been to change anything of the original character, or add anything to modernise the sound—in fact Macpherson is passionate about matching the originals as close as he can. Where improvements are made, though, are in terms of overall quality and impact.

'During the mastering stages a lot of grunge and distortion has crept in over the years which, of course, doesn't exist on the multitracks, so we automatically avoid that. Generally, what we're doing improves on the clarity, and increases the power of the record, for example there's a track called 'Our Love Was' on *The Who Sell Out* which although a great track has always sounded a bit weedy. What I discovered when I came to mix it was that the instrument bounce, that they always did, had been heavily compressed and sounded really crushed. We were fortunate enough to find another tape with this backing track on it, and using an Akai *DD1000* I was able to separately spin-in the drums and the bass which really brought the track back to life.

'Funnily enough it's generally much harder to improve on the early records than it is the later albums. For example *Who By Numbers* (1975) sounds woolly in comparison to *Who Sell Out* (1967)—I can actually remember being a fan at the time and thinking that the vibe and quality ▶

of the last few records really seemed to go.'

Macpherson generally allows himself a day to mix a track, and it makes little difference whether it is 4 or 8-track.

'People think here he is mixing a 4-track record, that should only take him an hour or so. But it doesn't, it really does take a day to accurately recreate all the things they did on the original mix—for example they'd record reverb on a track and then add more when they came to mix it producing this huge floating picture, and recreating that convincingly can take a few hours alone.

'The Who were big users of reverb—I've got a variety of units here but I generally find I can match the original sound pretty accurately using my Lexicon *224XL*, with the help of a little EQ on the send. Once the Lexicon is set up I don't normally have to change it much through an album although there are a few examples like 'My Wife' on *Who's Next* where the production style changes radically and they use things like tape delay on the drums.'

Although Macpherson finds digital reverb works fine for the old tracks, the same does not apply to digital delay, so he has dusted down his old 2-track reel-to-reels to produce authentic sounds.

'Digital delay doesn't fit in with the character of the recording, and for double tracking in particular, tape echo is far more convincing than using a DDL.'

Panning was used extensively as an effect during the early days of multitracking and Macpherson painstakingly duplicates every move on the original mixes. He is also careful to faithfully recreate the overall stereo image.

'A favourite thing in the days of 4-track was to pan the rhythm section hard left. We had a letter from a fan in America who had bought the box set and was disappointed that we hadn't put the drums in the middle. If we'd done that you'd end up with this centre mono track (bass, drums and guitar), and have to pan the two vocal tracks plus one other (often overdubbed guitar) around it which would result in a really weird image. Far better to put the backing track on the left, Pete's guitar and any other overdubbed instruments on the right and the vocals somewhere in the middle. It produces this huge feeling of space, which really highlights anything in the centre, and I don't know why people don't do more of that today.'

Great sounds

The overall standard of The Who recordings has impressed Macpherson, who is quick to point out that it would actually be quite hard to make any of it sound bad.

'As soon as you lift the faders it sounds good. Tracks like "I Can See For Miles" are exceptional —I think if you asked people to record a version of that today, they wouldn't be able to get anywhere near it. It was a real eye-opener working on that track—again you've got the backing track on the left, which doesn't actually sound that spectacular by itself, but added to that on the right is this overdub with additional guitar and drums —including a snare sound you'd kill for—which magically knits the whole thing together as though it were one track. The vocals are absolutely sensational as well, and I have to say that it rates as one of the best things I've ever heard.

'It's a bit galling to think that all those tracks were recorded really simply and quickly—but a lot of the magic comes from the sheer energy of the band. One of the characteristic things about those early Who recordings is the acoustic guitar sounds which are always these incredibly well recorded tower blocks that fit into the track perfectly without chattering with the drums. Bass guitar sounds are always terrific, and what I've noticed with John Entwistle is that if he wasn't satisfied with the bass on the bounced track, he'd just go in and dub on another using the two together—his accuracy was so spot on that its very hard to distinguish it as two tracks.'

As far as matching effects, Macpherson has had few problems.

'Most of the effects are recorded, like the miraculous guitar sound used on the track "Tattoo", which is just as well because I've absolutely no idea what they used to create it. There have been one or two occasions where it's taken some time to suss out what's going on, for instance "Slip Kid", which we mixed for the box set, has this grating tremolo guitar which I eventually discovered was created by splitting the track across two faders, and waggling them about. Once I'd worked that out, it took me about two and half hours to match it up.'

The most difficult part of reworking the mixes has not been recreating dynamic relationships, effects or imaging, but trying to emulate the depth of sound. Apart from generous helpings of reverb, there is also a surprising amount of bass.

'The low end plays a very important part in the character of the Who's sound and is really exaggerated. If it's not pushed really hard, the mixes don't work half so well, and I think if I was mixing the tracks cold without comparing them with the originals, I'd be in danger of ending-up bass light.

'As far as the high end is concerned, we appear to be achieving a cleaner, more open top without enhancing anything—whether this is due to the improved frequency response of modern equipment I don't know. What I am sure of, though, is that my Amek *2500* console is really helping—although not the same vintage as these recordings it does have a warmth and clarity that really suits the material.'

Lost and found

Another advantage in remixing as opposed to remastering is that additional material can be added to albums, and in the case of *Live At Leeds*, over ten previously unheard tracks have been included.

'The first 20 minutes of the album contains all the warm up stuff like "Heaven & Hell", "Can't Explain", "Fortune Teller" and all the old rockers they used to do, none of which appeared on the original album,' reveals Macpherson. 'It would have been nice to include the whole concert, which has bits from *Tommy*, but it would have run into a double CD which I don't think the record company wanted. We also extended *Who Sell Out* with tracks recorded at the time including a version of *Hall of the Mountain King* which Jon found.'

The biggest headache in the Who project has undoubtedly been locating tapes. Although Pete Townshend has endeavoured to find all the masters and archive them in one location, there are still serious gaps.

'The Who's library is not what it should be,' confirms Macpherson. 'The band recorded all over the place, including quite a bit of work in America, and often they'd do a number of different versions of the same song. There are wild stories about masters being ceremoniously burnt, tapes floating away down canals in Venice and a major London studio filling a skip with uncollected masters which passers-by just helped themselves to! In fact I've ▶

Andy Macpherson has remixed all The Who albums, up to 1972, in his own studio

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heard that Pete Townshend is prepared to buy tapes back from anyone irrespective of how they acquired them, which is pretty extraordinary.'

The largest gap in the archive is *Who's Next* where only five out of the ten multitrack masters could be found. Consequently, half the album has been remixed while the other half has been remastered by Jon Astley.

Surprises

When Macpherson came to mix the *Who Sell Out* album, he made an interesting discovery.

'When I started making A-B comparisons between the multitracks and the record, I was surprised to find that the record had been mastered at the wrong speed. Nobody has any recollection of this being a deliberate decision, and it's basically had the effect of pitching the whole thing down, giving it a doomy quality—this is particularly noticeable on the opening chord of "I Can See For Miles" which has always sounded a bit weird. We made the decision to put it back to normal speed, bearing in mind nobody objected, and the whole album to my way of thinking sounds a heck of lot better for being in the correct pitch. However it left us the problem of the Radio London adverts (offshore 1960s pirate radio jingles between tracks) which we didn't have any masters for, and Jon had a lot of fun repitching all these from the production master.'

Another surprise came when Macpherson listened to the *Live At Leeds* masters for the first time and found the whole recording was plagued with clicks—'Whether they're from stage lighting, the Student Union bar or whatever I've no idea, but they're extremely obtrusive. On the original record they're not so apparent, probably because of its innate dullness, but when we sat down to mix they made the tapes virtually unworkable. We decided to use an automatic declicker and hired-in a Cedar *DC-1* box to do the job, retransferring the problem tracks through the unit. It worked fine on the guitar, just making it slightly duller, and it did a good job on the bass too, but it totally wrecked the bass drum so I had to go through the whole album dropping the processed signal in and out on the bass drum track to cover the clicks, which took the best part of two days. In the end, though, we banished all the clicks without noticeably degrading anything which was great.

Macpherson also put a lot of work into the vocals on the *Live At Leeds* rerecording sections with different EQ to literally equalise the often erratic response. He additionally performed manual gating to avoid stage spill: 'I used a reasonably slow fade-up before a vocal entry and a quick fade-out where the vocal stopped, this avoided a lot of the stage pick-up interfering with the mix, particularly from cymbals when Daltrey was singing next to the drums. I had quite a bit of fun with that on the band's more amusing pieces like "A Quick One While He's Away", and was able to keep some interesting stereo going on so that Townshend's vocal appears where his guitar is and that kind of thing, which helps with the realism of the performance.'

Since its release in 1970, rumours have

Macpherson's next job is *Quadrophenia*

circulated among Who aficionados that *Live At Leeds* was not recorded at Leeds at all but was in fact a concert recorded at Hull University. However, Macpherson, who has listened carefully to both sets of masters, can now vouch for its authenticity.

'The Hull concert, which was recorded on the same tour, is not as good and there are problems with it—for example the bass guitar wasn't recorded on a number of tracks. Leeds is superior both in terms of performance and sound, and it's definitely what's on the record.'

Out of the albums mixed so far, *Tommy* has proved the longest and most complicated. Macpherson puts this down partly to its uniqueness and partly because it was the band's first experience of 8-track.

'*Tommy* was different from their other records in a number of ways. It's enthusiastically crammed with overdubs, and is actually more like a 16-track with all the track sharing that's going on. There must have been a lot of hands on the desk when it was mixed originally, and I couldn't have done it without using automation. The mastering also played a heavy hand on the finished record and it sounds as though it's received a huge, compressed bass boost which goes right down into the Gods. In comparison to the other records it's extremely bass heavy, but it's all part of the character of *Tommy* and we'll be adding that during the mastering stage.'

When I spoke to Macpherson, he'd just finished mixing *Tommy* and was waiting to hear the compiled mixes from *SADiE*. 'I've got one or two thoughts in the back of my head about how we could improve things,' he confides,' but it's always much easier to tell when you hear the whole thing in context.'

Once Macpherson and Astley feel comfortable with their efforts, and both are extremely critical, listening copies are sent to the record company and the Who's office for comment. If this receives the thumbs-up, the album will be sent for final mastering by Tim Young at Metropolis Studios, allowing the pair to get on with the next project, which in this instance is *Quadrophenia*. ■

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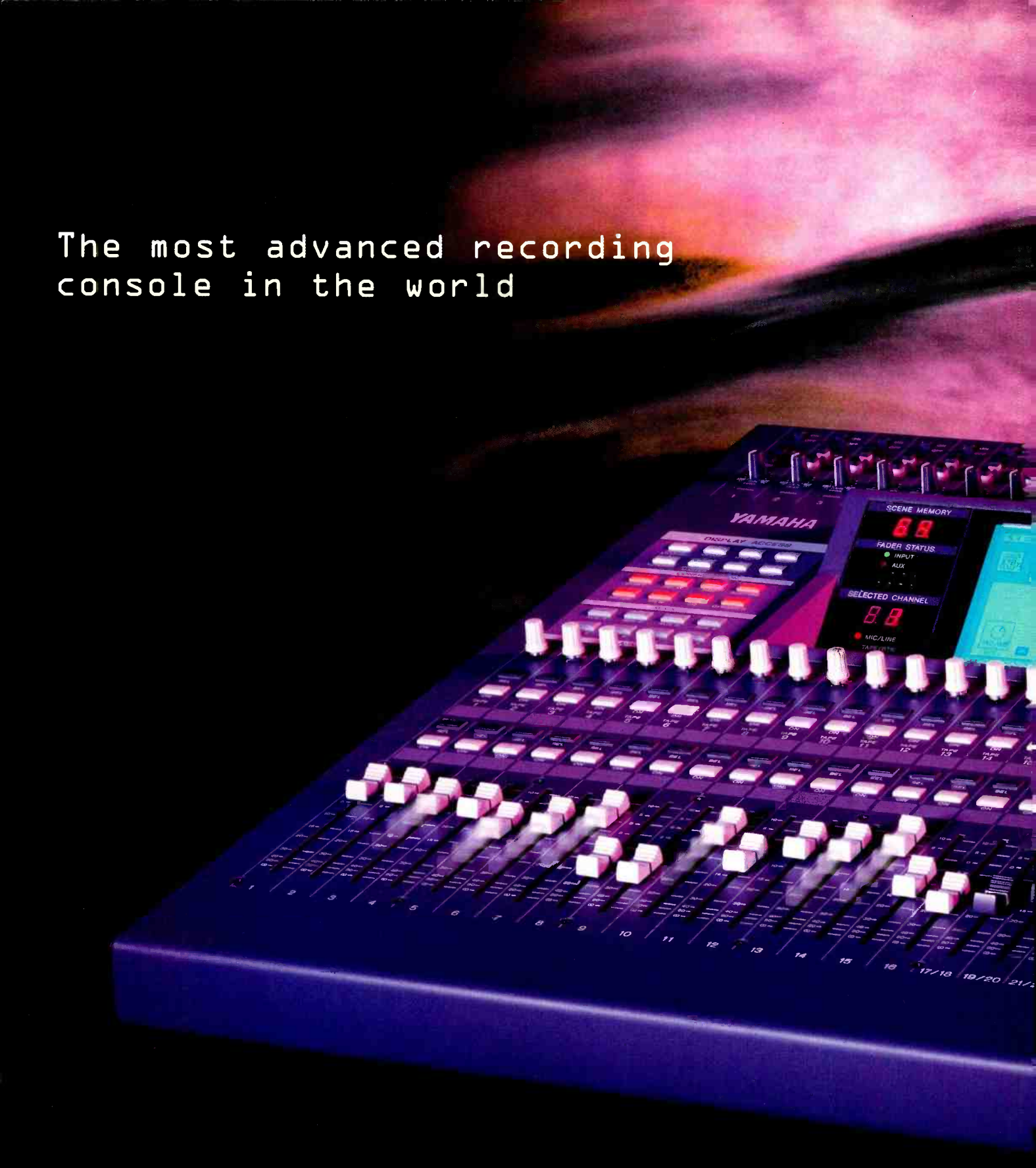

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SONY DYNAMIC MICS

Three dynamic microphones from Sony, the *F-710*, the *F-740* and the *F-780* are intended to raise the company's profile in the live arena. Dave Foister takes centre stage

While the company's name is readily recognised as significant in many areas of audio and video, Sony are not immediately associated with microphones. Indeed, their involvement in the microphone market has been marked by a sporadic individuality, some might even term it quirkiness. Some of the early models, however, (dating back as far as the 1950s) are now widely regarded as classics, particularly in the United States, but in all that time comparatively few Sony microphones have attracted a great deal of attention—with notable exceptions.

The *G800* valve models are flamboyant statements of the art, complete with lumps, bumps and Peltier heat pumps, they took the world completely by surprise, and were arguably the most expensive microphones in the world until the appearance of the Brüel & Kjær *4040*. There is also, of course, the *ECM50*, without which the audio world would not be the same, but even this is a specialised product and hardly part of the mainstream microphone market.

This impression of Sony as being a company for whom microphones are little more than a sideline may simply be caused by their other activities—the field of digital recording and editing for instance—having overshadowed their relatively low-profile microphone ventures. But that is not to say they have been dragging their heels. Indeed, one of my favourite microphones is the Sony *C48*, a large-diaphragm, side-fire, multipattern condenser that can give many more familiar (and more expensive) models a run for their money.

That said, the area of dynamic microphones for stage use is definitely not a market area I would have associated with Sony. That market has its favourites, those manufacturers who can manage to make a microphone sound good after it has been banging around on the road for a year. Interloping manufactures can have a pretty hard time launching new mics against models that have been industry standards for decades. Sony have a way into the market via their radio-microphone systems, and are following this opening up with a new set of three dynamic mics. The bottom-of-the-range model alone is likely to supersede the existing small range.

The present small range comprises two microphones, the *F-720* and *F-730*, compact, switched, models suitable between them for general-purpose voice and instrument miking. Both give a perfectly presentable performance, with the kind of frequency-response characteristics and close-use behaviour one would expect from a mid-range dynamic microphones.

F-710

The base model of the new range is the *F-710*, which is designed as a hand-held vocal microphone and, again, incorporates a switch—this addition alone is regarded by Sony as a significant upgrade on the *F-720* and *F-730*.

The microphone is substantially bigger than its predecessors, but the audible benefits are readily apparent. The old models are perfectly acceptable for general use, but the *F-710* adds a smoothness and a frequency-response extension which puts them in the shade. Its subtle presence-lift and good controllability of the proximity bass tip-up combine with a wind resistance, which is better than average, to produce a microphone that would fill the bill in any front-line application, giving many an old war-horse a run for its money. Its upper-mid response is noticeably brighter than that of an *SM58*, but in a rather higher area, which may well be of some use.

F-740

For the added sophistication demanded by today's high quality PA rigs, however, there are two further models. The *F-740* is a nominally flat microphone for instrument use, and therefore lacks the ON-OFF switch. Its size, mid-way between the old smaller models and the new *F-710*, makes it chunky enough to appear rugged but still small enough to get into awkward corners and remain reasonably unobtrusive.

I had the chance to try the *F-740* on a variety of typical instruments, and in every case it impressed, with a depth and clarity of sound remarkable for a dynamic of this type. Like the *F-710*, its sensitivity is almost identical to that of an *SM58*, but it eschews the Shure's distinctive presence-lift in favour of a more natural overall rendition, with a particularly impressive low end. This may be at the expense of pop resistance, as I found it easier to produce blasts out of it, but for the instrumental sources it is intended for this should not be a problem.

I used the *F-740* first on a flute, and it gave the kind of results I would have expected from a decent condenser wherever I put it. Over the keys the sound was clear, natural and suitable airy, while over the mouthpiece the intended presence was all there although never exaggerated. The supposed susceptibility to popping was never sufficiently pronounced to pose problems with the mouthpiece position, however close I placed it.

Use of the microphone on a saxophone gave the same more than satisfactory results, with an ample capacity to deal with the sound-pressure levels close in to the bell without complaints. Indeed, the sound remained open and natural even close up, with the potential to give a more studio-type openness with a little more distance. Acoustic guitar was just as representative of the microphone's capabilities, with a depth to the low strings, a bright clarity on the high strings, and an ability to distinguish very clearly between the various possible sounds from different positions on the guitar and render them all convincingly. The overall feeling was of quality and transparency, particularly in the critical upper areas, normally associated with a small-diaphragm condenser microphone.

F-780

The *F-780* takes this a stage further by tailoring the quality of the *F-740* specifically for vocals. Its presence-lift is clearly audible when used on the instruments at which one would be inclined to point the *F-740*, but even so it is not excessively marked. It seems to have an objective presence very similar to

Sony's dynamic range is to add the *F-710*, *F740* and *F-780* at the cost of the *F-720* and *F-730*

the *SM58*, but has a more open top-end and a more extended bass response. Even with the high degree of low-frequency rendition, it seems more than sufficiently immune to pops and blasting, coping particularly well with the kind of problems presented by extended 'h' sounds. This prodded me into dismantling the microphone, and the others in turn, to discover a very impressive standard of construction obviously designed with arduous use in mind.

The grille sphere unscrews in the expected way, and is revealed to be lined with lightweight foam as an initial barrier against wind-borne problems. This basic windshield behind the woven metal grille is augmented by a layer of stiff foam over the diaphragm itself, and the two of them together provide all one can reasonably expect in terms of built in wind resistance. The other aspect of the construction plainly evident with the grille removed is the shock mounting of the capsule assembly. The coupling between this central element and the microphone body is a solid, yet remarkably pliable, rubber ring, extending almost an inch down into the microphone body, and this sits in a threaded aluminium ring that allows the whole assembly to be removed very easily from the main-body sleeve. The capsule assembly itself is electrically connected to the base XLR via a PCB-mounted connector, making dismantling and servicing unusually easy. This careful mechanical construction gives what I would estimate to be 10dB better isolation from straightforward shocks to the body, than achieved with an *SM58*. Whatever the figure, handling noise is certainly very impressive, being a degree or two better than one might have expected.

The aluminium threaded-ring and rubber-insert construction is specific to the top two models, with the *F-710* being built more in the basic way of the earlier models with the capsule sitting in a rubber mount directly attached to the body sleeve.

The F-780 is the top model of the range and is the link back to the radio-microphone range mentioned earlier, as it has the same capsule assembly as Sony's successful *WRT-867* radio-microphone transmitter and is intended to sound to all intents and purposes the same. A mark of its success in this aim, and of the acceptance it has already gained, is the fact that it was adopted on the Rolling Stones' *Voodoo Lounge* tour around Christmas last year and has been in the rig ever since.

Conclusion

These microphones slot very neatly into the three basic requirements for stage dynamic types: a good affordable all-rounder; a naturally flat all-purpose instrumental microphone with a near-condenser sound but better than condenser robustness; and a made-to-measure vocal microphone with good handling characteristics and an up-front, yet deep and natural, sound. If the boys in the band can pluck up the courage to try something a little different from the usual bill of fare then this new Sony range deserves to do very well indeed. ■

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A FINGER ON THE PULSE

The recent resurgence of interest in live recordings indisputably favours older acts over the newer. Kevin Hilton investigates the recording of Pink Floyd's *Pulse* and the attitudes of 1990s A&R departments

In the liner notes to his 1976 release *Greatest Stories Live*, the late Harry Chapin wrote: 'People have been coming up to me and saying, "You're so much better live. . . When are you going to do a live album?. . . Your records don't capture the emotion you generate in a concert."'. Such comments explain why people go to live gigs—to see their favourite artists and experience the songs in a different environment, away from the hi-fi, sharing the experience with other fans. But they do not really explain live albums. The songs may be there, along with the sound of the crowd, but the listening is done back in the front room, on the domestic stereo system. Something will undoubtedly be missing, so what is the point of live albums, and why do bands, especially the older ones, continue to make them?

A milestone in live recording —Thin Lizzy's controversial 1977 album

Maybe because it is something of a grand tradition, going back to the creaky, and now almost unlistenable, live rock-and-roll records of the 1950s, where the sound of the crowd took precedence over sonic purity and performance. This was carried on by The Beatles; when their *Live at the Hollywood Bowl* album was rereleased a few years back, younger listeners could have been forgiven for wondering what all the fuss, and the screaming, was about.

Mick McKenna—for many years resident engineer with the now defunct Rolling Stones Mobile—identifies three main reasons for making live recordings: firstly,commercial, with a view to releasing an album; secondly, archival; and, thirdly, for personal appraisal, so that the musicians can gauge how their performance is from night to night. From the record company perspective, David Hughes, Vice President of Communications and External Affairs at EMI, explains: 'Every sustained success has a live album in it, especially if they're around a long time.'

Unpredictable industry that it is, the record business does not always adhere to such straightforward assessments. Some bands have churned out the live LPs over the years—witness The Rolling Stones with *Get Yer Ya-Ya's Out!*, *Love You Live* and *Still Life* and the promise of a new live recording in the autumn —while others either wait until success begins to wane, like The Police, or they may not bother at all.

Some have built entire careers on a live recording, which has given rise to the industry adage that, after a live LP, particularly a double, artists tend to fade. This is true for Peter Frampton, who had made four well-received solo records after leaving Humble Pie, and then stormed the globe with *Comes Alive*, still one of the best-sellers of all time. The success marred the rest of his output, to the point where the whole affair has become something of a poor joke.

Then there are the artists who record every show they perform: Bruce Springsteen was able to produce a decade-spanning retrospective in this way, while the late Frank Zappa was the aural equivalent of a magpie. Impromptu jams in airport lounges were laid onto Nagra recorders, while concert performances proper would either be plundered for single elements to be used in later studio projects, or released in their own right (*You Can't Do That On Stage Anymore, et al*).

One of the most unusual 'live' recordings in my collection is *Through The Fire* by a short-lived super-group called HSAS (Sammy Hagar, Neal Schon, Kenny Aaronson and Michael Shrieve), who put together some songs and toured the US during 1983. The shows were recorded by the Westwood One mobile, then taken into Fantasy Studios where over-dubs were added and the audience reaction moved, with the result released almost as a studio project.

Doug Hopkins, once of Advision Studios and Mobile, and now running the Malcolm Toft in-line equipped *A2D* truck, can see some logic in such a move. 'There is a certain energy that you get on the road,' he says, 'and trying to match the live monitor mixes doesn't sound the same. The adrenaline and inventiveness are missing.'

So there's the frisson created when musicians are working together on stage, and the element of a souvenir, to remind those who went to the gigs of what they experienced. But how honest are some of these so-called live recordings? Judas Priest's breakthrough LP *Unleashed In The East* was derided as Unleashed In The Studio, while Peter Gabriel, on his first concert outing, *Plays Live*, put his hands up to the deceit in the sleeve notes: 'These tracks were recorded on tour and then taken back to Box and tweaked. This is, of course, cheating.'

Maybe so, but not as much as what is generally hailed as one of the best live albums of all time, Thin Lizzy's *Live and Dangerous*. In an interview for the BBC Radio 1 programme *The Record Producers*, Tony Visconti admitted, 'We erased everything except the drums on *Live and Dangerous*. The voices were done again, so were the guitars, and even the audience was done again in a very devious way. One of the songs, Southbound, wasn't even recorded in front of an audience—it was recorded at a sound-check, and I added a tape loop of an audience just sort of screaming in the background. That was a totally manufactured live sound.'

This is the most extreme form of 'fixing', but there is always the temptation for producers and musicians to get together and fiddle around at the mixing stage. An album which eschewed this totally, and proudly proclaims its unadulterated nature, is the first Dire Straits live set, *Alchemy*, recorded by Mick McKenna. 'Sometimes a live LP can sound stunning, like *Frampton Comes Alive*,' he says. 'If they work well, then they're great, which was the case with

PHOTO: PHIL DENT

The scene of Pink Floyd's most recent live recording—*Pulse*

Alchemy. But when somebody sets out to make a live LP and it doesn't work, they go back and over-dub. At the technical level, this brings in all sorts of confusing data and phase errors. It's very difficult to add to live recordings perfectly.'

Doug Hopkins sees an economic reason behind the trend for re-dubbing live recordings in the studio. 'It used to be the case that the whole lot. all the concerts, would be recorded,' he says, 'but that was in more affluent days. Back then, people like Paul McCartney would record everything, but now it's more specific, picking one concert, which then needs a lot of fixing afterwards.'

The highest profile live release in recent months has been Pink Floyd's double *Pulse*, resplendent in its extravagant, flashing packaging, and featuring what is being called the first ever full, commercially (legally) available version of *Dark Side of the Moon*. The album was compiled from recordings of 20 shows around Europe and the UK (see 'The Recording The Floyd's Pulse' for full details), which gave Producer-Engineer James Guthrie the luxury of picking the best for public consumption.

Over the years, the Floyd have built up a reputation for sonic purity and technical excellence, which Guthrie had to balance with retaining the live feel. 'We decided very early on that nobody would come down to the studio to do repairs,' he says. 'If repairs were needed, elements would be taken from another night and flown-in. Everything you're hearing is a live recording, just a few bits have been relocated. Purists may say I was wrong to do this, but if there is something really objectionable, like a bum note, you don't want to hear it played-back forever on the record. It's still a honest performance.'

This trade-off between the creative and the technical could be one of the reasons why live albums are now less common in general, despite the massive improvement in technology, which has allowed the disparate disciplines of live sound and recording to work in something approaching harmony. In the dim and distant past, double miking was the norm, which meant that singers had to work through a performance holding two mics, one for front-of-house, one for the mobile. This disappeared as splitter technology improved, although there was always the danger of spillage from the monitors.

One of the most famous live tracks of all time is 'No Woman No Cry' by Bob Marley and the Wailers, recorded at the Lyceum in London. It's so famous that it completely overshadows the studio original (from the album *Natty Dread*). It also contains one of the industry's most noticeable mistakes, a piercing belt of howl-round during one of the quieter passages. Although that glitch is now as much a part of that record as the I-Threes' backing vocals, it probably would be absent had the track been made today, not through over-dubbing or fixing, just through better stage technology. As Mick McKenna observes, 'In this day and age, there's no excuse for overdubbing on live albums, especially with clean outs and decent splitting systems.'

These have made it easier to reduce the amount of equipment needed to lay down live tracks, whether they be for commercial release, archiving or appraisal. After the sale of the Mobile, McKenna put together Rack and Roll, an easily transportable rack-full of gear which can link into a multitrack or a DAT to provide what he calls 'live data storage'. The clean outputs on such front-of-house consoles as the Midas *XL4* have also made it possible to feed a usable mix onto DAT or *ADAT*, possibly adding a pair of audience mics to give some atmosphere.

Such simple and straightforward techniques, with the minimum of studio time for later fixing, have benefited the Unplugged trend. One of the last gigs undertaken by the Advision Mobile was Eric Clapton's acoustic MTV session, which came straight off the stage, through a Yamaha digital desk and onto *ADAT*. Another Unplugged recording, that of Paul McCartney, was merely the live monitor mix, but it still sold the restricted 500,000 issue. 'Warts and all, it's more exciting,' opines Doug Hopkins.

The live recording market, resplendent with its Cromwellian blemishes, is still there, but in a different form. There are now fewer mobile studios around, and those that have survived, or have just opened, are finding that the broadcast sector is more lucrative and offers more work. Although newer bands still record ▶

State of the live art 1995—Pink Floyd's *Pulse*

their concerts, the results are more likely to end up on the B-side of singles, or packaged on a short-play CD rather than as a full-blown album. Which is perhaps as it should be, remembering such 1970s excesses as the four-disc, quadrophonic ELP opus, *Welcome Back My Friends to the Show That Never Ends*.

Recording The Floyd's *Pulse*

Pink Floyd's latest album is the sumptuously packaged *Pulse*, a double set recorded on the European leg of their mammoth world tour. Among the familiar tracks are a selection from the last studio offering, *The Division Bell*, plus what is being called the first ever commercially available live version of *Dark Side of the Moon*.

Despite this, there is still the fact that *Pulse* comes only eight years after the Floyd's previous live opus, *Delicate Sound of Thunder*, which contains many of the same songs. Producer-Engineer James Guthrie acknowledges this, but says that, originally, the plan had been just to record *Dark Side*, although it later grew into a double CD (quadruple LP) proposition.

'The first thing we did was to have discussions about what we wanted to do,' Guthrie says, 'which were crucial to the process. When I was first told that they [the band] wanted to do *Dark Side*, I was thinking, 'This is going to be a tough act to follow'. So many know it note-for-note, and it has such atmosphere. My first concern was two-fold. The first was to capture as much feel and excitement of the live show as possible, which is very difficult when you're competing against Pink Floyd's quad front-of-house system. The other was to re-capture as much as possible the atmosphere of the original recordings.'

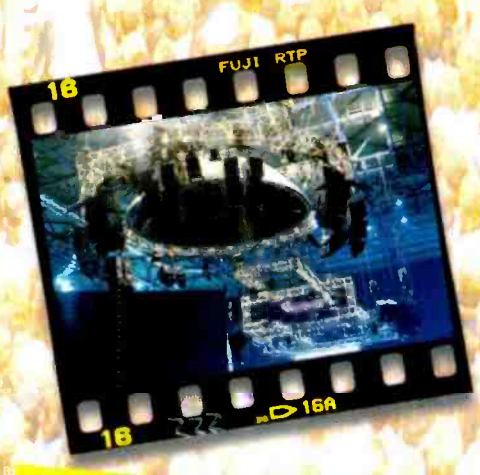
Guthrie and the band sat down and listened to the original 1973 album, although the intention was not to copy it exactly, merely to remind everyone of the LP's feel and atmosphere. 'We had a number of nights to choose from,' Guthrie says, 'and we referred back to the original a lot, although I don't think that one should reproduce the studio version. It's good to make some changes but the atmosphere and feel is crucial, especially with something like *Dark Side*.'

Differences are already built into the 1990s version of the Floyd anyway, given that former mainman Roger Waters is long gone, meaning that guitarist David Gilmour now has to sing two extra songs in the *Dark Side* set, and that there are other musicians around the remaining nucleus of Gilmour, Keyboard Player Rick Wright and Drummer Nick Mason. With the other material, taken from *The Division Bell*, *A Momentary Lapse of Reason*, *The Wall* and *Wish You Were Here*, with the old Syd Barrett warhorse 'Astronomy Domine' thrown in for the hippies, there was less concern about note-for-note recreations.

A perennial niggling point on all live albums is the amount of audience reaction used, and how high it is in the mix. Guthrie has definite ideas on this: 'As a kid, I never liked live LPs. They rarely sounded good, and there was always that horrible audience yelling over the music. What I've done on *Pulse* is like a pulling-focus camera move. We established the audience for excitement, but once the music starts, we zoom in on it, keeping the audience in the right place. The exception is "Wish You Were Here", which is a bit of a sing-along these days, and where I used the audience most. Generally, I'm very cautious with audience noise.'

For the recordings, Guthrie had very clear ideas about how he wanted to work and with what equipment. He settled on the Paris-based *Le Voyageur II* truck ('It's a great mobile and the crew are fantastic.'), which is equipped with a Neve *VR* Series console and custom-built monitors using ATC drivers. (ATC are Guthrie's favourite and preferred speaker.) As a sleeve note points out, *Pulse* is an analogue recording, with 48 tracks made up from two pairs of Studer *A820*-Otari *MTR90* combinations.

A stage splitter box took feeds to the front-of-house desk, with a spare feed going to the mobile. As the show was already well established by the time it reached Europe, Guthrie knew that the recording process could not disrupt proven routines too much. 'We [the recording crew] had to be as invisible as possible. It's a very complex show to set up, and anyone coming in half way through the tour would be very disruptive. We had to use the mics that were already on stage, and they were ▶



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better suited for live work than for recording. I managed to get additional mics for the guitars, the bass amp, the sax, and some overheads on Nick Mason's drums, but that was it. We did change the position of some mics, and the front-of-house guys [Andy Jackson, Colin Norfield and Paddi Addison] were fine with that.'

The recordings were treated like a studio session, with Guthrie handling all the EQing in the truck and practising monitor mixes on a few nights. This gave him the chance to practice for a live pay-per-view satellite broadcast of one show. 'Doing things like that keeps you honest,' he says.

The hundreds of feet of tape—six reels were used per night—were taken back to David Gilmour's 95-foot Edwardian houseboat on the River Thames. This vessel contains his studio, fitted out at the time with an Amek *Hendrix* console (now replaced by a Neve) and ATC monitoring. Working from a Studer *A827* and an Otari *MTR100* onto a Tim-de-Paravicini-built *J37* 2-track (based on the Studer *C37*), running at 15ips non-Dolby CCIR, Guthrie created the mixes for the various release formats. Extra width was provided by Q Sound processing, parallelling the quad effect of the concerts. 'Anything to make this an experience,' says Guthrie, 'although you have to sit right between the speakers to appreciate it.'

Guthrie admits that it was a lengthy project, which included ensuring that CD glass masters were as sonically pure and jitter-free as possible.

'Live recording doesn't have to be a sacrifice in audio quality,' he says. 'You can compete with studio albums if you take some care and pay attention to details.' ■

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A2D Mobiles: Tel: +44 1342 826800. Mick McKenna: Tel: +44 181-868 7415.

THE RECORD COMPANY VIEW

Record deals signed by bands will stipulate the number of recordings to be made and released in a given period of time, but the nature of these is not. As David Hughes, Vice President of Communications and External Affairs at EMI, says, the decision to make a live album is a mutual one taken by the group, management and producer.

'With live, you want something substantially different,' he says. 'In many ways, it's a souvenir, a momento of a concert tour. With *Pulse*, and its live version of *Dark Side of the Moon*, there was a good reason for that specifically. If someone is a success on the live stage, there will be the point where the band wants to record a live album, and where the fans want it too. But it won't be before the fourth or fifth release, where sustained success has given them enough hits.'

Even with huge success, some of the newer and recently established bands are not following their more venerable predecessors, like the Floyd, by recording full live albums. A common trend today is the bonus track on CD singles, or the live B-side. 'With artists now, every LP is so important globally, nobody is going to chuck in a live LP just for the sake of it,' says Hughes. 'It has to be regarded as a new LP, with good quality and the best performances.'

At Virgin Records, Ashley Forbes of the A&R department concurs. 'A lot of live material is used on B-sides,' he says. 'REM is a good example of a band doing that. Today, live material is being used as format tracks [tracks added to singles or CD packages for added value], and not necessarily for a live LP. Format tracks on CD singles also give an element of collectability.'

One of the most successful young bands at the moment is Blur, who recently played a highly acclaimed gig at the Mile End Stadium in East London and released a 4-track EP packed with their latest single. 'The band was really pleased with the show,' says Karen Johnston of Parlophone, 'and thought that it would be good for the fans if some of it was released.'

From the recording industry angle, Doug Hopkins of the *A2D* mobile says, 'Record companies now see live concerts for B-sides, and it's a cheap way of getting those—a very cost-effective way of compiling a lot of material.' ■

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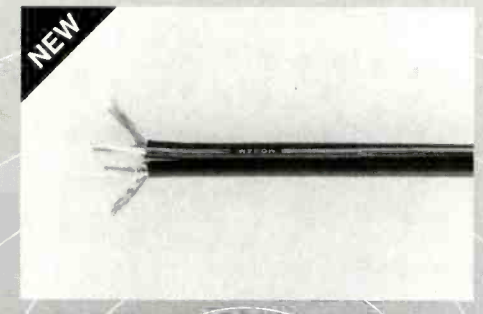

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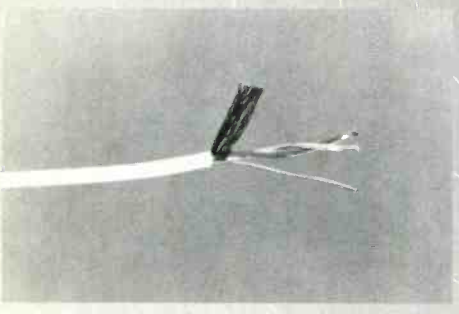

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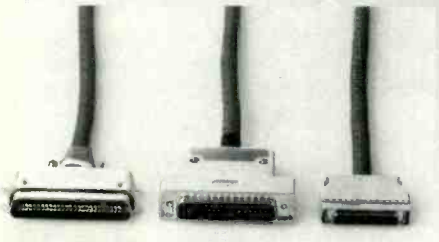

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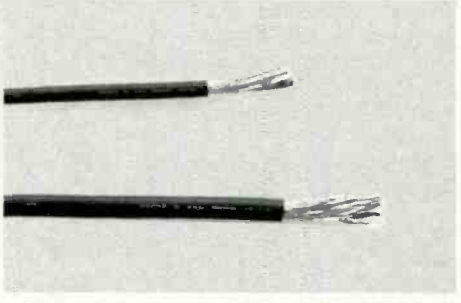

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THE RITE STUFF

Acknowledged leaders in the analogue field, Focusrite recently announced their intention to 'go digital' with a new A–D convertor. Patrick Stapley assesses the strategy

'It was clear to us quite some time ago that if we were going to survive the next decade, in terms of satisfying demands and suggestions from customers, we would need expertise in the digital as well as the analogue domain,' states Focusrite Technical Director Richard Salter.

In fact, the situation became more obvious as Focusrite started manufacturing products specifically for mastering, such as the *Blue 315* equaliser and *Blue 330* compressor-limiter.

'Mastering facilities want to keep the signal in the digital field, but are frustrated by not being able to process it how they want,' says Salter. 'There's obviously a strong need for more choice in the digital domain and specialist manufacturers like Focusrite are in an ideal situation to offer that.'

Digital conversion

Focusrite began research into digital conversion and processing about three years ago but, according to Salter, decided that what they were trying to achieve was not quite 'down the right path' and that the technology at the time was not good enough.

Consequently, the digital programme was allowed to stew for the best part of a year before being reopened in early 1994 with a new outlook.

'We started afresh with the principle that the right thing to do was to get in and out of the digital area competently. Hence our first products are the *Blue 245* A–D convertor, which was introduced in preproduction form at Audio Technology 95 Show (production units are expected in October), close behind will be the *Blue 260* a partnering D–A convertor scheduled for release at the end of the year.'

Both convertors are 20-bit designs and have been developed using the same basic design philosophy that Focusrite adopt for their analogue products.

'We apply rigorous known engineering principles and then simply sit down and listen,' explains Salter. 'It may seem a rather boring way of doing things, but it produces very good results, which we believe ends with a better sounding product. We've already had some very nice compliments on the A–D—in fact, one prominent mastering engineer, who has been acting as a reference pair of ears, has said it's the first A–D convertor he's heard that sounds as though an analogue engineer built it. We're very pleased by that.'

Both units use the latest 20-bit Crystal Semiconductor chips launched at the Paris AES Convention. Focusrite had already carried out development work using Crystal's 18-bit version and, knowing that the same architecture was being employed in the higher resolution chip, had no hesitation in adopting it.

'We looked very carefully at what was on the market and came to the conclusion that Crystal seemed to do it better than anybody else. Their architecture in the engineering sense seems to be correct, the chips themselves are laid out in such a way that it's easy to make a clean isolation barrier between the analogue side of the circuitry and the digital side, which is quite difficult considering you've got all these pins clustered around a small chip.

They have also paid more than average attention to the way analogue ports work on their chips, which is actually more in line with our understanding of how semiconductors can, or cannot, sound right.

'All we've done to that is add what any textbook would tell you—for example, extremely quiet and stable clocks, good interfacing with reduction of jitter and so on, and then just very careful engineering and screening of the power supplies. We also include an unusual electronic front end in the A–D analogue input stage that maintains the low-noise floor of the chip. As with most Focusrite products there's no "rocket science", just good solid engineering used to produce a quiet, very stable and good-sounding product.'

Although part of Focusrite's latest *Blue* range, the convertors are not aimed solely at mastering applications, and will be targeted widely. 'They will be viable wherever people want really good, high-resolution conversion,' states Salter. 'Obviously, mastering houses ▶

Focusrite's *Blue 245* A–D convertor herald's the company's move into digital technology

will play a big part but we also expect a lot of interest from studios mixing or transferring to 20-bit, whatever the media.'

The *Blue 245* provides both AES-EBU and SPDIF outputs and, in addition to standard XLR and co-axial sockets, features a TOS-link fibre output. External sync inputs conform to AES-EBU or wordclock and can run anywhere between 28kHz to 54kHz allowing for varispeed operation. The internal clock may be switched between 33kHz, 44.1kHz and 48kHz, while the digital output can either be in the form of a full 20-bit signal or dithered and rounded down to 16-bit. As far as the conversion process itself is concerned, Focusrite remain a little cagey: beyond saying the unit does not use standard delta-sigma conversion and is unusual in its approach—Salter is not giving anything away.

The front panel houses analogue PPM metering with further LEDs indicating how close the signal is to digital overload. There are also preset sensitivity controls that operate in a similar way to input gain controls by setting the peak sensitivity of the convertor.

The 2U-high unit shares the same styling and construction of the other *Blue* units, with its heavy, slab aluminium box performing both as an extremely robust package and a highly effective electromagnetic screen. Price of the *Blue 245* in the UK is £2,250, and the companion *260* D–A is likely to be about the same.

Collaboration

In parallel with their proprietary digital programme, Focusrite have been collaborating with Digidesign and their TDM platform for *Pro Tools* (see sidebar), entering into a joint development deal.

'One of the things that's not currently so strong with workstation-type products is the choice of processing,' says Salter. 'Of course, most workstations offer EQ and a variety of other processing, but nobody has yet offered a plethora of good equalisers, as such. We are not at the stage where people compare one software package against another for equalisation in the way they compare say a GML equaliser with a Focusrite equaliser—that degree of subtlety doesn't appear to have entered the digital frame yet. What we want to do is essentially take the uniqueness that is Focusrite processing and translate that into the digital domain.

'We felt there was a potential market for that level of sophistication in processing and so did Digidesign. Both companies have mutually complementary skills that, if joined together and working smoothly, should be able to produce the right products. Digidesign are expert at code writing and we're experts at understanding which transfer functions best describe our analogue processing. In theory if those transfer functions are translated accurately to run on a platform such as TDM, there is no reason that one can't replicate exactly what's happening in the analogue domain across to digital, given, of course, the fundamental resolution limits of the platform itself—convertor quality and the number of samples and bits one has access to.'

Salter reveals that the tie-up between the companies is set to produce a 'string of software products', but at the moment no firm decision has been made as to exactly what the first of these will be. 'We've got the building blocks in place,' he says, 'but now we need to do some more detailed work on them before we're ready to launch a product. However, we are aiming to move fairly quickly and I would expect serious beta testing before the end of the year.'

Digital console

Having developed proprietary convertors and, in the latter stages of developing digital processing, it does not take a genius to realise that the building blocks are in place for a Focusrite digital console. In fact, there have been rumours over the past year that Focusrite are planning a major digital desk.

'It's too early to talk about a Focusrite digital console,' says Salter. 'In our opinion, there have been plenty of examples of digital consoles that have fallen down either because they are still first-generation thinking, or simply because they are too expensive. The one thing we have realised is that until the high-end console market can be satisfied with a desk at or below the cost of an analogue console, there is unlikely to be a mass market there. We've seen a high degree of success from small digital mixers as typified by the Yamaha products, and a reasonable amount of success for digital products aimed at postproduction because they offer a definite commercial advantage. But in top-end multitrack recording environments there isn't such an advantage.'

A factor that Salter sees as significant is the 'whole-life' cost of a console. 'If you look at an analogue console such as a Focusrite, SSL or Neve *VR*, we all know, roughly, what they cost. We also know that, in terms of budgeting for a studio, reasonably sensible estimates can be made as to what that product will be worth when the studio comes to replace it. Of course, the cost of keeping it running over that period is also reasonably well known.

'Now, with a digital console, things are far less predictable, and, with the technology changing so rapidly, there is a high degree of uncertainty whether or not that product will have any secondhand value in five to seven years' time. There is also the strong likelihood that running costs over that period will be considerably higher than an analogue desk because, apart from anything else, the maintenance skills and test equipment cost more, and it's unlikely to be an in-house job for the average studio anyway, which again means extra cost. So the purchaser faced with the potential of higher running costs and the possibility of 100% depreciation has to be convinced the product will offer significant advantages if it's to be considered a viable risk.'

The upshot of this is that Focusrite will not be producing a digital desk unless it can be done at the same price or less than their analogue consoles. Salter also states that if the company were to embark on a digital console it would be essential to use technology that was easy to service.

'It's all very well using exotic technology but it's far better to use technology that a lower grade of service support can maintain,' Salter says. 'That's where standardising on a readily available chip and small, upgradable processing blocks rather than making a unique hardware product may be the right way ahead. These are all issues that have to be addressed before a big digital console makes viable sense to us.' ■

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THE TDM BUS

Digidesign's TDM Bus (Trans-system Digital Matrix) is a 256-channel, 24-bit audio bus that can provide communication between *Pro Tools* and TDM compatible devices. In addition, it enhances *Pro Tools* operation by offering mixing of multiple tracks, auxiliary send and return buses, effects inserts and other sources. Apart from Focusrite, other third-party companies such as Lexicon, Steinberg, QSound, Jupiter Systems and Waves have also developed, or are in the process of developing, TDM plug-in modules. However, it should be stressed that the tie-up with Focusrite, coming from a traditional analogue background, is expected to produce more of a two-way collaboration with Digidesign.

Third-party DSP can be integrated in two ways to *Pro Tools*, either via TDM compatible NuBus cards with related software (such as Lexicon's *NuVerb*), or via TDM plug-ins which are software only as in the case of Focusrite. Software-only plug-ins are powered via the systems DSP Farm, which is a NuBus card with four Motorola 56001 DSP chips. A single DSP Farm can run TDM mixing, and three plug-ins—for example reverb, EQ and dynamics. If required, multiple DSP Farm cards may be added to support additional processing.

TDM modules remain completely transparent to the user, integrating into the *Pro Tools* environment as if part of the overall system, with all editing and mixing functions being handled internally as part of the 'session'. All 'patching' is performed digitally from the screen which applies both to internal and external devices enabling favourite analogue outboard to be more easily interfaced.

New *Pro Tools III* workstations come with the TDM system. Older *Pro Tools 2.5* systems are TDM-ready and can be upgraded with a TDM Starter Kit which includes one *Pro Tools* TDM Module, one DSP Farm card and TDM software. Systems using more than four channels require additional TDM Modules for each 4-channel group. ■

NASHVILLE'S FIRST LEGACY

Music Mill Studios is typical of Nashville: a two-room facility owned by a Producer-record company President; in this case Harold Shedd, head of Polydor-Nashville and producer of country acts including Alabama, K T Oslin and Toby Keith.

The studio was built in the early 1980s and the main room still retains some of the flavour of the Nashville recording philosophy of that era, with carpeting competing with wood in the interior, reflecting little ambience but reams about the dead-sounding approach of mid-period contemporary country recordings. That studio will be getting a complete overhaul, as has the facility's Studio B, redone earlier this year by Russ Berger Design Group of Dallas. Studio B got 500ft² added to its control room by simply lowering the floor a few inches to the same level as the lobby, as well as a compressible, spring-hung 5/8th-inch ceiling, a compression front end, RPG Omnifusors, a new Sony *PCM-3348* digital multitrack deck, Genelec *1033A* monitors, and more outboard gear including a TubeTech *LCA-2B*, tc electronic *M5000* with the digital and analogue I-Os, and a Lexicon *300*.

What it has also got is Nashville's first new API *Legacy* console, which, in concert with the city's only Focusrite desk, in Studio A, makes the facility unique not only in Music City but in the US, as well.

The board was delivered and installed over a week in June, and was immediately put to work by Chief Engineer Todd Culross and Producer-Engineer Ed Seay on overdubs for country artist Davis Daniel and overdubs and mixes for new country band Ricochet. The studio's experience with the console shows the capabilities of this new generation of a classic name in desk design and manufacture.

Discrete and marketable

First off, the reason behind the decision to purchase the *Legacy*—launched at the San Francisco AES Convention last November—was tied to both marketing and price structure.

'The idea of having two unique and singular consoles in the same studio is something that sets us apart in a very crowded studio market,' explains Chief Engineer Culross. 'We looked at the idea of a used upper-end board like an SSL or a Neve *VR* but there are plenty of rooms in town with those kinds of consoles. Instead, we began looking into other names on the market, like the Raindirk. They were all good consoles, but we thought the combination of the scarcity of Focusrite in the market and the image of analogue warmth that the API name evokes thanks to its all-discrete design, and that's how the marketing decision was made. In terms of price, we know we wanted the B room to go for about $900 per day or $125 per hour for overdubs, and $1,300 per day for mixing. The price of the API allowed us to meet that target.' (Music Mill's Studio A goes for $1,850 per day.

The API *Legacy*'s appearance is reminiscent of the earlier vintage consoles; the wide spacing between control-surface knobs and the wood-bordered frame are still there. Underneath, the signal path on the discrete design is particularly straightforward. Elco and 50-pin D connectors wire Music Mill's console (the wiring was done by Jon Dressel from Minneapolis, who has done a number of API installations in the US.) The only real bunching is beneath the armrest where the ribbon wire of the optional George Massenburg moving-fader automation wends its way through the board.

Music Mill bought a 64-frame desk with 56 inputs. Of those, in the light of its intended use as an overdub and mixing board, 16 have microphone preamps. The studio is evaluating some onboard signal processing that API intend to market in the near future, and have already ordered 16 channels of gates that can be inserted into the mic-pre slots above the module strips.

Modifications

Music Mill's API is essentially an off-the-shelf version of the console with two significant modifications. The first is that a toggle switch has been added to the equalisation section of the module that allows the detented cut-boost knobs to be calibrated in 1dB increments instead of the API standard 2dB per increment.

'The reason for that was the API EQ tends to become more narrow and intense around the frequency band selected as you increase gain at that frequency,' Culross explains, referring to the bandwidth Q that is adjusted internally according to the amount of cut and boost, narrowing as more processing is added.

'By allowing the increments to be at 1dB, we got a softer approach to EQ from the console.'

Rather than increase complexity in the EQ section by installing a toggle switch for each of the four EQ posts (their ranges are set at 12kHz–20kHz, 800Hz–12.5kHz, 75Hz–1kHz and 30Hz–400Hz), they opted for a single toggle for the entire EQ section. The *Model 550L* EQ module that Music Mill selected, unlike many other EQ designs, is a passive filter, using op-amp filters as buffers. The cut-boost is up to 12dB (6dB in Music Mill's mod.)

The second modification was the implementation of a 6dB attenuation switch on the line inputs. 'We opted for this to add more headroom to the console, especially with the addition of the Sony digital multitrack and also because people are bringing in Digital Audio Workstations,' says Culross. 'The board already has substantial headroom—I believe the EQs have about 31dB and the channels in the centre section are about 26dB. But this way, they can slam the console and have that much more to work with.'

The studio also requested the in-line monitoring version; a split-monitor section is also an option. One other unrequested extra is the talkback button, which came from the factory labelled T/B, YALL Culross points out that this shows consoles are also made down south—in this case, Virginia.

Otherwise, Music Mill's API *Legacy* is stock. The console itself is quite straightforward, which Culross says is at the heart of what he calls: 'One of the cleanest sounding consoles we've ever heard.' Each channel strip comprises four modules: the stand-alone *Model 212L* mic preamp, the *550L* EQ module, the *Model 768* input and the *Model 468* fader module. The console is built upon API's discrete design *API2520* op-amp, which has been designed and optimised for linear, low-distortion operation.

The *Model 212* employs the same

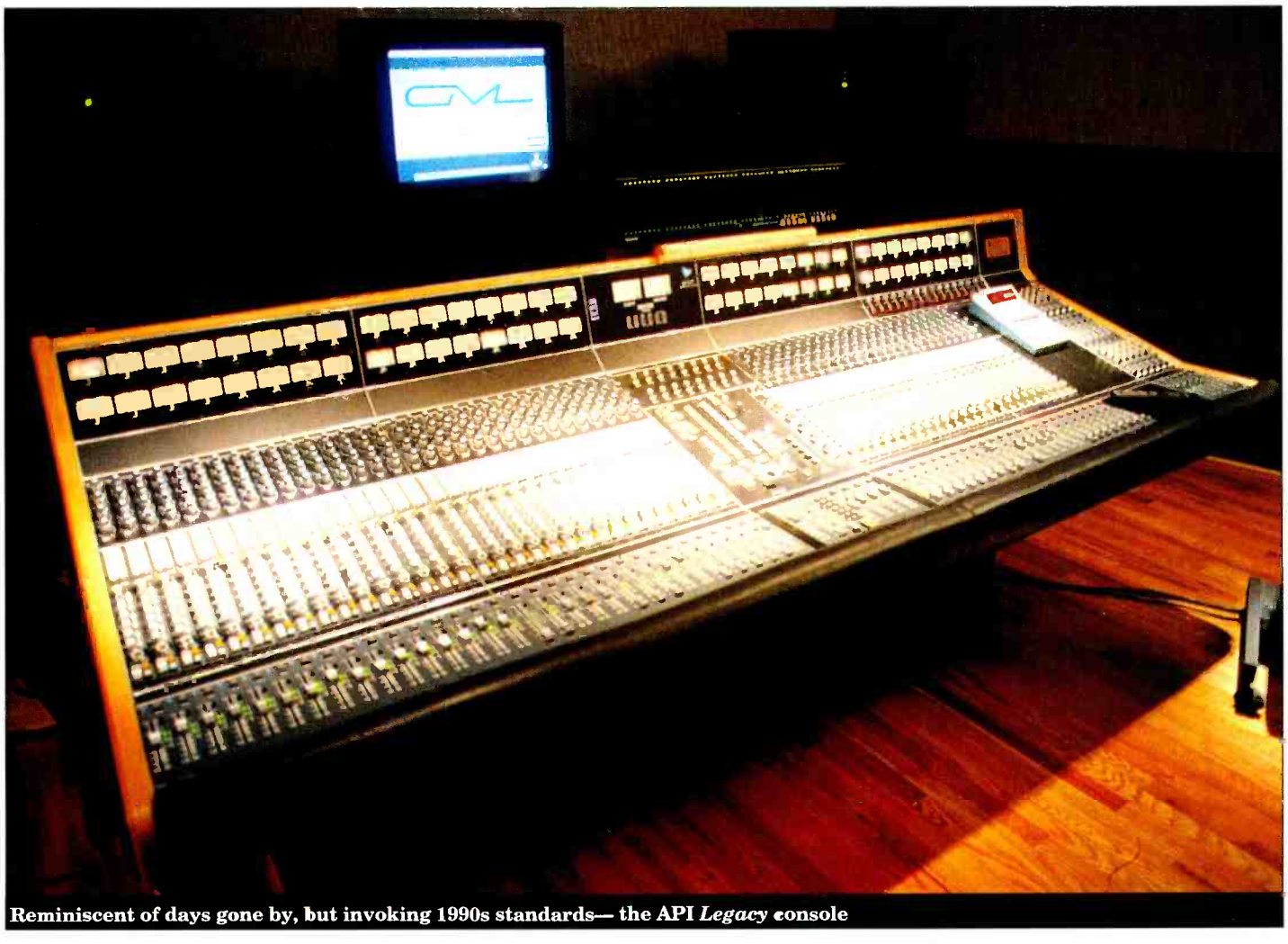

PHOTO: ALAN L MAYOR

Reminiscent of days gone by, but invoking 1990s standards— the API *Legacy* console

circuitry as the company's vintage *API512b* preamp. Gain is adjustable 0–60dB, with a standard 20dB pad and 48V phantom power on-off. A 5-segment LED meter indicates signal overload. Clipping occurs at +28dB.

EQ

Culross did an A-B comparison between the transformerless *550L* and the earlier *550B* EQ module and says the comparison proved the value of the API 'less-is-more' approach to desk electronics design. 'The overall sound of the EQ was a bit less aggressive on the *550L* than the *550B*,' he says. 'On vocal sessions, the EQ was very subtle yet present. Davis Daniel, for instance, can sing forever. You just can't blow his voice out. And the EQ managed to stay with him. The fact that the *550L* is transformerless also contributed to getting very clean, accurate vocals. The signal comes out of the channel's line input and goes to a discrete summing mix stage, then to the centre section of the console and only after that does it hit a transformer. The sounds, vocals and otherwise, were clean and punchy. There are few summing and buffer stages for signals to pass through.'

There are six aux sends per channel on the *Legacy*; Auxes 1–4 are mono with individual cut-gain switches; Aux 5-6 is a stereo pair with level and panning controls. Two switches extend their functionality: the LN switch enables Aux 5-6 to function as an additional input, accessible from the patch bay and can be used as an effects-return monitor or a tape monitor. The MX switch disengages Aux 5-6 from the channel strip and routes them directly to buses 1–8, providing up to eight additional sends per channel for mixes, or for use as additional cue sends.

'In effect then, we can have up to 20 aux sends on the board,' says Culross. 'And the LN switch allows you to have a separate stereo mix matrix that you can assign to the grand master fader.'

Additionally, the aux section uses a high-pass filter set at 50Hz and that uses no additional amplifiers in the signal path. Internal jumpers allow the frequency to be changed to either 80Hz or 150Hz. An INSERT button allows external processing to be connected directly via the patch bay to the appropriate channel signal path, post-EQ, pre-fader.

One additional future modification to the console in this regard that Culross discussed was resetting the calibration position of the bus outputs. 'It's set to wide open for zero,' he explains. 'I find that, when using the Aux 5-6 to the matrix for some of the other functions that aux can perform, if you're using several sends you also need to be able to have some easily accessible calibration ▶

Dan Daley visits Nashville's Music Mill Studios where a redesigned Studio B hosts one of the latest mixing consoles—API's *Legacy*

on the bus output. We're talking with API about how to give us a centre-detent knob that will provide that.'

Other channel strip features on the *768* input module include, obviously, an all-discrete design throughout, all-steel chassis construction which provides a physical shield between adjacent channels to eliminate crosstalk and individual on-off LEDs adjacent to each switch. 'The layout is one of the things that attracted us to the console,' says Culross. 'In overdub and mixing situations, you're going to have a lot of engineers passing through for short-term stays. The layout has to be as clearly marked and easy to comprehend as possible. So API took the same approach in layout as they have with electrical design: less is more.'

The centre section of the *Legacy* offers 16 individual gain controls over the full range of the bus amplifier for each main bus, as well as a master cut switch with LED indication. The *master solo* offers switching and gain control for the solo modes of AFL, PFL, SIP (solo in place) and Mix-Over Solo, a sum of the mix level over solo with a DIM control for mix level.

Drum trick

The versatility of the master centre-section is reflected in the two stereo main faders adjacent to the grand master fader (all automated). Culross explains that Producer-Engineer Ed Seay has a trick he uses to punch up drums: he sends a submix of the kit through an outboard compression stage, then returns that processed submix to one of the stereo faders, and an unprocessed submix to the second.

'Then he'll sneak in as much of the compressed submix as he thinks he needs on a track,' Culross explains. 'It gives him a great drum sound that can be instantly and very subtly adjusted.'

Again, in the master section, the *Legacy*'s layout is simple. Playback to monitor is arranged in two rows, Program and Playback. Program selects internal signals to monitor; Playback allows selection of 11 stereo sources to the monitor. There is also an individual gain control and cut switch for three pairs of cue masters, along with matrix routeing from auxes, control room and T-B facilities.

Another flexibility aspect is the ability to bring back a lot of external gear. While the console provides substantial routeing and insert points for outboard signals, the EXT 3 input acts like a 'bump box', allowing the connection of -10dB gear such as consumer cassette players to be brought back to the console.

Music Mill keep the bulk of automation control outside the master section, using a VDT and computer mounted on a cart next to the Sony remote control. While the *Legacy* is adaptable to a wide range of automation systems, Culross chose the Massenburg because it makes the *Legacy* compatible with the Focusrite in the next room, and because it is, as he describes it: 'Simply bullet-proof.'

There was one other feature not readily apparent on the *Legacy* but one that Culross says was critical in getting the console—and thus the studio—up and running quickly.

'Unlike many custom consoles, the *Legacy* was first completely assembled at the factory in Virginia, then they let it sit for about a week to allow the components, like capacitors, to physically burn in,' he says. 'There's always going to be a failure rate for components like that and it was a real plus that the break-in period occurred at the factory, not the studio.'

Culross concludes that the API choice was a good one, from the standpoints of operation, marketing and price. But it is the sound that seems to have clinched it for him.

'There really is something to the discrete approach to console electronics,' he says. 'The sounds off the *Legacy* are clean and contain a kind of warmth that makes this board a favourite for things like vocals and acoustic guitars. You get back what you put in, but there's a sensitivity to the electronics that makes it all the more musical.' ■

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YAMAHA CBX-D5

Years in the offing but finally shipping, Yamaha's hard-disk recorder has benefited from a significant cut in price along the way. Zenon Schoepe finds out if it was worth the wait

The amazement surrounding the arrival of Yamaha's *02R* digital desk at Audio Technology 95 is all the more surprising given that it was not that long ago when a showing of something digital was not necessarily an indication that it would be delivered imminently. Case in point: more than two years ago exhibition-goers were greeted by an inert beige box on the Yamaha stand which heralded the company's long-awaited and much-publicised entry into affordable hard-disk recording. It did the rounds, accompanied only by a crib sheet of stated features, and then the shouting subsided and not much happened for a while. Enquiries were met with the usual 'it's on its way' line but for all the world it was apparent that Yamaha were enjoying the growing pains and pleasures of developing their first tapeless system.

The problems were, to an extent, compounded by the unusual, although very admirable, route taken by Yamaha in developing a stand-alone box controlled by software to be run on an external computer. Its development happily coincided with something of a revolution in the software business as the sequencer designers got to grips with harnessing the potential of running hard-disk recording systems alongside their sequencing programs. Yamaha attribute the delay to these software writers but common sense suggests that, as with any first attempt, things are rarely so one-sided.

The system

The *CBX-D5*—for this is it at long last—comes to us still as a beige box that can be tagged on to a *Mac*, IBM (*Windows* 3.1) or Atari computer running software specifically written for it or incorporated into existing sequencing packages—and this is an on-going concern. The software running the *CBX-D5* in this review was *Cubase Audio* for the Atari *Falcon 030* which, like all the other versions, has been optimised for some of the extended features that the Yamaha box has to offer such as digital mixing with EQ and integrated digital effects. Storage was from a typically art-deco -style Micropolis 1.7Gb drive (which Yamaha recommend for this application).

It is important to stress that the functionality of the *CBX-D5* is the same across all platforms, the only real difference being in how it is presented and operated from within the third-party software. *Cubase Audio* will need no introduction as it has already carved a strong reputation in its various forms. However, to understand the software package is to understand the *CBX-D5* because, as with all the platform variants, the two are intrinsically linked.

The Yamaha box is impressively equipped and specified and one of its most appealing qualities is that, because it has a headphones socket and volume pot, you can listen to the audio editing while performing it from *Cubase Audio* without needing to resort to any other form of monitoring.

The *CBX-D5* can record two tracks simultaneously and playback four through four separate digital and analogue outputs, the latter using 18-bit D–A convertors. Digital outputs are provided for AES-EBU, SPDIF and Yamaha format. Analogue I-Os are on balanced XLRs and are accompanied by MIDI In, Out and Thru plus wordclock I-O.

Two units can be cascaded to yield an 8-track system running under single computer control and this will also enable 4-track simultaneous recording. In the, now, usual way for such systems, it is the Yamaha box that contains the required hardware for the tasks in hand and the host computer, we are told, is relegated simply to the role of controller. Audio files are handled in the same format as the host computer which means that general copying and deletion procedures can be carried out in the same way as with any other file.

On to the front panel, then. Here you will find a ganged analogue INPUT LEVEL pot with 12-segment peak bar-graph meters for the stereo input and the 4-channel output. The metering is excellent and is best kept in line of sight and suffers none of the nervous, jumpy nature often found on digital bits of gear. It also gives plenty of warning before it actually goes to Clip.

A multitude of illuminated indicators give a front panel representation of the nature of the incoming source (AES-EBU, Yamaha format, SPDIF or analogue), the recording sampling frequency (48kHz, 44.1kHz, 32kHz and 22.05kHz) and the playback frequency (48kHz or 44.1kHz). Consequently, the *CBX-D5* can perform real-time sampling rate and format conversion between the aforementioned modes, which is a very useful feature.

On line

The recording of audio on the *CBX-D5* within *Cubase Audio* holds no surprises for those familiar with the software—you select a track, define it as an audio track after deciding what signal is to arrive at the unit's input, and then record it in exactly the same way as you would with a MIDI track. The resulting recording can be drawn as a waveform display and manipulated and edited with the usual arsenal of tools facilities. If you are already confident with this package then you will not have any problems getting around the screens, the transport and employing the short cuts for which the software is renowned.

The mixing abilities of the unit arise fairly early on in the proceedings and serve as one of the differentiating features of the system over others.

A Monitor window enables channels to be named, put into Record, muted, adjusted for output level and switched between the 'to disk' and 'from disk' signal on a MONITOR button.

However, things really come together well in the Mixer window. Inputs to channels and channels to outputs can be freely routed and a mixer map depicts the four channels routeable to the two stereo buses, two mono post-aux sends and two stereo-effects returns. There is on-off switching for the paired 4-bus routeing, a channel mute, pan and EQ bypass.

EQ is 4-band consisting of two fully parametric bands with variable Q (0.1–5.0) and two sweepable shelves. The reason I have avoided referring to them as mids or HF-LFs is that all bands have identical 18Hz–18kHz frequency ranges with ±15dB gain and it is down to the user to divide them as required. The two effects returns, derived from the internal effects unit, get individual level and balance controls plus paired routeing to

Unusually, Yamaha's *CBX-D5* requires other manufacturer's software to make it operational

the four buses, which also get level and balance controls.

Mixer maps can be customised to take in fader or pot objects but can also be assigned to external MIDI controllers to enable the functions to be run from something like a MIDI fader panel.

Effects-wise, the unit offers the equivalent processing of an *SPX1000* which produces single, cascaded and dual effects programs from a list of 82 presets. Unfortunately, only 11 are of the dual type which means the second aux send is redundant for all but these. Effects can be edited using a clear depiction of parameters and values.

In operation

I had a lot of fun with the *CBX-D5*—it is a fairly fuss-free undemanding setup which is fairly easy to get around once your mind is in *Cubase* mode.

Among the many features is cycled recording which creates a single long file the duration of the number of cycles run which can then be cut into cycle-length pieces, auditioned, tweaked and comped in the editor. Thus virtual tracks can be assembled, although they all effectively compete for the available 'polyphony' of the system.

One of the best things about the package is the ease and variety with which bits of sound can be moved around. The processes and options involved are very *Cubase*-like and in line with the rest of the software, so *Cubase* aficionados will be very comfortable. On the other hand, absolute beginners will have to get their heads around *Cubase* concepts before they will be able to appreciate this.

One of the annoying drawbacks of the system is the time taken to create a waveform image of a piece of audio as this stands at slightly better than twice real-time. Long continuous passages of audio therefore take a long time to come up on screen as something you may want to cut to visually. Matters are worsened by the inability to scrub audio.

The mixer is automated and mix data recorded into a dedicated mixer track using dynamic and-or snapshot-based modes. This may seem like overkill given that there are only four tracks and two effects returns to play with but it is useful all the same. Different audio portions on a track can also be scaled individually for volume as a supplement to the automation for instances where disparate audio segments appear in succession on the same track.

I liked the mixer and the EQ is particularly good—which is to be expected as it is derived from the *DEQ5*. I did not find the lack of frequency ranges on the bands constraining —decisions are down to whether you want a shelf or peak, you grab one, do it, and grab another if you need more. In fact, I was very impressed with the sound quality of the *CBX-D5* in general.

However, I was conscious of underusing the system as I ran it purely for its hard-disk audio. This is likely to be the case for anyone who is happy with another sequencing package and is not interested in employing the skills of *Cubase* in this department, although Steinberg obviously expect you to.

Conclusion

The *CBX-D5* is not a hard-disk recording-editing system in the traditional sense of the term but a hard-disk system that runs alongside sequencing. Consequently, anybody coming in cold and expecting to get a hard-disk recorder for silly money is going to be taken aback, possibly disappointed and even bemused. By the same token, *Cubase*-literate types will have no problem with this and I consider the *CBX-D5* to be a more complete and able package than other *Cubase Audio* incarnations purely on the strength of the Yamaha box.

It sounds good and is self-contained, the mixing functions are excellent and it adds up to a powerful package. You may not want to spend hours editing dialogue and spot effecting on it but, for music composition and production, it is ideal.

There is also the matter of cost. When the *CBX-D5* was first announced it was going to be 'affordable', now it has finally arrived, it is positively cheap.

There is no getting away from the fact that, through the sequencing tie-up, the appeal of this product is potentially enormous for a market that has been waiting for something just like this. ■

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Martin Polon

Accepting the requirement for education in pro audio raises further questions concerning studies and standards

Last month we discussed the history of education in audio skills and the changes in audio employment patterns over the past 15 years or so. But who should be designing the core curriculum for audio instruction? What happens to audio graduates who cannot find work in their chosen field? And whose standards do we use?

The comments of studio operators and owners on both sides of the Atlantic show that several consistent themes run through almost every comment. Dissatisfaction with most of the training of popular audio-programme graduates—at least in the US—is rife. Since there are few, if any, Tonmeister training programmes in the US (there are such programmes in Canada), the implication is that four-year audio-school graduates are missing the mark in knowing how to 'hear' and how to 'think' while recording music.

While to some extent this is a rather 'snobbish' bias, the appellation still stings. Although many of the music departments that house the various recording programmes do emphasise so-called classical musicianship—the vast majority of the students and the instructors know that 95% of all studio recording work done today emphasises the popular music genre.

Despite protestations of the various four-year audio schools to the contrary, the hiring of many audio programme graduates—if not most—has more to do with working relationships built via 'hands-on' internships at studios and other facilities than as a result of their formal training.

Further, four-year audio graduates do not have enough 'hands on' studio time to prepare them for commercial studio employment. With the vast majority of students enrolled in and graduating from programmes in music, the audio sub speciality does not seem to have the academic priority it should have in terms of faculty and equipment.

Audio graduates have little or no 'hands on' electronic 'savvy' necessary to repair, install or perform more than basic maintenance on studio audio equipment. They also have little or no preparation for video and multimedia editing, which is becoming increasingly more important to studios and postproduction facilities.

Conversely, the graduates of audio programmes have equally strong comments to make—both about the schools themselves and the attitudes of prospective or actual studio employers.

On the issue of recording schools, many students comment that audio programmes frequently exist to sustain music departments that have grown obsolete in a technologically obsessed culture where liberal and cultural arts do not have a priority. In fact, it is felt that most programmes use the large number of audio-recording students enrolled to justify the virtually one-on-one faculty student ratios of conventional music instruction.

The curricula which the audio-recording students must adhere to are designed to pay homage to the music department in which the programmes are housed and to advanced mathematics and electronics engineering—none of which have been especially useful to many of the students interviewed in finding or retaining a job. In fact, these elements are the ones considered by many in the recording studio business, which justify the statements of studio owners-operators that many academic curriculums in audio recording thoroughly miss the mark.

The results of a four-year education in audio recording and music fails to prepare the student for a job outside the studio audio industry or even for employment in other venues within the studio audio industry—separate from recording.

Finally, it is suggested that four-year courses leave graduates with no options for employment outside of the electronic entertainment industry.

As to the treatment of students by the studios themselves, it transpires that recording studios frequently treat audio-programme graduates (potential employees) as though they were the lowest form of life on the planet. And despite good preparation, graduates are not trusted in the studio environment for some time. Unlike 99% of all college graduates, who are placed in jobs and allowed to sink or swim, our graduates feel scrutinised for up to a year.

Now, it is clear from all of this that today's audio education programmes appear to please few people on either side. Also, that within the general context of each category and taking into consideration the natural tendency we all have towards exaggeration—all of the above statements have incorporated the perceptions that drive the marketplace.

There are greater expectations on both sides of the job marketplace than there is an understanding of the reality of both the educational and studio hiring process.

First, the students produced by both the two-year vocational schools and the four-year institutions are the best educated audio graduates we have ever seen. But these students are, by definition, generalists. They will not know how to use, adjust or repair specifically every piece of equipment that they will find in an individual recording or postproduction studio.

Second, there is often little willingness by the college-trained job seekers to work for a 'minimum wage'. Yet the tradition of the recording studio has been the payment of low wages to new employees plus the fact that studio audio employment in general pays 10%–20% lower than any other technology-based employment in electronics.

Graduates feel ill-served since studios only account for 10%–15% of all audio jobs and yet exert what seems like 100% of influence on curriculums. Other audio-based employers outside the recording studio universe look for verbal and written communications skills and other audio and video skills that are simply not taught, or covered only minimally.

Another problem unique to the audio schools is that they cannot afford to provide current equipment, let alone a full range of state-of-the-art technology for their students. Many top studios today woo their clientele by changing technology and equipment on a yearly basis. Schools cannot afford to do that. The professional audio industry is both singularly negligent and unique in not supplying schools with equipment to facilitate training. Every other programme found in operation in universities, whether it be organic chemistry, computer science or mortuary science finds the industries in question providing both faculty and equipment.

The bottom line here is that the recording studios have unrealistic expectations of both the recording schools and of the graduates. No educational programme can provide the intensive hands-on training on unique specialised equipment that would give each studio 'turn-key' employees.

Further, it is impossible to foster a more conducive audio-recording teaching environment without the rest of the professional audio industry providing equipment, supplies and lecturers in the same way as IBM or US Steel. The problem is that while IBM or US Steel intend to hire the graduates of the programmes that they support; music school studio help is of little or no interest to professional audio equipment manufacturers. The audio equipment makers hire from programmes in engineering, physics and acoustics that provide prospective employees that suit their needs—albeit more frequently in Japan and Europe than in the US.

Finally, pressure on audio-recording programmes only weakens the graduates since their education places such a premium on preparedness—such as it is—for studio employment. The other 85% of the audio job market suffers for it. And so do the graduates. ■

Another problem unique to the audio schools is that they cannot afford to provide current equipment, let alone a full range of state-of-the-art technology for their students

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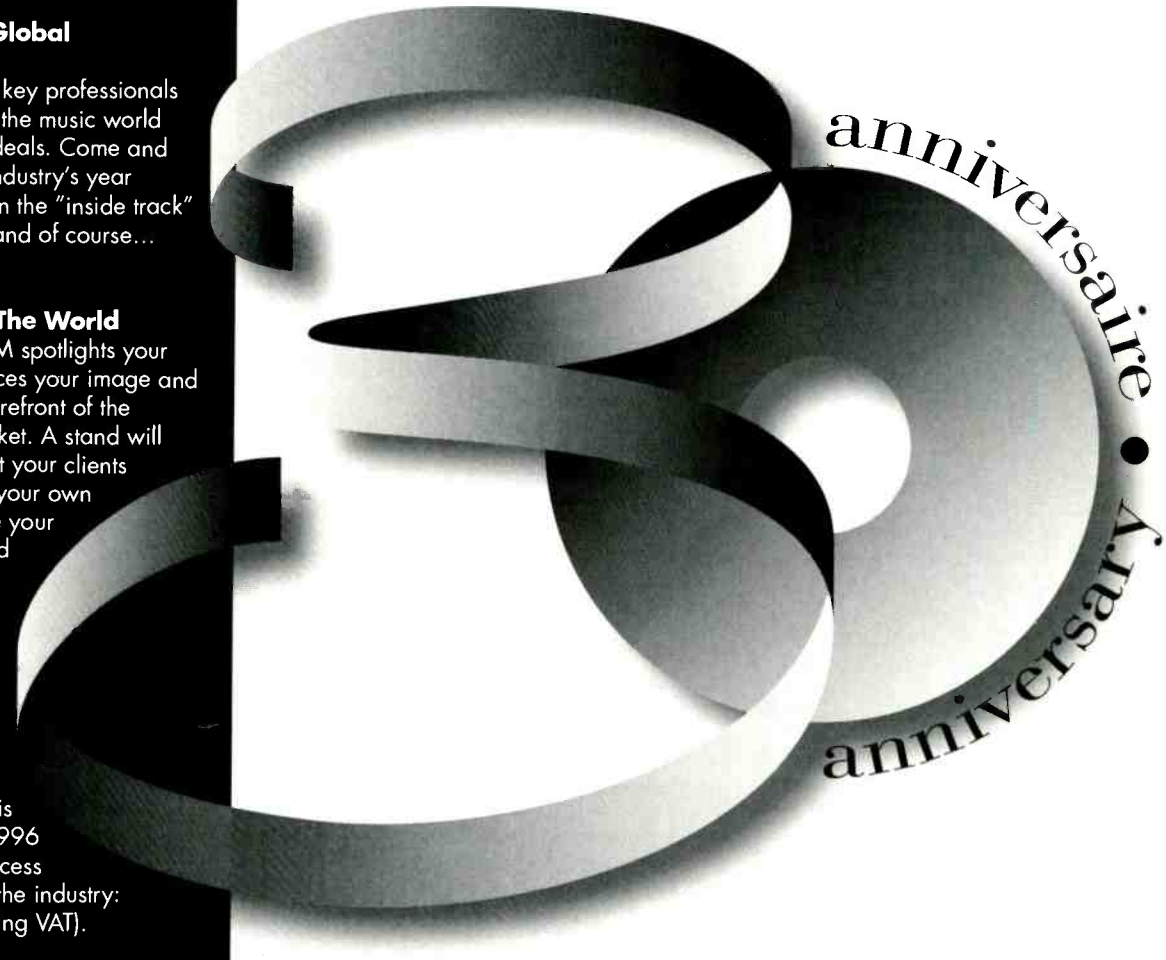

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Kevin Hilton

Audio is not the only medium rotting away in our archives—video, too, is becoming an important area for preservation and restoration

Archiving is an area of expertise that is usually thought of only in terms of libraries or museums, but in many ways all of us are archivists in one form or another. We collect things—ranging from stamps to telephone cards—and unaccountably hoard artefacts from our own past, which explains why just about every family cupboard is packed with old school reports, yellowing photographs, past birthday cards, and beer mats. Computers have probably made us even more conscious of saving things, backing up files for safety or posterity, or even downloading snapshots onto *Photo-CD*.

Which makes me wonder, why the hell have broadcasters and the major film studios been so careless with the treasures that lurk in their vaults? Shameful stories of video tapes being wiped to save a few pounds here and there are now well known; the BBC in particular has suffered because their Enterprises wing could have benefited hugely from the video sales of episodes of such classic series as *Dr Who*.

Although many of these have survived, some were only in black and white; modern technology had to be employed to recreate a colour version of stories such as *The Dæmons*, matching a monochrome film backup with a video copy made by an American fan. This kind of amateur foresight also archived editions of the comedy series *Steptoe and Son*, whose writers, Ray Galton & Alan Simpson, used the earliest video technology to record their creation.

Perhaps it serves the BBC accountants concerned right that they have deprived the Corporation of such a lucrative source of income, but this matter goes deeper than that. Such arbitrary erasure has meant the loss of important historical records; classic plays and adaptations of the great novels, plus pieces specifically written for television, have been lost in this careless way. But this matter is not restricted to the small screen; it is now being deeply felt in the cinema industry, where restoration is becoming one of the watch-words, although there is a similar jostling between those who have seen the growth in video demand, and those who see it as almost a duty to save movies for posterity.

Martin Scorsese, a top film director but also a leading film preservationist, has pointed out that cinema is 100 years old and the product—the movies—are an art form, and like any kind of art, they need to be treasured. During the 1970s, the entire industry was thrown into panic when it was realised that many early films and 2-reelers from the 1920s and 1930s were crumbling into dust as they sat in the vaults.

A major rescue programme was initiated, transferring these important works from their original nitrate stock, which was the most common carrier for commercial 35mm films up to 1951, to a safety base, made from more stable, less flammable cellulose triacetate. But this newer medium is not indestructible; movies are still not safe in their tins and are prone to bad handling, ham-fisted editing, the ravages of time, and down-right stupidity on the part of some of those entrusted with their care.

The efforts to save or rescue the treasures in the vaults have led to a whole series of rereleases. It is true that spruced up new versions undoubtedly sell, not only to the dedicated collector but also to the more casual viewer, but how cynical are the big companies being? Most of the major studios, including CIC, Columbia Tristar, Fox and Warners, have restoration programmes, but all of them understand the profit potential from video release. The question is whether they are restoring films for a new theatrical release, and then archiving, or just to get a better master from which to produce video copies.

In recent months, CIC have rereleased the original *All Quiet On The Western Front*, which was released to coincide with VE Day, and the remastered 20th anniversary version of *Jaws*. This last reissue, despite being fully approved by Director Steven Spielberg, could be seen as cynical, having only been rereleased in widescreen last year. Clare Cousins, Product Manager of CIC's Restored Classics Division, acknowledges this criticism, explaining that if the decision to mark the anniversary had been taken two years ago, the 1994 rerelease would not have gone ahead.

Film preservation roughly divides into three categories: restored versions, digital remasters, and new or cleaned up prints. The most extreme process, and therefore the most beneficial and important, is the full restoration, where movies are painstakingly pieced back together from the best available elements to produce the most complete version possible. In the case of *Lawrence of Arabia*, this involved a worldwide search for all known elements, going back to the camera negative, and even to black and white separations if this proved to be unworkable.

Digital remastering has already proved a successful and lucrative process for the record business, and the phrase digitally remastered is proving to be just as persuasive on the cover of video films as it was on album covers. The process does away with the old analogue source, usually 1-inch PCM magnetic tape, and works from the original print or negative (sometimes cleaned up to obtain maximum quality), which is then passed through a telecine machine onto a D1 VTR. This is a component postproduction format and movies are recorded in two parts. From here the material is archived onto composite D3, which, like PAL and NTSC, combines luminance and chrominance into a single signal. All subsequent VHS copies are made from this archive source. A spokesperson for CIC's production department explains that this process prevents any further loss in quality and gives the best possible version from even a 20-year-old film such as *Jaws*.

Both of these techniques involve a concerted effort, which cannot be said about the third category, the new print, which is merely a more up-to-date, less worn version. This makes restoration experts question whether the whole business is just a marketing ploy on the part of the distributors. One such doubter is Producer and Archivist Robert Harris, who worked with Film Historian Kevin Brownlow towards the end of the latter's obsessive rebuilding of Abel Gance's *Napoleon*, and then won acclaim in his own right for restoring *Lawrence Of Arabia*, *Spartacus*, and *My Fair Lady* (these last two in collaboration with partner Jim Katz).

'You have to be careful about what is restored and the others that are just done to sell videos,' he says. 'It has to be a labour of love otherwise it's not worthwhile. Restoration is more than just putting in a purchase order to the lab for a new print.'

Digital-computer technology (at $1,000 a second) was used to repair optical flaws, like a spot that obscured Audrey Hepburn's face and neck, but a seven-frame tear was literally taped back together again. *My Fair Lady* also saw a huge job to either clean up or reconstruct the soundtrack. Rex Harrison had refused to lip-sync and so was fitted with one of the first radio mics, which caused huge problems for rerecording mixer Bob Litt, who had to create a Dolby SR track from the 6-track print master, which was the only surviving audio element.

Computer systems have also allowed restorers to add such modern artistic technology as Dolby Stereo. Bob Litt created a surround effect for the Ascot racing sequence in *My Fair Lady*, while the rerelease of Peckinpah's *The Wild Bunch*, which is currently doing well in the US but is yet to get a UK date, has a new Dolby SR-D digital soundtrack.

'*The Wild Bunch* had a stereo magnetic track, but that's very expensive and difficult to control,' explains David Gray, Vice President of Dolby's Hollywood division. 'We're updating films to modern quality, meaning that there is a better master for video release and the company can start again for the vault.'

Robert Harris agrees with the sentiment of getting the best possible material for posterity, rather than just thinking about selling videos. 'We have to save these things,' he says, 'if they go to video, they go to video, but my job is to produce something that is as good, if not better, than the original. Saving the film is the most important thing.' It may mean cluttering up the cupboards again, but we have got to the stage now where things have got to be preserved. This should be the spur, but if the allure of high video sales means that treasured material is saved, then it should not be derided. At least not too much. ■

ON THE RECORD

Historically, what could be put onto tape in the studio was often much less restricted than what could be put onto vinyl; with what could be taken off vinyl being the most limiting factor. So it was of no use mixing a recording without giving due consideration to whether or not it could be played back on an average 'record player'.

A recording which would cause 'the needle to jump' would be unlikely to sell in significant quantities and would cause a great deal of expense to the record company in returned discs. The disc-cutting engineers had the specialist knowledge on how far a producer could push in terms of overall level, stereo effects, low-frequency boosts, and a number of other limiting factors, before problems were likely to occur. Recording engineers, producers and disc-cutting engineers often used to form very close working relationships. And the partnerships usually formed around a team who could get the best compromises.

With the advent of tape cassettes, a different set of constraints was added, but, in general, if something could be reproduced from disc on an average record player, then it would be likely to come back off a cassette. CD has since become the main medium for recorded music, with performance capability equal to whatever the recording studios can produce. This has now thrown the burden of response limitation onto domestic loudspeakers and amplifiers.

Vinyl demand

In the days of vinyl, high levels of low frequencies and out-of-phase signals were always a problem. If the low frequencies were in the centre of the mix, then they would produce a lateral movement of the cutting head. The greater the amount of low frequencies, the further apart the adjacent turns of the groove would have to be. The 'lines-per-inch' spacing would determine the total amount of time the disc could support, so high levels of low frequencies could determine the overall playing time of the disc. If the playing time required from one side of a 12-inch LP was above 20 minutes or so, lower levels of signal would need to be recorded to allow more lines per inch to be cut. It was critical, however, to keep as high an average level as possible, as surface noise was always around to blight low-level signals.

As the disc rotated at a constant 33⅓ rpm, the speed which the stylus travelled along the groove would gradually reduce as it moved towards the centre of the disc. Sometimes it would be necessary to stop well short of the label and lift-off restrictions if the specific requirement of the musical signal could not be supported by the gradually slowing relative groove-stylus speed.

After the oil crisis of 1973, virgin vinyl became very expensive and a much-recycled vinyl began to be used. At about the same time, hand-loaded presses began to give way to the faster, injection-moulding process. Instead of virgin vinyl chips being spread evenly over the stampers and the steam-heated presses producing a homogeneous disc, reconstituted liquid vinyl was pumped into the centre of the already closed presses. Any dross was forced ahead of the spreading vinyl, rendering a more polluted plastic around the region of the run-in groove. Consequently, with a conventionally rotating disc, the outer grooves were best for the loud crashes and bangs because the faster tracking speed would better support the high level transients and the higher recorded level would swamp the surface noise from the poorer vinyl. The quieter intros would enjoy a better signal-to-noise ratio if recorded near the centre of the disc where the less demanding musical signal ▶

As mastering formats remain in flux, objective monitoring has never been more important. Philip Newell discusses the issues with the experts

PCM *BB5* monitors at Metropolis Mastering

> 'They are set flat and actually sound it'
>
> **Mike Brown**
>
> **CTS Mastering, London**
>
> ATC *SCM100*

could be accepted by the slower tracking speed.

High levels of out-of-phase signals, especially those caused by putting instruments with high low-frequency content to one side of the mix, would create large vertical movements of the cutter head. The maximum cutting depth was set so the cutting stylus would not destroy itself by hitting the aluminium core of the lacquer, the upper limit being where the groove ceased to exist as the cutter lost contact with the acetate. As all playback cartridges had a stylus of a finite mass, they would consequently also gain momentum when accelerated, so one could not allow the stylus to be launched into the air with too abrupt a vertical movement of the groove. Almost always these limitations meant the audiophile would suffer some loss of potential overall quality from a commercially viable disc.

These are a few of the problems which disc-cutting engineers faced, so clearly a great number of factors had to be balanced if a compromise was to be reached. In general, disc-cutting engineers were a rather level-headed group. They were so constrained by physical processes that there was no room for the creative excesses more readily found with recording engineers and producers. Their jobs were at risk if shops and pressing factories returned too much of their work and they never had any of the 'artistic' get-outs of the recording staff. Cutting heads were also as delicate as they were expensive —a blown head could cost the equivalent of three or four months' wages for a cutting engineer. Inevitably this led to the point where only trained professionals were allowed to operate the lathes, ensuring that an experienced pair of ears was present to assess the last stages of the production process. With CD no such restrictions apply, so the tape master need not make compromises to the final storage medium. In turn, the removal of these restrictions has led to a free-for-all, which has led to much general unawareness of potential problems.

When vinyl ruled, channel separation was never more than about 30dB, so a guitar panned hard-left on the master tape would 'bleed' into the right channel, around 30dB down. With magnetic tape, or other digital recording media, channel separation is greater by 30dB–50dB. Effectively, what is panned left does not appear above the noise on the right. On loudspeakers, the effect of this change is not dramatic, but on headphones, hard-panned mono signals can sound very thin. The bleed across the vinyl pickup supplied enough cross-channel signal to keep a sound such as a hard-panned guitar sounding full.

Processing

With the demise of vinyl came an almost interminable supply of signal-processing effects. Many of these cause, or rely on, phase effects and multiple delays can also produce significant out-of-phase content in the overall mix when used for stereo effect. I believe that much of this is at the root of many modern mixes sounding unnaturally hard.

Many current mastering engineers were formerly, or still are when needed to be, disc-cutting engineers. During the days of vinyl, to pass something past their ears was almost mandatory as few recording engineers of the past 25 years have been able to cut discs.

There is, of course, currently, no absolute need to use the services of a mastering engineer, as many recording studios have all the editing equipment to produce a finished digital (or analogue) master. However, there is a ludicrous disparity of the monitoring conditions from studio to studio and an even greater proliferation of more or less self-taught recording personnel. Surely the frequency balances heard on many CDs are not what the mixing personnel intended, the deviation is just too great for that to be true.

Mastering engineers and their preferred monitor systems should be accepted together. Their experience in making judgments on equipment which works consistently for them is the combination on which you will be relying. Mastering engineers are an island of stability in a boiling ocean of uncertainty. What is important is not the absolute performance of the monitors but that they tell the mastering engineers what they need to hear and supply all the necessary details. It is worth noting that the loudspeakers they use at work may well not be the ones they choose to use at home for listening pleasure.

During the creative process of record production, different properties are frequently demanded of monitor systems, with the potential output-capability requirements of the systems gradually diminishing, from the initial recording, through mixing and mastering and finally to the domestic environment. This is not absolute but it is a general trend. The mastering process is the final chance to catch any problems before the end product goes on sale. It is also at the interface between the production process, with all of its artistic quirks, and the record-buying public, most of whom just want to enjoy the music, unaware of the 'life or death' issues which sometimes override reason in the studios.

If I am listening to the final mixes of a limited-interest or classical recording, I will be much more likely to trust my own ears when using what I consider an appropriate monitor system, but there are commercial realities to be faced when working with music which is likely to sell in large quantities. Bucking the general frequency balance trends in this area usually achieves very little for any of the parties involved. Perhaps what I am doing is premastering. When I talk about my own mastering, I do it based on almost 30 years of ▶

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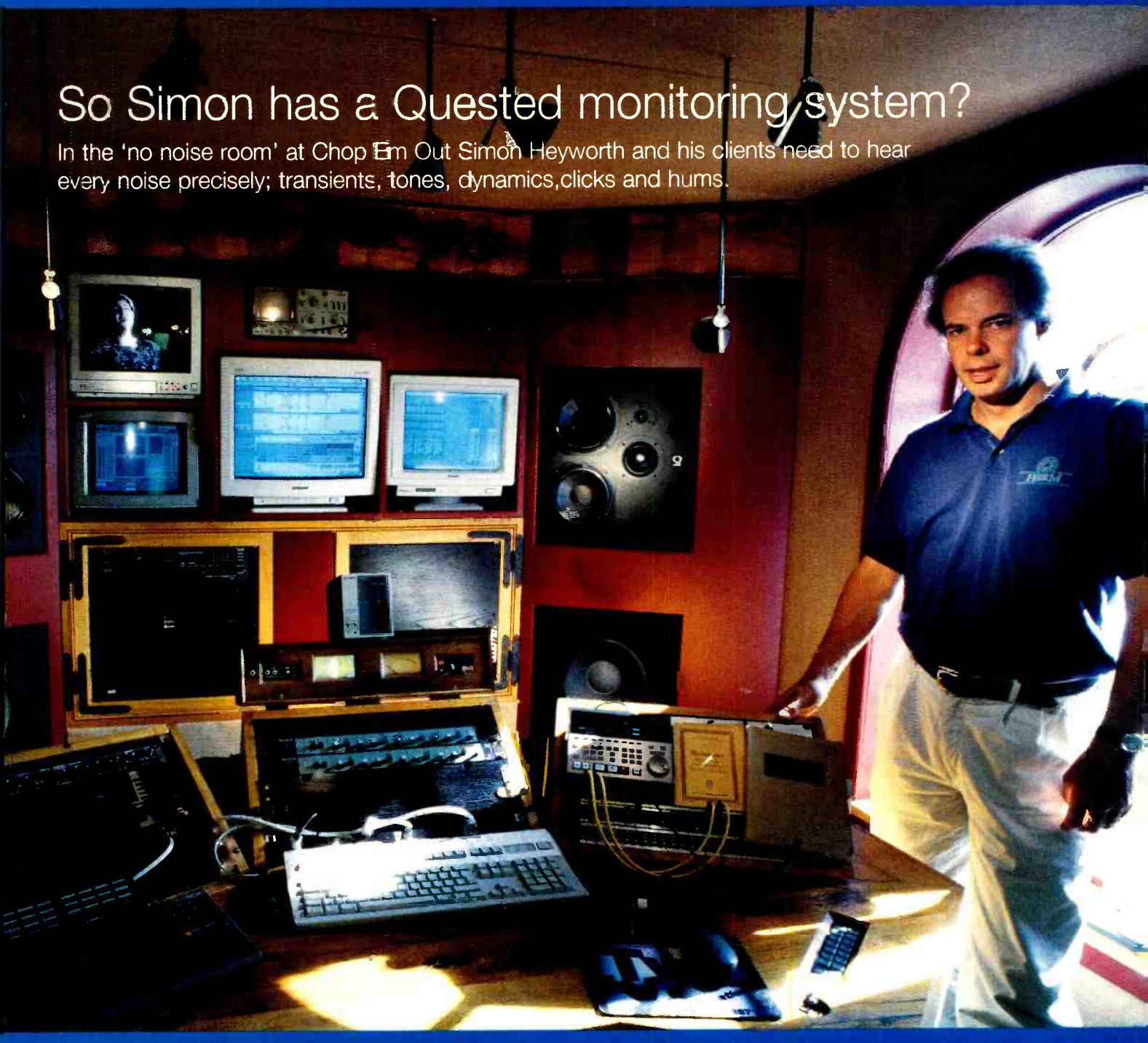

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Ian Cooper
Metropolis Mastering, London

PMC *BB5s* with Bryston amplification

recording experience and after having worked with some of the finest mastering engineers around, both in the UK and US. My golden rule is still 'never do it alone'; even after all these years, I always run things past another trusted pair of ears before committing anything to release.

I recently completed the mix of a live classical piano concert I recorded, by Burmester and Laginha, playing two phenomenal Steinway concert grands. Before the CDs were produced, we passed the masters through the hands of Mike Brown at CTS in London, which gave a good opportunity to discuss his views.

'Historically, disc cutting was always regarded as a critical stage,' he opines, 'this had to be the case, with vinyl being a mechanical medium having its own peculiar properties. Mastering for disc remained in the hands of a few specialist engineers and studios. Even with digits, this situation should still be the case, but it isn't. Anybody can copy a tape, edit it into a final running order, and send it to a disc-manufacturing plant. The plant will simply clone it to the preferred format for glass mastering, and that's it, your CD done.

'Of course, some people will be happy with the result of the CDs prepared in this way but just as many may be disappointed, often without quite knowing why. I suppose one cannot blame the plants for accepting raw DATs, but I think it is bad for the industry. One of the major roles of mastering engineers is to make sure the CD plants get what they need to ensure things go smoothly. CD plants rarely check incoming masters for audio faults; hence a recorded mute, for example, will faithfully appear on the pressing as part of an accurate transfer of the digital data supplied. Bypassing the mastering facilities leaves so many customers dissatisfied with the end product, while 'high-end' mastering houses need to drop their rates considerably just to have any hope of getting this type of work. And this, in turn, limits the facilities they can offer.

'So, what constitutes a good mastering facility? What exactly are the advantages of using one and how do you know what you're getting for your money? These may seem basic questions, but to the new generation of home studio users, they are important. One answer to the first question is that a good mastering facility is one which gives what you want on your finished record, regardless of what you have on your master tape.

'CD mastering tends to fall into one of two categories. One is straightforward transcription, though it is rarely totally straightforward, and the other is more creative. In the second case, a mastering engineer can, perhaps, offer advice on the running order or suggest the use of an alternative mix, or even get deeply involved in reducing previously unheard noises or other problems. And, of course, how does the whole thing sound; especially when compared with the generally accepted 'normal' balances.

'Mastering engineers ask two important questions: "Is there anything wrong with it?" And: "If so, is it anything I can fix?" To answer them it is necessary to have monitoring which is as "accurate" as possible. In an ideal world, of course, all EQ and compression would be done as part of the recording or mixdown, but this is not an ideal world, and there are five main reasons why it may be necessary to change the sound at the mastering stage.

'First: they had duff monitors in the mixing room ("It sounded okay when we mixed it, it was great last night, man!")

'Second: something technical has gone wrong—it should be noted here that certain popular hard-disk signal manipulation/editing systems are by no means as sonically accurate as they claim to be, especially with some of the earlier software. To make matters worse, a 'budget' setup, of the type which would seek to avoid the cost of using a good mastering house, would also have cheap monitors unable to show the degradation caused by the equally cheap (in relative terms) digital workstation!

'Third: for whatever reason, they did a duff mix. This could be either down to it being done using a "budget" system, or that they were tired, in a hurry, using strange equipment, or a host of other reasons.

'Fourth: it could not be cut satisfactorily onto vinyl. For example, there is an extremely bright hi-hat at a relatively high level towards the right-hand side of the mix.

'Fifth: the engineer and producer lack the experience to produce a professional-quality master. Sadly, this is a growing problem.

'In the first two cases, it may be possible to find an EQ which restores the sound to that which people thought they had without too much compromise, though often, duff monitoring will have caused them to get the bass-to-bass-drum ratio wrong, for example, so no simple EQ will correct the problem. In all the other cases, a greater degree of compromise (and patience) will usually be necessary.

'Given all this, what are the attributes a good mastering house should have? The two most important things you need to know are when you have a good tape that should be transferred flat and when a duff tape cannot be improved any further.

'My own experience suggests that the most important things I need from my monitor system are low harmonic distortion and low coloration. Low-frequency extension to 20Hz is nice, though, sadly, very few rooms used for mastering will support such frequencies. The frequency response should be smooth, though the relative amounts of LF, MF and HF are, arguably, less important, as they can be easily 'learnt' by a good resident engineer. However, nonlinear distortions and narrow-band colorations can lead to subjective inconsistency on different types of music and to difficulties in making decisions about EQ. That is to say, you end up making adjustments because they make the track sound better on the monitors you're using at the time. But on hearing the product elsewhere, you end up thinking: "Now why did I do that?"

'This would sometimes happen to me when using Tannoys in the past. It didn't matter how carefully they were set up, they would still end up fooling me. Later, when I started using ATCs, I found they were much more informative and would "talk" to me when I touched the EQ, saying, "What have you done that for... it sounds different, but it is no better, is it?" I began to hear lots of things that were wrong, but which were far too late to try to fix. And that is important. To EQ, or not to EQ? That is the question.

'Mastering engineers may differ about their choice of monitors, though. Of course, we all have different ways of listening to and interpreting what we hear. As a mastering engineer, you can hear a song half-a-dozen times, listening for effects of EQ, compression, noises and general problems, yet still not know a single line of the lyric; you may even have to ask what the song is called. Mastering engineers cannot be expected to like every piece of music they are asked to assess, so, despite the need to listen subjectively to make an overall assessment, the prime function of a mastering engineer is to be as objective as possible. Even so, I have often thought it surprising that experienced professionals can hold such widely differing ▶

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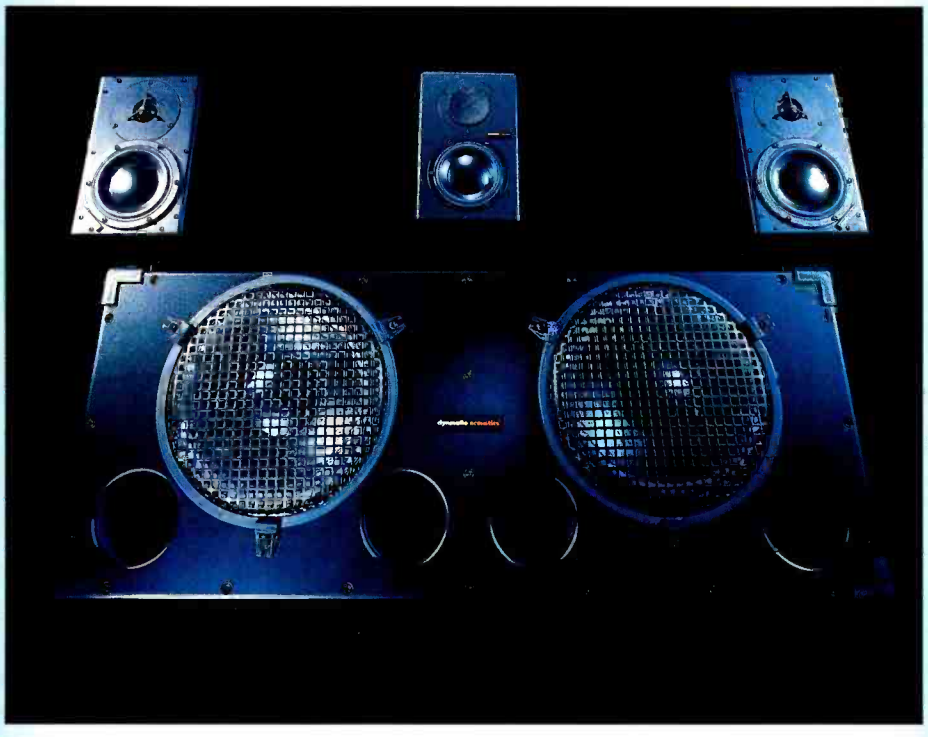

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'The PMCs have fantastic bass end, and they don't colour at any sound level'

Jack Adams

Townhouse Mastering, London

PMC *BB5*s with Bryston amplification in the Sam Toyashima room

opinions about monitoring. Engineers are often strongly prejudiced in favour of the familiar, assuming that other monitors are 'wrong' simply because they are unfamiliar. In fact, monitors are always wrong—there is no such thing as perfection, you just have to learn the imperfections.

'I use ATC *SCM100*s on Recording Architecture stands. They are set flat and actually sound it. They don't go down to 20Hz as I would like, but the stands make the LF much better and I can make consistent and objective judgment when using them. I'm not completely convinced, however, that conventional cone-type speakers are the be-all and end-all. I have always been impressed by the Quad Electrostatics and feel that it is a shame that this king of loudspeaker technology isn't given more serious attention. This brings me to a question raised many times: "Are the Quad Electrostatics so natural, that they are not representative of 99.9% of loudspeakers as a whole? Not that they are too good to be true, but that they are too true to be representative."

'The problem with monitors is just one of the reasons why I feel it is as important as ever, even in the wonderful new digital age, to have recordings mastered properly by experienced mastering engineers, rather than just sending a DIY job to the factory. Unfortunately, this is a difficult and abstract point to argue and the people who most need the advice usually find it the hardest to understand. This is a result of the current free-for-all created by ever-falling semiprofessional equipment prices, but I do not think that it is a good thing for the reputation of the industry as a whole.'

Proceeding to the views of another mastering engineer, I thought it would be good to look from the viewpoint of a well respected and experienced recording engineer.

Over Easter, I had been home to Spain, discussing the acoustic designs for a new multiple-use auditorium (rock music, classical music, conferences), but the following week went to Lisbon, to witness the first trial sessions in a studio I had just completed for Rui Veloso. His last album-but-one is now eight-times platinum in Portugal, breaking all national sales records. At the time the studio was completed, he was playing in the Trump casino in Atlantic City in the US, and has since been invited to play on BB King's new album. For his next album, Veloso has chosen to work with the Irish Producer-Engineer, Rafe McKenna, whose international successes have included work with Bad Company, Richard Marx, UB40, Six Was Nine, Wet Wet Wet, Foreigner, Paul McCartney, Depeche Mode, Thomas Dolby and Giant. He is reputed for being able to relate equally to rock, contemporary, R&B, classical and left-field music.

Clearly, a person of Rafe McKenna's experience and track record would be able to make up his own mind about when his masters were as he wanted them to be, so would a person of his calibre need to consult a mastering house before sending the tapes to the factory?

'Mastering is an important part of making any record. While there are many engineers like myself who have the ability to do this job, it's generally passed to a mastering engineer who has particular expertise in this area. In fact, I always use a mastering facility when at all possible. My only real unease about any of the CDs I have recorded is when, occasionally, work I have done in other countries is "mastered" either without me, or without using a reputable facility.

'I generally use my own monitors for recording and mixing stages but when mastering, I use facilities of the people I know. I let them use the monitors they know because I trust their ears and general competence. I know that by using a trusted facility I can be fully confident that the *1630* EQ'd and PQ'd production master has been checked for any glitches before it goes to the factory for the glass-metal master. I always try to use top mastering facilities, but the choices are based on the ones which consistently work for me. When I've worked abroad and I've not been involved in the mastering, I have had a few surprises with the finished CD. Also, I've found sometimes the finished CD sounds harsher or more steely than how I remembered it.

'As regards general frequency balance, I don't make any compromises to trends or fashions. The end result I go for is what I feel is right for the project, in conjunction with the producer and artist I'm working for. This overall approach has worked well for me, and I see no reason to change, but it is often only in the mastering room that the final satisfaction with the work is confirmed. I do occasionally work for non-UK companies who are tempted to bypass the mastering, on grounds of cost, but relative to the overall album budget it is such a small percentage that it seems very unwise to try to cut costs here. For me it is a very important final step in the production process.'

It can be seen from McKenna's comments that despite the temptation for many people to cut costs through bypassing the mastering phase, the facilities mastering houses offer are usually excellent value. They ensure the maximum potential is realised from the mixes which leave the studio and also help ensure the record-buying public is not short-changed. The sheer cost and difficulty in operation of disc-cutting systems for vinyl ensure everything released passes through a professional mastering process.

The falling real cost of the recording chain ▶

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has allowed so many inadequately trained people (who think they know enough to do the job well) to send masters directly to the factories via the record companies, the less responsible of whom only too glad to reduce the overall cost of production. The effect has been a hit-and-miss approach in terms of the quality of the end product. It is tempting, very tempting, to allow yourself to be convinced that your master is 'the one' but the closeness of involvement, especially over a relatively long period, can draw many people into a false reality. Under this influence, it is often the real world which becomes seen as unreal and a deep belief can be cultured into the 'rightness' of the masters. Even some of the most experienced professionals can suffer from this but a least they are aware of it, using trusted mastering engineers to help to keep their feet on the ground. One of the greatest lessons of professionalism is to know your limitations, and the top people are never afraid or embarrassed to ask for help.

Monitoring

I do not know of any serious engineers who would work solely by reference to a pair of *NS10*s, or the like, as they need a much greater degree of linearity and resolution of detail to be able to perform their critical job; but within the higher-performance range of monitors, the choice must be down to the preference of each engineer. On the other hand, so many people who bypass the mastering houses assess their work on inadequate loudspeakers.

Mastering engineers need clear monitors to be able to do their job, but mastering is more than just monitoring, it is about judgment and objectivity, with a touch of creative and subjective advice thrown in. To make an analogy: when I write an article such as this, it will pass through the hands of the editor of the magazine. I don't think I have ever had an article reduced in its potency at the hands of a good editor and, on many occasions, there have been significant improvements made to the clarity of the writing. Anyhow, a good editor will always be available to discuss any changes and, if I really feel strongly about a point, then probably my views will be respected.

Good mastering engineers can be thought of in the same way as good publishing editors. Their skill and judgment are sharpened by the sheer volume and variety of material which passes through their hands: they get a good feel for what is right and what is balanced. In both cases, the better the standard of the material, the greater the awareness of the true state of the art, and of what is achievable. If you pass the critical tests of their eyes and ears, you can be pretty sure you will not be letting yourself down with the end product. They are critics working for you. No degree of experience puts anybody beyond the odd embarrassing blunder, so it is better to receive a timely word in your ear, rather than to release something which could lead to be a lifetime of very public embarrassment.

It seems from what Rafe McKenna has said that there is no level of experience that out-grows the need for reference to a good mastering house. So, to close, let us get the views of another experienced mastering engineer, Gordon Vicary. For almost 15 years now, he has been working at The Townhouse in London, in whose mastering-cutting rooms the staff must have accumulated about 100 years of combined mastering experience. Vicary began work in the mono-cutting room at Pye, London, in late 1970, and, in those days, the restrictions were so great it was sometimes like working in a straitjacket.

'Things have changed somewhat since the late 1970s,' Vicary comments, 'with the majority of tapes we had to cut, it was generally considered that we could get through an album and a single before lunch, then two albums between lunch and 6pm. Now, three-days, 15-hours is quite normal for one album and even that is pushing it if you have to make separate production masters for vinyl, cassette and CD.

'The majority of the jobs I do are attended by the engineer or producer from the mixing. Since I moved to The Townhouse in the early 1980s [from Utopia] it has always had some of the best-designed and best-equipped rooms in London, so we rarely got any back-catalogue recuts as the rooms were always in such demand for high-profile work. That has been a huge benefit in terms of experience as some of the greatest producers and engineers have passed through creating some of the finest recordings of the top artists. This helps to set a good reference standard to which to work.

'The only way to really appreciate what you are hearing is via a monitoring system capable of reproducing the mix faithfully with an absolute minimum of coloration; from the loudspeaker or the room. Having the luxury of the facilities which I have enjoyed for the past 15 years, I have, on many occasions, been able to point out something in the mix which the client had not previously heard. We currently use PMC *BB5* monitors with Bryston amplifiers as the main system. To us, the PMCs are the most natural sounding of all we tried and we were very pleased with their performance at all monitoring levels. However, I still like to use large and small monitors. I tend to EQ on the large ones, then check what I have done against the smaller one, referring alternately to each until a generally satisfactory result is produced.

'In many cases, though, it is not so much what you hear, but what you are listening for. The experience gained in the early years of my career gave me a feel for sounds which many non-disc-cutting engineers may never be able to experience. You had to listen to the music when cutting on the old lathes but you also had to listen through the music to try to detect anything in the overall sound which suggested potential problems. Excessive high frequencies, for example, could easily blow a very expensive cutter head. It turns out that so many of the things which actually were problems when transferring vinyl do not do the overall balance, smoothness, or stereo imaging any good via any other medium. Certain sound characteristics ring warning bells in my brain, and I became highly sensitised when working on the older disc-cutting systems. Even though some of these smaller things are no longer problems in themselves, it can still be the case that the removal of any minor problems, and sometimes even hidden ones, can be the difference between a good recording and a great one.

'The wider range of experience of different sounds and ideas which a busy mastering engineer builds up is also very useful when compiling albums which consist of recordings from different studios, and which were perhaps recorded by different engineers and producers. For me it is still a joy to get a consistent and homogeneous-sounding album from a "difficult" assortment of songs; and even more so to be able to equalise at will to achieve the best overall result for CD, rather than having to filter down to a lowest common denominator. And that sometimes used to be the case with vinyl. Not as much importance is now given to recording for ▶

ADVERTISERS INDEX

vinyl, but we still have to take it into serious consideration as the medium still exists and clients would complain if a subsequent transfer didn't sound good; even if they were not considering it too seriously themselves at the time of the original mastering. We don't have any regular clients who are still fanatical about vinyl but we do get the occasional client for whom it is still a very important medium.

'As for people doing their own mastering, once again, remember that, because mastering engineers often work with the top levels of musical production they have a ready reference to what can be achieved, so are acutely aware of when something needs to be worked on to bring it up to standard. There always has been, and still are, a number of really good recording engineers who produce great sounding mixes, almost irrespective of where or with what they were recorded. On the other hand, it must require every bit of their skill and experience when working on cheaper equipment. In general, though, many of the recordings done by lesser mortals on cheaper equipment often do not seem to have the full sonic spectrum. These people often work with cheap monitoring, so, unless they have years of experience, they will not be aware of what is missing. In many cases, the work is musically excellent and well balanced, so it is a pity when small points let it down. They may over-use low-frequency filters, supposedly to clean up the recording, in the belief that they are not affecting the mix, as they will not hear any effect on cheap monitors. What often happens when we receive such tapes is that it soon becomes apparent exactly what is missing.

'Frequencies that would need boosting to match the sound of high budget projects are either just not on the tape or contain previously unheard problems which restrict the amount of boost that can be used before they would become too plainly apparent.

'From a personal point of view, it is very rewarding when something can be salvaged or significantly improved by my efforts, yet at the other end of the scale, it is also rewarding to take part in the transfer of superb masters which need nothing doing to them. You many wonder why such good-quality masters pass through my hands, but I suppose it's for one last check to make sure all is well. It provides reassurance to the recording personnel who, often at the end of a long, difficult job, are too tired, stressed and too close to the proceedings to be absolutely sure that they are hearing what they think they are hearing. For me, there is satisfaction from almost all of my work, whether it is salvaging a disaster from the dustbin, or giving the final nod of approval to the work of megastar. Perhaps my only real disappointment comes from hearing releases which good mastering engineers could have significantly improved for a relatively small amount of money but which the people involved saw as an unnecessary expense. It is frustrating to think I could have saved it for no more than the cost of a couple of hours of studio time. This is especially so when the bypassing of the mastering studios is only out of ignorance.'

Mike Brown, Rafe McKenna and Gordon Vicary each have between 20 and 25 years of professional experience behind them and the number of recordings with which they have been involved is beyond counting. All seem to agree that the mastering houses have a great deal to offer in many ways. They can squeeze the last ounce of potential from a less-than-wonderful recording, provide a last-minute check of a 'perfect' recording (to help everybody's peace of mind), tidy up small problems, and can, which is perhaps most important, provide a sympathetic but objective pair of ears and listen in a more detached way than can the recording personnel. They seem to agree on low-coloration, low-distortion monitoring conditions as a prime requisite, with absolute amplitude linearity being nice if you get it, but perhaps of less overall importance, as they are listening for details but comparing tonal balance to a known standard which they refer to daily. In many ways, good mastering engineers are 'the professionals' professionals', whose true worth is frequently under-estimated by the general public, and indeed, by, perhaps, too great a proportion of the music industry itself. ■

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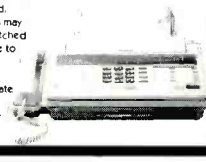

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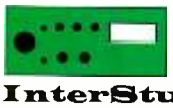

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Broadcast networking solutions and the limitations of human data capacity

The sneaker net is on the way out. Broadcast newsrooms can no longer afford to rely on Nike-clad staff to run tapes down corridors. They will lose out to rival operators who have invested in an all-electronic system, where news clips are stored on a bank of computer hard disks and 'served' up to whatever editing station calls for them, before playing out to the transmitter, direct from disk.

First it was audio news for radio. Now it is video news for TV.

At the recent International Television Symposium in Montreux, the future shook down to a straight shoot-out between well-established Sony and the younger Avid, each with a different solution to the same problem—how to capture, store and serve the picture in an electronic newsroom? At a seminar on the future of electronic news gathering Chris Grey confirmed Sony's commitment to tape for gathering. Video is then transferred to magnetic disk, at up to four times normal speed.

'We do need tape,' says Grey. 'Recording direct onto disk costs a hundred or a thousand times as much. Tape is here to stay for a long time.'

John Ive of Sony says: 'Disk involves substantial compromises. There is a risk of fascination for technology for technology's sake. People lose sight of the real world. We don't foresee marketing a disk-based Camcorder.'

All this, of course, fits neatly against Sony's success with digital Betacam; 10,000 decks and Camcorders sold so far, 4,000 in Europe. Sony's digital video newsroom will be ready by the end of 1995 or early 1996. The newsroom allows synchronised switching between tape and disk. The programme can stay on air even if there is a computer crash. Also, the newsroom can transmit late-breaking news that has just arrived on tape but not yet been edited.

Avid remain committed to the Ikegami Camcutter. This is a Camcorder which records direct onto a removable hard-disk drive. Demonstrations stressed ruggedness of the Camcutter's hard-disk pack. A 2.4Gb box, the size of several of several Betacam video-cassettes, can store about 15 minutes of video, at the horrendous price of around $2,500. But Camcutter allows the cameraman to build a play list inside the camera, so when the pack is slotted into the editing station it can serve up a menu of best shots.

Whereas the Sony system works with an Oracle database under Unix, the Avid system works on a Pentium PC under *Windows NT*. Avid stores JPEG-compressed video in a data format called OMF ('Open Media Systems', *Studio Sound,* May 1995). But Sony use a new variant of MPEG-2 compression, officially called 422 Profile MPEG-2, but catch-named SX by Sony.

Both JPEG and 422 Profile have one main feature in common. They provide frame editing. The first MPEG formats were intended for transmission. They compress a movie sequence by recording one full picture and then a string of up to 15 which capture only the differences caused by motion. JPEG codes each picture separately, so frame editing is easy. 422 Profile MPEG codes movie sequences in pairs of pictures which can easily be stored in memory to build single images for editing.

This limits the compression ratio for both systems, so data rates are much higher than for the Main Profile, Main Levels MPEG system used for transmission. Whereas MP, ML MPEG can deliver very high quality pictures at 6Mb/s, JPEG and 422 Profile MPEG each need around 20Mb/s for equivalent picture quality with the luxury of frame editing.

This puts up the cost of storage, and pushes the price of an electronic TV newsroom to $1m or $2m, depending on the number of workstations.

Sony's insistence on the continuing value of tape as a cheap storage medium makes a nice contrast with the same company's advertising for MiniDisc. This campaign writes off tape as an unreliable antique as another speaker at the news seminar reminded: 'I can cope with poor picture quality, if the news is important. But I never want to see a *Windows* egg-timer frozen on screen.'

His warning was timely. One of the hotels in Montreux had to stop checking guests in and out when its computer crashed. Over the road, at Swissair's centre, delegates with flight reservations to check and change were left waiting for several hours when the computer also crashed. Back in the UK I did a live radio programme about electronic TV news gathering. Hand on heart, I have to report that the station's disk system crashed in the commercial break, leaving the announcer without jingles or prerecorded inserts.

In Montreux I had the first evidence of the root problem. The people selling this new high-tech wizardry know absolutely nothing about how it works.

One delegate, a high-powered executive for a leading manufacturer of the computer servers on which this new technology relies, talked enthusiastically about her personal electronic-mail system. This lets her call up all her messages from anywhere in the world. She gets so much electronic mail that she uses a super-intelligent software program which strips out the salient points, while throwing away all social niceties.

Unfortunately, she had been unable to use the system in Montreux. Why? Because the grand old hotel where she was staying uses pulse dialling on the main switchboard, instead of modern tone dialling.

Trying to be helpful, I suggested that all she need do was replace the Hayes command 'ADAT' (which tells the modem of her portable PC to dial in electronic tones) with the Hayes command 'ATDP' (which tells the modem to dial in pulses).

First there were blank looks all round. Then came the rather sheepish admission that the executive had no idea what Hayes commands are, how modems work or how the software is used to switch the vital functions such as tone and pulse dialling.

A bit like Britain's Labour party, Toshiba and the SD Alliance have been making changes of policy and tactics which look most likely to win support. The SD Alliance quietly ditched the clumsy idea of a double-sided disc and agreed that SD will be single-sided disc, with double density achieved by recording two tracks at different depths and focusing first on one track and then the other.

This has removed the main obstacle to negotiation with Sony and Philips, who have very reasonably rejected the idea of a double-sided disc. If the player is to read both sides without manual flip-over, it must be more complicated and too big to fit into a standard-size PC slot.

Although Sony have now moved closer to Toshiba on DVD, the two companies have not yet agreed on a player which will play both types of disc (Sony-Philips MMCD and Toshiba-Time-Warner SD). They have agreed on a change in coding and error-correction standard which will make a future dual player possible.

Apart from its pit size, there is now only one real difference between the two formats. The Philips-Sony disc makes double-depth recordings by adding an extra coating layer to a full thickness disc. The SD system achieves the same result by sandwiching two half-thickness pressings.

Different optics are needed to read the two types of disc. But that is no real obstacle. Panasonic have already designed dual-focus optics so that a new SD player can play back ordinary CDs. It is now a logical step to make the same optics focus on SDs, MMCDs and today's audio CDs.

Then the industry can find out who's right. Sony and Philips say that SD's pit size is too small for mass production. Toshiba and Time-Warner say it can be done. We shall only know for sure when discs have been sold and either they play reliably or they don't. ■

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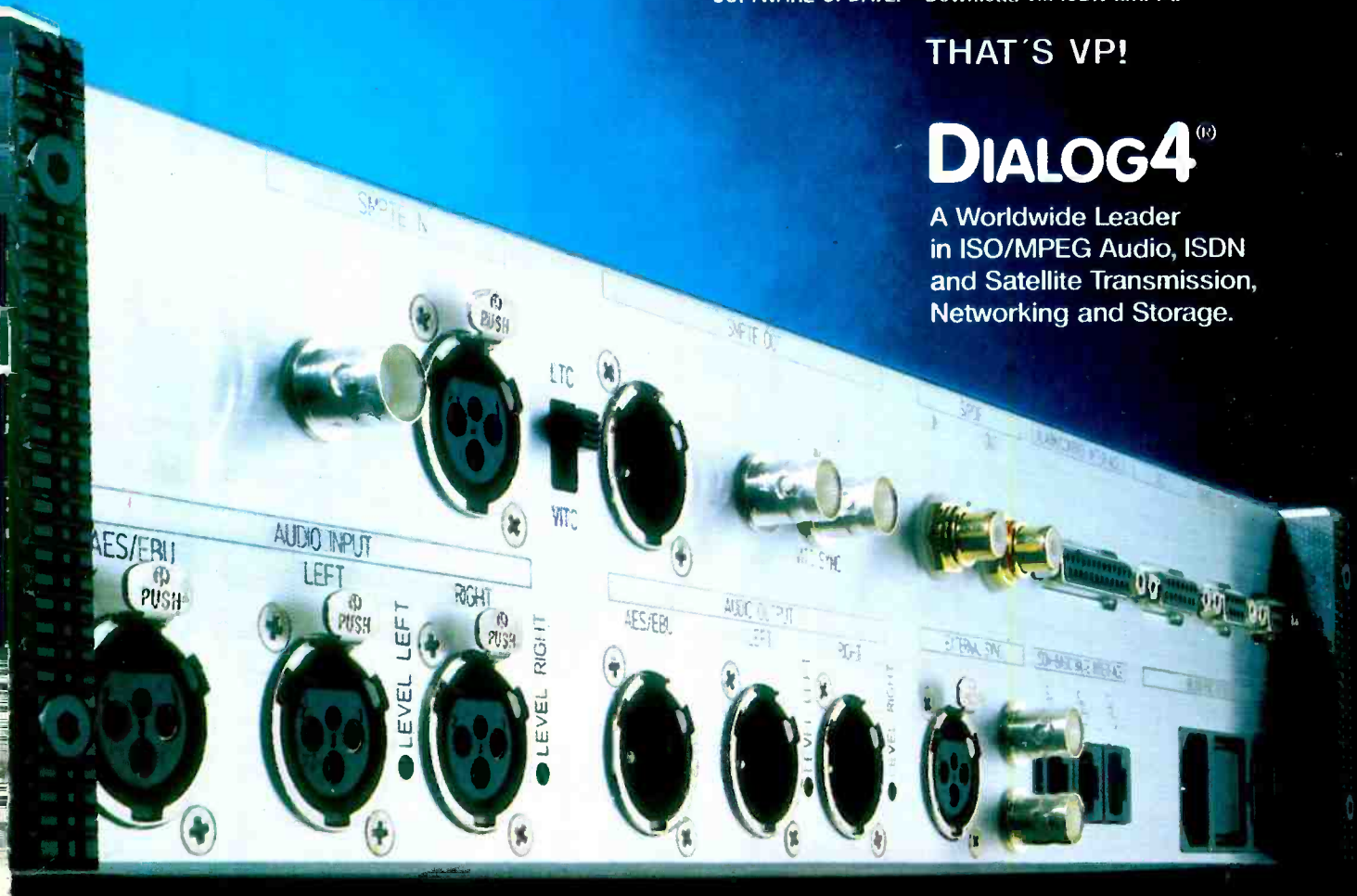

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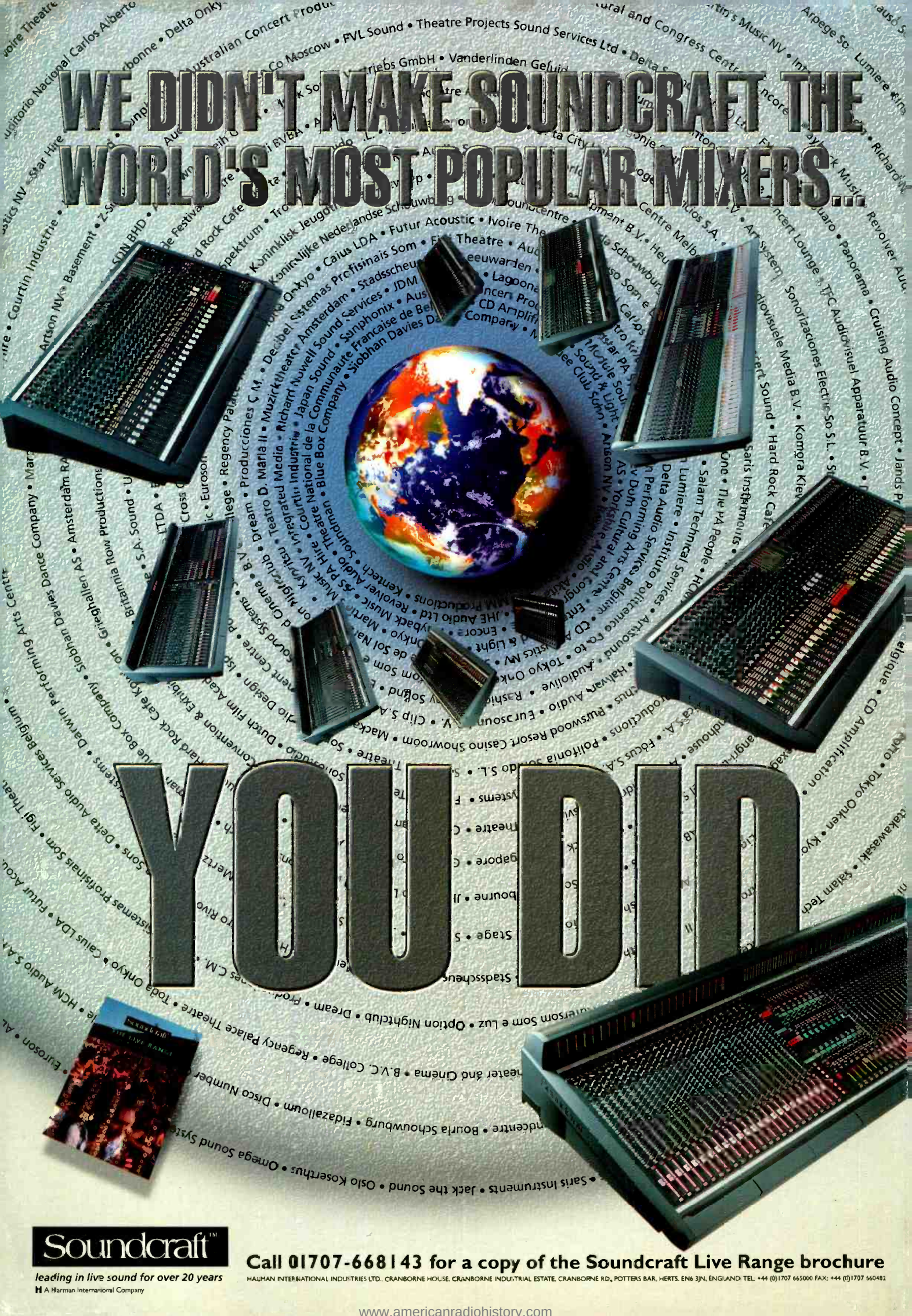

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