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SPECTRAL HARMONY

Mumbai joins recording's premier division



REVIEWS

- Rode NTK
- Marantz CDR770
- KSdigital ADM2
- Ambient TinyMix
- Buzz Audio MA 2.2
- AMS Neve Logic 3SC
- Midas Broadcast 2000
- Ambient TinyMike ATM 216
- Alesis Masterlink ML-9600 v2.0
- Manley Enhanced Pultec Stereo EQP1-A

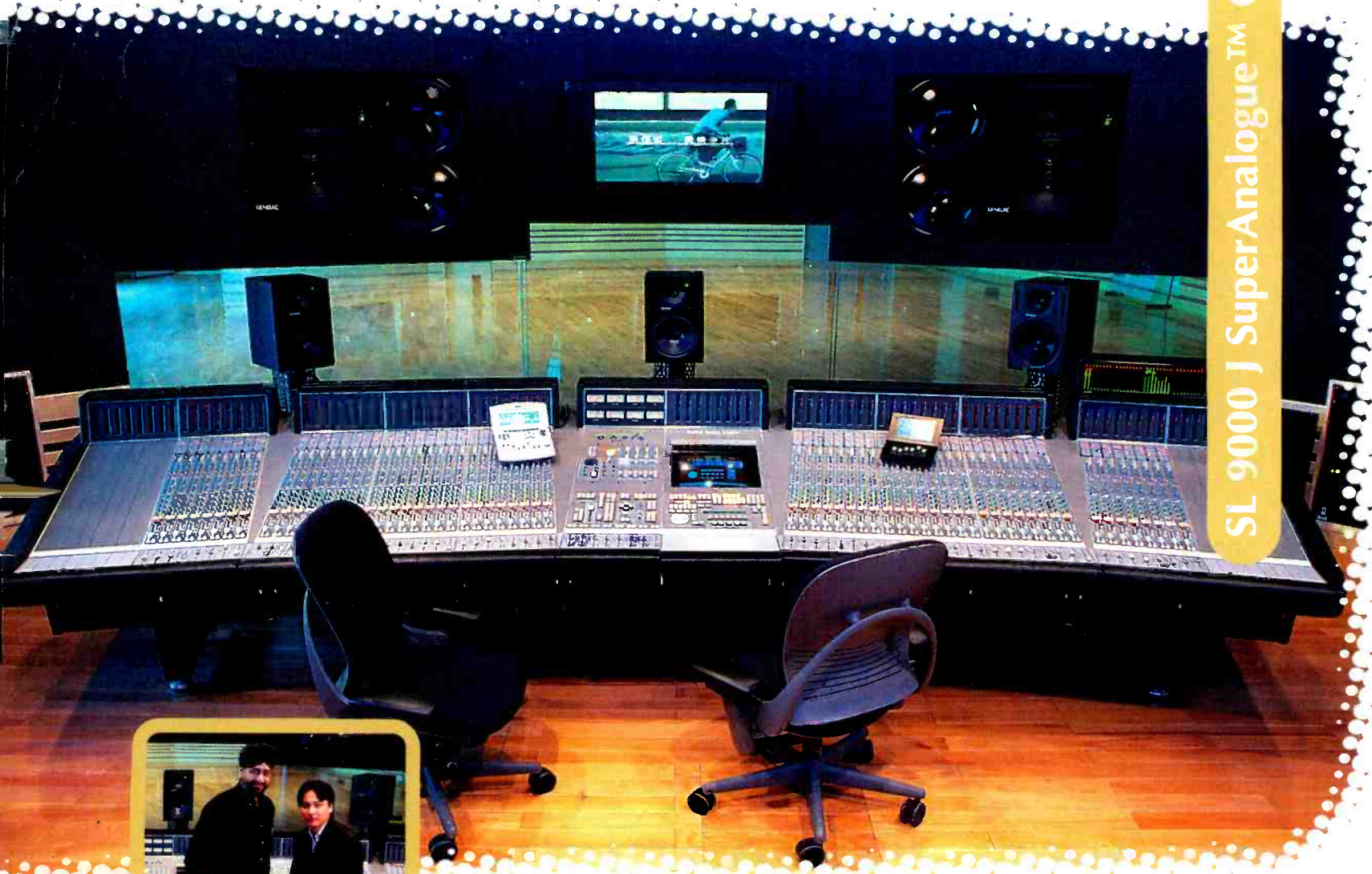


SIS: From French films to TV
Michael Bradford: Recording Kid Rock
Elvis: Bruce Botnik resurrects The King
Workstations: Defining options and understanding storage

"For us, the 9K was the only way to go"

Dindae Sheena, Oasis Studios, Beijing

SL 9000 J SuperAnalogue™ Console



YYVD Productions Chief Operating Officer Dindae Sheena (left) and President Patrick Kwok (right)



Studio One at Oasis



Great Studios Of The World

When YYVD Productions decided to create a world class recording facility in Beijing, the choice of console was obvious. "We did a market study on the standard that was currently on offer in other private facilities in China" says COO Dindae Sheena, "as we wanted to improve on them. We decided that the 9K was the only way to go and Oasis will be the first private facility in China to own one."

Oasis Studio, YYVD Productions Co. Ltd
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Visit www.studio-sound.com to catch up with the news from the Amsterdam AES Show

Is there a plan?

IT IS TOO EASY to neglect to rejoice in audio for its own sake when the requirement is so often to be analytical and judgmental. The greater proportion of your work, and therefore your income, probably depends on you being able to spot deficiencies, to make instant appraisals, and to devise rapid work arounds and solutions, but do you have time to listen purely for pleasure and escape?

It's the escape of the personal hi-fi wearer on public transport, the singing travelling salesman stuck in traffic, and the luxury of that forgotten album at the end of a busy day. Good quality audio is a wonderful treat regardless of the artist, song, actor, film or soundtrack if you can allow yourself to simply appreciate the brush strokes and craftskills of its creators.

Trade shows are excellent sources of high-quality audio if you can steal away from the exhibition floor to the demo rooms. Away from the bombardment of feature sets, benefits and bangs per buck, loudspeaker and 'format' demo rooms are all about sitting down and listening, possibly with a little evaluation, to someone else's work and performance and simply enjoying it for what it is.

With DVD-A and SACD we approach a veritable paradise of audio excellence when only two years ago it seemed we would be consumed by the spectre of compression-heavy delivery formats which looked set to reduce us to the lowest common denominator.

The maturity of practitioners in multichannel music has elevated the art to a back-to-roots musical experience that can be enjoyed from anywhere in the magic pentagon just as there is no 'best' place to sit in a con-



cert to enjoy and appreciate a performance.

It has been said a thousand times but the potential remains enormous and enormously exciting. What holds them back from commercial success is a software catalogue that matches them for ambition. If the top 400 best selling albums of all time were available in multichannel, on whatever format, would we still be as unsure about domestic take up?

Few of the parties in a position to make a difference seem prepared to take a lead or share the professional audio industry's enthusiasm. It's being driven from the middle by technology and practitioners without the universal blessing and support of the paymasters and without the outlet of nearly enough homes to go to. Tell me there is a plan that I'm missing.

Zenon Schoepe, executive editor

Listen carefully

IT SEEM TO REMEMBER being at a party in the late eighties during which massed ranks of junior-division UK engineers and producers gathered to pour their scorn on the rise of dance music. If you were to believe them, then the devil dance was singular in undermining everything from music itself through recording standards to the recording industry. And it was booming (sic).

The party wasn't an industry bash—in fact it was a musician's wedding reception—and the disenfranchised technicians were young enough to know better. They were also old enough to know punk. And punk, it seemed, was okay. Sure, nobody could play, but that was the fault of the musical excesses of the earlier seventies. Sure, recording standards were low, but that was also the fault of the excesses of the earlier seventies. Punk was good; punk was therapeutic; punk was overdue. Where dance... Dance was a triumph of ignorance over experience. It opened the door to all that was held precious by the record industry to those who

would debase it.

I said little. But I knew then, as we all know now, that the devil was in the retail. Dance offered the record companies what punk never could—a future. Of kinds.

The Japanese have a saying: fix the problem, not the blame. It runs contrary to human nature but betters it every time. The point here is not to blame it on the boogie, nor on the punks that destroyed pomp. The point is to recognise that between them they have

identified a future that escalating self-indulgence denied. A music industry neglected by its shareholders and redefined by entrepreneurs is music's future.

Just as you can lose the ability to read, you can lose the ability to listen. And to retain that ability is now the prime directive. Not for the specialists—jazz and classical purists who sleep with their eyes on the score—but for the mainstream. So while making chart records in mundane places on impractical budgets abounds, listening remains a rare and valuable skill. Uniting the two is now the game. And our future.

Tim Goodyer, editor



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The R-1 was put through its paces at the 20,000 strong Elton John Concert in Madison Square Gardens this year. A host of other stars also appeared on stage...

...all still very much alive!



There were 80 tracks on two R-1's at 24bit 96kHz – nearly three hours of non-stop recording for two separate concerts without a hitch.

It makes you think!



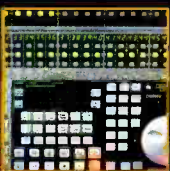
Tape-based recorders cannot keep up with today's demands for sound quality and speed.

The concerns of familiarity of traditional multitrack are addressed in the R-1.



Last year Euphonix Inc and Audio Export established Euphonix Europe to support Euphonix' many European users. We have built a team second to none to provide top level support to our customers.

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R-1 is available in 24 and 48 track versions. The unit is the perfect companion for the System 5 digital console.



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CONTRACTS

Spain: Television broadcaster Telecinco has ordered seven AMS Neve Libra Live Series II digital consoles for installation in Madrid. Seven new studios will accommodate the consoles, which will serve a variety of duties including live shows, contest shows, magazine programmes, television movies and large-format entertainment shows. Another Madrid post house, Exa has also installed a Libra Post for use on foreign language film mixes. Part of a move to a new building, Exa intends to offer two film mixing rooms, one with its Logic 2 upgraded to a DFC for Spanish produced film mixing, and a second for the Libra Post. Telecinco, Spain. Tel: +34 91 396 6300. AMS Neve, UK. Tel: +44 1282 457011.

Switzerland: New Zurich postproduction facility Audiokraftwerke has installed a Genelec monitoring system in its main 5.1 room. The system is based on 1038A and 1032A speakers. Audiokraftwerke handles a variety of work including that from the nearby Swiss National TV facility. Swiss Radio International, meanwhile, has installed a Quadriga automated archive system running on Cube-Tec's AudioCube platform. Audiokraftwerke, Switzerland. Tel: +41 1 303 1303. Genelec, Finland. Tel: +358 17 813311. Cube-Tec, Germany. Tel: +49 7435 910942.

US: Producer-engineer Ron St Germain has purchased a 1-inch 2-track ATR-102 recorder from ATR Service Company. The machine is packed in a custom flightcase containing a GPS-coupled 'shock alert' system and using military shock-absorbing wheels



designed for AWACS radar equipment. St Germain's work includes Mos Def, Treason and the Japanese group Yellow Monkey. ATR, US. Tel: +1 717 852-7700.

UK: BBC Bristol has joined BBC Pebble Mill and the Singapore Broadcast Company in purchasing a SoundField Mk V for drama and OB work. Projects completed involving the

ENG made easy

France-Switzerland: Netia and Nagra are to jointly develop new functions for ENG journalists. Designed to make life easier for journalists using Netia's Radio-Assist software and ARES-C, ARES-P and RCX220 portable digital recorders, Radio-Assist 7 will allow reports to be transferred more efficiently between systems. Similarly, Nagra will develop further functions for its portable recorders to enable location audio to be prepared with optimum sound quality for the transfer.

AES Amsterdam

The Netherlands: The 110th AES Convention robbed the majority of its attendees of the opportunity to kickstart their



sun tans as the sun blazed in Amsterdam recently. Proceedings began early when Tascam unveiled its SX-1 'integrated audio production station' before the show opened its doors. Combining a 40:8 automated mixing, 16 tracks of 24-48 digital recording, and 128 tracks of MIDI sequencing with a \$8,999 price tag, the SX1 proved worth the early start. SACD garnered significant support through new DSD 'mastering workstations' from SADiE and Philips-Merging Technologies, and the Genex multichannel DSD recorder. Also previously unseen were alternative marketing approaches from Sony and tc electronic. Sony's substitution of a robotic dog for ranks of electronics certainly drew a crowd but the discovery that 'AIBO' had an aversion to loud noises and the orange of the Sony folks' shirts wasn't in the script. tc's complete abandonment of product literature in favour of human resources, meanwhile, remains an unproven strategy. Speculative technologies lurking around certain corners included an intriguing audio analysis program from Danish company Leonard Research derived from mathematical modelling of the human auditory system. Any takers?

Dolby puts an E in broadcast

World: As the international broadcast industry continues its adoption of 5.1 audio, Dolby E is finding increased use in the postproduction and broadcasting realms. International network broadcasters who have adopted the format for acquisition or distribution include the Australian

Broadcasting Corporation, Astral Television Networks in Canada, BBC Research & Development, Broadcast Centre Europe in France, BS Asahi in Japan, HBO HDTV and NBC in the US and the Korean Broadcasting System and Mhwa Broadcasting Corp in Korea.

'As the broadcast industry moves forward with the transition to DTV, Dolby E technology becomes increasingly important because it allows broadcasters to accept and transmit multichannel audio data over media that traditionally carry an AES pair without sacrificing audio quality,' said Tom Daily, marketing director, professional audio for Dolby Laboratories.

'Additional features that Dolby E provides, such as audio synchronous with video, allow broadcasters to smoothly edit multichannel audio without having to decode to baseband.'

Additionally, Netherlands-based Axon Digital Design has joined the Dolby E Partner Programme following successful testing of two of Axon's SDI embedder SEB20, and de-embedder SDB20. 'The growing demand for products compatible with Dolby E proves again that Dolby has made a world-wide-accepted scheme for audio handling in a professional industry,' said Peter Schut, product manager for Axon. 'The broadcast community is adopting Dolby E with enthusiasm, and that again leads to products in the Axon range that can handle Dolby E. We are working on more compatible and dedicated solutions that will simplify the use of Dolby E.'

Launched in Europe at IBC 2000, the Partner Programme allows manufacturers of E-compatible broadcast equipment to promote their products' capability to broadcasters and production houses look-

Buddah goes clubbing

UK-BALEARICS: RADIO production company Wise Buddah, based in London's West End, is to provide a swathe of audio facilities on the club peppered Mediterranean island of Ibiza this summer. Radio stations around the world will have the ability to record, edit and broadcast from the island without OB overheads, while record companies and other organisations will have technical resources normally associated with London immediately to hand.

Wise Buddah will provide exclusive ISDN audio and video streaming directly from the famous Cafe Mambo, while a villa-based HQ will contain extended editing, mastering, compilation and ISDN facilities. Remote packages will also be available around the island. Head of Wise Buddah Creative, Paul Plant, outlined his plans for the summer to *Studio Sound*.

Q: This seems like a unique combination of broadcasting and recording. Are you trying to cover every eventuality?

Absolutely. Last year, for example, Victoria Beckham made a live appearance at Eden, and it took several hours to feed that to newsdesks. When something like that happens this year, it will be heard more or less as it happens.

Q: What will be installed at Cafe Mambo?

The first option is a self-op setup based around a Soundcraft SAT200, Denon MiniDisc and CDs. That will go straight out through an ISDN codec to the host station. The second is based on Technics turntables and Pioneer CDJs through a Pioneer VM600 mixer. And there's smaller, Behringer mixer-based kit to

provide even more flexibility.

Q: And the villa?

The postproduction suite in the villa will be based around Pro Tools 5.1 running on a Mac. The portable recording kit will be DAT or MiniDisc, so we can take feeds from clubs, bring them back to the villa and dispatch them. In some cases jingles will be prepared at Wise Buddah and sent to the villa, so that complete productions can be done in one hit over there.

Q: How will you dictate what goes where?

Where we go on the island will be driven by DJs, record companies and management companies. There'll be certain DJs who want to make mix albums, and if they're based out there all summer they can continue their recording schedule.

Q: What kind of stations are you targeting?

A lot of broadcasters have already expressed an interest, so it's the commercial stations that we'll be servicing both nationally and internationally.

Q: How much live broadcasting do you expect?

A feed from a club will most probably be recorded, because most people will want to edit. So that will be a DAT recording—a stereo feed from the DJ mixer—brought back to the villa for editing on Pro Tools. The codecs will be the Telos Zephyr Express/Prima and the Nicral LT.

Q: Is this a service exclusively for dance music enterprises?

No: there'll be artists performing acoustic sets in small cafes who can equally take advantage of the service. Ibiza needn't be exclusively a dance music venue. Wise Buddah, Tel: +44 207 815 9656/9603.



US: Jim Zumpano has installed a 64-channel Amek 9098i in the Zumpano Audio Complex in Atlanta. It forms the centrepiece of Stonehenge Recording, a new recording and mixing facility and will accompany a pair of Studer A827 analogue tape machines, including one Gold Edition, in a control room featuring Augspurger monitors and Bryston amplification. The new facility, designed by Zumpano (pictured left) and Jean-Michel Eber of Eber Designs, also houses Zumpano's two-room, Pro Tools ZAC Digital studios, as well as Southern Living Mastering. Zumpano has worked with a vast range of artists, with his credit list including REM, Aretha Franklin and Babyface.

ing for integrated Dolby Digital 5.1 audio. Membership is open to any manufacturer meeting Dolby's standards. The Programme also provides Partners with a Dolby logo advertising Dolby E capability. Companies currently supplying Dolby E-compatible equipment include 360 Systems, AMS Neve, Grass Valley, Philips, Pro bel, Panasonic, Sony and Quantel. Ongoing discussion and testing programmes are in progress with others including British-based Soundtracs.

NAB 2001

US: NAB creates a confusing mix of emotions in anyone who endures its assault upon eyes, ears and feet. Confusing because its sheer size makes it equally impressive and depressing and the logistics of managing a twin-centre convention experience effectively is forever in the mind of every visitor. There are queues to contend with for the irregular coach services between the Sands Hotel and the Convention Centre and, no matter how well organised you are, there is always one extra return journey involved to confound your best laid plans.

Audio representation benefits from a concentration around its own hall at the Convention Centre including, as always, a number of US brands that are rarely spotted in exhibition mode anywhere other than Las Vegas. What is becoming apparent though is that some of these players are beginning to think about breaking out and addressing the rest of the world, note the stronger presence that Wheatstone

and Logitek now enjoy outside of their native country.

Biggest news was the acquisition of Graham Patten by Klotz Digital in a move that will help to open new market opportunities, particularly in post, for the German manufacturer and establish a foothold and manufacturing base on the continent. Elsewhere Musicam (CCS) launched the SuperLink as its next generation codec product. Euphonix announced a ten-System 5 sale to ABC in Australia and SSL revealed the A Plus versions of its digital desks.

Yet leaving Vegas is a sad occasion, sad because it all has to be done again next year with the same logistical problems in tact and waiting for you.

Surround plans agreed by Abbey

UK: Key music industry players including BMG, Dolby, Sony, and Abbey Road Studios met and agreed recently that surround recording could help raise the barrier against Internet piracy. Hosted by Abbey Road Studios and the BPI, the forum agreed that in order to stave off continuing piracy, the industry's objective must be to educate consumers of surround DVDs before the Internet is capable of delivering and devaluing the commercial standing of surround in the eyes of the consumer. The music industry in general does not believe that a lack of investment in surround promotion has left consumers

largely ignorant of the benefits of multi-channel audio.

Another area of debate was the use of 'faux' surround recordings where a 'surround ambience' is created in a postproduction room rather than a full remix of the multitrack masters. One member of the audience suggested that the term 'faux' was a misrepresentation of the process and perhaps it should be renamed 'Produced Surround Sound'. It was agreed that if Produced Surround is the only alternative it should be created with care and sensitivity to the original stereo version.

Everyone who attended concurred that all parties involved, from the music and retail industries, must back surround sound fully if customers are to be convinced of its value in the high street. With surround currently a costly proposition, it was agreed that substantial investment and commitment is required to push the industry forward.

Commenting on the day, Samantha Harvey, creative director at Abbey Road Studios and chair of the seminar, said: 'At Abbey Road, we are determined to focus on how the music business will use surround sound technology creatively, not only to survive, but to thrive. We must educate consumers on the advantages of surround sound and in order to do so, the whole industry must invest time and effort in producing high-quality surround sound DVDs that consumers will want to buy. Surround sound is the next step in giving consumers an authentic music experience and, as such, we need to embrace it.'

Nuendo's Browne study

US: Engineer Greg Ladanyi has returned to his 1977 masterpiece *Running On Empty* by Jackson Browne, remixing the album in 5.1 surround at his private studio, Tidal Wave, on Steinberg's Nuendo DAW system. It's the first time Ladanyi has worked with either the format or the system.

'I chose Nuendo primarily because the sound is tremendous, and the fact it supports 24-96 makes it an obvious choice for surround mixing,' he says. 'Also, the automation in Nuendo is fantastic.'

The album combines live recordings with ambience from the rock touring environment, such as bus and hotel interiors and spontaneous jam sessions. Ladanyi is confident that these elements will add much to the 5.1 experience.

'Working in 5.1 will bring the listener into the total experience of the hotel rooms, the bus and lounges. With the arena recordings, the band will come from the front speakers, just as they would at the concert. We'll use the surrounds for the sound of the room, and the reverbs bouncing off the walls.

'One track, 'The Road', begins in a hotel

CONTRACTS

new mic include concerts from St George's Hall in Bristol spanning classical strings to Nigerian mbiri music. Soundfield, UK. Tel: +44 1924 201089.

US: America's WGBH public broadcasting station has ordered two DSP Media Postation II systems for its newly-renovated Boston-based facility. WGBH produces more than one-third of the PBS prime-time line-up including American Experience, Antiques Road Show, Frontline and NOVA. DSP Media, US. Tel: +1 818 487 5656.

US: Denver's KUVO 89.3 performance jazz radio station has recently moved to an almost all digital



signal path installing Logitek Numix digital consoles, an Omnia FM processor from Cutting Edge, Harris digital microwave, Shiveley antenna and Nautel transmitter. The only analogue area of operation falls to a number of Symetrix 528E voice processors. The station gained a Gavin Report nomination for 'greatest Jazz station in the country'. Symetrix, US. Tel: +1 425 787 3222.

Australia: The New South Wales-based Australian Broadcasting Corporation TV has ordered 10 Euphonix System 5-B digital broadcast consoles. The contract is the largest to date for the console and accompanies orders from WCPO-TV9 in Cincinnati, Ohio, and Chicago's Harpo Studios, home to The Oprah Winfrey Show, ABC, Australia. Tel: +61 2 9950 3219. Euphonix, US. Tel: 1 650 855 0400.

UK: Kate Bush has taken two vintage Neumann U67 mics from specialist dealer Funky Junk. The purchase accompanies Funky's sale of a Royer 121 mic to Surrey's Parkgate studios and a Neumann-Telefunken U47 to Dreamhire. Dreamhire, UK. Tel: +44 20 8451 5544. Funky Junk, UK. Tel: +44 20 7609 5479.

France: Duran Films, part of France's largest film postproduction studios, has ordered a Euphonix System 5 console for a new facility in Issy-les-Moulineaux, Paris. The new room will serve both film and episodic television projects. Duran Films: Tel: +331 4529 9999. Euphonix, Europe. Tel: +44 208 901 7510.

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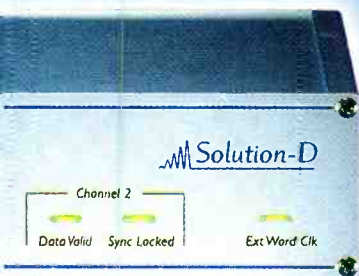
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Solution-D

Neumann goes Digital

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- Wide range of new functions through integrated digital signal processing
- Adjustments and monitoring of all parameters and functions through Remote Control Software



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- Phantom powering
- Word clock in and out
- Integrated word clock generator

Remote Control Software

- Monitoring and adjustment of all parameters
- DSP function control
- Peak level meter
- Gain reduction bargraph for transient limiter
- Save, copy, and recall for complete setups
- Master/slave groups

CONTRACTS

UK: The recently-launched TEAMtalk Internet radio station has adopted Fairlight On Air's CoSTAR and server to integrate its four broadcast studios, preparation studio and control studio. Over 13 years the Leeds-based operation has evolved from providing fixed-line telephony services to coverage of all professional football in the UK, US and Sweden. It also produces stories on sports including cricket, golf, F1, horse and greyhound racing, rugby and tennis. Fairlight On Air, Netherlands. Tel: +31 26 368 4925.

Norway: Following TV2 Denmark's order for a further Yamaha PM1D digital mixing system for OB use, Norway's OB Team has ordered two PM1D systems for its outside broadcast requirements. The TV2 Norway-owned company will replace an analogue console in an existing OB Team van with the first PM1D and install the second in a new OB vehicle. Yamaha Kemble, UK. Tel: +44 1908 366700.

UK: London's Redwood Studios has installed a Mackie D8b console where it is already being used to record a 5.1



soundtrack for the DVE release of the film classic *Jabberwocky*. Redwood's Andre Jaquemin worked on all the Python films since the *Holy Grail* and was nominated for a BAFTA for the sound on *The Meaning of Life* before beginning the re-recording. Meanwhile Morcheeba's private South London studio has become home to a 32-channel TL Audio VTC console alongside its Otari MTR 90 and Pro Tools Mix Plus system. Work on the band's fourth album has already begun. Mackie, UK. Tel: +44 1286 571212. TL Audio, UK. Tel: +44 1462 680888.

US: A new screening room at Dolby's new offices in Burbank has been designed by the company's VP of Hollywood Film Production, David Gray. The facility features a JBL cinema sound system including five screen channels of customised 5674 3-way cinema speakers and JBL Sound Power Series systems serving as surrounds. JBL, US. Tel: +1 818 894 8850.

room, then mid-way it crossfades to the arena. You'll feel the audience come up from underneath, as the vocals move to the front speakers.'

Original Studer 2-inch analogue multi-tracks have been transferred using Dolby A via Browne's Neve 8078 console. All 24 tracks of each reel were run simultaneously, a process which revealed hidden ambiences on apparently silent tracks. Ladanyi will use these elements creatively in the new version.

'Nuendo has the ability to create parts or passages by copying and pasting, setting and printing EQs and reverbs,' he adds. 'This is more exhausting on a console. I usually work more hands-on with musicians, but Nuendo is technology which truly enhances the performances.'

The remix is intended for DVD-A release.

Linux ups audio stake

US: Cirrus Logic's new audio drivers are intended to bring improved audio performance to users of the Linux operating system—an alternative to Microsoft popular in many technical circles including financial systems and web servers due to its stability. The new Cirrus drivers support all Cirrus computer audio including its motherboard audio chips, PCI audio controllers, add-in cards and DSP solutions. Computer systems already employing



Spain: Fairlight ESP has announced the sale of a 64-input, 24-fader FAME2 system to Spanish Audiovisual Service Providers, Telson Classic and New. Supplied by Madrid-based distributors, Fading, the FAME2 will be used to meet Telson's increasing demand for high-quality postproduction in advertising, film and DVD audio, including 5.1 Surround Sound. The new system joins seven MFX3plus and four Prodigy workstations installed throughout Telson's Madrid and Barcelona facilities. Pictured: L-R Quim Rubi (Telson); Simon Daniels (Fairlight); Javier Petrenas (Fading)

CrystalClear audio facilities can be upgraded with the new drivers.

Charlie Ashton, director of computer audio software for the company's Computer Audio Division comments. 'Cirrus Logic intends to provide its cus-

tomers with the greatest number of options to ensure high-quality audio on their PCs. We will continue to support Linux through ongoing development of drivers for both current and future versions of the operating system.'

HGA goes house hunting and ship building

UK: ACOUSTICS AND DESIGN consultancy Harris Grant Associates (HGA) has relocated to a larger HQ and expanded its roster of executives. The UK-founded company has transferred from a long sojourn at film and production nerve centre Pinewood to Guildford, the wealthy London commuter town rich in refurbishable period buildings.

HGA now occupies one such place, an 18th century town house in which the firm has consolidated its sister companies Coastal Acoustics and Discrete Systems, together with architect Gavin Sargent and finance director Carolyn Hayter. A Tokyo office is run by Sheen Uchida. Co-founder and renowned studio designer Neil Grant spoke to *Studio Sound* about the move.

Q: What prompted the move?

We'd just come through the busiest two years in our 18-years of business. So we were pushed for space, plus we wanted to own our own building. It creates good equity for the consultancy; and it demonstrates that the company has substance. We'd spent about 18 months looking around, and it's an absolutely lovely house.

Q: How does an 18th century house become an international consultancy HQ?

We took it all apart. We spent about three months creating a workshop, a theatre, a large open-plan design office, boardroom, reception and management offices—but it has retained a very nice feel.

Q: How have you moulded it to the current shape of your businesses?

Because we're doing a lot of work now with control systems, we wanted somewhere we could also do R&D and demonstrations.

We do a lot of work nowadays on private facilities—including theatres and yachts. The need to demonstrate to very demanding clients is clear. We have people who write code and design systems and networks for those facilities.

Q: A sign of the times?

It is. If we were still only designing control rooms for the music and postproduction industries, we would all be having a lean time of it. Ironically, though, over the last four years we have designed and completed two of the most sophisticated music studios that have ever been built.

Q: Who were they for?

Again, they are for private owners so I'm afraid I can't tell you. I am NDA'd up to the hilt...

Q: How else have you diversified?

We've diversified into architectural acoustics, particularly. I've just finished all of the background noise and architectural acoustic preliminaries for the new BBC development at White City in West London. And we've got three very large super-yacht projects on the go, which run over three or four years.

Q: Are you still making Boxer monitors?

Coastal Acoustics still owns the brand, and supplies installations and systems each year. We're not a major manufacturing enterprise. We don't have wood and metal work in-house, but 5.1 surround has definitely boosted demand and we have expanded to accommodate this.

Q: And where is Discrete Systems heading?

Very much into architectural acoustics, such as the Cinerama facility in Seattle. It has a 70kW EAW system. Soundweb control and is hugely successful. But again, we've just put the first of two surround systems into Guillaume Tell in Paris, so there's life in studios yet. HGA, Tel: +44 1483 885678.



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CONTRACTS

US: Christian Pirate Radio has taken an Aphex Model 2020 Series broadcast processor to sit with its Aphex Compellors, Telos AudioActive Encoders and Z-Sys digital patching equipment for Internet broadband broadcast of music channels, CPR and CPRXtreme. The Glendale, California-based operation also includes KKLA-FM, CPR's parent station, KRLA-AM, KXMX-AM, KEZY-AM and The Fish 95.9 FM. Other webcasters using Aphex Model 2020 Broadcast Audio Processors include Westwind Media.com, GratefulDead.com and Comedyworld.com CPR and The Internet. KKLA Communications Group, US. Tel: +1 818 662 3710. Aphex Systems, US. Tel: +1 818 767 2929.

Australia: Top-rating Melbourne TV station, GTV 9, has taken delivery of a number of ARX MaxiMix Line Mixers while Melbourne's AM radio station have been supplied with four MaxiMix units for its ENG sports commentary system. Elsewhere in the city, McLean Audio has added six ARX DI Plus for general hire applications. ARX, Australia. Tel: +61 3 9555 7859.

UK: A rush of sales of China Cones has seen Bunk Junk & Genius, Soul II Soul producer Will Mowat, Tina Turner producer Greg Walsh and Elton John engineer Pete Lewis at Townhouse Studios using them to improve the performance of their monitors, while Dave Gilmour's Studio Astoria has used them for both monitors and the Neve VR power supplies. Net: www.chinacones.co.uk



France: With sessions already booked for French chanteuse Arielle and Celtic hip hop band Manau, Paris-based Plus XXX studios' new Neve 88R analogue console is going to be busy. Installed in Studio 1, the purchase prompted owner Claude Sahakian to comment, 'With its wonderful live room acoustics, Studio 1 is a perfect match with the sonic performance of the Neve 88R. The console fits perfectly into the room.'

Linux itself offers priority handling of audio and video over other tasks, ensuring an uninterrupted flow of sound and pictures. Cirrus Logic, US. Tel: +1 512 912 3766.

Book work

UK: The third edition of the *Loudspeaker and Headphone Handbook* continues its authoritative tradition with a lineup of star contributors (including *Studio Sound* contributors Keith Holland, John Watkinson and Philip Newell) and edited by John Borwick. The volume's 700-odd pages cover popular practice and technical theory in a variety of contexts including sound stu-

dios and sound reinforcement, and are rich in graphs, figures, illustrations and photographs. *The Loudspeaker and Headphone Handbook* (ISBN 0 240 51578 1) is published by Focal Press, www.focalpress.com

Edited by some-time *Studio Sound* contributor Chris Woolf, the *Microphone Data Book* is 'a compendium of every microphone in professional use'. The tome has been compiled with the support of mic accessory experts Rycote and presents technical details on each mic in a common format to allow direct comparison of details. Similarly frequency graphs and polar diagrams have fixed scaling presenting virtues and vices with candour. The

Microphone Data Book (ISBN 0-9539354-0-X) is distributed by dormouse.distribution@cwcom.net


DISC: takes control

World: Under the slogan 'The Science of Sound', DISC (the Directory of International Studios and Control Rooms) was given its international launch at Alberts Studios in London's Islington. DISC is a subscription-based directory and high-end maintenance service for studio monitoring, mastering and control rooms, aimed at helping these rooms keep a certified level of audio excellence. An attempt, essentially, to bring standards to a billion-dollar business that many still see as being run on cottage industry lines.

The DISC group was boosted by the presence of new director Nick Whitaker, formerly a senior audio engineer and acoustician at Recording Architecture. In his opening speech DISC VP Dennis Hancock announced that DISC had already gained 80 subscribers world-wide—including US-based Rainmaker, Chelsea Sound and Terrarium, the UK's Lansdowne, Townhouse and Mark Angelo studios as well as Switzerland's Lakeside, Spain's Monster Music and Australia's Studios 301. Private subscribers include those belonging to Lenny Kravitz, Rick Astley, Russ Ballard and Underworld.

Speaker George Allen, owner of residential studio Arc, felt that DISC could end the 'horror stories of monitoring rooms with dead spots and no mid' while Whitaker emphasised that A&R men, producers and engineers could be certain that certified rooms would sound as good as possible, 'within the limits of their equipment'. DISC being something that gave smaller studios the chance to get rated up there with the big boys.

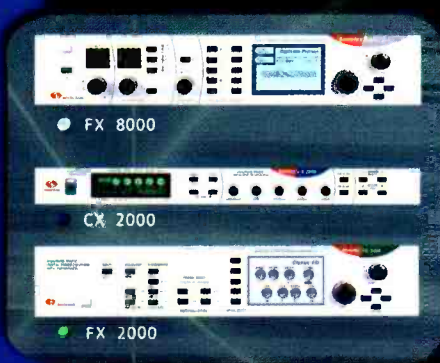
In the following Q&A discussions, some studio owners claimed that DISC might be just another subscription fee



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- Offers extensive possibilities for audio / video postproduction
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CONTRACTS

US: National Geographic Channel, a new US cable channel partnership between National Geographic Television and Fox Cable Networks Group, has installed an AMS Neve Libra Live Series II digital broadcast console in its new Washington DC facility. The purchase follows comparisons between the AMS Neve console and new consoles from competing manufacturers, with the Libra being identified as preferable for live operation. The console will be used initially for preproduction and live production of a one-hour-long daily news programme. AMS Neve, UK. Tel: + 44 1282 457011.

US: Bair Tracks has adapted its audio rooms for 5.1 working with the installation of Pro Tools 5.1 MixPlus systems, Genelec monitoring, Dolby Tools plug-ins and Aurora Fuse video cards. The facility is already at work mixing for television surround (Dolby 4-2-4), and 5.1 surround for film. DVD and HDTV. Projects to date include the Women's Soccer League and the NBA on TNT, promos for The Disney Channel, as well as movie trailers for Cartoon Network and TNT. Bair Tracks, US. Tel: +1 404 733 6100. Digidesign, US. Tel: +1 650 842 7900. Genelec, US. Tel: +1 508 652 0900.

while producer Pip Williams remarked on how his recording of the Moody Blues' *Long Distance Voyager* album had occurred in the much-maligned Threshold studios before selling 5m copies. Williams also mentioned how the acoustically untreated Nassau studios had been similarly successful as had other 'vibe' rooms though others present pointed out the impossibility of doing a 'vibe' directory. Most, however, did feel that DISC had the potential to defend the recording studios against some of the music companies' price-cutting antics as well as finally giving the industry a set of reliable professional standards. Net: www.disc-studios.com

UK: The UK's largest Otari Elite console has been installed in Theatre One at London's Goldcrest Post Production as part of a programme of upgrading and refurbishment. The 72-module console features 144 faders, 144 EQ sections and 10 aux sends. General manager Raju Raymond commented, 'Last year we installed an Otari Elite Plus console in Theatre Two and we have had such a good experience with it that,



Audio Deva for Avid

US: Avid and Zaxcom have collaborated on direct audio file import from the Deva II location hard-disk recorder to any Avid nonlinear edit system. This feature will be available in Avid v10.5 for Avid Media Composer, Film Composer, v3.5 for Symphony, v4.5 for Avid Xpress and v2.5 for News Cutter. The facility will eliminate the need to load audio from DAT or Nagra tapes in a linear fashion. Deva DVD-RAM disks are used as a direct source of nonlinear audio data.

when it came to replacing our old SSL console in Theatre One, another Otari was certainly in the frame. We looked at other consoles, of course, but the combination of features and value for money made the Elite Plus stand out.' Among Goldcrest's credits are *The Killing Fields*, *Absolute Beginners*, *Hero* and *Name of the Rose*.

This Support includes bin view display of time code, shoot date, scene, take and text comments, and import of multitrack clips of up to four tracks. The time code can be used to AutoSync separately recorded audio and video tracks in the Avid systems. Scene, Take and Notes from the sound cart are entered on the Cameo LRC location mixer and automatically downloaded to Deva and then to DVD-RAM.

Complex control: Direct results

US: Marking a first in remote control of complex satellite and transmission technology in the US, DirecTV has commissioned the newly-established BBC Technology operation to provide a custom designed broadcast network control System (BNCS). The contract involves a centralised system being developed for monitoring and control of satellite transmission equipment, at various sites remote from the central control base. The move is intended to provide America's leading digital satellite television service with leading-edge PC-based broadcast technology, to accelerate the convergence of broadcast and IT environments.

At the start of the project, BBC Technology installed simulator systems at

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APPOINTMENTS

Gepco has announced Lewis Frisch as eastern region account manager. Frisch will represent the audio and video cable manufacturer to the American eastern seaboard. He has previously spent time at Amek US, the Comprehensive Technical Group and The Bedford Consultancy.

Cirrus Logic has appointed Mike Noble to the post of vice president of sales for Europe. Noble is expected to raise the profile of the US semiconductor manufacturer having 18 years experience with chip OEMs and distributors in America and northern Europe.

Calrec Audio has appointed Patrick Warrington as technical director. Warrington spent time at ProBel and 360 Systems before rejoining Calrec as R&D manager. He joins Kenneth Farrar, Stephen Jagger, Graham Warren, John Gluck and George Waddington on the Calrec board.

Klark Teknik has announced Simon Harrison as director of signal processing. Harrison assumes responsibility for research and development of the KT brand having previously been a member of the design team responsible for the Sony OXF-R3 console and involved in the development of digital audio for Sony Broadcast and Professional.

Orban/CRL has appointed Henk Mensinga to the newly-created post of



sales director. Mensinga had been serving as the company's European sales manager.

NXT has announced Andrew Williams as group marketing director replacing Jon Vizor, who becomes head of venture sales. He joins NXT from iXL, the Internet and Business Consultancy based in San Francisco, where he was senior vice president of global marketing.



UK: Bowtie TV has added a new vehicle, Unit 6, to its OB fleet. The new production van is centred on a 36-channel Soundcraft B800 console, employs Leitch routing and a Trilogy talkback system and is available with up to six Sony cameras and four VTRs. Unit 6 was commissioned because Bowtie TV owners John Knopp (pictured) and Stephen Fox anticipate significant growth in the facilities sector in 2001-2002. Bowtie's vehicles are currently used regularly by ITN, Action Time, which produces studio-based material and Racetech, which broadcasts horse-racing. The company also enjoys substantial success as a sub-contractor to major OB facility providers including Carlton 021 and CTV.

DirecTV's two broadcasting centres in Castle Rock (Colorado) and Los Angeles. The system at each site consists of two PCs with monitors and touch-screen control panels, all running BNCS software and linked to DirecTV's existing computer network. These systems enabled DirecTV to assess exactly what BNCS is capable of and to realise how the system can be customised to meet its exact requirements. The project should deliver a system which best matches the broadcaster's existing infrastructure and working practices, at the same time as providing an advanced and expandable control environment.

Having developed a bespoke system for DirecTV, BBC Technology engineers will then extend the installation to the organisation's other facilities where local programmes are collected. To date, custom-designed BNCS units have been installed at two local collection facilities, as well as at the main broadcast centres.

Moving and shaking

World: Putting a bold face on its filing for Chapter 11 bankruptcy protection (27th April 2001), Alesis is anticipating being acquired by Jack O'Donnell, president of Numark Corporation. The company's auction is scheduled for 23rd May in the LA US Bankruptcy Court Courtroom (contact Alesis attorney Bennett Spiegel, 310 551 1015).

In a press release, VP of sales and marketing, Jim Mack, said, 'We have maintained the core integrity of the company including the majority of the engineering

staff, our manufacturing and sourcing team and our key sales and marketing staff. This will allow us to support most normal operations during this period and to ramp back up to full speed quickly once we're through this transition. We are working to continue the supply of Alesis products and services, and we are poised to begin shipping the remainder of the new products introduced at [US] AES and NAMM.'

Alesis was absent from the Amsterdam AES Convention.

Mackie Designs and Soundscape Digital Technology have agreed that Soundscape will continue to distribute products developed by Sydec NV of Belgium under the Soundscape name, Sydec having been acquired by Mackie during April.

'As the new owner of Sydec, Mackie benefits from having the continued support of Soundscape's experienced team marketing the Soundscape line of products. And Soundscape benefits because it will continue to have the talented Sydec engineering group working hard to meet its requirements for advanced digital audio technology,' said Jamie Engen, president and CEO of Mackie.

Soundscape's Chris Wright added, 'This new agreement ensures that our established and expanding customer base will have continued access to the finest digital technology available today combined with unparalleled Soundscape customer service and support. We look forward to a continued close working relationship with Sydec and Mackie.'

Sonifex, provider of ISDN-based audio broadcast solutions, has acquired Nical's current product portfolio, effective from

1st May 2001. Sonifex MD Marcus Brooke commented, 'This opportunity has placed us in a good strategic position to further strengthen our role as a technologically-based radio broadcast communications company in a fast growing niche sector. We look forward to welcoming new and existing users of Nical's technology into the Sonifex fold.'

Catherine Oates, director and co-founder of Nical, added, 'Although the Nical name will disappear from the radio broadcast map, I anticipate that many other advances, probably beyond Nical's resources, can now be achieved through Sonifex; a company with approximately tenfold the reach and resources of Nical.'

Sonifex and Nical will be working closely together in order to achieve a smooth handover between the two companies with Nical's prior association with American MPEG codec pioneer MUSICAM-CCS being continued under Sonifex.

In America, meanwhile, workstation manufacturer DSP Media has announced a second round of venture capital funding by Hong Kong-based The Pacific Group. CEO Andrew Wild commented, 'This new funding will allow us to continue to aggressively grow our core business in the audio postproduction market as well as move into the professional video markets through the adaptation of our existing technology.'

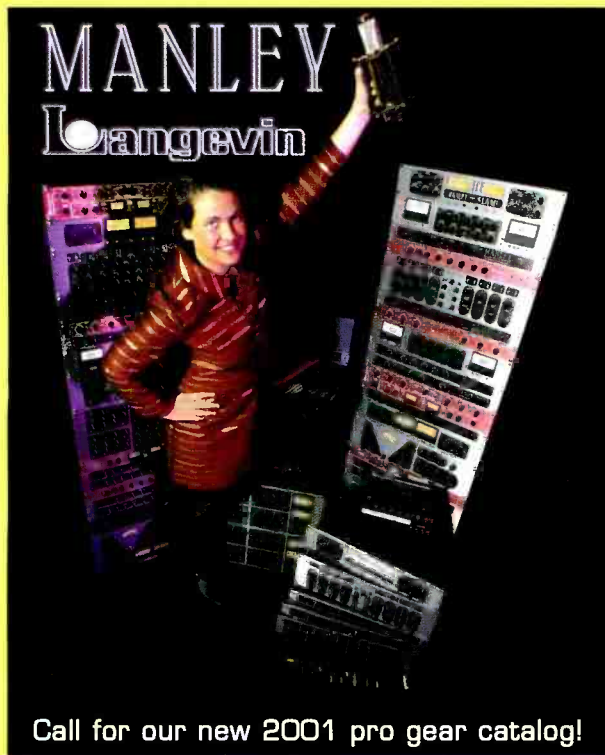
DSP Media received first round funding from Melbourne-based Momentum Ventures Limited in January 2000 using it to reposition the company as an American-based corporation, add management staff and establish sales and marketing offices in LA and the UK.



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SPECTRAL HARMONY

Extending the line of 'world class' recording facilities around the globe, Mumbai's Spectral Harmony brings India to the fore. **Caroline Moss** flies in

FORGET THE DIGITAL versus analogue debate that has raged for years in the West; in India the transition to digital has been realised with a minimal amount of fuss within a short time frame. Over the past two years, many facilities have leapfrogged generations of technology, going straight to digital from analogue equipment which in many cases hasn't been upgraded for years.

Change has happened quickly on the subcontinent. Cinemas are being updated with Dolby and DTS surround systems, raising the public's expectations of good quality sound. This awareness is also being boosted by the CD revolution, which is only now gaining a foothold across the country. Indian audiences like their movies to sound loud, but now they're discerning that high volume can also mean high quality. The new standards—in sound and picture alike—are luring audiences who strayed from cinemas with the advent of VCR back to the movie theatres. The situation has created an upward spiral that is demanding a better standard of Indian film soundtracks and playback systems alike.

The revolution has seen many studios undergoing upgrades to hard-disk recorders, digital audio workstations and new recording consoles, adding a whole

new level of professionalism to the market. However the subcontinent has lacked a recording facility of a truly world-class standard—until now.

Spectral Harmony is a massive, ground-up studio complex in Mumbai designed by British acoustic consultancy Recording Architecture. The centrepiece of the studio is a 24-channel AMS Neve Libra, the first on the subcontinent.

Owned by Indman Media Services, Spectral Harmony has shifted from its original premises in Santa Cruz to Mumbai's Andheri West district, which is fast becoming a base for broadcasters including Sony Television, B4U and Star Plus and record companies such as BMG-Crescendo, HMV and Tips.

The seeds for Spectral Harmony's expansion were sown by technical director Bishwadeep Chatterjee, who first joined the original studio in 1994 as a consultant during its planning stages. 'Back then it was essentially a video postproduction suite,' he recalls. 'When they showed me the original premises I thought it was fine for dubs and Foleys and things like that, but I didn't really think it was suitable as a music studio, as it was a small asymmetrical room with a pillar in the middle.'

However Indman Media Services director Raju Sud

was adamant that he wanted somewhere to record music. 'I said I would come and join them on condition I was allowed to buy certain pieces of equipment I wanted,' says Chatterjee. 'I was actually up against all odds because it was too small for film projects and all kinds of recording projects, but too expensive for the music album industry, and too far away from the advertising industry in south Bombay.'

Despite these drawbacks, Chatterjee managed to attract a wide client base which included advertising, music and film companies. 'That way if the markets slumped, as advertising did for about a two-year period, we were covered with our other clients,' he says.

Although Spectral Harmony flourished as a music and audio post facility under Chatterjee's guidance, it was still felt that a move to larger, more suitable premises would soon become inevitable, and plans for equipping a new facility began to develop. In 1998 Sud and Chatterjee travelled to the UK to visit AMS Neve in Burnley and find out more about the Libra, which Chatterjee had seen at the previous year's Broadcast India convention. 'A lot of these digital desks were just being launched here, and most of them were geared for post jobs,' he says. 'I thought



this one was very well laid out and that it was the one I wanted. What we didn't finalise was the configuration, which developed as I further understood the console and its capabilities.'

The recommendation to use Recording Architecture to design the yet-to-be-found studio came through a friend of Chatterjee's who was working for Dolby in India. While doing some postproduction work in London he had met Nick Whittaker from the design company, which wasn't represented in India at this time. 'We did wonder at first if we actually needed an acoustician or if we could do it ourselves,' muses Chatterjee. 'But when I saw the magnitude of the project and the costs involved I realised we'd need to get a professional.'

In January 2000, Sud found a warehouse in Andheri West which could be demolished, leaving just the outer four walls which could be reinforced to provide the shell for the studio. A fax was sent to D'Arcy appraising him of the discovery. 'We were trying all sorts of different combinations of rooms,' says Chatterjee. 'When Roger replied we jumped at it as it looked as if he understood us.'

Roger D'Arcy takes up his side of the story. 'Spectral Harmony's first contact with us was by fax during the first week of January 2000,' he remembers. 'The fax contained a rather sketchy—and wholly unworkable—layout inviting us to consider acting as designers.'

D'Arcy's quick response was a matter of some urgency as demolition work on the host building shell had already commenced. Within 24 hours of the initial approach, he

faxed over a vastly improved concept together with a basic material specification. Concrete was to commence being poured immediately. 'I was on site within a couple of weeks with a pile of design drawings and watched the building literally spring up around my ears,' he relates. 'Upwards of a hundred men worked around the clock—I have rarely seen such skill and commitment. The Indian can-do attitude made this a refreshing and exciting project.'

Due to the distances involved, site inspections by D'Arcy and his co-director Dipa Joshi were limited to half a dozen—about half the typical average for a London project. 'It is fair to say that in the days before CAD and email it would have been virtually impossible to manage a project of that scale and complexity at arms length,' D'Arcy says.

Much of the communication between Spectral Harmony and Recording Architecture was regarding the type of material which would be needed. Some of it—like concrete, foam and Rockwool—could be sourced locally, and indeed the concrete blocks were manufactured by a construction company also owned by Sud. The acoustic doors were also manufactured to order in Mumbai. To maintain his level of quality control, D'Arcy sent samples of materials from the UK so that the local version could be exactly matched. 'About the only thing we couldn't source locally was a special membrane which does the job of a bass trap,' says Chatterjee. 'That was something they had to send us. It's a very clever idea and the effect is very good—Nick Whittaker's graph was very impressive.'

D'Arcy also found he was able to use materials which would be unavailable or prohibitively expensive in many parts of the world, for example polished slabs of Indian granite which have been used for the control room floor and outside the building; hardwoods and light fittings.

Chatterjee is more than happy with the results of the project. 'We've certainly achieved what we were looking for—maybe better,' he says. He also attests to the trust which Recording Architecture placed in the studio, holding an unchallenged belief that they would be able to fund a project of this magnitude. 'It must have seemed a little vague, someone asks you for a rough plan and you send it across but there's no talk of money' he says. 'We needed to get some sort of information before we got into a financial transaction. So they put a lot of trust in us. Roger sent us an initial lot of drawings and we basically used Dominic Coll from AMS Neve as our proof for Roger, to vouch for us that we were going to do this.'

D'Arcy puts his perspective on the situation: 'All design projects require a high degree of trust between designer and client; this one simply required an extra

leap of faith. In some ways we had nothing to lose and everything to gain by laying our ideas on the line.'

Raju Sud had initially hoped that his new studio would be up and running by April 2000. D'Arcy managed to convince him that this was somewhat over-optimistic, and the facility eventually opened for business in the October, with design and construction completed in seven months.

Apart from the studio construction and mixing console, the other major decision Chatterjee had to make was concerning the monitoring. 'I heard the ATCs when I visited London for a second time to work on a mastering job, and heard my mixes on them' he says. 'Nick Whittaker also recommended them to us. And because control room design and control room monitoring cannot really be separated, I wanted that choice to be with the guy who was designing the studio.'

The 50m² main control room features a 5.1 surround system comprising left, centre and right ATC 300a active speakers (flush mounted, vibration isolated and mass loaded) with two sub bass units and six ATC SCM20 surrounds. The cabinets were custom-designed by Whittaker and built on-site. Brand-new equipment purchased for the main studio also includes a Lexicon 960L digital effects processor, an Eventide Orville processor and Pro Tools 24 running on an Apple Mac G4. Spectral Harmony's Otari MTR90 with Dolby SR has been transferred from its original premises. 'We'll add more equipment over time, but for now I can use the 960L as four discrete stereo units in themselves, and the Orville I can use as two different units,' Chatterjee explains.

The main Platinum studio is aimed at India's huge film market. It boasts a 50m² control room with a 60m² recording area; large enough for around 30 musicians. 'We told Roger that the control room here



FACILITY

has got to be really big because we have three or four heavy duty electronics guys coming in with all their gear to set up,' says Chatterjee. 'He got the message and it's very well laid out, with plenty of space for musicians and producers. The people with the budgets will want to do their mixes in that room, but I think they'll have to do a bit of time management to make it cost-effective.'

If that studio is too expensive to begin projects in, there are two sequencing rooms available for musicians to carry out preproduction, a new concept in India. Chatterjee believes this will help enormously with budgets. 'We've just put a pair of speakers in and everyone will bring their own gear,' he says. 'Nobody uses common software so people will sequence using their individual setups. So initially we'll provide just



the space but eventually, once everybody's standardised, we can install the necessary equipment.'

Spectral Harmony also offers a smaller studio, the Silver room, with the studio's existing Soundtracs Solitaire console, a Pro Tools setup and DynaudioAcoustics monitoring. Two postproduction suites offer Pro Tools AV setups running on an Apple Mac G4s. There is also a transfer room that Chatterjee describes as the 'nerve centre' of the facility, networking the studios: another new concept in India. 'If we want to transfer something we did in Studio B to Studio A we can just send it across,' he explains. 'It can also be used for patching or for small-scale transfers, for example Hi-8 to DAT. The facility can also offer an audio conferencing suite, a VIP lounge with internet access and leisure facilities.'

According to Spectral Harmony director Sadhana Rana, the studio has been booked out with film, music and jingle work since it has opened. Recent film work has included four new feature films with soundtracks by legendary Indian film music composer Anu Malik. These are Mukta Arts' *Yadeein* directed by the Subhash Ghai and starring Hrithik Roshen and Kareena Kapoor; *Mein Prem Ki Diwani* from 54-year-old film production and distribution company Rajshri Productions; *Filhaal*, a writing and directing debut from Meghana Gulzar produced by Jamu Sughand and *Ashoka* produced by Bollywood star Sharukh Khan who is also playing the title role. Another leading film project being mixed at Spectral is *Devdas*, produced and directed by Sanjay Leela Bhansali with music composed by Ismail Durbar.

Aside from these film projects, several famous Indian singers including Daler Mehndi Ila Arun and Asha Bhosle have all recorded new albums at Spectral Harmony.

Part of the original plan was that Spectral Harmony should be a world-class facility capable of attracting international clients, and it has already created an impact which has spread beyond the subcontinent. 'Even in our earlier studio we had recording projects from places such as New York and Switzerland,' says Chatterjee. 'So we want to increase that scope here. I'm expecting international business from the Middle East, Africa, places where there are Indians living abroad and creating music. The export market is huge for Bollywood films and is helping to increase demand for better quality.'

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SOCIÉTÉ INDUSTRIELLE DE SONORISATION

With a buoyant film industry and promise of increasing television work, the French audio industry is celebrating with new facilities and new plans. **Tim Goodyer** visits SIS

THERE IS SOMETHING of a dichotomy between the popular perception of French films and that of the French film industry. Where French film is associated with sophistication and *l'amour*, the industry is insular and almost invisible, in spite of its size and importance. Few French film productions are intended for the world's screens, so much of the industry's effort is to set French words to foreign lips. The little that is, Luc Besson's *Jean D'Arc*, for example, is often voiced in English before being dubbed into French.

In the crowded capital, competition between facilities is fierce. The key studios in and around Paris belong to Auditorium de Joinville and Société Industrielle de Sonorisation (SIS); where Joinville is considerably larger, SIS offers more comprehensive film, audio and photo services. Both, however, are fully booked. And when SIS chose to extend its film expertise toward telefilm last year, it's SIS TV facility located at Le Rond Point des Champs Elysées was instantly hijacked by the film-makers in spite of obvious differences in the design and equipment of its rooms. So where SIS is characterised by its large rooms, multi-operator desks, big screens and powerful multichannel JBL speaker systems, Film Le Rond Point comprises much smaller rooms. What was originally a logical extension of SIS' business, then, offers an unusual insight into the workings of the French film industry.

'We have had a lot of production companies asking to do television work at SIS,' says technical director Christophe Rajon, explaining the rationale between the two facilities. 'There are a lot of TV films being made in Paris and not enough studios. Previously, people had

been using film studios for TV but it's too expensive and it's not ideal for them. So two years ago we designed Studio D at SIS for TV production but we only did one TV film in the studio. Then we decided that we needed separate locations for TV and film.'

Complete refurbishment of the SIS TV location followed under Rajon's guidance, involving setting up four studios for recording and mixing based around a common equipment room, two AMS Neve Libra Post digital desks and two Merging Technologies Pyramid hard-disk systems.

Prior to the latest reorganisation, SIS moved to its present site on the outskirts of Paris in 1964 and suffered major fire damage in 1968. Rebuilt as part of the Datacine group owned La Générale des Eaux (now Vivendi), it found itself under the chairmanship of Jean Louis Destry and enjoying supporting services offered by Datacine's LTC film labs and its Scanlab digital imaging division. Since then it has gone from strength to strength, with the latest move into television film centred on SIS TV. SIS too has been moving on with the unlikely installation of a heavily-customised Cadac console in its Foley studio.

Elsewhere at SIS, an SSL Avant console dominates its digital room with SSL SL5000, SL4000 and Amek analogue consoles in support. Here the French preference for isolation prevails with each studio working strictly independently and personnel discouraged from sharing expertise and anecdotes. But after around a year in service, it is the Cadac in Studio H that is causing most comment.

'I can't say that that room is the best Foley room in Paris, but it is one of the best,' says Rajon modestly. 'It

is the best recording room because generally our competitors have very old analogue desks or digital desks. But the Cadac will take very high levels and has little noise at very low levels and the sound is always so good.'

Rajon's enthusiasm is borne out by an Israeli film team who recently used the facility. Surrounded by the ranks of shoes, battered car doors, boxes of workmen's tools, baths and kitchen sinks that characterise a Foley stage, the Foley team talk readily about favoured U67/87ai and KM84 mics and the excellence of Studio H. The obvious questions: why analogue, why customised, why Cadac?

'I had been looking for a suitable desk for about a year without success,' Rajon begins. 'So I designed a basic schematic of what I wanted and showed it to everybody who wanted to sell me a desk. Initially we looked at Neve, Studer, Sonosax, and the American Cooper but none of them were prepared to alter their designs. Then I went to see a basic Cadac C-Type and sent Clive [Green] my schematic who came to talk about it. Once he understood why I wanted these things he said, "Okay" and went to work. I think I came to England just once to check everything and a year later we had the desk.'

'It is a custom design because we have monitoring in the room and for headphones, so the busing is special. It's like there are two different desks because when you recall, you get one setting for the monitoring in the room and another for the headphones. A channel can be sent directly to the monitoring output without going through a group. The basic desk provides 6-track monitoring and 6-track solo facilities that we don't need, so I used this

bus to go directly to the engineer's headphone. Normally there are eight groups but I had 16 because I need 16 tracks for recording.'

'I also changed the values of the channel equaliser from $\pm 1.5\text{dB}$ to $\pm 1.2\text{dB}$ and I added a low-pass filter in place of an aux send that I didn't need.'

The arrival of the Cadac has also seen the departure of the outboard rack, as the onboard mic preamps have proven the equal or better of the external mic preamplifier and other boxes that preceded it. 'Now there is nothing except an Apogee convertor going to an Akai machine,' Rajon concludes.

The refurbishment of the Le Rond Point location began in July last year, its dedication to telefilm work coming



partly from direct demand and partly from perceived business opportunity.

'Our expertise is in film not in TV but we can bring the expertise we have gained in film work to a television film facility,' says Rajon. Sometimes we have projects that combine both film and TV and now we have a solution. In television, for example, when a producer comes to discuss a project he never has just one film in mind—maybe he has 12 films over two or three years. So we want to be able to take care of everything from the beginning.

'To make SIS TV more accessible to television budgets we have taken care with the choice of equipment. For example, there is a central machine room so that we don't need to have a lot of people to run it and we can assign equipment to where it's needed rather than having redundant equipment not being used.'

Rajon's two Libra Post desks are awaiting new hardware that will make them more familiar to those used to working with the acreage of traditional film consoles.

'I think we will be the first in the world to have it,' he confirms. 'It gives access to many channels simultaneously. It's a new feature but it was part of my decision to buy the desks. Without it, I would not have bought them.'

'It's a different way of working but the console offers a lot of possibilities and it's easy for someone who does not know the desk to use it, very easy.'

Having opened its doors at the start of 2001, SIS TV has been busy from the outset. But the experiment has delivered contradictory results: the majority of projects have been for film, not television.

'I think it's 85% film, the rest for TV,' Rajon concedes. 'At the moment it's a bit confused for us; we don't really know where it's all going. Obviously we can't say no to someone if they want to do film work in our tele-

vision facility.'

Accordingly, early April saw Roman Polanski and Brian DePalma among others working in the heart of Paris at SIS TV's editing room.

'That's maybe why we are doing some film work at SIS TV,' Rajon muses. Then with accentuated French accent, 'because it's in Paris! I think it will take two or three years before we have a proper vision of what people really want.'

If one thing is becoming clear, it is an imminent requirement for surround working. 'At the moment maybe two films have been made here in 5.1 for TV,' says Rajon. 'But in the future there will be more because there will be more methods of distributing surround programmes—via satellite, cable—so there will be a greater demand and if we do not offer it, another studio will. Maybe in the future some big TV films will be made in 5.1 in case they make it into the cinema. It is not the case at the moment, but...'

Also on the cards are further editing rooms, to be built in an adjacent building to SIS TV in eight or nine months in the space currently occupied by a temporary film production office. In the meantime, Rajon has his eye on the Pyramix as a likely replacement for his Sony DASH and Akai machines for premixing 'so the whole



project can be on a single machine'.

Yet larger on the horizon is a television series that will allow Rajon's team to assess their new studios. 'We want to be sure that everything is okay so we will have to look closely at how they work,' he says. And the criteria for success? Results: each project is discussed by Rajon, MD Jean Robert Gibard and assistant manager Florence Abiven to consider its requirements and likely profitability.

'My boss said, "Do as you want so long as you get results",' says Rajon mischievously. 'I have a free hand. If I tell him he has to invest a lot, he invests a lot!'

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AMS Neve Logic 3SC

With the future of the postproduction console still in debate, the latest developments of AMS Neve's Logic 3 and AudioFile may help hasten its conclusion. **Rob James** meets Max and Lite

THE LAUNCH of AMS Neve's majestic analogue 88R and the latest sales of 1000-input DFCs still make headlines. But while these and other large console manufacturers' successes are lauded, some are detecting a *fin de siècle* mood. In the bars and cafes, at trade shows or any hostelry where audio folk gather you will hear dark mutterings about the future of big consoles. 'We may be living in the last days of the dinosaurs', they mutter, 'We're all doomed'... Are these prophets right or is something more subtle happening?

Either way, there are a few constants. Work is becoming generally more complex, multichannel formats are popular. Decisions are being taken later in the production chain. All this mandates an ever increasing number of audio channels with a commensurately big block of processing power. In theory, this processing could be distributed—among several networked workstations, for example—but to date no-one has succeeded in applying this approach commercially. For the present, this necessitates big console 'back ends'.

However the growth is achieved, perhaps the most interesting part of the equation is the way all this power is presented to the user and how it is controlled. Whichever you prefer—a 3-operator surface that stretches off into the distance or a seriously compact console—AMS Neve has something to offer.

In early 1991 a small group in BBC TV Post Production decided to re-examine the whole sound for picture process, starting with a blank sheet of paper. At the time, I was a dubbing (re-recording) mixer. Later, I managed the introduction of the process we designed. The pivotal conclusions were that a physical control surface need no longer have the same number of strips as channels and should be integrated with a recorder-editor. AMS had been working along similar lines, developing a small control surface, known as Mini-Logic with an integral AudioFile recorder. Later, this was to develop into the Logic 3 as the project matured.

For a number of reasons we did not carry the idea through to its logical conclusion and used a larger Logic 2 console along with two Logic 3s to build the complete process. However, I have always been convinced the original idea was right, just a little ahead of its time.

The Logic 3SC is the latest incarnation of AMS Neve's integrated, compact and powerful solution. AudioFile SC (Studio Controller) is the biggest change to the original AudioFile concept since the 'green-eyed monster' was replaced by the Spectra TFT screen interface. Physically, the SC adds a rackmounted Windows NT computer with proprietary hardware and software. The implications are far more profound. The Studio Controller is the gateway to networking, plugins and future development. Developments to the L3 are equally significant. It now has twice the number of buses, channels and auxes.

Several control concepts developed for the origi-



nal Logic 3 found their way into its big brother, the Logic DFC. Now the compliment has been repaid; the L3 could always handle surround formats but it has now been endowed with monitoring and panning control modules developed from the DFC and the same ESP processing cards.

Big consoles, analogue or digital, are almost always custom built. It is not difficult to see why but for prospective purchasers unversed in the art of specifying custom consoles the choices can seem bewildering. For simplicity, AMS Neve has decided to offer the Logic 3SC in two 'off-the-shelf' configurations: Lite and Max. Naturally, other configurations remain available to those who require them.

Logic 3 SC Lite offers 24 tracks of AudioFile with a total of 60 inputs and 44 outputs, 48 mono channels each with filters, 4-band EQ and dynamics, four mono and four stereo auxes, 16 mono groups and one main stereo output. Storage is supplied to the tune of 36Gb. Also included is a single port 9-pin machine controller and 18-inch TFT panel screen. The control surface offers eight faders with joysticks and surround monitoring panel. All the EQs are full bandwidth (20Hz-20kHz) with various types including notch. The knobs are electronically 'geared' for coarse and fine control depending on the speed of movement.

Logic 3 SC Max raises the specification to 32 tracks of AudioFile with a total of 96 inputs and 56 outputs, 64 mono channels each with dual filters, 4-band EQ and dynamics, four mono and four stereo auxes, 16 mono groups and one main stereo output. Storage

is 36Gb as on the Lite but the machine control has five ports and two TFT screens are included. The fader count goes up to 16. Max also includes an SAM card as standard of which more anon. Processor cards are the hugely powerful ESP type, developed for the DFC, two on the Lite and three on the Max.

Both options include the furniture. As may be seen from the pictures this unusual design not only houses the three controllers, Spectra, L3 and joysticks, but also perfectly complements the design and provides space for scripts, production clutter and coffee. All the noisy electronics are remotely rackmounted and connected by slim cables to the controls. By including the furniture AMS Neve has made it possible to build a stylish, minimalist room or to update an existing one.

Apart from the SC Studio Controller all the electronics for the L3 and AudioFile and the analogue I-O are housed in a single 13U-high Combi-Rack. The AES-MADI interface is in a separate 1U-high box.

The TFT panel in the L3 surface displays 16 faders which, together with the 16 physical faders (on the Max) enables 32 of the possible 64 inputs to be viewed at once. Any channel can be attached to any physical strip. Keys at the side of the screen mean you are never further than one key press away from access to any channel. User presets allow operators to develop highly flexible and efficient working practices. EQ, dynamics and aux sends are controlled by a single set of 12 Logicators arranged together as an assignable control panel. Electronic 'scribble strips

MX-2424 Profile:

Jon Thornton, Head of Sound Technology,
The Liverpool Institute for Performing Arts

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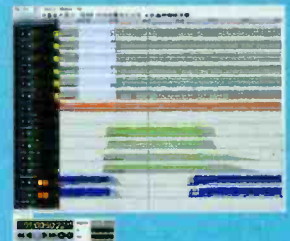
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REVIEW

show the functions and numeric values of each control. An LED ladder bargraph indicates gain reduction. All the console setup and housekeeping is carried out on the Spectra screen.

The automation is total and, uniquely, the Logicator knobs are touch sensitive. The key benefit comes when you release them. There is no need to press a key to drop in or out of writing EQ or dynamics changes. All passes are stored so there are no worries about destroying a potentially good take.

AudioFile SC is now running v2 software and builds on firm foundations. The Trim page is still seen as the ideal way to edit dialogue while TurboTrim has enhanced efficiency. The number of tracks is up to 32, and the Spectra screen has now joined by a separate

TFT display allowing a full and clear 32-track view in addition to the editing screens. In v1, the Studio Controller took over handling all the graphics and list management; in the new version, we are starting to glimpse the extra power it can provide. AudioFile has always used a 'flat' filing system for the audio cue pool. Now, whilst the audio cues are still stored in the same way for speed, this is presented to the user as a more conventional hierarchical filing system. In effect, this uses multiple 'aliases' to locate the actual audio. Cues can now be logically grouped for good housekeeping and simpler searching.

The SAM card mentioned earlier is actually the Starnet Adapter Module. This is the key to much of the new functionality and a bridge to the rest of the

world. For example, AudioFile drives can now be viewed and manipulated in a Windows environment. Dragging a file from an AudioFile drive to an NT folder converts it from native AudioFile format to WAV very quickly—20x real-time to be precise. This is, of course, the gateway to networking. When moving projects, unique file identifiers combined with clever list management ensure only audio not already present need ever be copied. It is also wide open for integration with third-party sound effects servers.

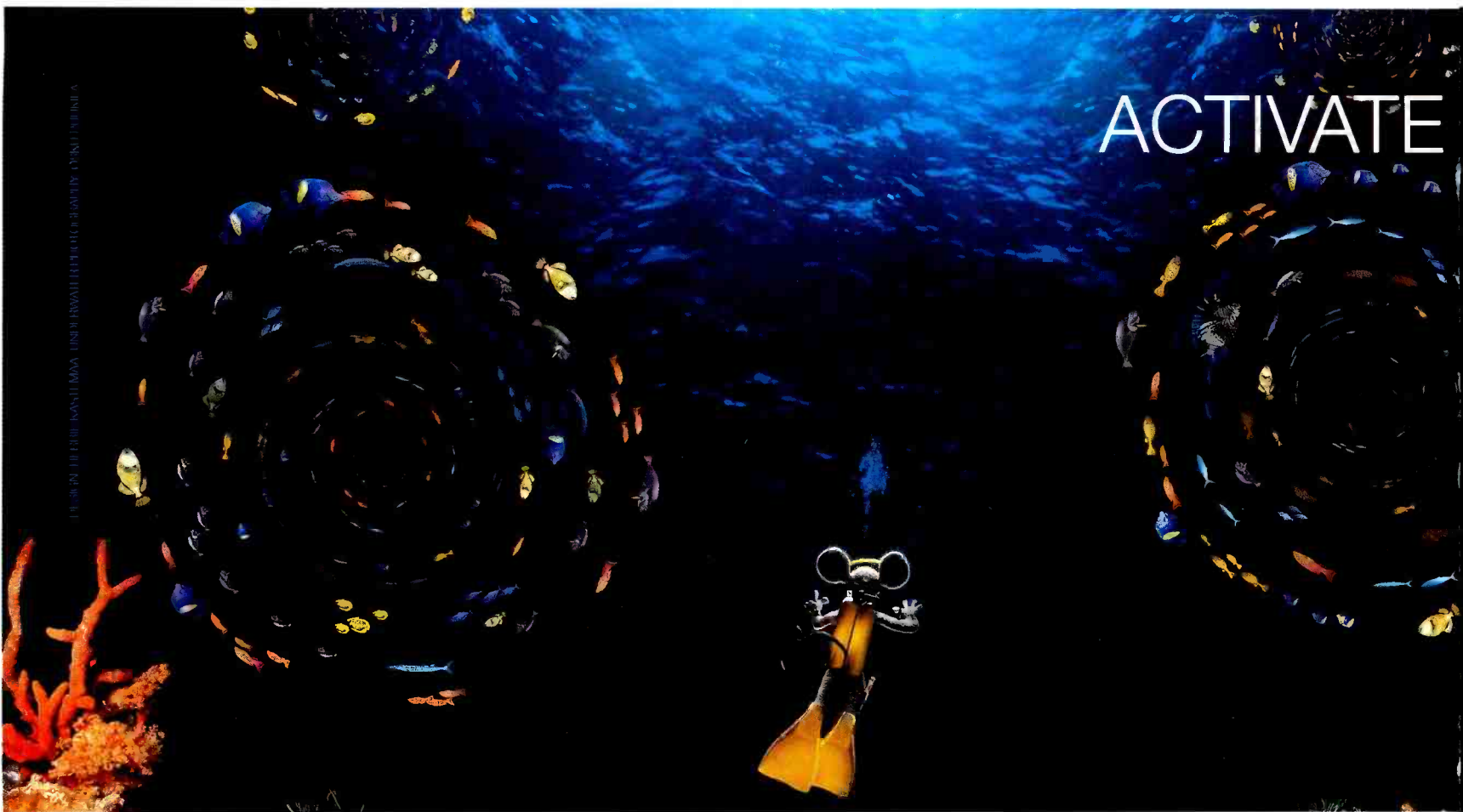
I also had a sneak preview of some of the plug-ins. They

offer real-time preview and fast rendering. From what I have seen and heard so far, they should make a lot of sound designers very happy.

When shopping for this kind of kit it is important not to be mesmerised by headline purchase costs. The really important questions are total cost of ownership and productivity. AMS has clearly demonstrated the long term benefits of 'joining the club'. As with previous AMS products, existing Logic 3 and AudioFile systems can be cost-effectively upgraded to the current specification. As for productivity, ask any of the users. One seldom discussed consideration is residual value. Compare the street price of an eight-year-old PC or Mac-based system with an similarly venerable Logic 3 or Audiofile...

In the fast moving world of digital audio equipment, AudioFile and Logic 3 have been around for a long time. Some of the nomenclature and operating procedures may seem odd to the generation brought up with PCs and Macs. Experienced AudioFile operators would not have it any other way. This is a problem for all successful manufacturers. How to move forward without alienating the existing user base. AMS Neve seems to have accomplished the trick without a wisp of smoke or a mirror in sight. AudioFile is suddenly broadening its reach with enhanced functionality and connectivity and the L3 now performs as if it were on steroids.

This is a highly deceptive package. Although the quoted specifications are accurate, they only tell half the story. The real scope and power of the Logic way of doing things lies in configurability. You could simply use the console as described but to do so would miss the point. If you don't need full facilities in each channel, and this is often the case, the processing may



be released for other purposes. It is actually possible to configure the L3 with up to 64 stereo channels, the equivalent of 128 monos. If you find you need an EQ in a channel which doesn't have one it can be added dynamically, 'on-the-fly'.

The beauty of this console lies in the elegant design of the control surface. The real trick with this approach to console design is to ensure the operator has exactly the right information and control at any given time. Clever use of keys and signal present LEDs associated with the virtual channel strips aid in this. A relatively small set of controls with quick access to anything you need can be a lot faster than searching through acres of identical strips and you always get to sit in the 'sweet spot'. The learning curve is shallow and, once learnt, operation is extremely quick and intuitive. Unless you really need a big console to impress the clients the L3 will do the job of a far larger machine. Throw into the equation 32 tracks of one of the fastest editors around and the old saying about good things coming in small packages, takes on a whole new meaning.

This combination has obvious applications in both final mixing suites and pre-mix-edit rooms. When used in the latter role all the automation data can be loaded into a Libra Post or DFC and any inappropriate decisions revised as if the automation had been written on the bigger console. This is a great way to work. Creative decisions can be made at a comparatively leisurely pace in a smaller, cheaper room, secure in the knowledge you are not irrevocably committing anything.

In terms of audio quality and control the L3 really is a 'mini DFC'. It uses the same processing hardware and the same algorithms. This makes a highly per-



suasive argument for its use not only in smaller rooms in large facilities, but also the main room in small facilities with ambitions and foresight.

A decision to install an L3SC isn't so much about equipment purchase, it is more like a lifestyle statement and membership of an exclusive club. It may also offer a glimpse of the future. □

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Midas Broadcast 2000

With the (mis)use of live consoles by broadcasters an established practice, it is little surprise that a live desk manufacturer has moved in broadcast. **George Shilling** tries the Midas touch

MIDAS HAS BEEN BUILDING consoles for 30 years, most of which have been for live sound applications. However, almost 5% of sales have gone to broadcast applications, such as OB. Following the company's acquisition by Telex (who has a large presence in other areas of broadcast technology) it was encouraged to further research this market. Midas was surprised to find that there was little choice in the midrange: expensive digital consoles from SSL and Calrec at the top-end, with consoles such as Soundcraft's B800 as the cheaper end, but a dearth in between. So for its first ground-up TV broadcast audio console, it has pitched for this middle ground by combining reliable analogue audio circuitry with digital switch and gain control.

In the UK, Midas is keen to battle for sales with the

Board layout has been carefully designed so that signal paths are kept to a minimum length. For example, the maximum bus audio path length in the modules is less than 2 inches, so crosstalk figures are exceptionally good.

Pushbuttons on all modular sections are clear plastic illuminating soft-switches, with a variety of illumination colours giving clear status indications. All modules are designed to be hot-swappable. Both mono and stereo input modules are available. The layout of controls is logical and fairly conventional, with input controls at the head of the strip, Auxes just below, then EQ, then Group Routing, followed by INSERT and SOLO buttons. An intelligent silent input switching system is included, so that when selecting different line or mic sources, or activating phantom power with the channel live on-air, there is no audible pop or click. When switching the 48V

Digital Assistance module can be mounted alongside the master faders. This was still in development at the time of writing, but includes a jogwheel, an LED text display for menus and names, and buttons for saving and recalling snapshots, by virtue of a 32-bit Fujitsu processor. From here, all sorts of clever logic combinations can be set up, so that for example, when a particular input is selected, a physically unrelated output could be automatically muted. There is also a hidden interfacing connector for diagnostic use. Also in development is PC software to enable graphical indication and control of the various processes and combinations. However, the individual channels can happily work independently, as each module has its own processor, a Hitachi H8. And with or without central Digital Assistance, the whole automation system can remain fairly invisible.

The designers are self-professedly not fans of central assignment, so if operations are required locally on channels, this is where the control is. There is a central Processor Watchdog section which includes indicators to show the status of the two processor systems. A dual-redundancy microprocessor system operates all major functions, and here there are indicators to show any faults. In the event of any trouble, a button can be pushed to switch from one processor system to the other. A master digital assistance OFF button defeats automation globally, handing full control to the operator. Settings are retained even when the power is off, as each bank of eight channels has a backup battery. The gain settings are the only rotary controls to include automation: EQ settings, aux levels and VCA fader levels are all old-fashioned manually-operated controls.

One interesting feature is a dual mix minus feed system for the direct outputs. When an input channel's M-1 button is on, a conventional arrangement sends the mix of the other direct outs, minus the particular individual channel itself. However, when de-activated (when the wearer of the mic is yet to go on-air, say), a second mix minus bus comes into operation, (unofficially dubbed M-2 or the Off-Air Mix Minus) consisting of the other channels in a similar state, potentially useful for the off-air inputs to communicate with each other, for example. Channel modules' direct outputs also include a TALK button which routes the talkback mic system to the direct output, plus SOLO and PREFADE selector buttons, the latter useful for archiving material whilst broadcasting.

Each fader is accompanied by selectors for each of eight mix minus audio buses, which also feature a similar system of off-air mix minus modes.

The modular construction includes a large custom-configurable meter-bridge. Midas has recently introduced some wonderfully bright dual 40-segment LED meters with alternative input switches. And of course, vu and BBC PPM needle meters are available. The main rear panel includes silent cooling fans and all connections on EDAC sockets, enabling customers to run cabling to a patchbay or digital router, with suitable connections provided for all eventualities including cabling to an adjacent production control room. Power is supplied by two remote power supply units with dual redundancy.



established market leaders, and is therefore pleased to have made the first installation of a Broadcast 2000 in CTV's OB-3 truck, which made its first outing to cover cricket for Sky TV in May. In Asia and Europe, Studer is dominant, so Midas is very happy to have sold the second example to Korea's national broadcaster KBS. However, a major market the company hopes to break into is the US, whose TV newsrooms are dominated by Wheatstone consoles. Following favourable receptions at the NAB and AES shows, Midas believes that the Broadcast 2000 is flexible enough to work in all these differing markets.

The Broadcast 2000 is aimed squarely at television news presentation or OB van operation. As such, tremendous effort has been made to implement automation systems useful in broadcast situations, along with the famous Midas robustness and build quality. Every modular channel strip includes two circuit boards, spaced slightly apart with bolts and connector pins. One board includes the audio components, and the other contains the processor circuitry which enables button statuses and gain settings to be stored, for example. Surface-mount technology is used extensively but there are also a number of discrete components on the audio board.

phantom button, (or switching to a non-phantom source), the 48V is automatically discharged (or recharged), mic gain is reduced temporarily to a minimum, VCA mutes are momentarily activated, then the switchover takes place and gains are restored. This all happens in a second or so, and this system will undoubtedly save many blushes and a few blown speakers. Dedicated surround routing and panning to groups is included, with a dedicated button on each input module labelled 5.1 which automatically configures the group routing accordingly. With this button depressed, other surround standards are catered for: manually de-selecting one of the groups reconfigures the panning law and assignments to output a 4.1 matrix.

Similarly, 7.1 is available by reconfiguring the Groups (eight stereo Groups are available), or including the master bus. Panning is controlled by a conventional L-R pan pot and a Front-Surround pan pot. Divergence, or 'spread' of mono signals across the L, R and Centre outputs is internally preset. Having set this up, upon de-selecting and re-selecting the 5.1 button, the previously selected array is recalled by virtue of the processor on the individual module—this is without using global snapshots. In fact, global automation is optional; a central

The talkback implementation on the Broadcast 2000 is comprehensive, allowing for all the situations that might occur in broadcast situations. There is a TALK button on all direct outputs, plus all mix minus, aux and sub group masters. Return talkback defaults to the cue speakers built into the meter bridge, but can be switched to the main monitors.

The mono input modules each feature a mic input as the default setting, with a LINE button heading up the strip, and a B button enabling two mic and two line inputs. The mic amps are remotely controlled by the automation section. A rotary encoder is accompanied by an LED digital display which shows the gain setting. When one of the two mic inputs is selected, there is -6dB to +72dB of gain available, incremented in differing steps dependent on the range used. When switching between the different available sources, the previously set gain setting is always retained, by virtue of the automation processor. Optionally, a pre-selector is available for mounting in a logical position just above the channel in the meter bridge, consisting simply of eight buttons, four mic and four line inputs, which when installed appear on the B inputs, giving a total of 10 inputs, or 18 in the case of the stereo module. When installed, the pre-selector uses the respective channel strip's processor for the storage of gain settings.

Back on the Channel strip, a PHASE REVERSE button is provided, along with the aforementioned 48V button, and an OSC switch which derives test signal from an internal bus. Directly below the input section are the six aux controls, (two stereo and four mono), each accompanied by ON and PFL buttons, with stereo send Aux 1 additionally including a pan control and a PAN button. When this is not activated, the stereo pan position follows that of the main channel pan, and Aux 2 always

follows the main pan. The PFL setting for each Aux send is internally configurable to be pre- or post-EQ. The Insert point has a bypass button near the bottom of the strip, and a long press on this switches it to be pre-fader or post-fader. Again, in Pre mode an internal switch is factory-set for pre- or post-EQ operation. CUE and SOLO buttons allow PFL to Cue speakers and AFL to main (local) monitors respectively. A fixed 12kHz 12dB/octave low-pass filter is the next item down, along with a useful variable 24dB/octave high-pass filter. Channel EQ uses similar centre frequencies to those used on Midas desks for the last ten years. This section comprises four bands with shelving Treble and Bass; (how refreshing to see those terms used). All bands are sweepable with dual-concentric pots, and the two mid bands are accompanied by WIDTH buttons for two different bandwidth settings. The channel Peak LED is mounted here.

Stereo modules look similar to the mono modules, but include eight inputs onboard (four mic and four line). Switches enable the routing of the Left or Right signal to both paths, or swapping of the two signals. The F-S pan pot becomes a stereo width control when not used for surround panning, with Stereo Wide and Mono settings at the extremes. The auxes are similar to the mono module, except there is no pan pot for Aux 1, this knob replaced with a Gain Offset control for balancing the two inputs.

The VCA faders are not dynamically automatable, but should any customer require them, motorised faders are an option. The standard fader panel includes routing buttons for the eight Mix Minus audio buses, VCA subgroup buttons for the four VCA groups (which have dedicated master faders), and a SAFE button disconnecting all forms of 'digital assistance' and VCA control for the channel.

Monitor modules for Control Room or Studio monitoring include three external inputs: 1, 2 and AIR, and these are accompanied by a 5.1 button for surround monitoring. Internal sources comprise the six auxes, eight mix minus signals, eight groups (with accompanying 5.1 button), and two mono and two stereo master signals. MONO, DIM, MUTE and SPEAKER 2 buttons are all provided here, along with a monitor level knob.

Two similar-looking master modules control the overall levels of the auxes and the mix minus buses, each master level knob accompanied by a large TALK button, a confidence feed routing button, a SOLO button and an ON (mute) button. Confidence signals may be sent to all auxes or all mix minuses with one button. Each of these master modules can be isolated from digital assistance with a button at the top of the module.

Groups have their own master modules which include aux sends routing to main outputs or any other groups, and a flexible routing section allowing sourcing of the group signal from direct inputs, or conversely routing the direct inputs via a level knob to the sub group mix, M1 or M2. Interlocked switches prevent feedback.

With the Midas experience of building live sound consoles which are regularly loaded into flight cases, you would expect construction to be extremely robust. The Midas staff has enormous fun crash-testing prototypes in the factory car park, so one would assume that OB purchasers can be assured of the durability of the Broadcast 2000. □

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KSdigital ADM2

Studio Sound's 'bench test' loudspeaker reviews continue with the KSdigital ADM2. **Keith Holland** reports

THE ADM2 by KSdigital is unlike any other loudspeaker tested in this series to date. Like many others, it is a two-way active design with in-built electronics, but here the similarity stops. The big difference is that the electronics in this case are digital. All of the necessary signal processing, including the crossover filters, gain control, time alignment, equalisation and overload protection, is carried out in the digital domain with only the output stages of the power amplifiers being analogue. The drivers are a 200mm pulped-cone woofer along with a tweeter that KSdigital describes as a '2-inch radiator' which appears to drive through the 25mm diameter throat of a shallow horn assembly.

The rear panel of the ADM2 has two sets of XLR-type input connectors; one for conventional, balanced-line analogue signals, the other for AES3 format digital signals; analogue input signals are converted to digital through the use of 24-bit A-DCs with 64x oversampling. Alongside the digital input socket is an output XLR which is used to connect to the input of the second of a stereo pair and/or an optional sub-woofer. A similar, analogue output XLR can feed a sub-woofer with an analogue signal. Also on the rear panel are controls for gain and room equalisation (both digital), a digital-analogue input selector switch, input and output D-connectors for a remote volume control, and the usual IEC-type mains socket and power switch.

The measurements presented in this review were taken using the analogue input, with the room equalisation set to 'linear 0'.

Fig. 1 shows the on-axis frequency response and harmonic distortion for the ADM2. The response lies within ± 3 dB limits from 40Hz to 20kHz except for a peak in response around 600Hz which exceeds these limits by around 1dB. The low-frequency roll-off is 6th-order with -10dB at a very respectable 31Hz indicating the use of a high-pass protection filter. Low-frequency harmonic distortion is very low with the second harmonic only exceeding -50dB (0.3%) at frequencies below 40Hz, and the 3rd harmonic only a little higher. The 2nd harmonic distortion is, perhaps, higher than expected at high frequencies, although it does remain below -40dB

(1%) at all frequencies. The off-axis frequency responses are shown in Figs. 5 and 6 for the horizontal and vertical axes respectively. The high-frequency directivity is seen to be broad, but the frequency response at 45° and 60° off-axis is quite ragged. The notch at 1500Hz in the upwards direction is due to the interference between the vertically-spaced woofer and tweeter, and is a characteristic of most non-concentric loudspeakers. Some slight mid-range narrowing is evident at around 1kHz.

The time domain performance of the ADM2 is shown in Figs. 3, 2 and 4. The step response is almost certainly the best of any loudspeaker tested to date with perfect driver time-alignment, a very steep rise and a steady fall. This accurate transient response is clearly the result of careful and accurate crossover design, made easier through the use of digital signal processing. The acoustic source position is seen to shift to over 3m behind the loudspeaker at low frequencies due to the 6th-order low-frequency roll-off, and the power cepstrum shows little activity except for an echo after about 0.6ms which may be a cabinet edge diffraction effect. While on the subject of the time response of the ADM2, it is worth noting that the digital signal processing carries with it a penalty, the importance of which depends upon the application of the loudspeaker. During the analysis of the measured data it was noticed that the delay from loudspeaker to microphone was about 10ms—twice as long as that due to the 1.7m distance alone. Fig. 7 shows the waterfall plot for the ADM2. The low-frequency decay is extended in time but smooth and there is only slight evidence of ringing in the mid-frequency range.

To sum up, mid- and high-frequency transient response, is as good as any loudspeaker tested to date although low-frequency transient components are delayed due to the employment of a rapid low-frequency roll-off. The on- and off-axis frequency responses are both acceptable and the extended low-frequency response is impressive, particularly as it is achieved without excessive distortion. However, given the potential for digital equalisation, it is surprising that the frequency response is not a good deal flatter than it actually is. The documentation sent to accompany the review

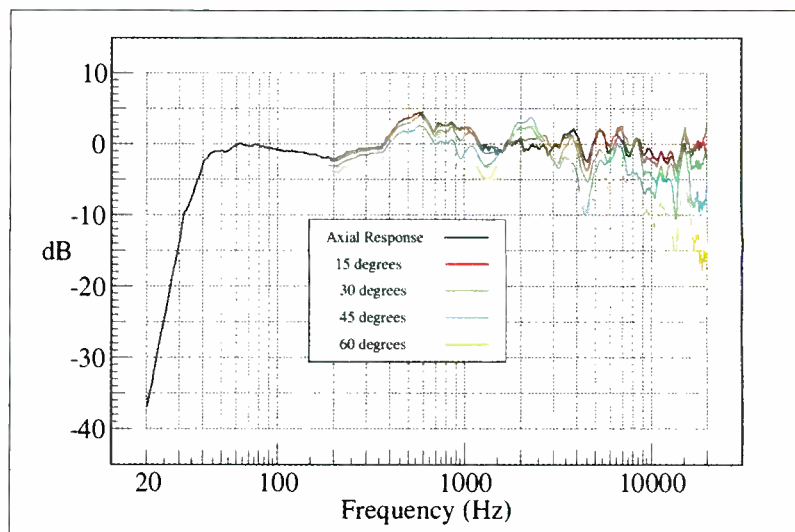


Fig. 5: Horizontal Directivity

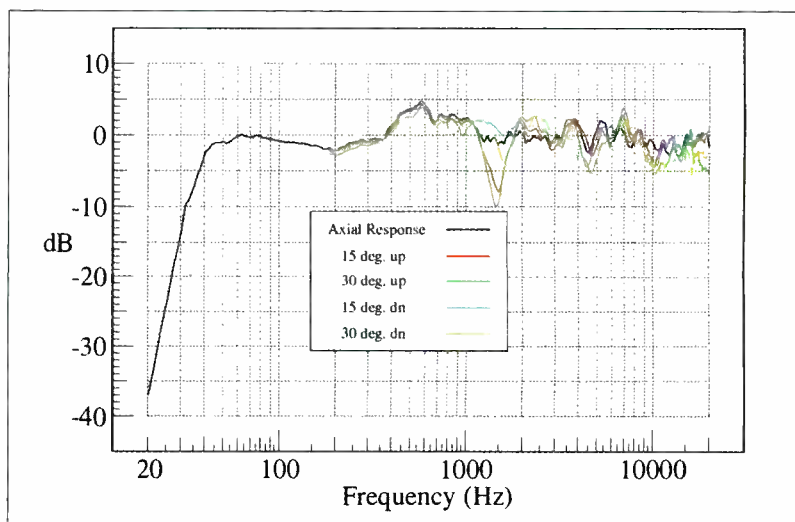


Fig. 6: Vertical Directivity

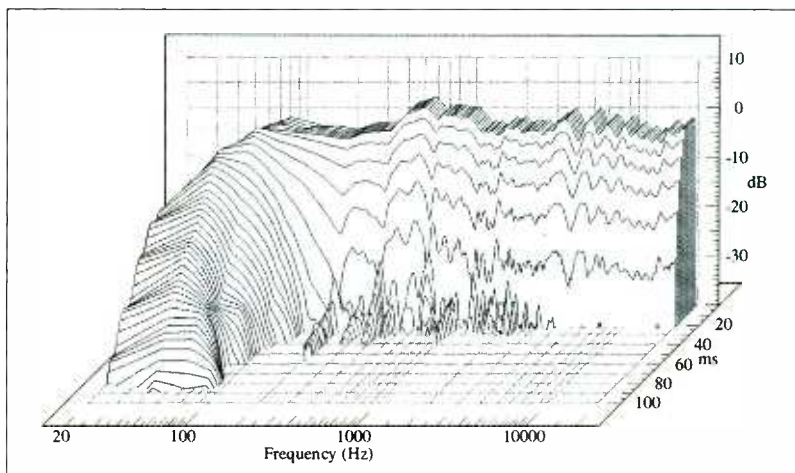


Fig. 7: Waterfall

loudspeakers shows impressive looking 'before vs after' equalisation plots, but these could not be replicated in these tests with either of the two loudspeakers with any of the equalisation control settings. The decision to produce an almost totally digital loudspeaker is a bold one, and one that shows enormous promise. □

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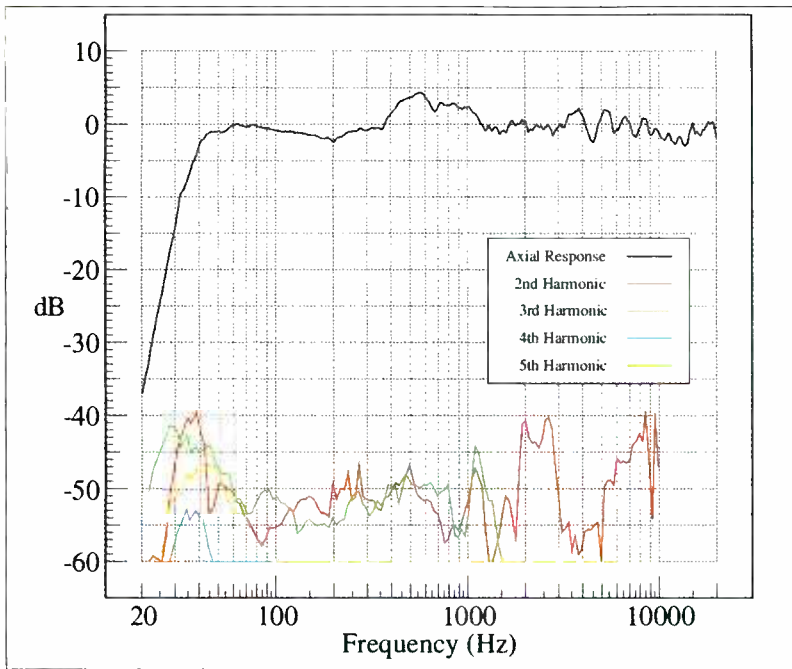


Fig.1: On-axis Frequency Response and Distortion

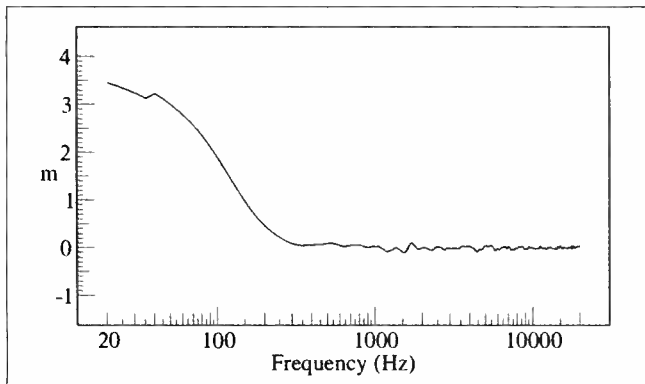


Fig.2: Acoustic Source

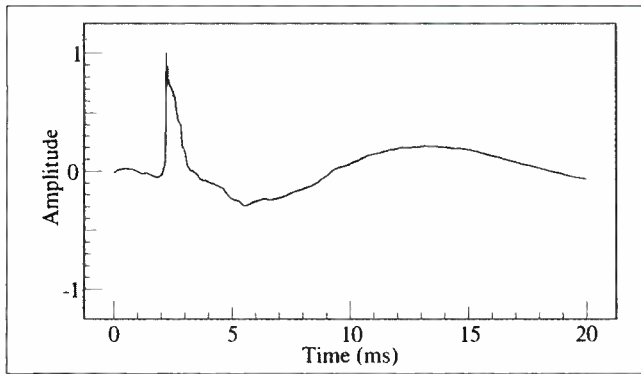


Fig.3: Step Response

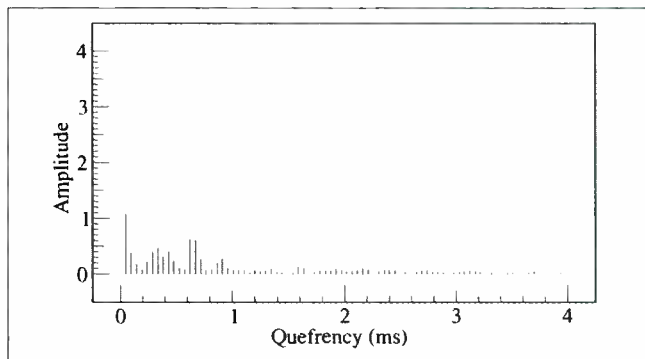
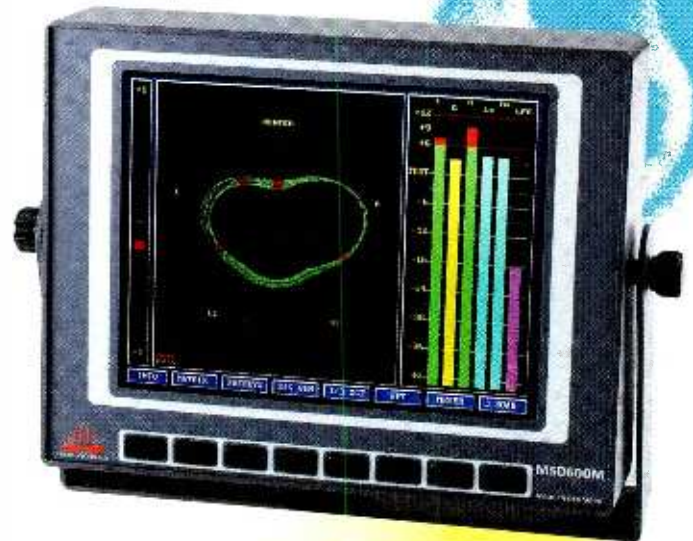


Fig.4: Power Cepstrum

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Buzz Audio MA 2.2

Making its way quietly north from New Zealand, Buzz Audio's MA 2.2 brings New World purity to the microphone amplifier market. **Dave Foister** says, 'g'day, blue'

IF YOU WANT THE BEST circuitry for bringing microphone signals up to manageable levels, there seem to be only two ways to design it. One is with tubes; the other is with discrete solid-state Class-A circuitry. There are plenty of preamps of both flavours around, which by their very nature end up fairly similar in presentation. These are not boxes for the gadget fan, but simple tools to do a job in which anything other than straight gain control is regarded with suspicion. You wind up with a selection of products distinguished only by the details of their specifications, subtle differences in sonic qualities, and their cosmetics. It takes a brave manufacturer to put a toe in this water, but that's what New Zealand company Buzz Audio (they must be brave people to have chosen a name like that—or perhaps they want to suggest they're light years ahead?) has done with the MA 2.2 True Class-A Microphone Amplifier. (Maybe the noise floor is at minus infinity or beyond).

The challenge facing the external designer these



days is to make a product stand out with distinctive touches that do nothing to undermine the impression that it's a sensible, professional piece of equipment. Blue may be this year's black, and its use on the MA 2.2 achieves the above aims rather well. The knob end caps, the screen print, and the recessed panels that carry the switches are all in matching deep sky blue, and of course the power indicator is a blue LED that even the manual can't resist describing as 'cool'.

The knobs number only two, and are inevitably the gain controls—detented for confidence and repeatability but not switched. The calibration numbers around the edge are augmented by lines on a black surround within the panel cut-out. Each of these is flanked by two blue insets within which all the control switches are mounted, and in true laboratory style, all the switches are simple silver toggles (up for off). The fact that there are only five of these per channel plus an LED is a good indicator of how simple the facilities are and how reluctant to gild the lily Buzz is.

One of only two remotely unusual switches on the MA 2.2 is the OUTPUT MUTE, provided to avoid the thumps that would otherwise be associated with the operation of almost any of the others. These others comprise the bare minimum that you would expect to find on a microphone preamp: phase invert, a 20dB pad, and phantom power, all independent for the two channels. There is a peak LED for each channel, notable for being red (hands up if you can remember when that was the only colour you could get) and for a facility I can't remember

ever seeing before—internal presets for defining at what level they come on. If you know what you're doing when setting these up, they could prove more useful than bargraph meters, since they can be set to flash at the level that concerns you and the specific following equipment, rather than some arbitrary level. How often have you seen peak lights and red meter segments flashing vainly at you when you know there's no danger of clipping in the equipment concerned nor in what it's connected to? In fact, the manual gives instructions for calibrating all the internal adjustments, including the maximum gain and separate controls for CMRR at high and low frequencies.

The only other external control is for the input impedance, which will appeal to those with ribbon microphones and others that deviate from the 'norm' but should perhaps be checked out with supposedly standard microphones. I found that a familiar model sounded just a little more open with the low impedance setting than with the nominally standard high setting. Even this will thump a bit, making the MUTE

switch a very worthwhile addition.

The back panel looks conventional but this is deceptive. A big surprise with the Buzz box is that, as supplied, its output is unbalanced albeit presented on an XLR. This is not the cost-cutting exercise that it would be on a down-market preamp but—according to Buzz—a valid step in minimising the signal path, avoiding any degradation, however slight, that might take place in the final balancing stage, be it an electronic circuit or a transformer. When the preamp is sited locally to its destination, this is fine; I placed it on top of a rack, hooked up with conventional patch cables, with no ill effects whatever. If the cable run on its output were longer, the situation would be different, even with a low output impedance, so Buzz offers an optional retrofittable output transformer, whose other effect is to reduce the upper limit of the bandwidth from 250kHz to 40kHz.

The MA 2.2 is a simple preamp even by purist standards. It has no filters and only the most basic facilities—certainly no digits. But it sounds superb; clean and open, with that ability to coax the best out of a microphone that such a design depends on. If all you need is to be able to get a microphone signal into an analogue line input as cleanly as possible, they don't come much better than this. □

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NEW TECHNOLOGIES



Neumann digital mic

Described as being comparable in performance to its best analogue microphones, Neumann's Solution-D digital mic employs a new A-D conversion process that acts directly after the capsule without an amplifier in between. The result is an internal 28-bit signal with a claimed dynamic range in excess of 140dB with a shorted input and more than 130dB A-weighted. The mic also sports a specially developed synchronisation method and remote control of typical mic parameters and mixing console functions. The product consists of the D-01 digital mic, the DMI-2 digital mic interface and remote control software. Signal and data transmission of the mic conform to AES 42-2001. Solution-D mics can connect directly to any equipment that supports AES 42-2001 while in all other situations the DMI-2 interface is required which converts the signal to AES-EBU with the interface controlled by remote control software. Neumann, Germany. Tel: +49 30 41 77 240.

SSL digitals are now A Plus

SSL has announced new advanced specifications for its digital console family, creating A Plus versions of the Axiom MT, Avant and Aysis Air. A Plus consoles benefit from improved hardware and hardware options including the HS Automation Computer which improves the speed of operation, provides an improved graphical environment and a flat-screen TFT monitor for all HS Computer control screens. RIO Grande provides greater flexibility in mixing analogue and digital inputs and outputs, together with a simple and economical expansion path while optional INFO faders SSL's INFO digital linear motor faders provide increased accuracy and tactile feedback at null points and level matches together with a four-character LED display. An option only on the MT are new Super-Pre mic amps combined with SSL NiTech converters which boast negligible latency in record and monitoring paths. SSL has also introduced a compact 'production' variant of its MT digital desk for multitrack TV and music. The MTP provides the power of SSL's MT Plus console but at one third less weight for applications such as remote trucks. The in-line desk has simultaneous multichannel surround-sound outputs for TV production and the console's bus and channel structure supports 96 clean feeds, 48 mix-minus outputs and full multitrack back-up capabilities. SSL, UK. Tel: +44 1865 842300.

Tascam production station

Tascam has introduced the SX-1 Integrated Audio Production Station which combines automated digital mixing, hard disk recording, MIDI sequencing, editing, DSP plug-in technology and multiformat mastering capabilities. SX-1 has a 40 x 8 digital mixing console with 100mm, touch sensitive faders, built-in dynamic automation, and 16 high-quality phantom-

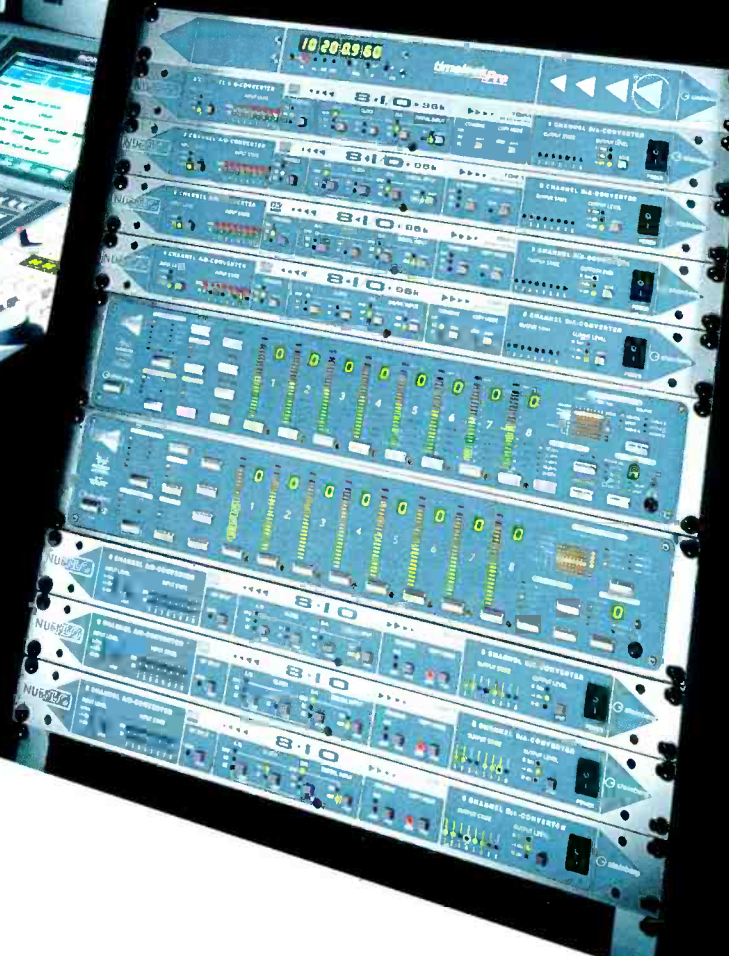


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Manley EQP1-A

Taking the classic Pultec equaliser circuitry of Eugene Shenk, Manley has produced the updated EQP1-A EQ. **George Shilling** checks the price of progress

MANLEY HAS OFFERED a mono Pultec EQ replica for some time. Now, due to customer requests, the company has started producing a stereo unit, the EQP1-A. The unit uses the Western Electric passive EQ circuit found in the original Pultecs (made by PULSe TEChnology Labs) and it is a measure of Manley's diligence, that of the many copyists, it

remains the only manufacturer to have taken the trouble to track down the original designer Eugene Shenk and sought permission to use his circuitry. However, the Manley Pultec is not an exact copy—the new model includes extra switchable frequencies, a Manley-designed make-up gain amplifier and power supply. And of course, modern electronic components which are made to closer tolerances than originals.



The construction of the unit is in the Manley house style: the front panel is thick and sturdy, with beautiful legending clearly etched into black anodised panels and small, deep knobs with a loose feel, due to the Bournes conductive plastic pots that Manley insist sound best and are most reliable. Alternatively, you can order the mastering version with Grayhill 24-position gold contact rotary switches, similar to the frequency selectors on this unit, but this will cost considerably more. The top and bottom panels are very thin and rattly metal meshes which might vibrate, but in a rack these are probably not a problem, and enable proper ventilation of the valves and power supply.

The rear includes inputs and outputs at +4dB on jacks and XLRs. A 3-position toggle for each input selects 0∞, 180∞ (phase reverse) or Direct In: the high impedance unbalanced jack input, which bypasses the transformer. Interestingly, original Pultecs had three transformers in the signal path. With the ability to run this model completely transformerless, this unit is much cleaner and quieter than an original, with little discernible or measurable difference whether the transformer is in circuit or not. Anyone hoping to 'tubeify' their mix might be disappointed—this modern valve circuit adds no coloration that I could discern, and boasts exceptionally low distortion figures.

All the controls will be familiar to anyone who has ever used a Pultec or any copy. The low-frequency band features both CUT and BOOST knobs. Like the original EQP1-A3, shelving-only frequencies are supplied at 20Hz, 30Hz and 60Hz, but instead of 100Hz there are 90Hz and 120Hz. And like the original, these shelves are gently

curvaceous, so for example with a full boost at 20Hz there is a 2dB gain at 100Hz, 7dB at 50Hz and 13dB at 20Hz. The LOW CUT interacts with the LOW BOOST so that when both are turned up there is a dip in the frequency response above the pivot frequency, the boost occurring lower down the frequency spectrum.

The High Boost section is a quasi-parametric bell-curve boost: there are 11 selectable frequencies—the original EQP1-A3 had only seven. The continuous BANDWIDTH control interacts with the BOOST knob: when the bandwidth is narrow the boost is greater, with up to 20dB of gain available on all frequency settings. With frequencies available from 1kHz to 16kHz this section is extremely flexible and powerful.

The High Cut shelf has five frequency settings (as opposed to the original's three), which are useful for removing unwanted nasty highs, smoothing harshness, or reducing noise on bass guitar, for example.

With many Pultecs, the Boost-Cut knobs seem to have little effect until somewhere past the halfway point; then, somewhere around 6 or 7, there is a huge sudden change. Not so with the Manley. EQ boosts and cuts have a natural progression which feels more even, making this unit seem more powerful at milder settings. Distortion is very low for a valve unit, and I found no discernible difference whether or not the input transformers were in circuit. The frequency response easily reaches the quoted 70kHz.

However, I am duty bound to report that during use Channel A stopped passing signal, even in Bypass. Ridge Farm Studios' chief technician traced the problem to several signal wires which were pinched and almost sliced between the edge of one of the circuit boards and the case, which was surprising to find in a unit from a manufacturer with a reputation for diligence. Perhaps this early example is not representative of subsequent production models.

In conclusion, I found the unit to be quite unlike any Pultec: it is precise, clean and powerful. I quite missed the coloration and distortion of a real Pultec, but the EQP1-A exactly achieves its design objectives and despite lacking fully-parametric controls is a surprisingly flexible tool. □

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Net: www.manleylabs.com

NEW TECHNOLOGIES

powered mic preamps. A 48kHz, 24-bit, 16-track hard disk recorder uses an internal IDE drive and additional IDE and SCSI drives may be connected via front-panel slot or a rear panel SCSI interface. Waveform, MIDI, and automation data editing via an internal recording-editing engine uses the BeLA operating system and a powerful graphics engine. Surround mixing capabilities include the ability to record a 5.1 mix to the internal HD in addition to the original 16 audio tracks while each of the 128-track MIDI sequencer's 64 MIDI outputs can be mapped to channel strips on the console, and channel strip faders and knobs can then be assigned to output MIDI channel or custom, user-defined MIDI messages. A built-in CD-RW drive is included for printing surround or stereo mixes, data backup and archiving, and importing sounds from audio or data CDs and the DSP plug-in technology offers built-in effects by Tascam, TC Works and Antares as standard features as well as the ability to add new effects as required. Analogue, digital, MIDI and computer interfacing includes 16 balanced XLR inputs, 16 1/4-inch TRS line inputs, TRS inserts on each analogue input, an onboard speaker switcher, eight channels of ADAT Optical, two stereo SPDIF inputs (with SRC) and outputs, wordclock, two MIDI inputs, four MIDI outputs, a SCSI port, two USB ports, a 100Mbps Ethernet jack for FTP capabilities, and separate studio and control room monitoring. The SX-1 will be available in the summer US\$8999. Tascam, UK. Tel: +44 1923 438880.

Single speaker stereo

ESE (Embracing Sound Experience) has invented a single speaker stereo concept with the first incarnation of the technology coming from EMES with its Owl monitor. The ESE system is based on three parts: a 2-channel sound generator which works from one point, thereby eliminating time and phase errors; an ESE sound processor which calls up the information which our brains interpret as direction; and a 'nose' between the elements which slows air pressure equalisation. Current Owl users include producer David Foster, Per Hallberg (supervising sound designer for films such as *Gladiator*), and Andreas Carlsson, songwriter for Britney Spears, N-Sync, Celine Dion and the Backstreet Boys. ESE, Sweden. Tel: +46 8 774 00 40.



Prism Pro Tools converters

Prism Sound's latest addition to its ADA-8 product range is the 8C-DIO-PT direct Pro Tools interface module which claims to offer a high-end, flexible alternative to the Digidesign 888/24 I-O. The ADA-8 can also work with Pro Tools systems through the AES3 interface, in which case an 888/24 is required. The release of the new Pro Tools compatible interface module follows agreement between Prism Sound and Digidesign relating to the implementation and sale of a compatible interface by Prism Sound. Prism, UK. Tel: +44 1223 424988.

5.1 monitoring with networking

DynaudioAcoustics and tc electronic have announced the AIR Series of 'intelligent' monitor systems, which use DSP, networking intelligence and digital amplifiers. Central remote control, preset storage and recall, alignment flexibility, and precision are the advantages claimed by the manufacturers. Built-in DSP enables compensation for

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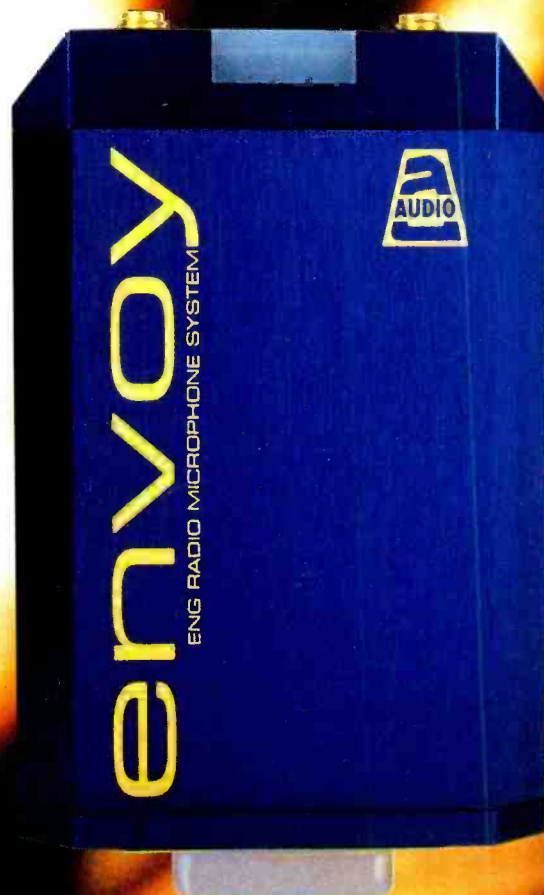
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SOUND MADE SIMPLE

Rode NTK

Sacrificing the flexibility of the NT1000, Rode's latest budget tube condenser mic turns in a surprising performance. **Dave Foister** finds new character in old technology

ANOTHER VALVE MICROPHONE, I hear you cry. Which one is this one pretending to be? Well, of course, many of the last few years' crop of tube models are deliberate mimics of old favourites, but that's perhaps not the pigeon hole into which you'd put Rode's offerings. The Classic and Classic II are very much their own microphones, overtly exploiting the perceived character of the valve but not specifically modelled on one type. The fact that they look a bit like a U47 but have the controls of a C12 serves to underline this. And now they are joined by a new, much simpler valve model whose only cosmetic similarities are to other Rode microphones. This is the NTK, physically resembling the NT1000 reviewed last month but having little in common electronically.

Like the NT1000, the NTK is a sleek microphone in more ways than one. The cylindrical tin-can shape of the Classics gives way to a slimmer, more streamlined housing, with a finer mesh grille and an elegantly unadorned body. To make room for the valve electronics, the tapering of the body shape on the 1000 gives way to a more straight up and down cylinder, but the similarities outweigh the differences. Rode is much more modest than some when it comes to emblazoning its name across its products; here it identifies itself only on the trim band around the base. In the place you might expect to see a name, the familiar Rode gold dot marks the front of the microphone.

Mounting the NTK on a stand is done in what has become the standard Rode way, using a mount attached to its base with a screw-down locking ring. The NTK comes with the basic SM-1 mount as standard but can also use the SM-2 suspension mount introduced with the Classic II. On that microphone the mount was clamped in place using the locking ring of the big multi-way connector, but here a much smaller cable is used so a separate ring is required.

The reason for the different cable is simply that the NTK doesn't have the operational complexity of the Classics. They are twin-capsule multi-pattern designs, with nine polar patterns switchable from the power supply; the NTK is cardioid only, with no switched functions at all, so all the necessary connections between microphone and power supply can be handled by a thinner cable with 7-pin XLRs both ends. This is much more manageable than the heavy cable supplied with the Classics.

The power supply too is straightforward, with no purpose apart from powering the microphone. Connections are on the back end of a relatively slim case, and comprise just the input 7-pin, the output XLR and a mains connector. A big on-off switch and the obligatory blue LED indicator make up the front-



panel complement on a box that can effectively be tucked away in a corner and forgotten about. The cable is quite generous in length, removing the placement restrictions that can sometimes be a problem with valve microphones.

When you put a valve in a microphone you generally end up in one of two camps. One approach is to make the most of the smoothness and transparency that good valve circuitry can produce; the other is to exploit what is commonly perceived as 'valve character' and deliver a particular type of presence. The danger with the first is that it might become just another neutral microphone, while the danger with the second is that it can acquire too much coloration to be a generally useful tool, being held in reserve for certain vocal jobs but even then sometimes being a bit too hard.

But the good ones manage to combine the best of both approaches, and the NTK pretty much achieves this. Here we have a microphone with enough bite and presence to make an attractive option for voices, yet with an overall silky smoothness that allows its use for classical instrumental sessions. I have had the NTK in use on a series of sessions for solo demonstration pieces, an ideal opportunity to try it on trombone, trumpet, clarinet, and others, all producing the kind of clean natural results the job needed. On the other hand, I put it up in a battery of others for a jazz vocal recording workshop, and it won the day on a couple of the voices that tried it, against other more neutral microphones. This is a combination of roles few manage successfully; it's what you expect of an M149, but a microphone at the price of the NTK ought to have traded one off against

the other more than it has. Unless it's a misprint, the published frequency response is identical to that of the NT1000, but the difference in character just goes to show the extent to which frequency response only tells part of the story.

What it lacks of course is the flexibility of multiple polar patterns but since in most instances it would be likely to end up within a notch of cardioid anyway, this won't be seen as a disadvantage by many. Its SPL handling capacity means the lack of a pad is not a problem, and no-one's going to miss the high-pass filter. As an 'in' to what the quality end of tube character means, the Rode NTK is an attractive candidate. □

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NEW TECHNOLOGIES

traditional speaker inefficiencies and offers tools to adjust speakers for different acoustic environments. All audio and control information is distributed in an internal network between monitors, which allows for bass management simulations on-the-fly, central control of levels, recall of different set-ups, and solo-mute of individual monitors. Expecting to ship towards the end of the year, the first products will include the AIR6 and AIR15 bi-amplified two-way close-fields with 1.1-inch tweeters and 6.5-inch and 9-inch woofers respectively. Three different subwoofers will be offered.



tc electronic, Denmark. Tel: +45 8742 7000.

Studer On-Air 2000 M2

The Studer On-Air 2000 M2 is derived from the On-Air 2000, and uses the same core technology as its predecessor together with Studer's patented Touch'n'Action operation and the new look introduced by the D950 M2 and On-Air 1000. The On-Air 2000 M2



incorporates a complete input routing system allowing for more input cards than fader channels and input cards can be placed in an external rack or directly inside a custom mixer frame. The M2 can be equipped with 6, 12, 18 or 24-channel faders and can have up to 64 inputs. Existing On-Air 2000 customers can get an upgrade kit to benefit from the functionality and the internal routing system of the new M2. Studer has also introduced a version of its On-Air 1000 console with redundant power supply. Studer, Switzerland. Tel: +41 1 870 7511.

Zaxcom goes digital wireless

Zaxcom has introduced a digital wireless microphone system which the company says completes its integrated location production system of Deva recorder, Cameo mixer and wireless links. Audio is transmitted digitally without compounding distortion, FM interference or artefacts and transmitters are half the size of current equivalents. Receivers and transmitters never need calibration while real-world benefits include studio quality audio transmission, transmitter remote control, automatic clear channel selection, transmitter push-button control, DSP effects and true diversity receiver with drop-out protection. The news coincides with the announcement of direct audio file import from the Deva II location hard-disk recorder to any Avid edit system and the introduction of the Studio Deva rackmount unit. All Deva file outputs playback automatically on Studio Deva and DVD-RAM playback is direct from disk without preloading the hard drive. The machine can record 4 tracks on to hard drive that can be used on a Deva II. Features include 10-second prerecord, RS422 control, SMPTE reader-generator, and AES-EBU I/O.

Zaxcom, US. Tel: +1 201 652 7878.

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Ambient TinyMike & TinyMix

Practical performance for location cameramen comes from Germany in the form of Ambient's TinyMike ATM 216 and TinyMix. **Neil Hillman** does the hot shoe shuffle

WHILE REMAINING THE SCOURGE of professional location crews, the ubiquitous DVcam has established a certain hero and villain notoriety in television production—depending on which side of the budget-versus-quality line you stand. On single-camera shoots, it is commonplace to see the DVcam used by a director-researcher-assistant cum spare-pair-of-hands as a simultaneous cut-away source or even as an ill-matched two or wide-shot. Other applications include the elimination of a days crew-costs by sending same director-researcher-assistant cum spare-pair-of-hands to gather the GVs and background shots. Shamefully, even more adventurous attempts have reached the transmitter.

Love it or loathe it, the DVcam has become an integral part of much broadcast television production here in the UK—and we are poorer for it; due not to the instrument per se, but to the technically inept way that these devices have been used in unskilled hands.

Ambient Recording of Germany, well-respected for their commitment to quality in their location filming devices, have made a significant contribution to the ability of higher quality audio being collected on DVcam with the recent introduction of their TinyMix and the TinyMike, a coupling of devices that brings a new level of professional audio control to the semi-pro audio configuration of most DVcamcorders, such as the Sony VX-2000.

The DVcam's standard built-in camera microphone delivers barely usable direct sound due in part to camera noise and also to the microphone's low directional characteristic. Professional microphones often need phantom powering and are twice as long as the camera itself, making the camera assembly unwieldy. The Ambient TinyMike ATM 216 fills this gap. It is a miniature shotgun microphone complete with soft mic support and windshield, with a good general frequency response and with highly directional characteristics in the mid and high frequency ranges. Overall frequency response is stated as being 20Hz-18kHz, with an impedance of 1.5kΩ and a weight of just 29g.

Sensibly, it's 1.5μV needs can be met by power from the standard 'plug-in power' socket available on almost all consumer cameras, eliminating the need for a separate power supply; although the microphone is also adaptable to 48V phantom power using an Ambient Eumel lead. The microphone itself is mounted through a spring bracket to the TinyMix. The microphone support is a bent aluminium rod which places the centre of gravity opposite the support post; a silicon tube dampens any induced camera noise and vibration. The 'stiffness' of the bracket can also be adjusted by pulling on the rubber de-coupler so that the gap between the support post and the bracket is bigger—with the microphone in its lightest form, or smaller—to compensate

for the extra weight produced by adding a fluffy windshield. As a function of the microphone being hyper-cardioid, the characteristic rear-lobe can be used by the operator in situations where they may need to ask questions to tape.

On most DVcamcorders there is no provision for separately adjusting the level of the two input channels. There is either automatic level control, or one level control knob for both channels. Also, the separate mix boxes that fit on to this input to provide two separately fadable channels do not make use of the 'plug-in power' and have large XLR input sockets, which result in a heavy and large unit.

Ambient decided to build a system which overcomes these drawbacks and the result is the TinyMix, claimed to be the smallest and most versatile mixer for DVcam.



The two-input, 1.5kΩ input impedance, mixer is laser engraved, showing functions and input socket connections on the right-hand side, and although it is a

passive device it allows the electret 'plug-in power' from the camera to be available at the input socket. The input sensitivity can be selected between line-level, dynamic or electret by soldering to selected pins, giving a connecting cable configured for the application required. Each channel is adjusted by its corresponding fader knob on the left-hand side and on the right there is a switchable bass-cut filter. The mixer's base is insulated to avoid ground loops and any associated hum problems.

Connection and setup is simplicity itself by design. The mixer is screwed to the hot-shoe of the camera and its goldplated minijack plug is connected to the microphone input of the camera, with the TinyMike connected to TinyMix Input 1. A second microphone may be connected to Input 2. Speaking normally into the TinyMike from about 2ft away and adjusting the input volume until the scale is about two-thirds up results in level 3-4 on the VX2000, and means that a normal presenter voice-level is fine, but there is still sufficient headroom for loud speech or noise if necessary. One of the most endearing features of DVcam is its headphone output; anything approaching a decent monitoring level creates distortion, so it is a case of trusting the meters rather than what you can hear, and this line-up procedure acquitted itself well. Which should give even less excuse for the badly recorded material that has for too long now been epitomised by broadcast DVcam. □

Contact

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NEW TECHNOLOGIES

Milab digital mic

Milab's DM-1001 digital microphone system is based on the classic Milab rectangular dual cardioid condenser capsule followed by a 24-bit, 48kHz sigma-delta ADC and a 24-bit DSP. The signal leaves the system in AES-EBU digital format. Standard settings can be selected from phantom power unit but the microphone is also controllable by PC software which offers free choice of



polar pattern, analogue-digital gain, and frequency response tailoring using digital filters. Milab, Sweden. Tel: +46 4221 5078.

SADiE DSD mastering editor

SADiE has shown a prototype DSD Mastering Workstation capable of editing and mastering stereo DSD material and producing finished masters for the SACD format. Based on a radically new hardware platform from the company's existing products, which will be available later this year, the new product is expected to form the first of a series of workstations supporting all existing and new delivery formats. In addition to the recording and editing functions, full SACD authoring facilities to the Scarlet Book standard are incorporated. Using a similar interface to the SADiE red book PQ editor, a dialogue window will allow all of the SACD text and ancillary data to be entered and edited. An image file can then be automatically created to AITT tape for transfer to factory for pressing. The new DSD editor will also support down-conversion to 16-bit PCM for producing the red book CD layer. SADiE, UK. Tel: +44 1353 648 888.

Musicam goes for the 'gateway'

Musicam USA has unveiled the SuperLink audio and data gateway which it describes as 'a new product in a new category—it's a link between the broadcast-audio world, the communications world and the information technology world'. With a user configurable hardware interface it serves as a low cost codec, a linear STL, and a network audio server with multiformat streaming audio. The rackmount device has a menu window for programming, a phone keypad, programmable function keys, vu meters and headphone connector. Four hot-swappable hardware modules plug in to the rear panel and are recognised automatically. Musicam has also unveiled its Voyager digital audio codec targeted at users who need to send and receive broadcast quality audio in real-time from remote sites. It boasts low delay and 15kHz quality and the modem allows users to re-equalise the line within 1.5s. Musicam, US. Tel: +1 732 739 5600.

Otari net products

Otari has introduced a new family of products to link to modern audio networking. Pilot products are the ND-20 multichannel, fibre-optic transmission system and the FS-96 digital 24-track multiformat converter. ND-20 units perform as standalones between stage and control room or operate in complete networks and standard features include 24 bit working throughout with up to 96kHz sampling, high performance audio circuits and internal sample rate conversion. Each ND-20 controls up to 32-channels and 16 units can be linked in a network. Each of the rack mount system has 4 slots for plug-in modules including 8-channel mic inputs, analogue line I/O and AES-EBU

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Alesis Masterlink ML-9600 v2.0

New software bringing new features to the Masterlink also significantly extends its range of likely applications. **Dave Foister** reckons broader is better

HOLDING FIRM under its filing for Chapter 11 bankruptcy protection, the release and support of Alesis core products continues—including the v2.0 update to its Masterlink mastering system. When we first looked at the ML-9600, it was the only device in its field. It's somehow typical of how Alesis does things that it still is; it addresses an obvious need in an unobvious way. If I had reservations first time around they were simply that it was a bit too specific in its aims, missing out on a couple of features that could easily have broadened its scope considerably. Now we're on software v2.0 and, lo and behold, some of those things have already been addressed.

What the box does is so unobvious that it may still have passed you by. Within a 2U-high box that looks like little more than a CD recorder (its button and light count is probably lower than the Yamaha CDR1000) lies hardware that can record over five hours of material to its hard drive, define tracks, process those tracks with a variety of DSP functions, and then burn a CD. It can put 24-96 audio onto CD in a format that can be read by computers; it can perform simple editing; it has a palette of processes specifically geared for mastering; in fact it has all you need to get a collection of finished mixes onto CD, either as Red Book or in a high-resolution archiving format.

Audio, acquired via the usual selection of inputs or



lifted straight off a CD at 4x speed, is recorded as Files, and Tracks derived from those files are managed in Playlists. Sixteen playlists can be held on board at once, and the playlists can share audio files and tracks. Tracks can be precisely topped and tailed, and fades in and out can be added. Signal processing facilities comprise EQ, dynamics, a look-ahead limiter, and a normaliser; a pretty complete kit of parts for adding the finishing touches to your mixed masters. Finally, gaps between tracks can be adjusted before the finished CD is burnt using the onboard drive. At this point there is a choice between a standard Red Book CD and a high-resolution format that can handle any combination of word length and sampling rate up to 24-96 (with obvious trade-offs in running time) and conforms to AIFF formats for compatibility with PCs and Macs (shortcomings in the Mac implementation have been eliminated in v2).

This seems like a very comprehensive package, and so it is; but it assumed your audio was already in track-sized chunks and consisted of a series of separate songs. Transferring a live performance to CD, copying a whole DAT full of stuff in at once and separating the tracks out, or even recording live on to the Masterlink hard drive and chopping it up afterwards, were not catered for. Now, however, a small but significant set of extra features allows all of these jobs and more to be carried out with the same ease and speed as the basics.

The first of these is Track Split, which allows an existing track to be divided in two at a chosen point, dividing its source audio file at the same time. The split point is found with fine precision using the same facilities as are provided for determining start and end points, with a usefully slow scrub function on nudge keys. Split doesn't then force you to separate the audio; it will now play seamlessly across the resulting join (v1 introduced a small but audible gap between tracks) but will put a CD track flag at the split point. On the other hand, the separated tracks and files now become quite separate entities, to be trimmed, processed and moved around as required, or even used in other playlists.

Conversely, tracks can be joined, merging them into a new file, again with no gap between them. In combination with the Split function this allows simple musical editing, which was not possible before, and can do it without sprinkling CD tracks all over the joins.

It's also now possible to read an entire CD into the unit, separating the audio into files corresponding to the CD tracks as it goes; and there are other useful functions like the ability to copy a complete set of DSP parameters from one track to another—a big time saver in many situations. It can also back up entire playlists with all the editing and DSP details to a CD to help with housekeeping.

The original front panel was commendably simple and direct, with menus kept to a minimum and dedicated keys for most functions. The trouble with that is that it leaves no room for manoeuvre when extra facilities are added; Alesis' answer has been to use the Playlist Edit button as a kind of shift key for the new functions, which is intuitive and effective.

The additions in v2.0 look at first like just a few extra frills; it's only by using the unit in both modes that you realise how much they have opened up the Masterlink concept to a whole range of jobs and applications that you really wouldn't have wanted to attempt on it before. It does things very much its own way—the mindset from a typical DAW doesn't transfer straight across to using Masterlink—but its methods are easy to master and fast once you've learnt them. When I first reviewed it, I thought it was a neat idea that would be useful for a lot of people but perhaps not for me; the new software now makes it a machine I'd seriously consider investing in, even though I've already got SADIe and a grown-up CD recorder, as there are some jobs it can do more quickly than either. □

Contact

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NEW TECHNOLOGIES

interfaces. Future options include MADI and TDIF interfacing and transmission of video signals will be possible as well as using the LWL multicamera cable existing in television studios. The FS-96 24-channel multiformat bit and sample rate convertor permits transfers between AES3 (AES-EBU), TDIF1, ADAT (optical) and SDF2 (DASH), and FS-96 also supports MADI and IEEE1394 optionally. The system simultaneously converts 24 channels in 24-bit with up to 96kHz sampling and a special feature is the bi-directional conversion of AES3 and TDIF. Otari, Germany. Tel: +49 2159 50861.

Comrex Matrix

The new Matrix codec from Comrex has been designed to work on a variety of telecoms circuits to handle any



broadcast outside of the studio. In its base form, the unit is a PSTN codec for 15kHz, full duplex audio over one analogue telephone line. However, optional slide-in modules enable the Matrix to work on ISDN or GSM services. As an ISDN codec, the Matrix has three algorithms for maximum industry compatibility: ISO-MPEG Layer III, G.722 or Turbo G.722. With its GSM module, the Matrix sends improved audio over a wireless circuit. For direct connection to microphones and headphones or a mixer, the unit has two mic inputs (one mic-line switchable), one headphone output, and one line-level output. An additional -10dBu input allows connection to a MiniDisc or DAT player. Comrex's new codec also has 'store and forward' capability to store nearly 10 minutes of audio for non-real-time delivery on any available circuit. With an optional battery kit, the unit can run for up to seven hours on battery power, which can function as either a primary or a backup power source. Comrex, US. Tel: +1 978 263 1800.

Sanken debuts omni mic

Sanken Microphones has described the new CO-Z as 'the first perfect omni microphone in the world'. The omnidirectional microphone is claimed to have a perfect circle polar pattern from 20Hz to 20kHz. Other products from the company include the P33 powering module and CO 330 omnidirectional condenser microphone head for the CU-300 series; the ultra high-sensitivity MO-64 microphone, dubbed the 'insect mic' as it has been specially designed to pick up noises such as ants' footsteps and the creeping sound of snakes; the CUB-01 miniature boundary microphone with cardioid polar pattern; and the CMS-10 which has been designed for use with HD-cam digital video camera and is switchable between sharp shot-gun direction and stereo. Sanken, Japan. Tel: +81 3 3392 6581.

Magtrax monitors

Aspen Media has added to the Magtrax Select surround-monitoring controllers and has introduced the first three offerings in a new range of monitor speakers from Leema Acoustics, a Magtrax sister-company. All five Magtrax Select models feature LCRS and Stereo downmix outputs:



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Marantz CDR770

Driving down the price of CD-R leads inevitably to a balance of compromise and performance.

Zenon Schoepe weighs up both on a new entry level model

WHILE MUCH HAS BEEN made of the cost-performance aspect of the current generation of CD-Rs, we should regard Marantz's CDR770 as its most definite address of the entry level standalone market. Whereas the CDR631 served as a distillation of ideas and now expected features as its previously base level machine, the CDR770 goes substantially lower and the trade offs can be seen pretty immediately from visual and constructional aspects. For starters it's black as opposed to Marantz Professional team off-white and the rack ears come bundled in the box for self assembly.

Screwing on the rack ears also allows the addition of



a chin spoiler which gets the word 'professional' on to the front but also hides the super hi-fi elephant rubber feet. This is a very light unit, an easy one hand lift.

You're reminded of the unit's Advanced Power Calibration (APC) by a large front panel sticker, a process that runs each disc on loading and optimises the laser for the media. It's worth pointing out that this process is not unique to the CDR770 and has existed in all Marantz machines since early CDR631s and is thus also included on the excellent twin-drive CDR500.

The 'transport' is the same as that found in the CDR631 which means it should be dependable and durable but front panel switch gear and feel is less impressive. The controls are also dotted around the front panel in a manner that aims to satisfy cosmetics rather than ergonomics. While many professional CD-Rs represent repackaged and refined versions of existing domestic machines, in the Marantz range the CDR770 shows these origins most apparently although the manufacturer's experience and skill at performing this transition is now at the stage where this should not put a potential professional purchaser off.

Power comes in on a 2-pin detachable cable rather than the more usual IEC and rear panel connectors are reduced to phono I-Os, coax digital I-O and an optical input. If you'll be coming in on SPDIF (it'll autodetect AES-EBU) this may not be an issue for you.

Controls cover PLAY/PAUSE and STOP, an inconspicuous little button for RECORD and others for selecting RECORD MODE (synchronised record disc, record track, and make CD with automatic finalising, plus manual record), FINALISE, ERASE and SOURCE selection. To the right of the centrally mounted display are PROGRAM, REPEAT and SHUFFLE buttons for the playback side of things and a scroll switch for viewing CD Text information. The exercise in black-on-black is rounded off by forward and reverse search, a multifunction push-to-make dial for parameter adjustment and selection, such as record level (balance is menu adjustable), a MENU button, CANCEL/DELETE key, and headphones socket with no accompanying level control.

The display is fairly good with the usual time display options, a row of numbers signifying tracks available, the playback mode, indicators for sync and manual recording modes, and selected input. A SRC is included but seems to be activated automatically with no indication that it's in the chain. Draw your own conclusions from the fact that when a disc is loaded in to the machine and undergoes the APC laser calibration process the words 'Yum Yum' appear on the display and whenever recording is stopped and the disc is being updated it reads 'Groovy'. Metering is peak hold but very small. Less groovy.

In terms of what the CDR770 actually does there is

absolutely nothing wrong with it. It's all there with CD-R/RW capability,

the usual

laborious method of CD Text entry, recording modes that lessen the amount of user interaction required with intelligent halting of recording on predetermined lengths of incoming silence, and the full blown 'watch it burn' manual process. It performs well, sounds good and there's pause mute. The remote is smaller than that for the CDR631 but carries most of the functionality—you can't instigate recording from it but you'll need it as the only means of entering manual track increments.

The thing is that this machine is less enjoyable to use than the other Marantz CD-Rs due to the peculiar layout of the front panel which has the transport controls scattered over the fascia and separated by the extrusion of the display. I found myself operating it two-handed—the dial selects tracks and a push activates PLAY—but the STOP and PAUSE/PLAY are tucked away in the top left corner perilously close to the EJECT button which I hit by accident more than once and you really don't want to do that. The self same buttons are too close to the drive drawer and if your hand lingers on pressing eject deliberately then the escaping drawer will attempt to move it. If like me you always have headphones hanging out of such a machine, the position of the jack manages to cramp the space around the right side panel controls. Less than ideal therefore and a light year away from the wonderful ergonomics of 'white face' Marantz machines which I prefer infinitely.

In conclusion I've got to say that the CDR770's biggest selling point is its incredibly low price and the fact that it does many of the things that are now expected of a modern CD-R to a standard. As such it is a worthy addition to the manufacturer's range and it will appeal to those seeking an entry level solution but it will not detract from the enduring appeal of its professional models. □

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Aspen Media, UK. Tel: +44 144225 5405.

Three new products from Digigram

The miXart from Digigram is a PowerPC-based multichannel audio processing and mixing PCI soundcard. It has four programming environments that can be used alone or in tandem to facilitate the rapid creation of sophisticated computer-based audio solutions encompassing recording, playback, editing, mixing, and effects and compression plug-ins. The initial miXart configuration is the miXart 8 card with eight mono-four stereo analogue I-O paths and including four studio-quality microphone preamps. An optional AES-EBU daughter card effectively doubles the I-O capabilities. Digigram is also introducing the HitPlayer-L, a digital audio player which is capable of storing more than two days of audio for playback via a playlist, and can be programmed either locally or remotely over the Internet or a LAN. The product can be used in networked or standalone sound installation applications such as background music, sound entertainment, interactive audio systems and public address systems in places such as retail stores, transportation terminals and amusement parks.

Digigram, France. Tel: +33 4 7652 4747.



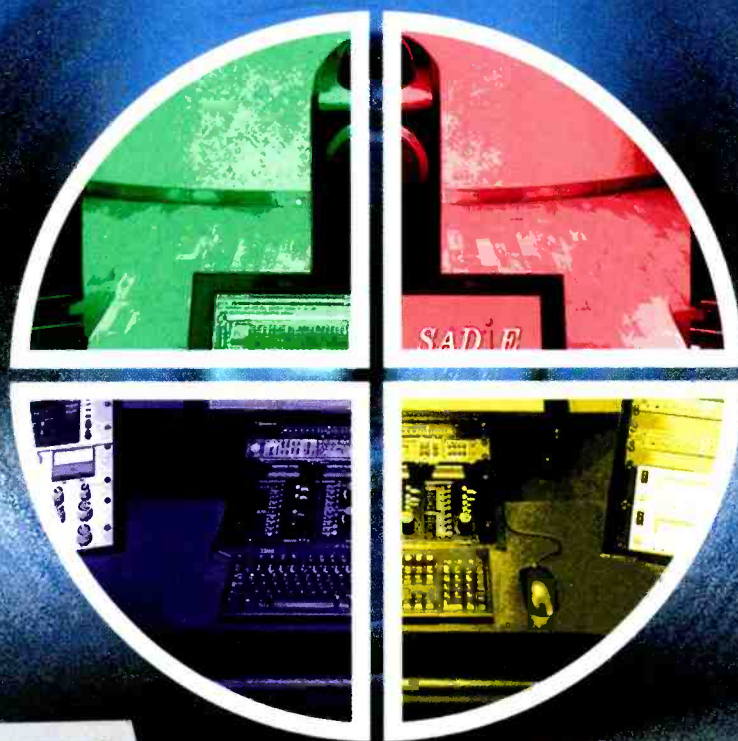
Lawo introduces new plug-in card system


Lawo's I/O DALLIS can directly convert analogue line, AES3, RS422, and GPIO studio signals into ATM. Due to the backplane designed in star-wiring topology, the redundant power supply units and the possibility of hotplugging of all card types, the I/O DALLIS system is especially designed for applications where high availability is needed, such as in control rooms. The system is part of the DSN (Digital Studio Network) and the mc² series. One ATM connection can connect up to 80 mono sources and 40 mono targets to the matrix. A new mc² audio-follows-video feature allows predefined crossfades to automatically follow the cuts of a video mixer. The events can be triggered by serial and GPIO remote. The parameters of the crossfades (up to 10s crossfade time) can be on the console for each DSP channel.

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THE BRADFORD EXCHANGE

If you haven't heard the name yet, you will. Michael Bradford has played an integral part in Kid Rock's multi-platinum *The History of Rock* album, as well as one of the most-requested American songs of 2001. **Howard Massey** reports

HE HAS TOURED EXTENSIVELY with artists from reggae's Heptones to jazz guitarists Earl Klugh and Grant Green, and R&B artists of the standing of Anita Baker. Filling the gaps between tours honing his craft in the recording studios of his native Detroit, it was here that Michael Bradford began assisting Bob Seger's engineer Gerard Smerek—jumping on the Pro Tools bandwagon long before it was fashionable. But his empathy as a producer stems, no doubt, from his apprenticeship as a multi-instrumentalist, playing bass, guitar, keyboards and programming drums.

It wasn't long before Bradford moved from Detroit to the City of Angels, where he developed a reputation as one of the town's top programmers. His skills landed him a gig with arranger Paul Buckmaster, with whom he has collaborated on several movie soundtracks. Bradford also developed working relationships with

Terence Trent D'arby, Madonna, and New Radicals' founder Gregg Alexander. Currently, he is working on projects with Meredith Brooks, Tre Hardson (of the Pharcyde), Youngstown, Tommy Lee's Methods of Mayhem, and Run-DMC, as well as releasing solo material under his pseudonym Chunky Style.

Maybe you can begin by running down the main pieces of gear that you have here.

My studio's pretty much all digital. It's not that I have anything against analogue—it's just that it's easier for me to work in a digital format, mainly because of editing and total recall. I switch from project to project and I love having the ability to snap from one thing to another without a major reset or documenting a patchbay it's just so much easier this way.

It's also compact and very portable; I take a lot of this gear on the road with me when I'm on tour. I've

got a rack with MIDI gear—[E-mu] Planet Phatt and Orbit, a couple of samplers, and a couple of rackmount synthesizers, including the Nord Modular. Then I've got a second rack which is my Pro Tools system—a Mix Plus with a couple of extra DSP cards. I've got an old-fashioned DAT machine, because sooner or later you've got to archive, and my computer also has a CD burner, a tape backup system, and a hot-pluggable hard drive. My speakers are Mackie HR824 powered monitors. I've got a special case made for them so I can take them with me everywhere I go. There's an old-school turntable for DJ-type work and a mixer for that but the only really classic piece of gear in here is an ARP 2600 synthesizer that I still love to use. I started out a long time ago programming synthesizers; I'm into sound design, so I enjoy having boxes like that around.

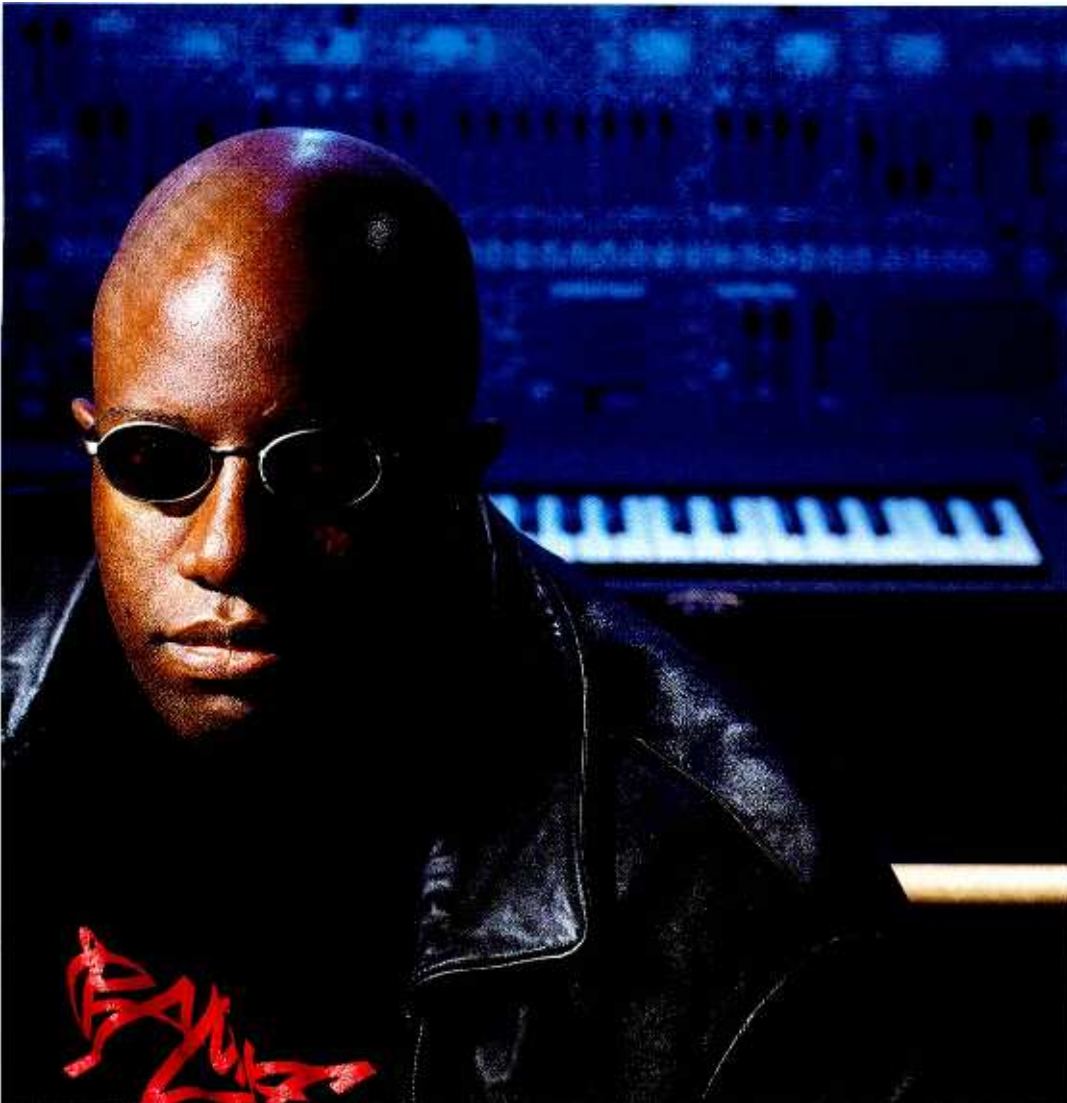
I have another room next door that's an iso room; it's got a regular drum kit and various microphones plus a couple of amps—Marshall, Ampeg SVT—and there's another room down the hall that's a sort of lounge, just a sit-and-chill kind of room.

What's your typical signal chain when recording bass?

Bass is my first instrument. It's the most natural instrument for me, so I take a lot of care in recording it, though the signal chain varies. My touring bass amp, which I use a lot in the studio now, is called the Mo'Bass, by SWR. It provides a complete signal chain, including a tube preamp, an analogue Moog-style filter for auto-wah effects, analogue distortion, parametric EQ, and a subsonic generator. It can also operate in a dual mode so that one channel is clean, while the other channel has effects. This is very valuable when I want distortion, but still need a full low-end. I also have an 8x10 cabinet that can be split. I often go direct, but if I use the cabinet, I tend to mic it with an Electrovoice RE20 or a Sennheiser 421.

Another thing I've been using lately is the Line 6 Bass Pod, and my chain then is just to go from the bass into that and then take either a digital or analogue output into Pro Tools. If I'm in a studio where there's a console and a more standard signal chain, I tend to run it through something like an Avalon DI. I don't use a lot of external processing because I think basses sound pretty good the way they are, and the more boxes you run things through—well, I don't know that it really helps the sound as much as it's just more stuff to write down.

I've had to make records in all kinds of conditions that were pretty primitive—*The History of Rock* was recorded on our tour bus; Uncle Kracker's record was also done on a bus. I've recorded stuff in some pretty unusual places—places where I didn't have the benefit of a large-format console and 30 pieces of outboard gear, and they still sold millions of records. I've reached the conclusion that, although it's good to have a lot of gear for options, I think sometimes engineers make the mistake of piling stuff on to make a more impressive looking pile, rather than to make a better sound.



You don't take the DI signal as well, just to give yourself the option later?

I don't believe in options. I'm radical that way. I don't like options, because they just mean you take more time. I've been in this business for 20 years, and when I started out, you didn't have nearly as many tracks to work with as you have now. You didn't cut three tracks of bass—one clean, one processed, one DI—and then decide five years from now which you want to use. If you can imagine a sound in your head, that's what you should be going for from the beginning. I think the reason a lot of records sound so generic now is that everybody has too many options, so they never made a decision to begin with. I'd rather make a decision up front.

You said that The History of Rock was recorded on a tour bus, but it has a lot of well-recorded live drums.

There are lots of live drums, but a lot of them were cut in a little studio in Detroit after the fact. We would use a drum machine to get beats going and then we'd do overdubs in Pro Tools. Even though we went into a little studio and added live drums later, the drums you hear on the record were heavily edited—they were put back into the computer and shifted around. So there are tracks where the performance of the drums doesn't bear a lot of resemblance to the way they were originally played. There are certain songs where, for example, I took a fill that I liked and stuck it somewhere else, or a song could have used something at the end that it didn't have, and since I had all these drums, I could move them around and drop them where I wanted. Also, some of the live drums were cut in the arena during a sound-check, where I would have the drummer play individual drums, and I would make samples out of them.

The History of Rock has a broad range of sounds. In every instance, were you working toward a specific sonic goal?

I can't say they were entirely conceived beforehand, but to a degree they were. A lot of the songs on *The History of Rock* are re-cuts of older songs that Kid Rock had put out on his indie records. On some of the songs we used the original masters and then overdubbed onto them; on other songs, we just made completely new recordings because he wanted them to sound as good as they could sound today. If that meant cutting them, re-cutting a vocal, re-cutting the whole song, rearranging the song, then that's the way it was.

It was actually pretty easy to get the sounds because, even though it's a pretty diverse record stylistically, sonically the band is what it is—the guys are what they are. And also, because Kid Rock and I played a lot of the guitar on the record, we already sound the way we sound. Using different effects is one thing, but the basic approach to the way you play doesn't change.

On a lot of *The History of Rock*, engineering-wise, I took cues from classics like 'Whole Lotta Love', 'Are You Experienced?'—records that were very innovative. Over time, you learn those techniques, and I've learned how to apply similar techniques in Pro Tools. I'm not going to take a reel of tape and turn it upside down to get a backwards reverb, but I can get the same effect in Pro Tools, plus it's a lot quicker, and I can make it very precise. If I want that trail to be exactly 2½ seconds long, then that's how long it's going to be.

Do you rely heavily on plug-ins for processing?

I don't believe in outboard gear for processing. I should take that back: I love outboard processing but I don't believe in documenting patchbays. I don't

believe in writing settings down. Plus, to me, the plug-ins in Pro Tools are very musical sounding, they're very versatile, and I can automate them. It's nice to have a big, shiny rack of effects, but I'm having a hard time saying that they really sound that much better.

Even analogue compressors and equalisers?

If I had all the time in the world and three assistants, I might use them more but I don't. These days, I like the consistency that I get from a digital audio workstation. I know that it's going to be the same way next time, and, to me, that's more valuable than some of the esoteric benefits of using classic outboard gear.



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INTERVIEW

Do you have any special drum miking techniques?

I use fewer mics than a lot of people do. I like to use a kick, a snare, a couple of overheads, and a couple of room mics but I don't like to closely mic every individual drum. I think that a lot of people over-mic drums just because they can. The best-sounding drums are pretty much the sound of the drums in the room. My favourite mic technique is, first, picking a studio with a decent-sounding room—you'll save a lot of time and money in the long run. I think the main reason that big production recording studios are never really going to go out of business is that they have great-sounding rooms. And sometimes you need a great-sounding room and there's no way around it. And if you've got a great-sounding room, you don't need as many microphones to get the sound.

What drum mics do you use?

Lately I've been using a lot of CAD mics. They've got a kit that's designed pretty much for drums—dynamic mics for the toms and kick, and some really nice condensers, similar to the AKG 414, that work well as overhead mics. For room mics, I'm at the mercy of whatever the studio has, but if they have some Coles ribbon mics hanging around, I love those. If they have an RE20, I love using that for a floor tom mic. If they've got a Sennheiser 421, I don't mind using that as an alternative kick drum mic. If they've got a Telefunken 251, that can be handy if you really need a lot of sizzle. On the snare I've been using the CAD TSM411. It's a small dynamic mic and it's good for use up close—you can beat the hell out of it, and it won't die. The 57s work great, too, though.



What's your technique for recording guitar?

I use the guitar Pod a lot. If I'm miking an amp, I'll tend to use a combination of a 57 up close and maybe a U47 for the room—if there's a room. The real problem with recording guitars is the same problem with recording drums—if you don't have a good room, you may as well just go direct and add ambience in later. So how you record depends on what you've got to work with, room-wise.

What are your microphones of choice for vocals?

I'm going to sound like a CAD advertisement but they've got this new thing called the Vx2. It's got two tubes and variable patterns, and it's one of the best-sounding mics I've ever used for vocals. I've been using it lately with Uncle Kracker, I've used it with Youngstown, I've used it with Meredith Brooks—I really like that mic. I also like any good Neumanns.

Interestingly, if someone's got a thin voice, I've found

that a thinner mic like a 414 actually works for them. A lot of people would go the other way, with a heavier duty mic like a Neumann, but sometimes, with a reedy voice, something like a 414 captures the reediness.

Another vocal mic that I've used a lot is the Shure SM7. I learned about that when I was an assistant engineer working with Gerard Smerek. It's a dynamic mic, so it's got the punch and the impact handling capability of the 57 but, to me, it's a far superior-sounding microphone; it's got lower noise—it's just better all around. It's just about my favourite vocal mic if you have a powerful voice. When we cut *The History of Rock*, I used the SM7 on Kid Rock's voice most of the time. I also used it on Uncle Kracker, on Anita Baker, on Bob Seger, on a lot of different singers—that shows you how versatile it is.

Since you believe in making decisions early on, you may not spend as much time on a mix as some other people do.

If I get a good recording, I find that I don't have to spend as much time mixing it. In fact, I really try hard to make it sound good before we start recording by working on the arrangement of the song. Whether it's all MIDI or whether I'm playing all the guitars and basses, I'm going to work out an arrangement for the song. It's not going to be like all this stuff is playing all the way through, and then the mixer has to do the arrangement by muting things. I want the song to be arranged beforehand. Paul Buckmaster, who's the arranger for Elton John, is a very good friend of mine, and I've learned a lot about arranging from him. When you arrange songs beforehand and you record them that way, you find that a lot of the time that it takes to mix goes away. Some of my mixes can be pretty complicated, because a lot of the sounds are heavily processed, but that sort of straddles the line between production and mixing. □

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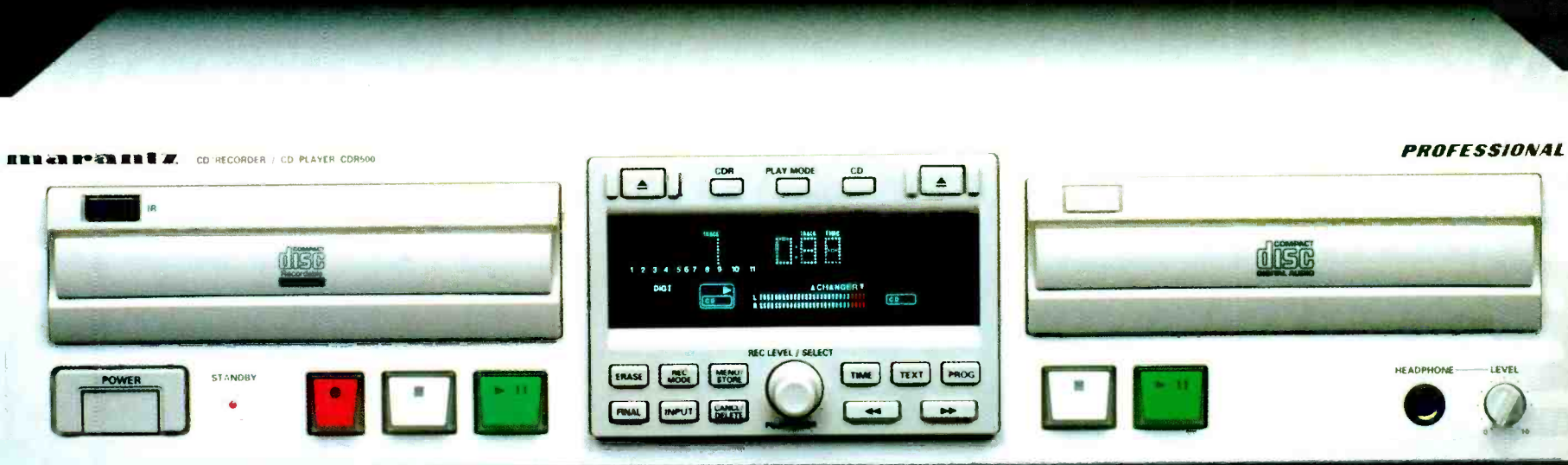


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FLOATING EARTH MOBILE

Running a specialised classical recording company takes enthusiasm and self belief indistinguishable from bravery. **Dave Foister** hitches a ride in a new mobile that is strictly for the bold

TO INVEST THE MONEY required to build a truck especially for classical recording is not for the feint-hearted. Welcome then to the brave and enthusiastic world of Floating Earth, one of the best-established outfits in its field anywhere on the planet. With a track record that includes award-winning broadcasts, platinum, gold and silver CDs and webcasting, and a client list including most of the major record labels, BBC TV and radio, Channel 4 and a host of other broadcast and production companies, it goes way beyond the bunch of fulfilled but skint keenies that sometimes constitutes this specialised operation. Floating Earth has been a successful business since 1987, with impressive West London premises including Harris Grant editing suites with a view. It already owns four complete location recording rigs and the vans to deliver them to the venues: now its full-blown truck is about to hit the highways, providing a full mobile control room specially geared to the requirements of location acoustic classical (and jazz) recording.

The standard picture of this kind of work involves turning up at a venue—usually a familiar one since there aren't that many suitable places—and unshipping a vanload of equipment into a room inside. The room is generally chosen for convenience or because there's simply no choice, and is rarely ideal for monitoring. It's usually made to work because the people concerned have used it before and know how to get away with it, but compared with the kind of control rooms the industry now expects it's usually hopelessly inadequate. There have been many occasions where Floating Earth has dry-hired a rock 'n' roll mobile (the Manor and Fleetwood trucks are favourites), notably at venues where there is simply nowhere suitable like Glyndebourne, but even these are not ideal as they're built for a different set of requirements. Here the emphasis is on low noise floors and purity of signal paths rather than on heavy manipulation, so a purpose-built truck designed around those criteria is a dream come true. Once it would have seemed absurd that this area of the business could justify spending a quarter of a million pounds on a vehicle like this, but the shifting emphasis of the industry

coupled with the scale of Floating Earth's operation has made it viable.

The truck itself was built by Spectra, who also build specialised vehicles for other industries including Formula 1 (not the cars, the trucks to put them in). Acoustic specs were a joint effort between Spectra and Floating Earth with a few off-the-shelf components, notably the RPG rear-wall diffusers. The space requirement doesn't demand an artie, so the platform is a rigid chassis Mercedes Atego 815, and the overall length is quite modest at 8m; despite this, the interior is spacious and comfortable for engineers, producer, possible video people and more, even though it's equipped for surround monitoring. This is partly thanks to the choice of desk: one of the first Sony DMX-R100s to be sold.

There's a sense in which the acceptance of a piece of equipment by the classical fraternity stamps it with a special seal of approval. The O2R knew it had made it when purist classical people started using it, and the same goes for the Genex M-O recorders. Both of these are to be found in abundance through-

out Floating Earth, but this time it's Sony who can point to classical endorsement of the signal integrity of its mixer. The appeal came from several aspects of the console: sound quality aside, its small footprint, its surround monitoring capabilities, its processing capabilities and its digital I-O arrangements are just a few, to say nothing of the price. The desk arrived ahead of the truck's readiness to receive it, so was checked out on some production work in the studios, to universal approval.

Analogue signal paths don't come into the truck's equation because it has jumped with both feet into another relatively new technology: CobraNET fibre multicore. It's not new for mobiles to site mic preamps within the venue and run line level or digital—even optical—signals to the truck, but this is one of the first installations to use CobraNET, a single fibre carrying up to an astonishing 192 channels of AES-EBU signals. At the stage end are Rane NM84 network microphone preamps, remote-controlled preamps in racks of eight, of which the original four have been upped to six since work began. The



NM84s have built-in 24-96 convertors, and the signals from all of them run together down the single fibre. At the truck end are QSC CobraNET decoders delivering AES-EBU straight to the machines and/or the console. There's a dedicated screen and keyboard next to the desk for controlling the pre-amps' configuration, control signals also obviously running through the fibre. The system also provides return feeds, whose obvious uses include talkback and playback, and Floating Earth's complement now allows 48 channels from stage to truck and 16 returns. The advantages of this kind of set-up are well-established, with its avoidance of hum difficulties between truck and venue, its immunity to HF losses over long runs, and its simplicity when it comes to rigging. The CobraNET system handling this much communication down the one fibre takes the concept to new lengths. Speaking of which, Floating Earth carries 200m of fibre—50m more than they'd normally expect with traditional multicore—and has access to a further 200m if it should be required.

All of this has been researched and specified by ex-US sports OB engineer Mark Harrison, who has also applied his experience to the mains supply for the truck, which is balanced mains to avoid hum problems—quite appropriate considering the company's name. The result is a power supply that is claimed to be more consistent and reliable than that in most studios.

The digital signals from the QSC CobraNET decoders can be split out to multiple destinations within the truck. Here the Sony's XLR access to its AES inputs is useful as compared with the multiway connector approach, giving substantially more flexibility. Signals can be sent to the desk, direct to the

recorders—or both. Standard equipment for recording at Floating Earth these days is the aforementioned Genex 8000 magneto-optical disc recorder, and the truck carries a pair of these along with another new acquisition, the Mackie 24-track hard-disk recorder. Machine control for the Genexes and any video machines is managed at the desk, with a dedicated remote alongside for the Mackie, with an associated display screen. There is also provision for hooking up Tascam DTRS MDM machines if they are needed, as of course they may be for picture work.

Another rack carries four stereo machines: two CD recorders, Sony time code DAT, and the unique Tascam DA-45HR 24-bit capable DAT machine. As would be expected in a truck assembled for classical work, outboards are pretty thin on the ground—there's more communications equipment than signal processing gear. There are no compressors, gates or



Limo Hearn (Floating Earth); Steve Angel (HHB); Steve Long; Mark Harrison; David O'Carroll (Floating Earth); Alan Johnson (Sony UK)

other dynamic processors beyond the facilities built in to the DMX-R100. The little outboard there is an interesting selection of reverb devices, and again acquires a certain authority from its inclusion here: there's a tc electronic M3000, and a Quantec Yardstick, the re-released version of the classic Room Simulator. The emphasis on being able to simulate and enhance real spaces is immediately apparent.

The subject of reverbs brings us round to surround. Floating Earth has been looking at both the Lexicon 960 and the tc System 6000, but has yet to take the plunge on either; the point is that a facility that would once have been stereo pure and simple is

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Steve Angel (HHB); Steve Long (Floating Earth); Alan Johnson (Sony UK)

now equipped for surround and has to consider these options. This partly reflects the increasing interest in surround for audio-only music recording, but is also an indication of the expanding market that has made the truck viable at all: video, particularly in relation to classical music. The Sony desk has the necessary facilities to work in surround, and for monitoring there are two quite separate systems. One is the favourite Floating Earth pair of B&W 801s, as found in all the control rooms, but the other is a matched set of five Genelec 1029As, wall-mounted and small enough that the centre channel sits between two picture monitors and in front of the outboard racks without obscuring any of them.

The importance of all this was shown by a mix that was going on within the Floating Earth mix room while I was there, of an operatic production recorded in surround. This was Owen Wingrave, a project for Channel 4, and the shoot was unusual in that the singers sang live to the cameras accompanied by a pre-recorded backing track, making the mix complex (a Yamaha DMC-1000 and an 02R working hard in automated tandem) but the final effect far more involving than the usual miming. The thing is that although the work I saw was recorded before it was available, the new truck can run a session like this standing on its head, including managing the video.

Behind the mixing position is more furniture, centred on a desk that can be moved backwards and forwards as required. For sound-only work, it's a guest and listening area, with plush fitted seating in front of the rear-wall's RPG diffusers. For video work it can become the video area, built around a Global Streams Trinity system, handling eight digital component inputs with comprehensive editing and effects capabilities. The plan is to carry robotic cameras, but while the possibilities are being explored the necessary equipment and manpower is hired in when required.



Mark Harrison (Floating Earth)

to adapt to the changing face of the associated technology, and the truck is a good example of this approach.

For instance, another area that Floating Earth has found itself increasingly involved in is webcasting, partly because it has close links with the Global Music Network through Company Secretary Steve Long, who is also production director and senior vice president of GMN. There is a room within Floating Earth's building specifically for web work, and the facility has produced, encoded and broadcast many concerts for Internet broadcast. No surprise then that the truck is equipped for live Internet work;

there is an on-board Pro-Bel Chyron encoder that converts to Real Audio or Windows Media formats ready for transmission via ISDN or satellite uplink. There are high hopes for increasing involvement in this market, building on the large audiences attracted across the world, and particularly in the US, for Floating Earth's broadcasts of major concerts by leading international artists.

This then is a truck with a mission. Determined to allow themselves a better starting point than the average in-house 'control room', the Floating Earth people are taking advantage of the opportunities presented by the way multimedia and technology are developing to give themselves the facility they've always needed, and to do it uncompromisingly their own way. Expect to see it parked at a venue near you soon; if you don't, hire it yourself—it's available for rent with or without crew. There's probably nothing else like it on the road. And yes, it has a kettle and a fridge for beer. □

Contact:

Floating Earth, UK
Tel: +44 20 8997 4999

Floating Earth clearly knows what's needed for the work that's on offer and although the equipment is not yet built in to the truck, the necessary space and wiring is being pre-installed.

It's the increasing recognition of the importance of audio accompanying pictures that has helped justify the commissioning of the truck. It's a standing joke that on the average shoot audio is less important than catering (as one wag remarked, 'yes—and on this shoot there's no catering') but the push to exploit new media may be changing that. To get in on this means being able



Steve Long (Floating Earth)

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ELVIS—THAT’S THE WAY IT IS

Adding unseen footage to Elvis Presley’s 1970 film was only the beginning of a restoration that saw a complete digital surround soundtrack replace the original mono. **Kevin Hilton** talks to Bruce Botnick about old masters

ELVIS AARON PRESLEY is one of the true icons of the 20th Century. Not just for his voice or his melding of black rhythm-and-blues, gospel and white country blues, but for his look, which inspired countless handsome young men to become rock ‘n’ roll singers in the years that followed. The dangerous, snake-hipped phenomenon of

the mid fifties, the neutered all-American boy later that decade, the leather-clad Guitar Man of the late sixties and even the bloated Las Vegas Elvis are all strong, indelible images.

The recordings are undoubtedly Presley’s strongest legacy but it is the visual aspect that truly helped create and sustain the Elvis legend. From the noto-

rious pelvis-shaking on *The Milton Berle Show* in 1956, through the shot-from-the-waist-up-only appearance on *The Ed Sullivan Show* (the stone-faced host vowed that the singer would never appear on the programme but ended up paying \$50,000 for the privilege), to dressing in top hat and tails to sing ‘Hound Dog’ to a basset hound on *The Steve Allen Show*, Elvis Presley’s image has usually been filtered through a screen.

This has been reinforced by his mostly derided movie career. It all started well with the Don Siegel directed western *Flaming Star* and reached iconic heights with *Jailhouse Rock* and *King Creole*, but these were soon undermined by an unrelenting annual spew of cynical marketing vehicles. It is these thin excuses to string a few songs together that come to mind when discussing Elvis’ films but he also made a number of live concert features and documentaries.

With his flagging career revived by the Elvis TV special in 1969, Presley went back on the road during the early seventies and seemed keen to undermine the myth that had grown around him. In 1970, film maker Denis Sanders directed *Elvis—That’s The Way It Is*, which presented a star who was only too aware of the power he possessed, both naturally as a performer and as an international recording artist.

Seemingly riddled by self-doubt and indecision, Presley clowned around both during rehearsals and on stage, leaving his backing band sometimes bewildered by his antics. The King seemed comfortable to parody himself—ironically several years before unwittingly becoming a self-parody during the white jump-suit Fat Elvis period—and used his undoubted charisma to enjoy himself for once.

A favourite with fans, particularly on video, *Elvis—That’s The Way It Is* has now been restored and remastered, with additional footage and a new digital surround soundtrack to replace the mono audio of both the original feature and home releases. The main impetus was to mark the 30th anniversary of the film but there was an even simpler aim, the desire to see The King in performance again.

The faintly creepy and dubious ‘live concert’ of a few years ago—when Elvis’ backing band ‘accompanied’ old footage of the singer—was a success but resurrecting a complete performance where he is truly interacting with his musicians is preferable. ‘We think Elvis should be seen on the big screen,’ explains Rick Schmidlin, the producer who supervised the restoration of *Elvis—That’s The Way It Is*.

Schmidlin has built up a reputation in rock ‘n’ roll and film restoration, having worked on two Doors movies—*Dance on Fire* (1985) and *Live at the Hollywood Bowl* (1987)—and the reconstruction of Erich von Stroheim’s *Greed* (1925) and Orson Welles’ *Touch of Evil* (1958). Having already worked for the Turner Entertainment Company on *Greed*, Schmidlin was approached when a vast amount of unseen footage of the Presley movie was discovered. ‘They knew that not only did I like Elvis but that I



love live music,' he says, 'and so thought I would be the right person to work on this.'

Between 60,000ft and 70,000ft of negative was discovered in vaults 2,000ft underground in Kansas. This was all in good condition and was re-edited for a modern audience that is only too aware of effective visuals. 'Few people knew how to cut music on film back in 1970,' Schmidlin says. He brought in editor Michael Saloman, with whom he had worked on The Doors features, to cut the pictures; the Morrison and company connection also made his choice of audio consultant easier.

Bruce Botnick is still firmly identified with The Doors but is also firmly rooted in the general recording ethos of the early seventies. 'Bruce knows what it was like being in a recording truck at that time,' explains Schmidlin, 'and he is an Elvis fan and had seen him live during that period and so would have some memory of how the room sounded.' Although the movie soundtrack was mono, analogue 16-track masters were recorded in Las Vegas during the summer of 1970 by engineer Al Pachacki, working for the Wally Heider Remote Recording Company.

Six shows were recorded on two sets of two 16-track recorders using 3M 206 2-inch tape at 15ips NAB. These produced two sets of A and B master tapes of each show. 'The track assignment was 15 tracks of music and one track of 60Hz pilot tone sync pulse,' Botnick explains. 'Time code wasn't widely used in film or television but 60Hz crystal sync was.' One set of these masters was kept in the MGM vault; they were only played once during the transfer to 35mm film. The other set, in Botnick's words, lived in RCA Records' Hollywood tape vaults.

Despite this, there was still difficulty in tracking down these masters. 'After the idea for the show was sold to Turner, the search began for the original MGM 16-tracks and we came up empty,' Botnick says. 'After contact with BMG, which had bought RCA, it was agreed that 24-track SR analogue copies of the original 16-tracks would be made, as those tapes were in Belgium. As luck would have it, we didn't have to make the copies as the MGM 16-track versions turned up the day that a purchase order was being generated. So we were now in great shape.'

Rik Pekkonen, a well-known music engineer, was



engaged to mix these tapes. After careful discussion, it was agreed that Pekkonen would resolve the 60Hz pilot tone and transfer the material onto a multi-track digital format. The analogue master tapes were transferred A-D at 24-bit/48kHz to a Digital Music Technologies high-density digital audio system that comprised dB Technologies A-D and D-A converters and a Radar hard-disk recorder.

During the mix, the new code was then resolved to NTSC video and the songs were synched in phase against the rough edit video. The mix was performed



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POSTPRODUCTION

at Cello Studios using vintage Neve 8038 and 8078 consoles. After this, the finished mixes from the Radar were transferred D-D to Pro Tools. These were then edited to picture at Soundelux in Hollywood by supervising music editor Roy Prendergast, whose other credits include *Scary Movie*.

While the performance tracks could easily be re-mixed and prepared for today's surround-sound market, Botnick and the audio team came up against a problem with the tapes of the various rehearsals, which help create such a candid portrait of Elvis. These were recorded at the MGM music scoring stage and back-stage in Las Vegas. The MGM recordings of Elvis and his band, which included the lauded James Burton on guitar, the only real inheritor of Scotty Moore's position, were recorded in the control room instead of the famous recording stage.

'The control room is bigger than most pop recording studios and can easily hold a 60-piece orchestra,' Botnick outlines. 'They recorded the rehearsals on 1/4-inch 2-channel Nagra with a pilot tone. So these tapes were transferred A-D at 44.1kHz in Belgium onto CD-R. In turn these CD-Rs were transferred D-D at 44.1kHz to a Radar hard disk recorder and referenced with 59.94 NTSC video sync. We then pulled this down and sample rate converted from 44.1kHz to 48kHz/24-bit, then re-recorded D-D to a DA-88.'

As Botnick exclaims, 'Whew, what a process!' But the trials and tribulations of the audio restoration were not over. The rehearsal tapes posed a further problem to the creation of a modern 5.1 film soundtrack. 'The layout of the instruments and Elvis's vocal was very strange,' Botnick muses. 'Elvis was assigned to the left, the drums and bass to the centre and the guitars to the right.'

To turn this tape into a multitrack recording and place Elvis and his band in what is generally con-

sidered to be the proper place, the engineers used a Dolby 424 matrix. 'If you put in two channels of music that have a phantom centre, it will strip out the centre channel and give you back three channels of information,' Botnick observes. 'After this process it was easy to re-assign the channels on the console so



that they would come up properly: drums and bass on the left, Elvis in the centre and guitars and piano on the right.'

The applause was 'built' and edited by the supervising sound editor at Soundelux studios, Gregory

Hedgepath, and then mixed at associated company Todd-AO Hollywood's dubbing stage A. Mixing took place on an AMS Neve Logic 2 3-operator console, with playback D-D from two Pro Tools systems. Each mixing engineer handled 96 layered inputs: Botnick taking care of the music and re-recording

mixer Jim Fitzpatrick dealing with applause and effects. Reverb and Finalizer effects were sourced from a te electronic System 6000. The final digital mix was recorded on redundant D98s for the 48kHz/24-bit 5.1 and Dolby matrix versions.

SDDS and Dolby Digital (which will feature on the DVD to be released in September) versions were made from this reconstructed mix. Rick Schmidlin says that it was his intention to give the cinema audience a sense of what it had been like to be in the original theatre watching Elvis and his band. 'I wanted it to be a performance, rather than just a movie mix,' he says. The restored film was debuted before an invited audience of fans at the Orpheus Theatre in Memphis, home of Sun Records and site of Elvis's greatest achievements.

The full Cinemascope theatrical version was screened at last year's London Film Festival and has been shown in cinemas around the rest of the UK, thereby giving British fans a chance to see their idol in an almost-live setting, something they never got the chance to do during his lifetime as he never toured Europe. The whole restoration process took approximately nine months but the critical response appears to have justified it.

Even if it hadn't, the audience would still be there for *Elvis*—

That's The Way It Is. When a contemporary icon like Madonna admits 'Elvis Presley? He's God', you know you're dealing with something special, even if you're not a massive fan yourself. Obviously Elvis has never left the building. □



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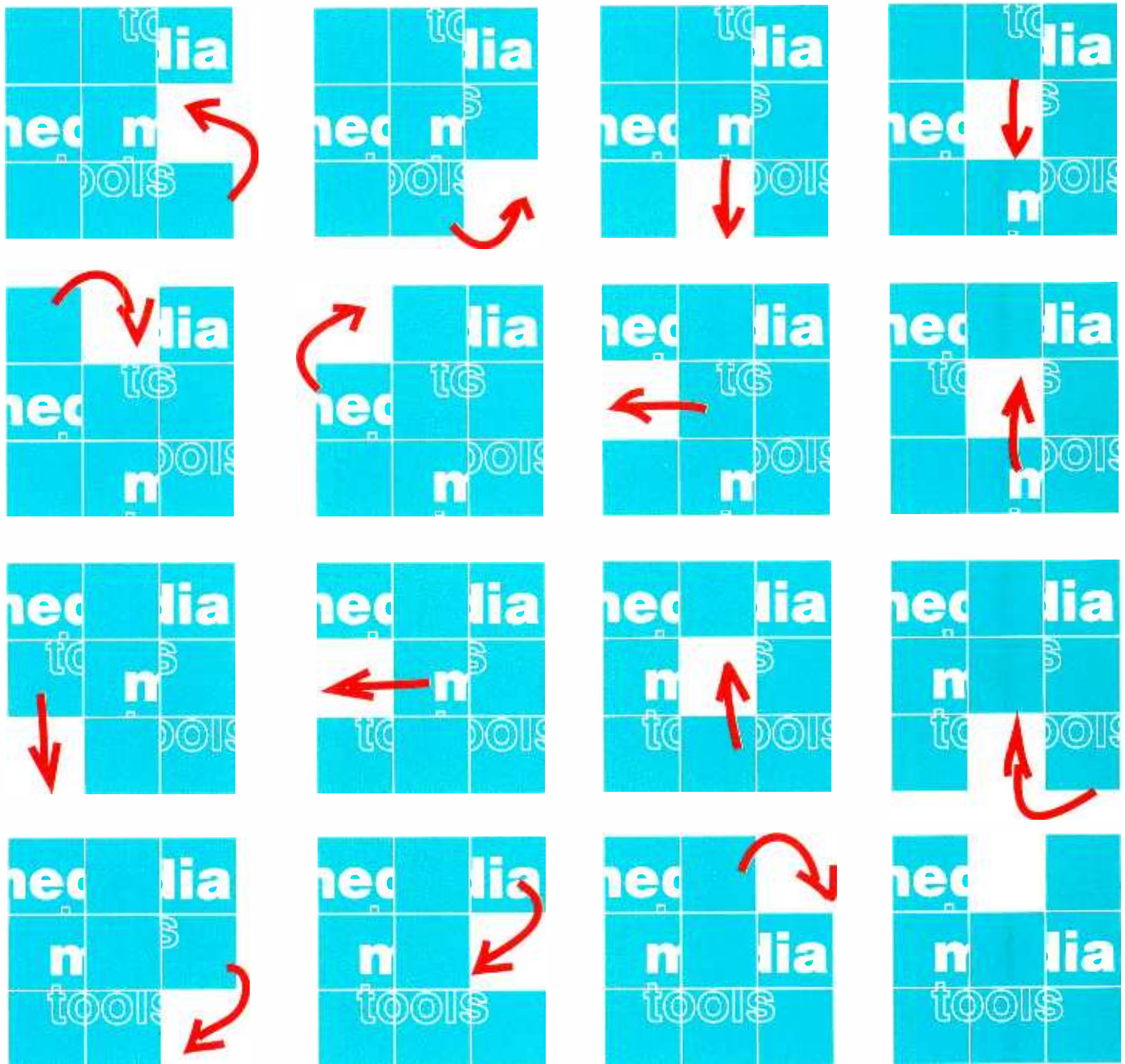
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BREAKING DOWN THE DAW

With DAWs now a regular part of working life, it is tempting to treat them as any other piece of kit. But the questions they raise and the problems they pose still set them apart, says **Rob James**



DIGITAL AUDIO WORKSTATIONS have now become an established feature of the landscape. A mere 15 years ago, however, they were as rare and remarkable as white tigers. And there is another similarity—both possess awesome beauty and power which can and will bite the unwary.

In the formative days, choosing a DAW was reasonably simple: if you could find one that did something useful and the numbers added up, you bought it. But early examples were emphatically not commodity items, with hardware and software on the 'bleeding edge' of technology. Their first users quickly discovered their initial decision was just the beginning and found themselves drawn into complex relationships with manufacturers in order to protect their investment. Thankfully, DAWs

are a lot more common and less fragile nowadays. However, so much 'choice' can be bewildering both for established users looking for new machines and for beginners trying to work out where to start. So it's worth noting that the *DAW Buyers Guide* from SYPHA is an excellent source of primary information, listing over 150 workstations.

I have never heard anyone say they have found the perfect workstation 'solution'. This may partially explain one curious phenomenon observable in otherwise sane and rational people—the tendency to be seduced by new, untried and often unavailable kit. Consequently, salesmen are adept at presenting an invitation to beta test their products at your expense as an opportunity to 'mould the system to suit your requirements'. Anyone embarking on this path should do so in the knowledge that reality seldom lives up to the promises and that software delivery dates operate in a different time-continuum to the rest of the universe. I know, I've been on the receiving end more than

once. Occasionally, there is a good reason to go this way but people frequently buy into the dream of 'jam tomorrow' when there is a perfectly adequate and proven system available now.

Simply going shopping for a DAW is asking for trouble. You should start with a detailed analysis of the complete production process. This may be as apparently simple as editing analogue 1/4-inch tape or as complex as a sound for picture production chain. In either case, or indeed any of the myriad of other processes, time spent properly analysing what you are trying to achieve will save heartache and expense whether you are buying your first DAW or replacing 10 of them in a big facility. The product of this analysis should provide a list of essential features and a further list of desirable and undesirable features and characteristics.

There are three broad categories of workstation. First, there are so-called 'hardware' machines. At the high-end these include the Akai DD1500, AMS Neve's AudioFile, DAR's Storm and the Fairlight MF3. Lower in cost, Yamaha's AW4416 and other digital multi-trackers from the likes of Akai, Fostex and Korg. Next there are the DAWs that use a recognisable personal computer in conjunction with additional proprietary DSP processing hardware and software. These may or may not have dedicated hardware control surface(s) as with Digidesign's Pro Tools, Soundscape's REd, SADIe and Waveframe's 7. The last is a good example of the use of OEM DSP boards—in this case Merging Technologies Mykerinos, used in their own Pyramix system but also sold to other manufacturers. Finally, there are the so-called, 'native processing' designs. Creamware's TripleDAT, Steinberg's Nuendo, SEK'D's Samplitude and Sequoia, Sonic Foundry's Sound Forge and Vegas, Syntrillium's Cool Edit Pro are all primarily audio packages. Steinberg's Cubase, Cakewalk, E-Magic's Logic and MotU's Performer started life as MIDI sequencers but now have serious audio capabilities. Native processing means the computer's CPU handles the DSP functions, user interface and display. The only additional hardware required is audio I-O (plus sync MIDI and time code). In some cases DSP boards can be added to a system to do some of the work. Creamware's Pulsar, Yamaha's DSP Factory and Soundscape's Mixtreme are just a few examples of this approach.

A further group is emerging from the ranks of hard-disk tape recorder replacements. The Mackie HDR 24/96 is already more than half way to being a full-blown DAW and the Tascam MX2424 is showing signs of moving the same way.

This categorisation is blurred by machines which appear to be bespoke but actually leverage PC hardware concealed inside a custom casing. The DSP Postation is a good example here. DAW software may or may not sit on top of some flavour of Windows, BeOS, Linux or one of the industrial OSs.

None of this is particularly relevant to a purchase decision. There are far more crucial parameters to consider.

Storage and connectivity for one, the number of simultaneous inputs and outputs and the limits on the number of simultaneous audio streams, buses, EQs, dynamics, effects and plug-ins.

There are a number of aspects to storage; on-line or archive, the physical medium, the interface, performance, compatibility and reliability. Originally, there was really only one choice. Local, dedicated hard drives using a SCSI interface. Current EIDE drive performance is more than adequate for audio use and FireWire is showing promise. SCSI drives remain far more expensive than EIDE but are more convenient where multiple drives are involved and are perceived to offer greater reliability.

M-O (magneto-optical) and removable platter hard drives such as Jaz have largely failed to live up to expectations, although they remain a good option for some applications. For back-up, Exabyte tape is still popular with DLT also in evidence. CD-R is common and DVD-

RAM is already making itself felt. Once a winner emerges from the writable DVD standards battle, prices will fall and I have no doubt this will become the obvious choice for local back-ups.

Fast on-line networked storage is rapidly becoming a practical option although still expensive. Meanwhile, networking already offers the quickest and most convenient methods of backing up projects and moving them around. However, it is important not to lose sight of the overall picture. It may take an hour less to move a project across a network than by 'sneaker-net' but this will be insignificant if it takes a day longer to complete, say, a dialogue tracklay because the DAW is slower in operation than one without networking. If projects need to be physically moved it is more convenient if the entire project is on a single, removable drive.

Questions to ask depend on application. Mostly, it comes down to disk bandwidth and the way in which the DAW deals with crossfades. This is a contentious area of difference between rival designs. Can crossfades be performed on a single track with overlapping audio? Are fades and crossfades performed in real-time on playback or do they have to be rendered to disk? How long does this take? Real-time fades may be a big time saver when editing, since they can be changed without re-rendering. But a real-time crossfade requires two data streams per track for the duration of the fade. If rendered, less disk bandwidth is required but there are a lot more files. RAM buffering is used to reduce disk bandwidth. If excessive or badly implemented the downside is a less responsive system, since buffers take time to load and flush, and tracks may be 'dropped' if fades are too long or across too many tracks. In general, machines which render provide more tracks per disk.

Perhaps the biggest can of workstation worms is compatibility. If you need to move projects between different machines there are several possible methods. The most basic method is to simply do an audio transfer. Next comes conforming raw audio to an EDL and beyond this various levels of project exchange, either by physically moving the storage or via a network. The issues here are the physical medium, the file structure and the EDL. Even where a DAW claims to support the formats you need it is wise to insist on a realistic trial before making a decision. In sound for picture work auto-conforming from an EDL and re-conforming may be essential features.

Some other things to consider include how many events and/or cues are allowed per project, per disk...? Does the system slow down with a long EDL? What type(s) of analogue and digital audio interface do you need and how many? If the DAW does the mixing less outputs will be needed. What sample rates and bit depths are supported? Is real-time sample-rate conversion and dithering included? Is there a requirement to record while playing back and what about latency? If punch-in and out performance is important, check if multiple successive punch-in and outs are allowed and how long it takes for the monitoring to switch back to replay when punching out. Do you want reverse play, good scrubbing and jogging and at what speeds?

What EQ, dynamics and effects are included? Are there filters as well as three or four bands of EQ? Are these inserted in tracks, buses or are they clip based? Or all three? Are all effects available all of the time, or are there limits? Are plug-ins supported? What types? Are all parameters automatable? Do they sound good? Are mixing and effects provided? If so is the internal processing adequate (it should be at least 32-bit floating point)?

And what about the user interface? There is no 'one size fits all' answer here either. A simple, dedicated hardware controller with no screen may be perfect for simple,

fast or repetitive tasks but less satisfactory for sample level precision editing. The standard WIMP (windows, icons, mouse and pull-down menus) computer interface, with keyboard 'shortcuts' may be the answer for a DAW which aims to offer every feature known to man and then some at the lowest possible price. However, the combined approach where custom keys, faders and controls are supplemented by a screen display, mouse and alphanumeric keyboard is generally acknowledged as the most versatile and efficient answer. Manufacturers are converging on this solution from their respective directions. Dedicated hardware makers such as AMS Neve

are adding plug-ins, networking and larger screen capabilities with their new AudioFile SC (Studio Controller) computer. Fairlight is promising VST plug-ins on the new Fame II and Prodigy II. Digidesign, meanwhile, is approaching the issue from the opposite starting point



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Above: SADiE
Right: Yamaha AW4416

with ProControl, and the more recent Edit Pack and Controll24 surfaces. Third-party controllers are supported by many manufacturers, thus a Mackie HUI or JL Cooper control surface can be used with Pro Tools, Soundscape's REd and others. Steinberg and E-Magic are joining in. Steinberg has announced the Houston control surface, and Mackie is producing a new controller specifically for Logic.

Where a DAW is to be used with MIDI, video or external machines another set of criteria comes into play—is the timing based on MIDI or audio? With DAWs that have grown out of sequencing applications such as Logic or Cubase MIDI timing rules—change the tempo and the audio goes out of sync. In Pro Tools

and others the opposite applies—audio is locked to absolute time so a tempo change leaves the audio where it is while the MIDI goes out of sync.

Do you need integrated video? Is there file compatibility with video editing systems? What picture quality do you need? If you use a separate video machine how is it controlled? Time code chase could be an option but proper 9-pin control enables tight sync between sound and picture when jogging (highly desirable when spotting effects or adjusting sync).

If there is a track display do the tracks scroll? With a moving cursor you can bet your life the bits you are interested in will always be around the 'page turn' point. How



smooth is the scrolling? Are the horizontal and vertical zoom functions suitable and is there an overview of the whole project? How is multichannel source material handled, stereo,

LCRS, 5.1 and so on? If multichannel material cannot be dealt with in one operation editing can become fiddly and time consuming. Is there multichannel panning, busing and monitoring? What about the editing functions? Are there unique file identifiers and multiple time-stamps? Can cues be locked in time but allow movement from track to track and trimming or fading?

Do you want a 'plug-and-play' system or are you

prepared to delve further into the technicalities in order to achieve results? A surprising number of DAWs, including some of the big ticket names oblige the users to get their hands dirty in order to get the desired performance. This involves manually setting parameters such as buffer sizes, automation thinning and so on, and can become an infuriating juggling act as the limits are approached, usually in a busy session in front of the clients...

Learning curve is frequently underestimated. A highly complex system is unlikely to be suitable for occasional users or non-specialists whereas a simple machine such as the 360 Systems Short Cut can be learnt by an eight-year-old in an hour or so. Many systems require days of training and months of practice to achieve real proficiency. Factor in the cost of training operators to the system price.

Speed of operation for your specific process is essential. Once you have a short list consider doing a 'shoot out' on some real material not just the manufacturers demos which are naturally designed to make their systems look good.

Other cost considerations are residual value and keeping up to date. Do you have to pay for software updates? How often do they appear? With PC and Mac hosted or native processing systems consider how quickly the technology changes. In the relatively short history of DAWs, dedicated hardware systems have generally cost more initially but required fewer expensive upgrades to stay current and have demonstrated better residual values.

The final decision is always a compromise. The trick is to make sure the things that are essential to your operation are rock-solid—now—and not promised for the next software revision. □



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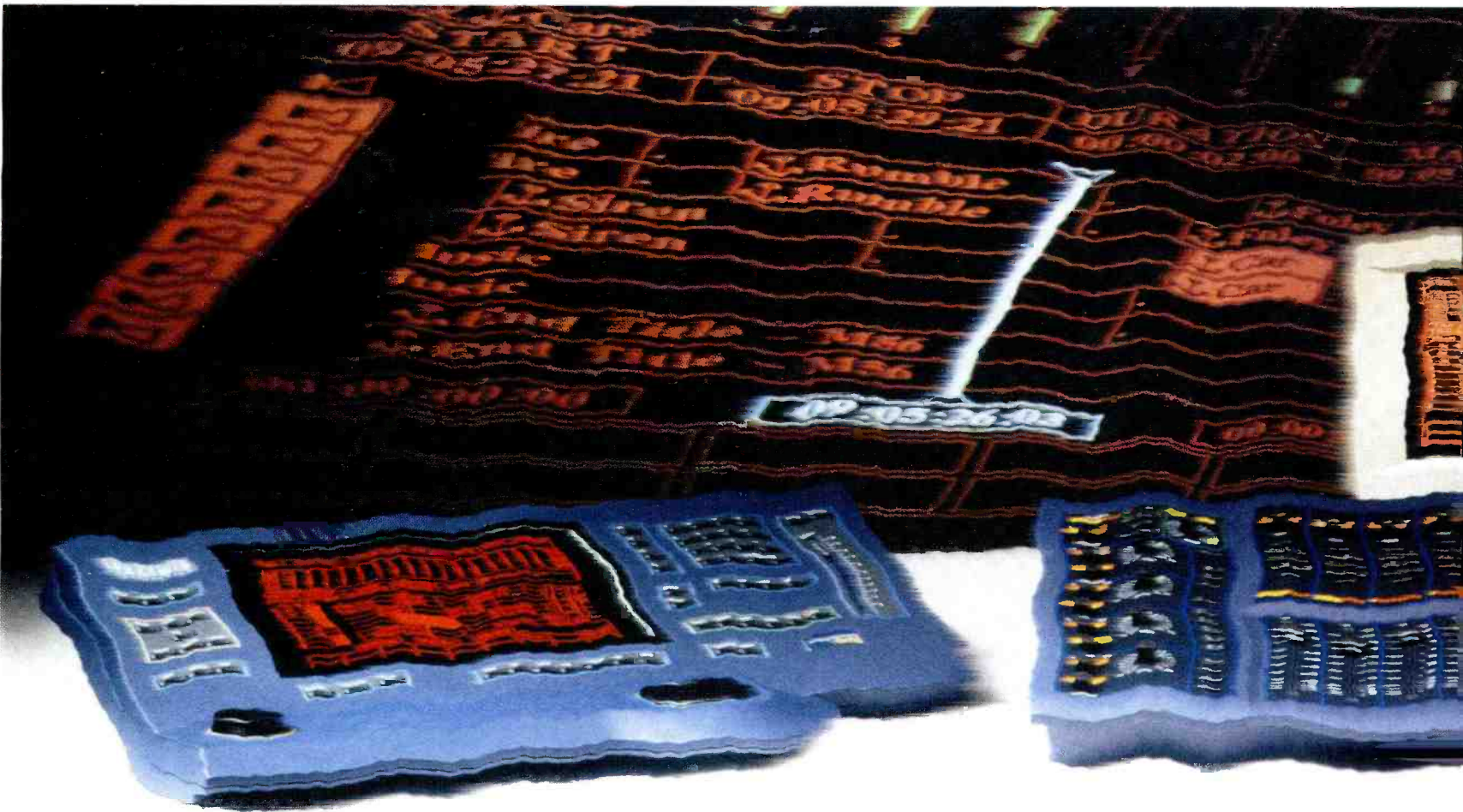
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STORAGE FOR DAW

When is a hard disk not a hard disk? Whether you are in corporate IT networks, a video edit suite or a recording studio, a drive is never just a drive as Glyph's **Keith Warburton** explains

WHEN CHOOSING A DRIVE for AV use, you will discover that most manufacturers these days have implemented basic settings into the firmware or setup of the drive to handle your requirements. However, any off-the-shelf hard disk is configured to (i) give optimum performance when running a bench test (it helps to sell the drive off the back of magazine reviews) and (ii) needs to work equally well for a web server and a 64-track heavy editing audio environment. For this very reason a couple of companies specialising in the AV industry take a standard drive and re-program this for optimum AV use.

As most PCs and Macs nowadays are expected to be connected to the Internet, their hard drives are designed to stream movies, play MP3 files and handle large graphics files as well as dealing with ever-growing operating system demands. It is for these reasons that different drive configurations are needed.

If we take audio for example, the requirement (worst case) is for 32–64 tracks of multiple files of which there could be anything from a few hundred kilobytes to a couple of hundred megabytes with four crossfades per second—a tall order. To throw another spanner in the

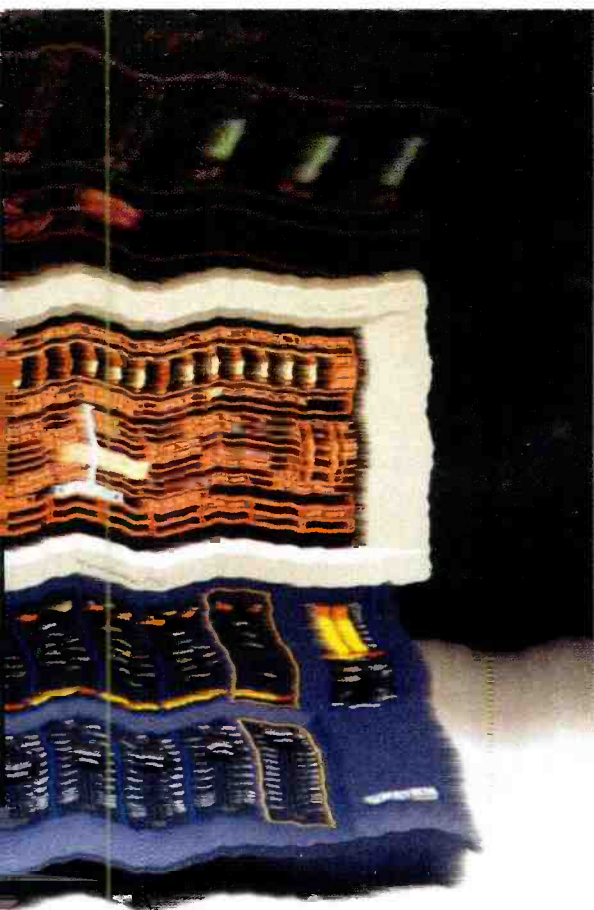
works, there could be multiple drives on a bus type (IDE, SCSI, Firewire or fibre channel) so how should the drive behave?

People ask why, for example, an IDE drive is 60% (on average) cheaper than the equivalent SCSI version? But while the interface itself (PCB) is almost the same to manufacture, however, just by looking at the external design, you can see some mechanical differences. Cheaper components and limited warranties allow manufacturers to cut costs—so if an IDE drive lasts between two and three years with no problems, but needs to be replaced with a new drive during the third year, you know where the savings are being made (if you view the potential loss of data as an acceptable saving). Most IDE drives come with a warranty lasting between one and three years. SCSI and fibre channel drives generally have 3–5 years' warranty.

Comparing the drives from one manufacturer, the platters (the spinning disk part that looks like a record) is the same component in the IDE, SCSI and fibre channel versions. However, the IDE drives have different spindle motors at present: they spin at 7,200rpm whereas SCSI and fibre channel versions run at 10,000rpm

and 15,000rpm. Additionally, with SCSI and fibre channel drives, a controller is required, whereas the processor has to do a lot more work with IDE drives. So for audio, if your processor is rammed with disk I/O processing it's decreasing the power available for real-time plug-ins or real-time video effects.

SCSI and fibre channel (FC) drives are superior for AV for the following reasons. Access time along with throughput is much higher (more tracks, faster edits, quicker screen redraws). Fluid bearing motors for smoother operation and they also have a greater track density per square inch (the tracks are closer together for speed of access), and finally there is the 'rotational vibration effect' to consider. Everyone forgets about this one—'rotational vibration' is where a hard disk is mounted in the same enclosure as other drives. The more drives, the bigger the gyro and therefore the greater trouble the heads have tracking data off the platters (an example would be an IDE drive mounted on top of a Mac system HD). Well-designed external enclosures limit this issue and SCSI and FC drives are designed to help eliminate this problem. Tracking errors equal more time taken to write or read data—and fewer edits).



With the above said, what is getting better and were do the gremlins lie?

Certainly all drives are getting faster, IDE instead of running at 5,400rpm (although Apple chooses this for the new 466MHz), most are now 7,200rpm devices. SCSI and fibre channel drives are now running at 15,000rpm—so in real terms, deliver faster edits.

Bandwidth is also increasing. SCSI now provides 160Mb/s (up to around 120Mb/s using multiple drives in the real world) and fibre channel around 200Mb/s. As for Firewire... So far, real-world results with a Mac G4/466 give a bandwidth of around 38Mb/s on the bus.

Rotational speed is very important—as discussed—for audio edits. However, bandwidth is not such an issue as 64 tracks of 24-bit audio is around 8Mb/s, so the UW bus of 20Mb/s is fine. For video (HDTV for example), this requires around 120-150Mb/s, so bandwidth is very important, access time is now becoming more important as real-time multi-layer transitions push for new limits.

To some people, backing up simply means copying data to another hard disk or burning data to a CD. Although this is better than nothing, imagine what would happen if extreme sunlight got to the CD, or it got scratched entering the CD-ROM drive, or if your hard disk had a head crash, or the spindle motor ceased spinning... How much to hire the same session guys with the same mindset as the first recording? If you don't backup we can't enjoy your work.

True backup and archiving in the semi-professional and professional worlds is still based around tape, (some still use optical). Tape used to be slow but now the most common drives use a DDS format offering 20Gb of native backup with speeds of around 2.4Mb/s-



A selection of audio drives

144Mb per minute writing, which would be around £1000 (UK) for a standalone unit. So around a 4Gb session would take around 30mins. Tapes are easy to put in a FedEx carton and shipped across the world for another user to restore.

Tape technology has now moved on in size to 200Gb

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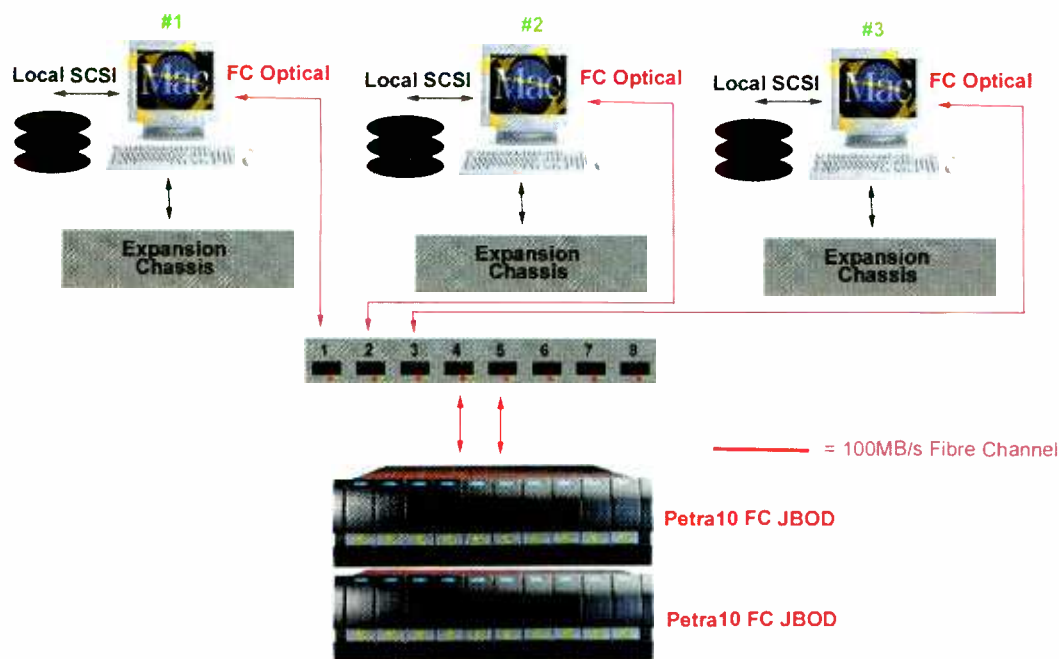
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- Disk 1 ● User#1 Read & Write / User 2 & 3 Have Only Read Access
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Simple 3-user network with Glyph fabric switch, two drive banks showing how the drives are assigned for the users works on a volume-sharing basis

tapes, speeds of 30Mb/s and tape libraries for large facilities allow multiple sessions to be backed up simultaneously with over two terabytes of storage. This is obvious for large production facilities not your average studio. More and more common is the AIT (Advanced Intelligent Tape) designed by Sony, which has a microchip built-into the tape to store the TOC (Table of Contents). As a consequence, search times are down to 18s instead of minutes. With these 50Gb drives cost around £2,500 for the unit with tapes around £60, offer good value for money. (The quicker you restore the more cost-effective your session becomes).

As with all technology the, 'lab conditions' do not really reflect real-world conditions.

The cheapest real-world option is IDE—though it is still limited to a maximum of two drives on each bus and short cable to the host (Not forgetting about tying the processor-system down).

At present a Firewire to IDE bridgeboard is used to bring drives into the Firewire world. Drive manufacturers at this point are holding off releasing true Firewire drives as bridgeboards are inexpensive and heavy investment is required to move things forward. Additionally, Apple designed Firewire and it can change its mind on a daily basis. Some manufactures design their bridgeboards for AV use and tweak the IDE drive attached; this makes Firewire HDs with 24-32tracks of 24-bit audio or single-stream uncompressed video (using hardware like Pinnacles Cinewave and Apple's Final CutPro) possible.

SCSI has the advantage of running multiple drives on the same bus (up to 15 devices using UW/LVD or UI60) in external drive enclosures with lengths up to 8m. However, more than one drive is added to this length per-

formance rapidly starts to decrease. More than 6-8 SCSI drives on a single bus will start to cause problems. SCSI is doubling clock speed to push to 320Mb by the end of the year, but I believe that by next year fibre channel will be very similar pricing to high-end SCSI. (Once again 320Mb/s on copper... I think not).

Fibre Channel allows up to 126 devices on a loop, 16 million devices in a fabric environment, access time slightly better than SCSI due to transmission technology but bandwidth at 200Mb/s. Fibre channel transmission is over copper for up to 30m and lengths up to 20,000m using optical. So, apart from amazing specifications, how will this benefit the audio and video worlds? Answer: the added benefit of fibre channel is networking—allowing collaboration on editing and content creation, sharing of assets, cross-platform security and scalability.

To touch on the potential applications of fibre channel networking, consider an AV production facility in which Studio 1 is using Digidesign hardware and all the best outboard recording vocals or dialogue to its own drives on the network.

Studio 2 is also using Digidesign hardware, this time to design SFX and saving them to the SFX library drive on the facility's network. Studio 3, meanwhile, is performing music design on its drive while Studio 4 is capturing video uncompressed on to the video array. Finally Studio 5 is reading from all the above drives to put the project together.

All the above stations have the capacity to work at 100-200Mb/s (mainly for video), read, write and share other users data across Mac and NT platforms.

The future is safe; the future is in safe storage. □

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Clouds in the crystal ball

If marketing is the measure of the modern civilised world, it is giving worrying indications of the future of emergent consumer technologies, writes **Barry Fox**

EVERY DAY, DVD-Audio looks more like a Grade A turkey. In the US, poor software support and confusing labelling on the sleeves of the few Warner discs available quickly left dealers selling off \$1000 DVD-A players for a third of their price. Now history is repeating itself in Europe. As usual, the root cause is the music industry's inability to understand the new technologies they try to sell, and their ignorance of the hi-fi world into which they are trying to sell. Here is a rundown of the Euro shambles so far...

All the advance publicity for DVD-A centred on the negative aspects of watermarking, how it will cripple DVD-A copy-functions and perhaps degrade the original sound. This turned off the hi-fi press in spite of the fact that the format is aimed primarily at hi-fi buffs who want the best—and think they can hear the benefits of 96kHz or 192kHz sampling and 24-bit coding, without compression.

In early March, professional bodies the APRS (Association of Professional Recording Services) and AES (Audio Engineering Society) ran a seminar at Olympic studios in Barnes on watermarking. During the course of this meeting I learned, purely by chance that Disctronics was sponsoring a seminar on DVD-A to be held by the MPG (Music Producers Guild) and DVD Association (who are they?) at Angel studios in Islington, the following week. The hi-fi press were not present at either event, because the organisers had not invited them.

At the Angel event I learned—again purely by chance—that Warner was planning to launch DVD-A discs throughout Europe on 6th April. Andy Murray, the man in charge, said Warner had not yet decided how

to handle, and publicise, the launch. By late March, Murray was still undecided and in early April the launch date was delayed until the Easter Bank Holiday week, arguably the worst time possible to run press briefings and demos. There were to be no launch events at all on the Continent, likely because Warner was shutting down the Teldec operation in Germany and Erato in France.

Every day it becomes more clear that the music industry wrongly equates DVD-A with multichannel surround, which of course is already available from DVD-Video. The material difference between DVD-A and DVD-V is the use of MLP (Meridian Lossless Packing) as an alternative to Dolby Digital or dts compression. Music industry executives and performing artists are most unlikely to hear, or understand, the difference.

Says Andy Murray: 'I am in the happy position of being a marketing person. Our focus is on the music and how it sounds, and the proof of that so far is the positive reaction of everyone we know that has heard it.'

Disctronics, who should know better, has now sent the music industry a press release extolling the virtues of DVD-A and the wisdom of Warner's decision to put both MLP and Dolby Digital versions of the same music on a DVD-A disc, so that DVD-A discs will play on DVD-Video players. The release quotes Graham Sharpless, general manager of Innovation and Technology at Disctronics as saying, 'DVD-Audio provides a single format that allows discs to be played on both DVD-Video and DVD-Audio players, thereby allowing consumers to enjoy infinitely improved sound quality.'

So now we have the music industry wrongly thinking that using a DVD-Video player to play the Dolby Digital tracks on a DVD-A disc provides 'infinitely improved sound quality'.

Meanwhile the BPI (British Phonographic Industry, trade body for the British record companies) has staged a DVD-A promotion at Abbey Road Studios. Hardware and music software companies joined forces to sell the format. Leading lights in the music industry wafted through, registering only that they were hearing surround sound through very high-quality equipment. I asked the BPI why the audio press had not heard of the event until afterwards, if at all.

Says Maggie Crowe of the BPI: 'I wanted everyone to come that was interested, especially the audio press, as I would have liked to have more press exposure about this issue. As you can appreciate, we mailshot to all our constituents and Abbey Road only had a capacity of 100. As it was, at least 20 didn't show which is always the case when you are hosting a free event. We had it posted on our web site—do you visit it?'

No, I do not visit every web site loosely connected with the music hardware and software industries on a daily basis, on the offchance that someone somewhere may be promoting an event which might make the DVD-Audio launch less of a mess. Like a stuck vinyl record, I'll say it again. DVD-A will be quickly killed off by music industry incompetence and resurface only as a giveaway option in all DVD-Video players, enjoyed by a tiny minority and completely ignored by the world at large.

Nobody's perfect

We seek technical perfection at every turn, but continue to draw most of our listening pleasure from the imperfections of the past, writes **Dan Daley**

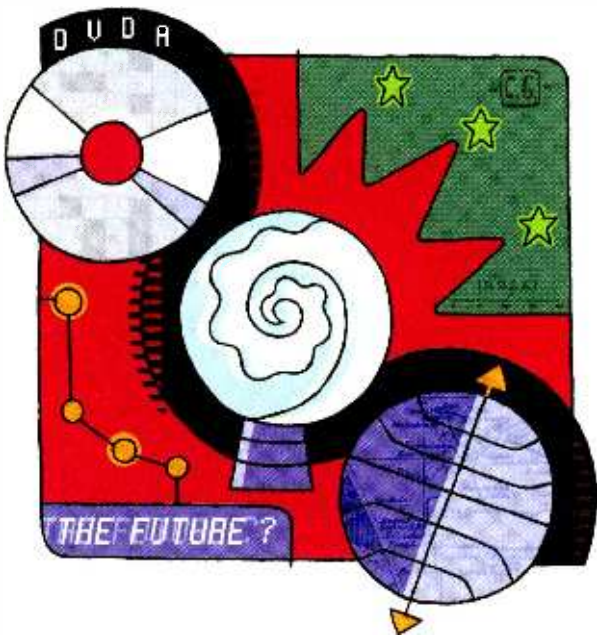
THE PURSUIT OF PERFECTION has been an American business trait since we began operations at our North American facility in 1776. (The pursuit of perfection is not to be confused with the attainment of perfection, which, of course, is reserved for the French.) The illusion that we can achieve it is equally characteristic—an hour spent watching American television commercials will convince anyone of that. From teeth to toenails, perfection is everywhere promised, and operators are standing by, so call before midnight tonight.

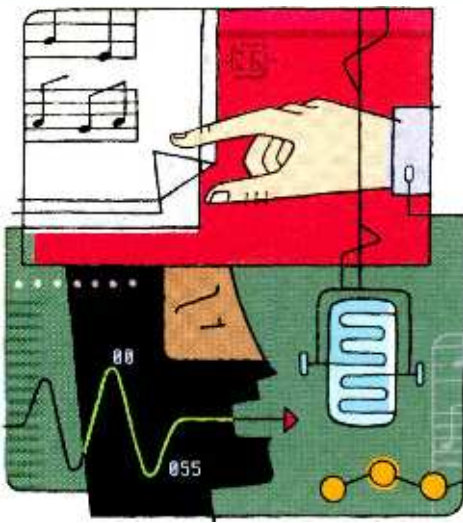
In the last two decades of the music recording business, perfection has certainly been something presented as worthy of pursuit. Starting with console automation and culminating (so far, anyway) with Pro Tools and plugins, any audio anomaly can be fixed and rendered perfect. And once you achieve perfection, you can make a perfect copy of it and cut-and-paste it everywhere you like, in perfect sync.

However, the inherent soullessness of the whole perfection thing is starting to show. This all came up at a dinner, in Nashville, during the e-Studio business summit there in May, at a restaurant called PF Chang's. The talk at the table turned away from the music business and towards music, and as people began to consider which of their favourite albums had withstood the test of time, it clearly emerged that most of these records are far from perfect. Listen closely to Aretha Franklin singles, including 'Respect', and hear the distortion. The voice that was trained in a southern Black Baptist church with no PA system seemed to virtually blow up a capsule per track. Listen to some of the old Four Seasons' records and hear someone put the tambourine down on the floor during a take.

You can find tons of this stuff on these records. Set the car radio to the local oldies station and then grab the radio's panning control. Flip it back and forth during records from the 1950s and 1960s, on the early stereo recordings when bouncing often meant that entire rhythm sections would be found on the left side and a vocal and some miscellaneous overdubs were on the right. Listen to Frankie Valli clear his throat on 'Can't Take My Eyes Off Of You' in between verses. Listen to the painfully out of pitch vocals that so many pop and rock records of that era had. Listen to the never-quite-right double-tracked vocals of so many pop records from the sixties and seventies. Dissonance was never so beautiful.

Those records were often made with relatively primitive technology, and they were done under serious time and budget constraints. Bob Gaudio of the Four Seasons once told me that the group found out it had to arrange, record, mix and master 'Rag Doll' in one day—a Sunday, no less—before starting a national tour the next day. And those records were never intended to be put under the microscope of fidelity that any standard FM car radio is capable of today, as compared with the AM radios of the era.





So perfection in recording pop music is not part of art's legacy, though the pursuit of it may have become an end in and of itself more recently. Sometimes the need for speed was a function of budgets, sometimes it was just the way people liked to work. Inspirations of the moment were often captured as is in those days before multi-tracks and remixing. Even today, classical recordings still consider the occasional audience cough or violinist turning a page not a blemish but a sort of watermark of authenticity, as if to say, 'People were here, and people sometimes make odd noises.'

The obsession with perfection seems to have infused itself into pop music recording in Southern California in the 1970s. The records of Peter Asher, Val Garay and Al Schmitt, among others, developed a glossy sheen driven in part by the precise triple-harmony guitar parts that characterised records by the likes of the Eagles and Linda Ronstadt. The rise of the synthesiser and MIDI in the 1980s just took the pursuit of perfection to another level, allowing the off-line editing of performances to minute quantisation values.

Today, perfection has never been more attainable. The auto-tuning of vocals assures perfect pitch, just as the airbrushers' and Quantel box artists' capabilities have climbed to new heights to ensure that performers look as good as they sound, which in both cases is very often better than they could ever have relying solely on nature's gifts. In fact, the high degree of perfection that packaged pop music now offers has led consumers to expect perfection every time out. And the entertainment business in general is at its most successful when it is giving the people what they want.

So why were we, this group of purveyors of pop music and its technological paraphernalia, pining at the dining table for the imperfect pop of the past? I think it goes far deeper than nostalgia for the music of our youth, back to a much more primitive time, still matrixed in our genes, when you weren't sure if that day you were going to eat the bear or the bear was going to eat you. When every time you did something, the results were not guaranteed and predictable, or absolutely fixable after the fact. Music production may have become more risqué, but it has also become far less risky. There are still pockets of resistance, most of it in the margins of music, like blues and rap. I remember when I asked Carlos Bess, engineer for rappers Wu Tang Clan, how he could tolerate the distortion that is often found on their recordings. To Bess, the distortion is always secondary to capturing the moment of inspiration.

The pursuit of perfection is still up there in the hierarchy of music production. And who's to say what engineers might have done 40 years ago if they had Pro Tools? But the pervasive and deeply felt affection for the way records used to sound, warts and all, remains as palpable today as the awe bestowed upon the latest black box. So at a time when perfection is so much within our grasp, it's worth remembering: nobody's perfect.

The evolution of 'Van Man'

Delivery is less a new concept than one with endless applications fuelled by rampant technology, writes **Kevin Hilton**

EVERY SO OFTEN, when I come to write this column, I think about the word 'delivery', how it still implies a man in brown overalls driving a liveried van from house to house, conveying groceries and the like. This sounds quaintly old-fashioned, although I remember such services as recently as the early 1970s; and while it all smacks of a different time, one 'before' technology, there has been a return to home deliveries through Internet shopping.

All of which encapsulates the duality of modern life, which is both of the future and the past at the same time. The cinema is a good example of this: as much as this field is high-tech, with discreet channel digital sound and mind-boggling computer generated visual effects, it retains elements that are in many respects old-fashioned. The fundamentals of film stock go back over 100 years, while, despite modern upgrades, the projector can by no means be described as a cutting-edge device.

Film has been co-habiting with video for several years and recently the phrase 'digital cinematography' has been coined to refer to the use of video as an alternative to, initially, 16mm stock and, now, 35mm. High definition (HD) is enabling this, with US television already moving towards the new format, which is being regarded as a foundation for digital cinema.

This phrase is being bandied around for a whole new approach to the business of both acquiring images and distributing finished material. As ever there is disagreement; and while it may appear petty to argue over labels, there are many who prefer the term 'electronic cinema' (e-cinema) as it implies a complete chain, not just acquisition and projection but delivery as well.

While just emerging from the prototype stage, e-cinema has already been through some significant early stages since the late 1990s. Although there are seven competing and conflicting digital projection technologies currently available, it is Texas Instruments' Digital Light Processing (DLP) technology that has featured in many of the high-profile try-outs. An example of fixed resolution technology, DLP is based on TI's digital micro-mirror device (DMD), an optical chip that contains an array of 1,300,000 mirrors.

Various tests have proved the validity of the concept, at least on technological grounds. In 1998 the independently produced movie *The Last Broadcast*, which was shot on digital video and is seen as partly an inspiration for *The Blair Witch Project*, was beamed by satellite to five cinemas in the US and later went on an 'electronic' tour of venues in Europe. *Star Wars Episode I—The Phantom Menace* was screened at selected sites in the US using DLP-based projectors when the movie opened in 1999, making it the first full-length feature from a major studio to use the system.

There have been other experiments, including BT's bold but flawed e-cinema trial in West London during 1998, which is now

remembered for a representative of Snell & Wilcox, a technology partner, branding the screening 'incompetent' due to artefacts in the projected image. An early pioneer of e-cinema techniques is French company VTNR, which began using CRT projectors and 35mm film and resurfaced in 1994 with HD technology.

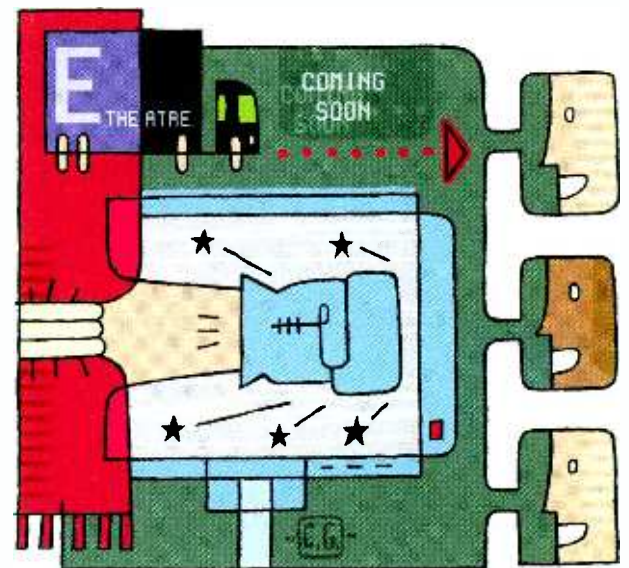
VTNR is an exponent of what is being called 'e-theatre' and initially presented large-scale sporting events, before broadening its programme into theatre, ballet and opera. VTNR is part of the Cinenet consortium of technology and content providers. Another member is British company HD-Thames, which plans to use old cinemas, theatres and town halls to bring plays, sport and music to areas that no longer have access to live entertainment.

The concept of delivery via satellite or broadband connections is sound but there are still doubts over the download times (around eight hours for an average film) and the cost of installing the infrastructure to cope. Cinema operators are worried that the cost will be too great and that smaller concerns could be forced out of business. There are also doubts over image quality at the moment.

Lurking in the background is our old friend the format war, which doubters regard as another reason why e-cinema will take time to establish. Such a conflict currently exists with cinema sound, as Dolby Digital, dts and SDDS each continue to lay claim to the market. But the general belief is that it will happen; that stalwart of celluloid, Kodak, is hedging its bets by investing in both and extolling the longevity of film.

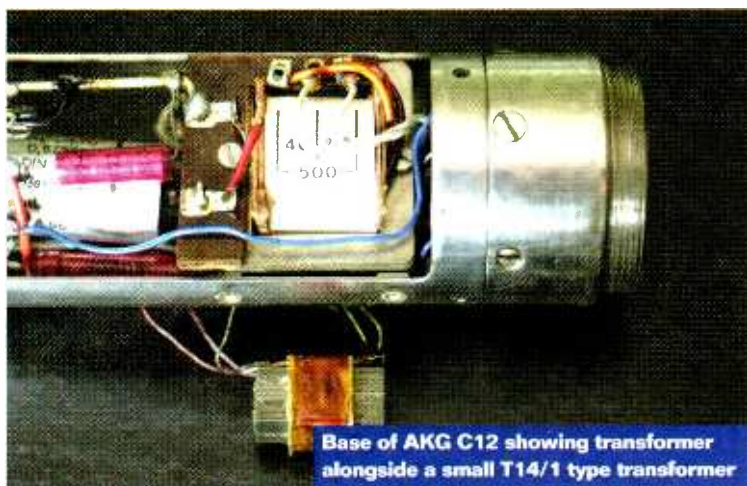
Screen Digest, which has already prepared one report on the subject and will produce a second after the UK general election this month, predicts that film has another 10 to 15 years of life left in it. E-cinema is now regarded as entering a new phase, as evidenced by cinema operators investing in new technology. Last November Toei in Japan became the first commercial chain to buy digital projectors, while Technicolor-Digital Cinema announced in March that it was to install the new technology into an initial 1000 screens in the US.

As George Lucas prepares to shoot the next *Star Wars* epic totally on digital video, the promise of electronic or digital cinema is coming ever closer. Just don't be too keen to write off film, that's all.



MIC MECHANICS

Moving on from the general advice offered last month, **Ashley Styles** looks at the problems presented by specific models of valve microphone, and how to overcome them. First up are some classic AKGs



Base of AKG C12 showing transformer alongside a small T14/1 type transformer

THE AKG C12 is AKG's flagship, a superb microphone, using the now discontinued CK12 capsule. Together with the equally famous 6072 valve, this microphone is capable of delivering some excellent sonic results.

Early versions of the C12 used a larger audio matching transformer (type V1248) compared to the smaller transformer (type T14/1) used in the later models. The smaller T14/1 transformer was also used in the 'stereo' AKG C24 and valve versions of the C28. Because of the larger cross-sectional core area of the V2148 transformer, it is possible to obtain a far higher level of flux before the onset of saturation (dynamic compression-distortion). It could, therefore, be argued that the earlier models, with the larger audio matching transformer, are capable of producing a more linear response at higher SPLs—especially at LF.

Because of the solid construction of the C12, it presents few problems to careful users. Those problems that do arise include damaging the crescent-shaped perspex fixing material when hanging the valve. Also, the capsule, suspension type mounting sometimes ages and becomes less effective. This causes problems such as the microphone becoming more microphonic or a slight rattle when the microphone is tilted.

The KG C12a is a superb little microphone, using the original AKG C12, CK12 capsule, and based around the 7586 Nuvistor for the preamp-impedance converter. This Nuvistor is also used in the AKG C61, and many other valve microphones produced by other manufacturers.

The sound quality of the C12a is quite different to that of the C12, however, and so it has many uses that a C12 may not. In the eyes of AKG, the C12a was a replacement for the ageing C12 and was the forerunner of the semiconductor-based C412 and, of course, the C414 series to follow. The distinctive shape of the C12a, has since become famous and lead on to become a trademark of AKG quality.

A 'black' version of the C12a was also manufactured, this was distributed by Philips, with the famous Philips logo, together with a Philips model number: LBB9061 (part of the complete LBB9060 kit—microphone, PSU and cables). Apparently, according to the label glued on the microphone body, it was 'Made in Holland'.

In my own collection, I am fortunate to own a Philips version, finished in standard non-reflective silver grey. This particular microphone is badged Norelco. Again this is a distributors label and on this particular C12a it has printed within the Philips type logo, 'North American Philips Companies'. On the rear of the microphone it is marked as 'Made in Austria by AKG GmbH'. So it is obvious, that there are numerous versions of the C12a around.

There is also a C12b, the main difference being with the type of stand mount and not the microphone. The locking mechanism used on the C12b stand mount, is based around a knurled wheel, within the casting, instead of the usual locking lever, utilised on

modified for fitting into the C12a stand mount, are obsolete and therefore the only solution is to modify the microphone connector. I regularly have C12as, C414s and so on sent in for connector modification. Once modified, the microphone can be used with confidence, especially with respect to the reliability of the connector and stand mount—in everyday studio use and in terms of the availability of modern day connectors.

AKG C26, C60 and C61 were probably the most popular 'starter' valve microphones for many users. The early versions, they used the famous 6072 valve, as found in the C12-C24 and Telefunken M250E-M251E, while later models of the C28, used the 7586 Nuvistor. The easiest way to identify whether the unit is valve or Nuvistor, without looking inside, is to check the serial number. As a guide, from my own collection, the changeover occurs somewhere between 2127 and 2160. Serial number 2127 and below are 'true' valve types, and serial number 2160 and above, use Nuvistor electronics built on a PCB.

On the early valve models, as opposed to the later Nuvistor type, the framework to which the valve holder and associated electronics are fitted is quite fragile. The socket assembly, like the valve holder, is silver soldered to the framework, together with the aid of locating pins. Both the valve holder and socket assembly joints can get damaged, although normally this only occurs through rough handling. To repair these, involves stripping the microphone down to the frame,



Two versions of AKG C12a



Norelco and Philips version of C12a

the side of the pivot assembly.

The main problem with the C12a-b and its early semiconductor predecessors that used the same style of connector-stand mount, is that of reliability with the connector fitted in the stand mount. The connector, which is constructed out of cast alloy, is fitted within the stand mount via two locating-retaining pins. Under rigorous studio use, the connector locating collar fractures. The connectors, that were AKG

as the heat from the silver soldering would completely wreck the electronics. When I've had the need to repair a C28 with such problems, it involves a lot of preparation work, before the re-silver soldering is carried out, and is very time consuming. This all adds up to a very expensive repair bill.

Alas, sometimes the microphone may not be deemed worth such expensive work being carried out. I have been servicing valve microphones for over 20 years,

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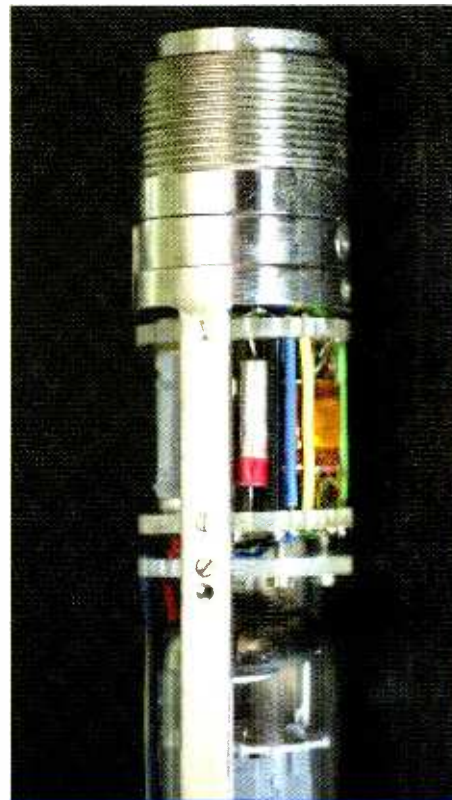
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and during that time I have never, as yet, had a Nuvistor-type C28 in for 'structural' repair work. So, with the Nuvistor versions, the construction would seem to be somewhat stronger.

The split primary winding on the audio matching transformer, type T14/1 is prone to going 'open circuit'. This normally happens because the coupling capacitor has aged and gone 'leaky'. If the microphone is old and has been well used, then it is well worth getting this capacitor changed, as it can prevent the necessity of having to have a new transformer fitted after the capacitor eventually causes problems. Should a new transformer be needed, then the complete component assembly has to be dismantled. This is a time consuming and delicate job and in some cases, the cost of such a repair might outweigh the value of the microphone. Prevention is better than cure.

The cable connector-stand mount, that plugs into the C28-type microphone, is no longer available. Being constructed from cast alloy, which is naturally very brittle, it is very easy to damage the stand mount connector. A modification is available, allowing a conventional Cannon type of connector to be used. An AKG stand mount, supplied with the modification, is then required to hold the microphone.

Unfortunately, the capsules used with these preamp-impedance convertors—type CK26 (omni) and CK28 (cardioid)—are no longer available. Capsules such as the CK1 and CK2, from the CMS range of microphones introduced back in the early sixties are interchangeable but many users of the CMS range of capsules and preamp-impedance convertors consider their performance to be somewhat less than brilliant. One reason for this might be the fact that the CMS type preamp-impedance convertor—C451 is based around a semiconductor design and therefore not offering the virtues of 'the valve sound' associated with valve type microphones. However the CMS range of capsules are acoustically very good and show their worth when used in conjunction with preamp-imped-



Close up of AKG C28 frame-socket joint



Close up of AKG C61 PCB and Nuvistor

ance convertors such as the C28 or the C60-C61 preamp-impedance convertors. Indeed the C60 preamp-impedance convertor offers the additional advantages of excellent low-noise and sonic properties of the superb Telefunken AC701 valve. This has particular value when considered with the fact that the audio matching transformer, which is normally housed within the microphone body, is housed within the N60 power supply unit. The transformer used is physically large, akin to the earlier models of the C12 and therefore very capable of transferring a very wide dynamic range.

Sadly, the CMS range of capsules was discontinued some years ago. However, a 'refurbishment' service is available, enabling owners to keep these useful capsules in good working order. Some of the older CK20-CK28 capsules can also be refurbished.

If you are lucky enough to track one down, try using a CK4 that uses the large CK12-type capsule together with a C60 preamp-impedance convertor. The combination produces a great sound and is a poor man's alternative to the excellent AKG designed and made, Telefunken-badged Elam 250-251. It will be limited to fixed figure 8 mode, however the CK4 can easily be re-wired for cardioid or omni capture. Indeed, the Telefunken M250-251 uses the much smaller T14/1 matching transformer. So maybe the C60-CK4 combination has the edge.

The C61 with its Nuvistor-based electronics uses quite a small PCB which also carries the capsule socket. Because of the microphone's small

physical size, parts of the PCB are very fragile, notably the area around the Nuvistor itself. The PCB can be damaged whilst changing the Nuvistor, so always check for the signs of damage in this area. □

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CONVERGENCE

As inevitable as it is inexorable, Convergence is the combination of computer, digital audio and digital video technology as, **John Watkinson** explains

AT ONE TIME analogue audio and video had nothing in common with computers. Each field developed its own terminology and had no need of the other. How things change... Digital technology crept into audio gradually—automated analogue mixing consoles controlled by microprocessors, digital delay lines to allow variable pitch vinyl disc cutting, time code readers and autolocators were all early digital devices. Digital technology crept into video even more slowly, hampered by the wide bandwidth of video signals. The first digital video products were timebase correctors designed to stabilise the jittery replay signals from analogue video recorders. This was followed by standard convertors and DVE (digital video effects) units that could flip and tumble the picture. Early examples of such devices cost as much as a house.

But digital audio and video are just other kinds of data, albeit with a specific timebase, and so convergence between computers, audio and video has always been inevitable. Pulse code modulation (PCM), which is the technique of representing analogue waveforms as data, was invented over 50 years ago, so why has convergence taken so long? The answer lies in economics. Just because something is possible doesn't mean that it is affordable. Digital technology remained a vision for a long time until the economics improved.

Integrated circuits have had a major economic impact. Integrated circuits are electronic systems where all of the components have been shrunk to fit in a single part. They are also commonly called chips although strictly this refers to the actual circuit element inside the protective housing. The advantage of integrated circuits is that the unit cost can be very low. The development and tooling cost, however, is considerable, so integrated circuits are only economically viable if they are made in volume. Consumer products are an ideal market.

The smaller each component can be, and the closer they can be packed, the more functionality can be obtained from the part without any increase in cost. Inside such circuits, the small spacing between the wires results in crosstalk where signals in one wire are picked up by others. Binary systems resist crosstalk and allow denser packing than would be possible with linear or analogue circuits. As a result, binary logic and integrated circuits form a natural alliance. The integrated circuit has been the subject of phenomenal progress in packing density that con-

tinues to drive costs down.

When it became possible to put all of the functionality of a central processing unit (CPU) on a single integrated circuit, the result was the microprocessor. Computing power came within the reach of the consumer and led to the explosion in personal computers.

The functionality of integrated circuits goes up with time with the following results: (a) existing processes become cheaper: the price of pocket calculators, (b) processes such as error correction and compression which were previously too complex become affordable, and (c) the cost of RAM falls.

Moore's Law is an empirical observation that the cost of a particular computing process halves about every 18 months. Although this progress will have to

media continue to improve and when compounded with the coding and control improvements, each generation of storage device displays a significant reduction in the cost of storing a given quantity of data. This makes new applications possible which were previously too expensive. For example the falling cost of the hard-disk drive led first to the word processor, which needs a relatively small amount of data, in the 1970s. Next came the digital audio workstation in the 1980s and then the digital video workstation in the 1990s.

When the compact disc was launched, mastering had to be performed on converted U-matic video cassette recorders which were huge and expensive. An indication of the progress which has been made is that most of today's laptop computers can store the contents of a number of CDs with ease.

Storage devices are generally classified by their access time and the cost per bit. Unfortunately these two parameters are mutually exclusive and improving one usually worsens the other. Fig. 1 shows the relative merits of RAM, disks and tape. RAM has the fastest access, but is extremely expensive because every bit has to be individually fabricated inside the integrated circuit. Magnetic recording is cheaper because the medium is uniform and the bits are created by the passage of the head. Disks are optimised for speed whereas tapes are optimised for capacity. As a

WINCHESTER DISK	TAPE	OPTICAL DISC
FAST ACCESS	SLOW ACCESS	MEDIUM ACCESS SPEED
HIGH COST PER BIT	LOW COST PER BIT	LOW COST PER BIT
NON-EXCHANGEABLE	EXCHANGEABLE	EXCHANGEABLE

Fig. 1: Storage media compared

end eventually, the fundamental limits will not be reached for a little while yet. As a result of the rapidly improving economics of chip-based technology, devices based on complex processes become available not when they are invented, but when the economics of integrated circuits make them feasible. A good example is the compact disc. The optical storage technology of CD is much older, but it became possible to use it as a consumer digital audio product when real-time error correction processors became available at consumer prices. Similarly digital television was not viable until compression processors, which are more complex still, became economic.

Advances in integrated circuits do not just improve the performance of RAM and computers. Integrated circuits are used in storage devices such as disk drives to encode and correct the data as well as to control the mechanism and make the heads follow the data tracks. If more complex coding and control can be used, the storage density can rise. In parallel with this, the performance of heads and

result, various different storage technologies co-exist because no single one has all of the ideal features. The performance of all storage technologies increases with time, but the relative performance tends to stay the same.

Optical discs such as CD/CD-ROM and DVD are optimised for mass replication by pressing and cannot be recorded. Recordable optical discs such as CD-R and DVD-R are also available and these have the advantage of high-capacity and exchangeability but usually fall behind magnetic disks in access time and transfer rate.

The final element of convergent systems is digital communications. The computer industry has spent many years building up various types of networks to deliver data from one place to another. When communications was expensive, it was easier to keep the data nearby. The AES-EBU digital audio interface and the SDI serial digital video interface are limited to a length of a couple of hundred metres or so. To go any further required a tape and a motorbike.

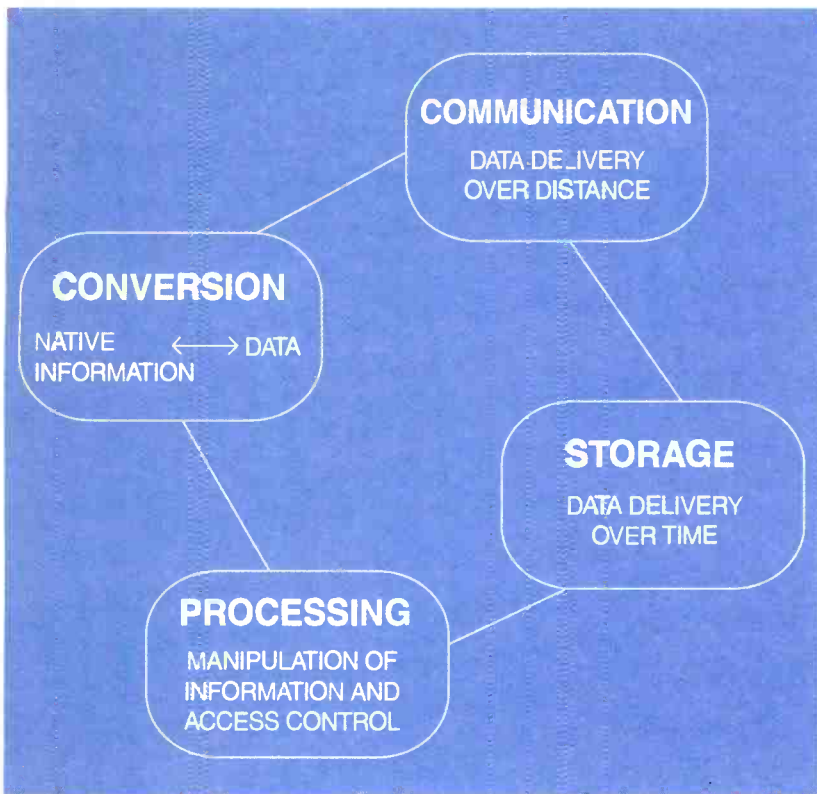


Fig.2: The key convergent technologies

Two developments have changed this. Firstly the cost of communications has come down owing to the introduction of technologies such as optical fibre

and secondly the development of economic compression algorithms such as MPEG has reduced the amount of data needed to represent audio and pictures for some purposes.

Fig.2 shows the key elements of convergent systems. Conversion is vital to move between the original form of the information and a data representation. It should be clear that convergent systems can only handle data. Nothing physical can be handled. Although this seems obvious, one wonders how obvious given the hype surrounding the capabilities of the Internet and e-business. You might be able to order a new garden shed over the Internet but it's going to be delivered on a truck. You select that movie from your video-on-demand provider, but where are you

going to get the pizza?

Storage allows the data to be kept indefinitely and accessed as required. Computation allows the data to be manipulated and communications allow the data to be delivered elsewhere. Allied technologies such as error correction and encryption ensure that the data are unchanged by their experiences and that the data only goes to those who are authorised to have it. At the moment computer technology available in quantity (basically this means PCs) is very weak against breaches of security as hackers prove almost daily. This is going to have to improve.

Convergent technology allows life to go on as normal in some areas, as well as turning it on its head in others. The DV camcorder is a good example. This consumer-priced technology combines imaging, audio, compression, channel coding, error correction and an advanced microprocessor-controlled tape transport into a package which will fit in your hand but looks and behaves just like a camcorder.

Until, that is, you connect up the FireWire interface to your laptop. Now the recorded material can be edited, coded and sent over the Internet. Camcorders buried 8mm home movie cameras without trace and as the picture quality of digital still cameras improves, film based photography is under threat. Electronic cinema is just an extension of this technology. Cinema film is based on silver, which is expensive. In order to release a movie, a print of the movie has to be physically delivered to every cinema concerned. Suppose that every cinema has a file server, a high-resolution digital projector and an optical fibre port. In theory, every cinema in the world could show the same movie simultaneously. □

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Event management – Digidesign participates in a large number of European events including major European Audio and Video trade shows and annually presents a major product tour in Europe with its developers, called DigiWorld. The successful candidate will work alongside the European technical marketing group, co-ordinating the core marketing activities and logistics of these events. **European Web Management** – Manage localization of the Digidesign website (French, German and Italian) and co-ordinate/track updating this site. Co-ordinate distribution of a quarterly electronic newsletter. **Press Relations** – Oversee press relations and editorial coverage throughout Europe. Create and manage a database to track press hits throughout Europe. Work with the European marketing manager to create and distribute reports to local offices and US headquarters on press activities throughout Europe.

Project Management – Digidesign in Europe has enjoyed steady growth over the last seven years, we have had offices here. As the organisation continues to expand we constantly explore new and exciting projects, the successful candidate will help define, prioritise, manage and implement these projects for Digidesign Europe.

Job Requirements

- Good communication skills (verbal/written)
- Fluent in 2 or more European languages (French, Italian or German are strongly preferred)
- Excellent organisational and time management skills
- Ability to manage multiple priorities/projects simultaneously
- Ability to work well in a team environment
- Aptitude for managing high levels of detail
- Previous marketing experience
- As a European position the role has an element of international travel
- As a major contributor to the Events team, the candidate must be prepared to occasionally work unsocial hours during high profile events

To apply for this position, please email **Francois Quereuil:**
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THE WISH LIST

Continued from page 78

'Again, microphones are one of those things where everyone has a favourite so offering a good range is essential in a commercial facility because it is important to give clients a choice. The same applies to top quality outboard—you can never have too much.

'A range of valve mic preamps, compressors and EQs makes sense as I suspect that the bulk of the work carried out in a facility of this type would be digital. Personally, I love the TLA range of compressors and EQs so a selection of these would certainly be on my list. I'd also install a couple of Tube-Tech compressors and some Focusrite Reds.

'On the microphone front I would look at serious valve beasts such as the AKG C12VR, Neumann M147 and 149, some Neumann U87s, AKG C414s, a good amount of Shure SM57s, Sennheiser MD421s, a few Electrovoice RE20s. I'd also include a range of other workhorses—enough diversity to keep most clients happy.'

Acoustic Design

'The question of an acoustic designer and the overall equipment installation rears its head and is obviously crucial to the whole project. There are a large number of people out there designing and installing recording studios and at the end of the day its going to be down to meeting a few of them and seeing whose ideas are favourable and who one gets on with. It is extremely difficult to put a price on this, but for arguments sake let's say I'm going to spend £120,000 on the acoustic treatment, wiring and installation.'

Start up costs

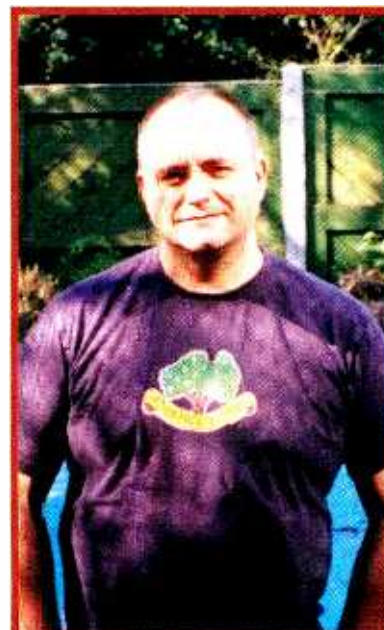
Purchase of freehold property	£250,000
Multitracks and Pro Tools	£43,000
Console	£80,000
Main monitors	£20,000
Outboard and mics	£100,000
Acoustic design, wiring, etc	£120,000
Sundry equipment	£10,000

Furniture etc	£10,000
Legal fees for purchase, etc	£3,000
Total setup cost	£636,000

Staffing and running costs

'Assuming that this amount gives me a fully up and running facility, I would then have to look at the cost of staffing it. A huge staff is not required for a facility like this. If we assume that the studio will be owner-managed, we're really only looking for a main engineer, assistant engineer and a receptionist-secretary. This would incur the following costs:

Owner-manager	£20,000
Main	£15,000
Assistant	£7,500
Secretary-receptionist	£12,000
Rates	£4,000
Electricity	£2,000
Maintenance	£5,000
Advertising	£5,000
Office-stationary	£5,000
Telephone	£2,000
Motoring	£8,000
Entertainment	£7,000
Total annual staffing cost	£82,500



THE BALANCE SHEET

Total expenditure: £636,000
Annual running: £82,500

THE BALANCE SHEET

On the basis of Mark's figures the studio would have a net profit of just under £40,000, which in this day and age wouldn't be bad going at all.

Now it's time to sit down and do the arithmetic. For this kind of facility Mark's maximum potential income is £175,000, based on the studio working 350 days per year. The annual staff and running costs are £82,500, while the annual mortgage payments would be £14,400. There is also the annual equipment leasing cost, which would be in the region of £30,000 assuming a 20% deposit. This gives a total annual expenditure of £136,900.

'Obviously, this assumes I had the 30% deposit for the property and 20% deposit for the equipment in the first place—not to mention an ability to book the studio 350 days of the year. However, annual costs would be significantly reduced if one already owned equipment or bought it outright instead of leasing. For this experiment I've assumed that I didn't have that kind of money up front and have

leased everything.

'Looking at this all I can say is the figures aren't bad but you can't beat a residential!' □



DR SPOONER'S TOP 10 ARTISTS

- | | | | |
|-----------------------------|---------|----------------------|---------|
| 1 Crier Mary | ♣ † ↑ | 6 Duff Paddy | ♣ † ↑ |
| 2 Dearly, Stan | * * ♣ ← | 7 Peep Purple | † † ↑ |
| 3 TT Zop | ♣ † ↓ | 8 Lady Kang | * ← |
| 4 Bloody Moos | ♣ * * ↑ | 9 Dials Mavis | * * ♣ ← |
| 5 Fella, It's Gerald | ♣ ♣ * ← | 10 Eminem | ♣ * * ↓ |

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MARK DAGHORN'S STUDIO

Who says commercial studios don't make money any more? Producer and studio owner Mark Daghorn sets out to prove that they can, and he tells us how he's done it

AS THE OWNER of a mid-priced residential recording studio, Mark Daghorn is no stranger to balancing the cost of running and maintaining a commercial facility against the studio's daily rate. His own Essex-based studio, New Rising, was originally set up as a private facility to record artists signed to his record label Positive Records. Over time it evolved into a business in its own right as other bands heard about it and began booking it for their own projects. It became fully commercial earlier this year and is now hosting sessions for bands such as Cradle of Filth, Hangnail and Porcupine Tree. Apart from being a studio owner, Daghorn is also a producer having worked with acts such as Marillion, Fish, John Wesley, Katherine Crowe, David Booth, Area 54 and The Positive Light.

As his starting point, Daghorn's first consideration was where to base the studio. The requirement is to appeal to London's recording community but the considerations should apply to any international city.

'Being reasonably close to London allows plenty of scope in terms of location,' Daghorn opens, 'but before making a choice several things come to mind. It needs to be easily accessible by road and as it isn't a residential it needs to be close to a reasonable range of hotels and B&Bs in case clients want to stop over. Proximity to a major airport and a train station also come in to play.'

'My first instinct is to look at Surrey as it is close to London by road, near to Gatwick airport and well serviced by rail. The down side is the cost of real estate.'

'Assuming we've chosen Surrey, the next decision to make is whether to rent or buy. Generally, I would choose to buy the freehold, as I believe renting is just throwing money away. However, one has to consider that a commercial mortgage only provides approximately 70% of the purchase price. So, if we decide to buy a property in Surrey, where do we go and how much is it going to cost?'

'A small house that had permission for commercial use would be ideal. It would have to have parking as the last thing clients want to think about is

THE TASK
Build and equip a non-residential commercial recording facility accessible from London

THE BUDGET
Unlimited—but the studio must survive on a daily rate of £500



feeding a parking meter every couple of hours. I would estimate paying around £200,000 to £250,000 for the right property. On a £250,000 property, assuming that one would have to find a 30% deposit, we're looking at a mortgage of £175,000, which will mean monthly repayments of around £1,200 depending on the deals available, bearing in mind that this will be a commercial mortgage.'

Recording

Pro Tools Mix Plus; Various plug-ins; Otari MTR 90 Mk2; Otari/iZ Technology RADAR

'After deciding where to locate the studio and finding the right property, the next serious consideration is the equipment. I would look to provide a number of recording options so that the facility would appeal to the widest possible number of end users. To this end I would install a Pro Tools Mix Plus system with a range of plug-ins, an Otari MTR 90 Mk2 and RADAR for good measure.'

Mixing and Monitoring

56-input SSL G-series console; Quedsted or Dynaudio Acoustics main monitors; Yamaha NS10

'£500 a day for a non-residential studio based outside London is reasonably pricey, so the console would have to reflect that. In this scenario I think I would choose a second-hand SSL G-series in good condition with Total Recall and around 56 inputs as this is a popular and versatile desk that would be suitable for a wide range of clients.'

'Main monitors are always a difficult choice as so many producers have personal favourites. There is also the problem that some monitors are hugely popular for a while but soon go out of fashion to the point where no one wants them. As a result, I would choose a system from a manufacturer like Dynaudio or Quedsted—something that isn't necessarily trendy but also isn't going to go out of fashion next week. A set of Yamaha NS10s as back up would make a lot of sense because they are the studio workhorses.'

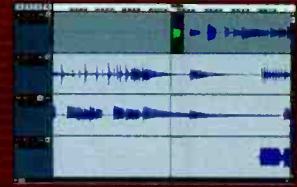
'I can't see that a £500 a day facility would be expected to have surround capabilities so I won't include this in the costing.'

Microphones and outboard

TL Audio compressors and EQs; Tube-Tech compressors; Focusrite Red range; AKG C12VR; Neuman M147 & M149; AKG C414; Shure SM57; Sennheiser MD412; Electrovoice RE20; Miscellaneous microphones

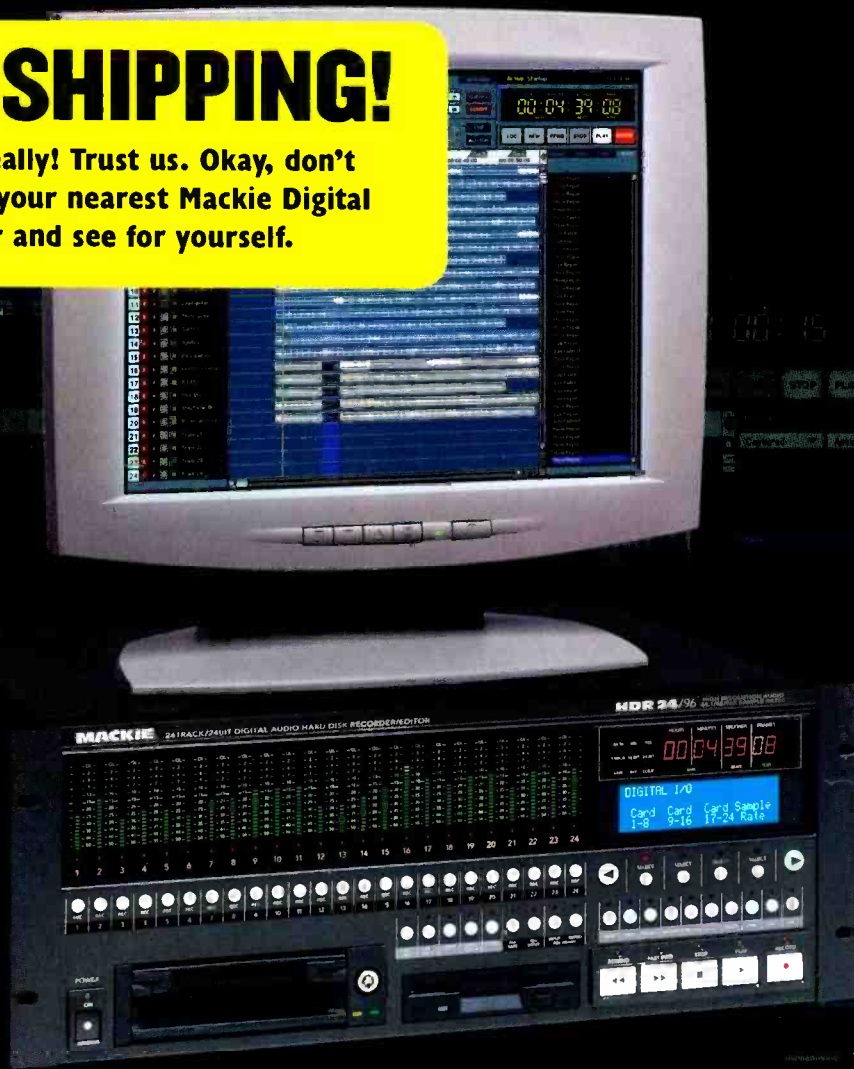
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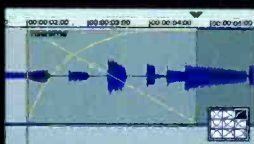
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