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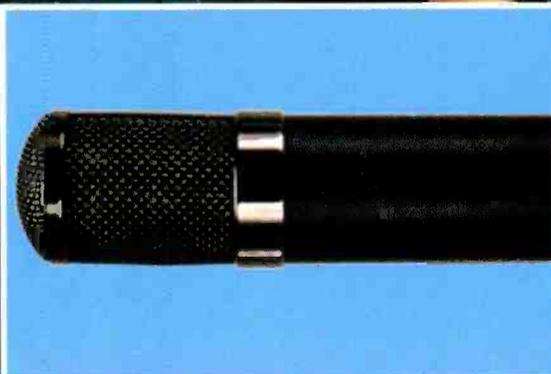
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BUTT UGLY MARTIANS

Aliens invade the post suite



REVIEWS

- Soundelux U95S
- Elberg MP8
- Focusrite Platinum Penta
- Sintefex FX2000 & CX2000
- Trident MTA Series 80B
- Mackie D8b v3.0
- Waves MaxxStream
- SSL MTP



XM Radio: Washington's digital initiative
Forum: Recording beneath a Roman church
Thriller: Michael Jackson's classic goes multichannel
Monitoring enigma: The secrets of the NS-10

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DAVID MASON, DUBBING MIXER,
BBC RESOURCES, BIRMINGHAM, www.bbcresources.com



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ANALYSIS

- 4 Editorial**
On old English and new media
- 6 Soundings**
Breaking news on professional audio, post and broadcast
- 67 Classifieds**
Trading places and pieces, pro-audio's bustling marketplace
- 71 Letters**
Audio-Technica reviews *Studio Sound* while Bob Orban challenges Marvin Caesar
- 71 World Events**
The regular update for your pro-audio events calendar
- 72 Stereotypes & Top 10**
A new look at audio industry characters and their listening habits
- 74 The Wish List**
Florian Camerer lines up a multichannel broadcast postproduction room

FEATURES

POSTPRODUCTION

- 44 Butt Ugly Martians**
Hideous but loveable aliens invade the postproduction suite

RECORDING

- 16 Forum**
Beneath a Roman church is a grand Roman orchestral recording facility
- 40 Mick Guzauski**
Reworking Michael Jackson's classic *Thriller* for multichannel release

BROADCAST

- 48 XM Radio**
The future of radio is being pioneered in a new Washington facility

TECHNOLOGY

- 54 The enigmatic NS-10**
An unlikely industry standard from the beginning. Yamaha's NS-10M has recently been withdrawn from the loudspeaker market. *Studio Sound* juxtaposes technical and subjective evaluations to understand the past and anticipate the future of close-field monitoring

- 62 Dr John**
Exploring the intricacies of video interfacing with the Serial Digital Interface
- 64 Masterclass**
Exposing the secrets of the classic valve microphones and the badges they carried

REVIEWS

- 20 Waves MaxxStream**
An Israeli streaming system is helping define the standard for audio broadcast on the web
- 24 SSL-MTP**
All-round improvement follows the latest revision of SSL's digital console
- 28 Mackie D8b v3.0**
New touches and v3.0 software renew Mackie's challenge in the digital compact mixer market
- 30 Sintefex FX2000 & CX2000**
Recycling its powerful Replicator technology, Sintefex offers a new approach to digital processing
- 32 Trident MTA Series 80B**
Classic British mixing desk circuitry resurfaces in a retro rackmount for seventies revivalists
- 34 Elberg MP8**
Purist analogue mic preamps now come in boxes of eight from an unlikely corner of Denmark
- 36 Soundelux U95S**
A striking new American design is set to change the visible face of the studio valve microphone
- 38 Focusrite Platinum Penta**
Innovation and flexibility in a classy cost-conscious dynamics processing package

COLUMNISTS

- 60 Technology**
Barry Fox reckons that Marantz' new-found freedom from Philips' corporate line will predict new formats' fortunes
- 60 Business**
Dan Daley finds the recording studio business in the advanced stages of a Pro Tools revolution
- 61 Delivery**
Kevin Hilton listens in to digital radio and asks awkward questions concerning its content and its future

16



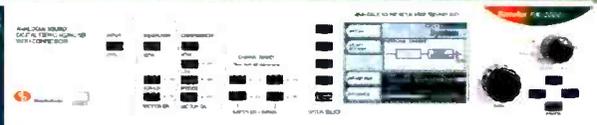
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54



30



24



40



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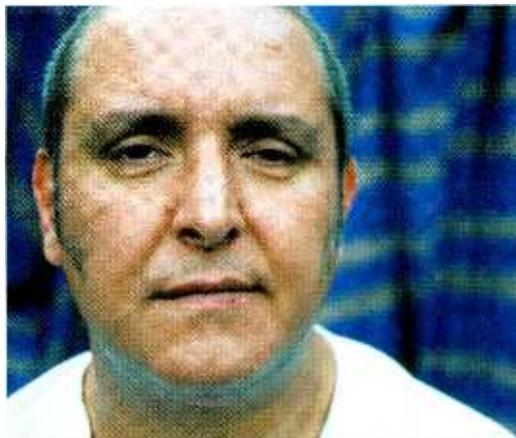
Feed your mind

IT'S AN UNAVOIDABLE FACT of life that if you are a PC user then on a fairly regular basis you will be looking to bolt in extra bits or upgrade others. While it's a process of renewal that more system-orientated Mac users tend to be spared, the more easily disposable and tweakable PC seems more vulnerable once you become aware of the purported ease with which enhancements can be made. The message is driven home by constant reminders of the absolute current market value of your present steed.

Sooner rather than later, the prospect of the system upgrade rears its head and because you're an audio type the prospect of a widely available off the shelf system is abhorrent in principle. Matters are not helped by the fact that while you have an eye on incorporating certain key audio components, be they cards or software, you want to keep your options open and you come over all farsighted.

At the point of purchase a PC is imparted with a strange sense of immortality, but unpacking it breaks this spell and it ages faster than anything else known to mankind.

Those embarking on this treacherous route will undoubtedly be thinking about the incorporation of video. It's a manifestation of farsightedness, keeping options open and the irresistible issue of availability. Suddenly names that have meant little more than enormous stands in the non-audio halls at events like NAB and IBC become your problem. Pretty quickly you'll have to reconfigure the proposed PC to accommodate the



cards, investigate conflict and compatibility issues and learn more than you bargained for just to ensure that you will arrive at a farsighted system that will actually work.

But you'll quickly grasp how video companies handle audio, how the video editing process works, and understand that the technical shortcomings are where the higher end video editing systems differentiate themselves. If you can bear the initial grief I would recommend it. Broaden your mind, it may broaden your business.

Zenon Schoepe, executive editor

Bad language

MAYBE IT'S BECAUSE I'm a magazine editor that words offend me. Words like... No. It's not like that. Let me explain.

The association of words with sound and vision takes many forms. Perhaps the most obvious of these is a song—so close an association that a single word embraces both words and music. But the relationship extends readily to encompass everything from song-writing and recording to commissioning an expensive television advertising campaign. And in every context the words can be either good or bad.

Maybe it's indicative of the age of song that a 'good' lyric is so readily recognised by its public—and a tribute to radio and recorded media that the public is so well educated. If this is so, it might be that flaws in newer media are indicative of their youth. Ever more impressive (and expensive) video graphics cannot, however, be used to justify grammatical errors that would see a schoolboy in detention.

Backtracking a little, I have to admit to drawing a cruel kind of pleasure from the lyrical mis-translations purveyed by cover bands



in Singapore. In context it's amusing, but some of the nonsense sung in Raffles' Long Bar grates as badly as bum notes. In contrast, an average lyric neither offends nor excites; it probably just should never have been written. There is, however, no comparable excuse for those advertising copywriters.

From the British Kenco coffee ad that had no subject associated with its second sentence (a failing implicitly recognised through the hasty substitution

of a corrected version) to the inconsistency of the voice-over and screen text of a more recent Charcol financial services ad, I cannot conceal my amazement that television advertising budgets are apparently insufficient to appoint literate copywriters. How can an ad agency take responsibility for every aspect of creation and realisation of an advertisement except the English? Alternatively, how can an advertiser be satisfied by an ad agency that cannot generate a few coherent sentences?

I have no answers, only one suggestion—if you work in audio, watch your language. And theirs.

Tim Goodyer, editor

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CONTRACTS



UK: Islington's Angel Studios has added a third iZ Radar 24 recorder with analogue and TDIF I-O, a remote Session Controller. An iZ UFC-24, 24-channel convertor and router will allow recordings to be transferred to or from the new Pro Tools I24 MIXPlus system, complete with Universal Slave Driver, 888/24 audio interface, a TDM plug-in Antares AutoTune and Emagic Logic Audio Platinum software. An ATR 1, standalone version of AutoTune, Lexicon 960 for 5.1 and 7.1 mixing, and two Apogee AD8000 convertors have also been purchased. Pictured above are (L-R) Angel engineers Steve Price, Niall Acott and Gary Thomas, and technician Garry Cairns. Angel, UK. Tel: +44 20 7354 2525.

US: New LA-based recording facility, Chalice Studios, has opened with an 80-channel SSL 9096j console in Studio A and a Neve 88R as the centrepiece of Studio B. The facility promises to be 'a unique, fantasy-like recording facility geared toward rock and roll artists'. Chalice Studios, US. Tel: +1 323 876 0826. SSL, US. Tel: +1 323 4643 4444. AMS Neve, UK. Tel: +44 1282 457011.

Germany: Grunwald-based film mixing facility Sound Shop has upgraded its SADIe system to 64 channels. The SADIe is one of three systems in use at the facility and was upgraded from an Artemis system that had been running with a Tascam DA-88 for film mixing. The SADIes also make use of CEDAR's range of restoration plug-ins. Sound Shop, Germany. Tel: +49 89 64 12 320. SADIe, Germany. Tel: +49 711 39 69 380.

UK: London's Hackenbacker audio-for-film postproduction facility is the first European installation of ServerSound sound FX and music database. The system provides the facility with ready access to up to a Terabyte of third-party SFX and music libraries that would traditionally be stored on CD. ServerSound is a development partnership with mSoft, making mSoft's ServerSound NT FX and music database available to Fairlight AudioBase2 users. Hackenbacker, UK. Tel: +44 20 7734 1324. Fairlight, UK. Tel: +44 20 7267 3323.

Radio Aid for Laos

Laos: Two of the country's provincial radio stations have been given a grant of US\$300,000 to upgrade their broadcasting capabilities. The stations, located in Laos' ancient royal capital, Luang Prabang, and in the central province of Savannakhet, have been given the money by the government of Sweden.

The year-long project to upgrade the stations is intended to improve the quality of local radio programmes in the two urban areas by increasing the capability of programme producers, journalists and technicians. It also aims to research listener trends.

Laos, one of the poorest countries in the world, with a per capita income of just \$600 a year, suffers from a chronic shortage of funds to upgrade radio stations. Even in the capital, Vientiane, programme producers have to make do with British-made (GEC) and American-made (Marconi) equipment that is sometimes as much as 30 years old.

Delia departed

UK: BBC Radiophonic Workshop pioneer Delia Derbyshire died on 3rd July. Renowned for her 1963 realisation of Ron Grainer's theme to the cult British television sci-fi series, *Doctor Who*, Coventry-born Derbyshire read mathematics and music at Cambridge University before joining the Radiophonic Workshop in 1962. Once settled, she demonstrated an exceptional

ability to apply mathematical and analytical techniques to the formative electronic composition systems at the Workshop with remarkable results. Her pieces 'The Delian Mode' and 'Blue Veils and Golden Sands' have been described by her contemporaries as 'without parallel in our output'. In breaking the news of her death to *Studio Sound*, composer and sound designer Mark Ayres noted the 'extensive catalogue of beautifully-crafted work she produced during the sixties and seventies... she was unique'.

Derbyshire established a reputation for tempering electronic sound sources with traditional musicality and won particular praise for an extended piece she composed for the IEE performed at the Royal Festival Hall before the Queen. Here she began with the letters IEE and worked through Morse code and elements of electronic communication to the 1969 moon landing. The *Doctor Who* commission began with producer Verity Lambert's brief to Desmond Briscoe requesting the services of TV composer Ron Grainer. Grainer



tied the theme closely to opening graphics that relied heavily on the then-exploratory technique of camera feedback leaving Derbyshire to manage the sine, square, white noise and beat frequency sources required to voice the composition. 'We then cut, shaped, filtered and manipulated them in various ways until the separate tracks were ready for mixing and synchronisation,' explained the Workshop's Brian Hodgson in the book *The BBC Radiophonic Workshop—The First 25 Years*. 'Each one of the swoops is a carefully-timed handsoop on the oscillators,' Derbyshire added. Summing up her 11 years at the Workshop, she commented, 'I suppose in a way I was experimenting with psychoacoustics.'

Streaming to be heard

US: Claimed to be the world's largest digital content facility, the Seattle-based Activate Grand Central has chosen Symetrix 422 AGC units to optimise its audio output. The company comments, 'To meet the needs of enterprise and high bandwidth customers, Activate Grand Central was designed to be scalable and flexible, supporting a wide variety of webcast events.'

Systems integration specialist Doyle Technology Consultants collaborated with Activate's engineering effort to convert a historic 1914 building into an advanced digital content facility designed for Internet media, including equipment installation and integration. The resulting facility is capable of managing and streaming thousands of simultaneous audio and video signals

Gallery views Cinesound

THE TAPE GALLERY'S Lloyd Billing has dramatically increased the scope of his online resource www.sound-effects-library.com. Billing, who runs his audio post facility in the heart of London's Soho, has acquired the entire Cinesound sound effects library and retrieved it from vaults at Elstree Studios. The collection includes Foley and location recordings for countless British films, including all of the James Bond movies and historical classics such as *Battle Of Britain* and *Zulu*. Many documentary recordings, such as Winston Churchill's state funeral of 1963, are also present. Now beginning the process of digitising the collection for online access, Billing spoke exclusively to *Studio Sound*.

Q: Just how big is this library?

It would take one guy 10 years to catalogue it in the traditional way, and that would be only for the 1m individual sounds that we're retaining out of nearly 4m in the whole collection. It's a huge undertaking.

Q: How are you making it available in the short term?

We're running a back-up catalogue service, so for the first year we'll be searching through and creating lists that can be faxed out. In the meantime, the whole library is available now in the traditional analogue way. But part of the collection has already been put onto 53 CDs, which we are now cataloguing and converting for the site.

Q: Is there a great deal of restoration involved?

We're applying all of the modern treatments that you can apply

yes. Even the CDs needed tidying up; some of them had bits of dialogue still mixed in the effects. We should have those online within the next two months.

Q: Do you still have the analogue masters that created the CDs?

Absolutely, but it's much quicker and easier to work from the CDs. Some of the masters were DAT, but most of them were analogue recordings onto Nagras—often on the actual sets of films like *Cromwell* and *Battle of Britain*. There are some very big crowd scenes, and some of the *Battle of Britain* Nagra tapes are of real Spitfires flying very close overhead...

Q: How did sound effects for the Bond films, made at Pinewood, end up at Elstree?

Cinesound was based at Elstree, and they did deals with all the film production companies to procure the rights to sound effects generated by each film, wherever it was made. Often they'd sell them back to the same companies for later productions! They certainly covered the market, right up till the late nineties.

Q: How are you digitising the sounds for the web site?

We're trying to get some software analysis programs written, through the DTI. They're very interested in funding it. We want to be able to feed in a sound and have the computer recognise it and resynthesise it, which will obviously help both encoding and cataloguing in equal measure. We're talking to some key audio research sites, and at the end of development we'll have some pretty powerful software...

Sound Effects Library, UK. Tel: +44 1438 715446.



Japan: The Nogizaka district of Tokyo has seen the construction of Sony Music's new HQ, a 10-storey building housing three floors of recording facilities. Some 70,000ft² accommodate two large recording studios complete with iso booths, three mixing suites and 11 mastering and editing rooms. New media production facilities include video production, CD-ROM and DVD authoring. The studio design duties fell to LA-based studio bau:ton with Tokyo's Obayashi Corporation planning and constructing the building. The studios' custom loudspeakers systems are the result of a collaboration between bau:ton, TEC:ton systems and Swiss Strauss Elektroakustik. Studio bau:ton, US. Tel: +1 213 251 9791.

over the Internet, and has installed hundreds of 422 levellers. By placing 422s in line prior to the input of each capture card on every encode computer, the system levels mismatched incoming audio.

'Since many of Activate's incoming signals are satellite feeds, audio levels can be anything but uniform,' said Scott Whitcomb, director of broadcast engineering for Activate. 'In addition, audio-only enterprise webcasts are auto-coupled telco signals, which frequently provide differing levels. With its implementation of the Symetrx processors, Activate addressed automation and preserved unity gain throughout the entire process—acquisition through encoding.'

Activate Grand Central, US. Net: www.activate.com. Symetrix, UK. Net: www.symetrixaudio.com

Broadcast Thais to D&R

Thailand: Netherlands-based console manufacturer D&R Electronica has sold seven Sirius digital on-air systems to Thailand's A-Time Media Company, which operates several key radio and television channels. The consoles are being installed within a new HQ and studio complex acquired by A-Time's parent company Grammy Entertainment. Six of the desks are configured identically for TV audio control rooms, while the seventh has been configured for production and transfer and

is located in a transfer room.

'Sirius was conceived as a radio broadcast system, but because of its software flexibility many people from television are approaching us with the idea of adapting it for TV,' comments D&R software engineer Anton Prins. 'You can make many combinations with Sirius, like how many analogue or digital inputs you want.'

Prins is closely involved in sales of this kind. 'The sales process is complex, because the customer can dictate the size of the I-Os and even the control surface itself. For A-Time, there was a lot of discussion about their exact frame sizes, for example.'

The Sirius systems were supplied by Satellite Pro AV, the SE Asian pro-audio and video supplier formed by mastering engineer and music producer Kenny Jackel.

D&R Electronica, Netherlands. Tel: +31 294 418014. Net: www.d-r.nl. Satellite Pro AV, Asia. Net: www.satelliteproav.com

Surround abounds

US: Dolby Laboratories estimate that some 10m US households will have a set-top box capable of delivering Dolby Digital 5.1 (via DBS and/or digital cable) by the end of the year. The American manufacturer also estimates that over 9m US households will have Dolby Digital 5.1 home receivers. The estimates follow the adoption of Dolby Digital broadcasting by Time Warner's Home Box Office television channel earlier this year. And with con-

sumer take-up on the increase. Dolby is anticipating further networks to be adopting their 5.1 audio format in the near future.

'HBO has a reputation for bringing its viewers the highest-quality home entertainment, so we are thrilled to now offer Dolby Digital 5.1 on the service,' commented Bob Zitter, senior vice president of technology operations at HBO. 'Many of our viewers have home theatre setups, and with the growing number of set-top boxes equipped to deliver a Dolby Digital bitstream, we are able to enhance our subscribers' experience.'

HBO's primary channel opened its 5.1 programming with the pay network premiere of *The Perfect Storm* during July; further films and other programming is to follow including the theatricals *What Lies Beneath* and *The Contender*, the HBO Film *Dinner with Friends*, and the 10-part HBO miniseries *Band of Brothers*.

'We are very excited to see HBO embrace Dolby Digital 5.1 on their primary channel,' Tom Daily, marketing director of professional audio at Dolby Laboratories added. 'Dolby Digital is changing the way viewers experience television programming, and we are starting to see viewers demand high-quality multichannel audio through their cable and satellite television subscriptions. The quality of the home viewing experience is now richer than ever.'

Other networks currently broadcasting in Dolby Digital 5.1 include ABC, DirecTV, Dish Network, HBO HDTV, PBS, Showtime, and STARZ!

Dolby Labs, US. Net: www.dolby.com/tvaudio

Cinema Expo's tenth

The Netherlands: The Sunshine Organisation celebrated the 10th anniversary of Cinema Expo International at the RAI Congress Centre in Amsterdam between the 25th–28th June. In true Hollywood tradition, everything was bigger and better—meaning that registered delegates' numbers were up and the trade show had also expanded its footprint.

CEI has firmly become entrenched in the European calendar as the annual rendezvous for the cinema exhibition industry, and continues to receive plaudits from those who attend. It provides a comprehensive overview of the state of the industry with seminars, screenings and product reels, trade show and, just as important, the opportunity to meet colleagues and new contacts at the sponsored lunches and dinners. The trade show ranges from the latest technology in digital projection to the latest in popcorn machines but all are important in order to keep the business wheels of the industry well-oiled and turning. The big question at the moment in terms of technology is Digital Cinema and where is it going?

CONTRACTS

Iceland: Reykjavik-based Screen One Television has installed the first CEDAR DNS1000 Dynamic Noise Suppressor in Iceland. The unit's first application will be removing background noise from live feeds for *The Jay Leno Show*. CEDAR Audio, UK. Tel: +44 1223 881771.

US: National Public Radio has installed an AudioCube 4 workstation in its Washington, DC facility. The NPR Cube is configured with seven Virtual Precision Instruments running on dual 850MHz Pentium III processors supported by a Plexor CD writer and CD-ROM; 100Mbit Ethernet and removable 18Gb audio drive. NPR serves nearly 15m Americans, distributes programming to Europe, Asia, Australia and Africa via NPR Worldwide, and throughout Japan via cable. NPR, US. Tel: +1 202.513.2000. Cube-Tec, US. Tel: +1 905 469 8080.

Netherlands: Due to be completed in September, Valkieser is intended to be one of the largest and most sophisticated postproduction facilities in Northern Europe. With Harris Grant Associates behind the design of the audio suites, the purpose-designed building in Hilversum will offer advanced video and audio postproduction facilities and house the first two Soundtracs D4 digital consoles. Valkieser, Netherlands. Tel: +31 35 671 4400. HGA, UK. Tel: +44 1483 885678.

China: China Central Television has ordered three further SSL consoles to join the two Aysis Air digital broadcast consoles already installed at its Beijing broadcasting centre. A 96-channel, 48-fader Axiom-MT is to go into a new music recording and mixing room at the Beijing site while two Aysis Air consoles are scheduled for new OB vehicles currently under construction in France by Thomson. Scheduled for delivery later in the year, one mobile will house a 64-channel console, the other a 48. CCTV has been broadcasting for over 40 years and currently has eight channels, broadcasting 138 hours of programmes daily. The coverage of CCTV-1 now reaches over 84% of the total population of China, represented by the ownership of more than 280m TVs. Audiences for popular programmes frequently exceed 900m. CCTV, China. Tel: +86 10 6850 6212. SSL, UK. Tel +44 1865 842300.

CONTRACTS

Hungary: Budapest's Operett Theatre has ordered around 80 DPA mics including 70 Type 4061 miniature microphones, 10 Type 4065 headband mics and various compacts (4021s, 4033s, 4037s and 4053s) which will be used on the horn and string sections of the theatre orchestra. The theatre's extensive refurbishment includes the installation of a Soundtracs DPCII console and is expected to open in the autumn. DPA Microphones, Denmark. Tel: +45 4814 2828.

US: Boston-based postproduction house, Soundtrack, has replaced an SSL Scenaria with a Fairlight MFX3.48 workstation equipped with Fairlight's QDC Technology engine. The new DAW is the facility's third MFX3-series workstation, with two MFX3plus already in operation. Soundtrack handles television and radio commercial advertising and is currently moving into Internet-based audio, industrial and corporate sectors, and ADR. Soundtrack, US. Tel: +1 617 303 7500. Fairlight, US. Tel: +1 323 456 0070.

Turkey: Istanbul-based Sinefekt Film Lab has chosen an AMS Neve Libra Post for its refurbished Studio 1, joining the facility's Logic 3 and two AudioFiles.



The new console is already working 10 to 12 hours a day, six days a week mainly on commercials, many mixed in Dolby Surround Sound for cinema release. Sinefekt Film Lab, Turkey. Tel: +90 212 275 7234. AMS Neve, UK. Tel: +44 1282 457011.

Belgium: DVD specialist Stay Tuned has ordered a professional encoding and monitoring package from dts. Stay Tuned specialises in the production of DVDs for European and US film distributors. With the installation of the DTS encoder and decoder, it can now meet the increasing demand for surround soundtracks. dts, UK. Tel: +44 118 934 9199.

Germany: DeutschlandRadio is building three new OB vans with console manufacturer Lawo serving as console supplier and main contractor. The first of three surround capable mc² production consoles has been built and tested for the vans that will serve in Cologne and Berlin. Lawo, Germany. Tel: +49 72 22 100227.



US: Long Island's Pie Studios gave its new Pro Tools 24 MIXplus system an early workout when Cyndi Lauper (pictured) dropped in to add overdubs to her forthcoming album. Recorded in Lauper's home studio with production duties shared between the artist and William Wittman (Joan Osborne, The Fixx, Too Much Joy), the overdubs were run through the studio's Neve console and vintage outboard gear to Pro Tools. 'Pie Studios is my favourite studio in the New York City area,' said Wittman 'and one of the best studios anywhere. It has an all-discrete desk with GML automation, a great sounding control room, just about every bit of outboard gear I could possibly want, a large recording room, and best of all, everything works.' The album is due release later this year on the new Edel America records label. Pie Studios, US. Tel: +1 516 674 3300.

Indeed, the opening seminar asked the question *Digital Cinema—Why the Wait?*

The cynical will probably answer 'money', but this would be taking too simplistic a view. The cinema exhibition industry is often regarded as being particularly conservative, but digital cinema sound has now been with us for 10 years and its rapid acceptance surprised even the most optimistic. In fact, for some observers, sound currently has a lead over picture. You are free to agree or disagree.

It could be said that digital cinema is actually now with us, and Disney underscored their commitment to the format by screening their latest animated epic, *Atlantis—The Lost Empire* in its digital form. Phil Barlow of the Disney organisation is a well-known proselyte of digital cinema and he wondered why people were still talking about it rather than getting on with it...

It would appear that there is a chicken-and-the-egg situation growing, with exhibitors saying that there is a limited catalogue of material while the studios say that there are a limited number of cinemas available for digital exhibition. At the end of the day it will no doubt boil down to the question of who pays for what, so as they say, watch this space.

It is rather amusing to see that cinema exhibition is suffering in many ways from

the same traumas as pro audio—the customers (in this case, the cinemas) plead limited equipment budgets while on the other hand we have emerging new tech-



Hungary: Postproduction company A-Produkcio has had two Miller & Kreisel 5.1 monitoring systems installed by Vektor Penna. The first M&K facility in Hungary, A-Produkcio has placed one system in a new mixing room and the other in a new projection room. The systems were built for video and DVD productions and for television broadcasting. Pictured are M&K MPS 2510P front monitors installed in the mixing room. Vektor Penna, Hungary. Tel: +36 1 3258772.

nology that is expensive. The eternal conundrum—higher quality on the one hand and 'good enough' on the other, with the latter often being reflected in the new audio products at the trade show.

As a percentage of the overall investment in a modern multiplex, the sound systems do not exactly require the lion's share but this is where 'economies' are often made. However, public expectation will continue to get higher—particularly in light of home cinema systems at affordable prices and DVD—and these economies could rapidly prove to be false.

Digital soundtracks have not exactly done cinemas a favour, either, as the level of many of the films previewed at CEI demonstrated. Headroom, lads, headroom.

You can already mark the dates for CEI 2002: 24th–27th June.

Virtual concert going

Net: Having been delayed by the British Foot-and-Mouth outbreak, this year's Glastonbury Festival took place during July and was streamed directly to the web by playloder.com. Three days of top names including Coldplay, Blur, REM, David Gray, Stereophonics, The Pretenders, Orbital, Gorillaz, Pulp and The Cure entertained concert-goers and web-watchers while Cambridge-based Imerge seized a spot for itself by offering an £1200 S1000 SoundServer, hard disk-based stereo audio server as part of a competition that ran for the three days of the festival.

Glastonbury Festival, UK. Net: www.glastonbury.playloder.com. Imerge, UK. Net: www.imerge.co.uk



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www.soundtracs.com

CONTRACTS

US: The Denver-based XACT Radio Network has taken eight Aphex Systems Model 1100 mic preamps, eight Model 622 expander-gates, and two each of the Model 108 compressor, Model 109 EQ, Model 104 Aural Exciter, Model 720 Dominator II and Model 320A Compellor. XACT Radio allows radio stations to stream programming to the Internet. Currently, NextMedia, Greater Media, Citadel Communications Corp and Milwaukee Radio Alliance have adopted the service. Creative Studio Solutions, US. Tel: +1 303 425 5004. Aphex Systems, US. Tel: +1 818 767 2929.

UK: Glasgow-Based recording studio, Ca Va has purchased three Pro Tools MIX and MIXPlus systems, and three Apogee A-D converters to 'provide a complementary digital solution to enhance the studio's existing Neve mixing consoles'. A MIXPlus and two AD-8000SEs have gone into Studio 1 alongside a VR Legend while Studio 2's Neve 5106 console has seen the arrival of a MIX system. A further MIX system was installed in the Mastering studio, which will also use the portable Apogee Track 2. Having served the likes of John Martyn, Simple Minds and Texas, Ca Va has welcomed Wheatus and Joy Zipper to its new facilities. The studio also hosts film soundtracks and recording sessions for radio and television. Ca Va, Scotland. Tel: +44 141 334 5099. Mediaspec, UK. Tel: +44 845 270 2233.

Business moves

World: British mixer manufacturer Allen & Heath has announced a £9m management buy-out, ending a 10-year period as a division of Harman International Industries. Heading the buy-out are managing director Glenn Rogers, sales and marketing director Bob Goleniowski, finance director David Jones and operations director Tony Williams. Lead investment has come from 3i, Europe's leading venture capital company, with additional investment from the Bank of Scotland.

Rogers commented: 'The time has now come to pursue our own independent goals. By maintaining our passion for audio, our commitment to quality and our thirst for innovation, we are uniquely positioned to further develop our position as a key player in the sound reinforcement, installation and club markets. With 3i on board as our financial partners, look out for some exciting new products very soon.' The company will remain based at its recently-extended factory in Cornwall retaining all its current employees.

Liechtenstein-based Neutrik has announced the separation of its audio test and measurement manufacturing from its connector design and manufacture under the name Cortex Instruments GmbH. Effective from 3rd July, the move prompted Neutrik CEO Werner Bachman to comment, 'Neutrik's goal is to strengthen the core business to better provide innovative solutions and cutting-edge connector technology to audio professionals worldwide. We have enjoyed a long and productive association with Cortex Instruments and look forward to a continued beneficial working relationship to provide our mutual customers with the best products possible.'

Taky Electronics has announced a change of name, 'to reflect the growing success of its JTS microphone range'. The



UK: The audio industry will take to waves once again in September when the DAMSTY Trophy will be up for grabs off the coast of the Isle of Wight. Set to establish a record number of entrants, the competition's 14 boats will be crewed by staff from the likes of Soundtracs, Beyerdynamic, Neutrik, Arup Acoustics, Kelsey Acoustics and, of course, Martin Audio. Established some 15 years ago, the fund-raising competition was renamed in memory of Dave Martin who was an ardent participant prior to his untimely death. The event continues each year, to raise much needed financial resources for audio related charities. Further information on either the sailing or the social evening to be held at the Island Sailing Club, Cowes can be obtained from Brenda White (+44 1753 646100) or John Carroll (+44 1372 845600).

Taiwanese microphone and audio equipment manufacturer is to be rebranded JTS Professional, and to offer a closer association with the JTS brand in professional audio and MI markets. JTS says it will be retaining the Taky brand name for consumer electronics products in non-English speaking countries, where it has been established for over 20 years.

Svetlana, US-based manufacturer of glass & ceramic vacuum tubes, has appointed UK-based PM Components primary world-wide distributor including

setting up PM of America Inc to handle product sales and servicing in North America, including Canada. Distribution outlets are still being sought for 'certain' territories, however.

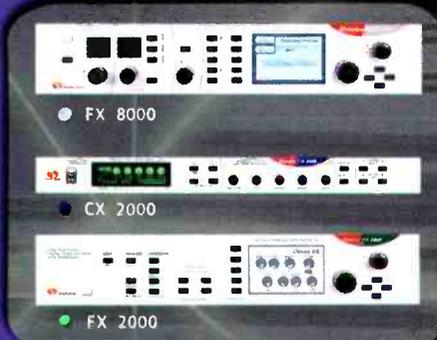
US-based Harris Corporation completed the acquisition of the Austrian Hirschmann Multimedia Communications Network (MCN) at the end of June. Harris reckons to have supplied over 60% of all DTV transmitters operating in the US, but has lacked the DVB-T transmitters needed to serve two-thirds of the



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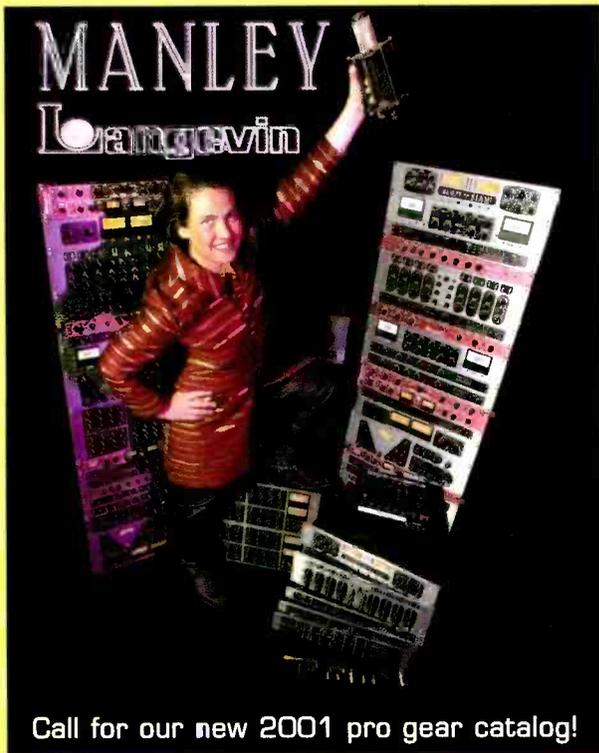
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APPOINTMENTS

Cirrus Logic has named Hans-Werner Eisinger sales director for Central and Eastern Europe and general manager of Cirrus Logic Germany based near Munich. Eisinger comes to the post via Integrated Device Technology and time as Cirrus' regional sales manager for North Europe.

Crown Audio has promoted Bob Lichty from music industry sales manager to music industry market:



manager. Lichty will oversee all marketing functions pertaining to music, touring, and recording and broadcast studio use.

Euphonix Europe has announced John Gallen as commercial manager. A recent recruit to the company, his recording engineering credits include Queen, Simply Red, George Benson, The London Philharmonic and The Beijing Symphony Orchestra.

Sonic Solutions has appointed Jim Taylor to its executive team as chief of DVD Technology. He remains president and technical director of the DVD Association, and will continue working with the DVD-A Haiku group and the DVD Forum. He joins Sonic after serving with Daikin US Comtec Laboratories and Microsoft.

DSP Media has appointed Gerard Volkert as eastern region sales manager for a new East Coast office opening in New York City. Volkert will be responsible for all aspects of DSP Media's sales and support efforts for the East coast of the US. Volkert was previously sales and System 5 specialist with Euphonix.

Synchro Arts has appointed John Cavendish as sales manager, Tim Rogers as software developer and Janine Wilson as marketing and administrative co-ordinator. The appointments accompany relocation to new offices in Epsom, UK.

DPA Microphones has hired Craig Parrish as sales and marketing manager and Henrik Bronner as Area Manager (Americas). Both have backgrounds in international sales and marketing and come from a Danish manufacturer of large-format scanners for the reprographics industry.



US: Studio B at North Hollywood's The Bakery studios has welcomed a 44-input Amek Media 51 console with four dual-stereo line input modules, providing a total of 104 inputs. The console replaces a 56-input Mozart RN desk and has been installed with three additional chassis extenders, one for the patchbay and two housing Pro Tools screens. Bakery president Andy Waterman commented, 'We're in an element where Pro Tools is the dominant postproduction medium, so we felt strongly that we wanted to deeply integrate Pro Tools into an analogue console in this room.' The facility specialises in music and mixing for 'themed entertainment and independent feature film projects'. The Bakery, US. Tel: +1 818 508 7800.

world's remaining digital television transmitter market. Additionally, while Harris is well placed in developing US-standard digital radio transmitters, it has lacked the European-standard DAB digital radio transmitters in which Hirschmann has a significant market share. Hirschmann

MCN is based in Rankweil, Austria, and becomes part of Harris Corporation's Broadcast Communications Division. Hirschmann MCN has sales in calendar year 2000 of \$26m.

JTS Professional, Taiwan. Tel: +886 4 493 8808.

Allen & Heath, US. Tel: +44 870 755 6264.

Neutrik, Liechtenstein. Tel: +423 237 2425

PM Components, UK. Tel: + 44 1634 840500.

US Surround Conference

US: The annual Surround 2001 Conference and Showcase is to return to the Beverly Hills Hilton in California on 7th-8th December. The third event of its kind, Surround 2001 is designed to provide professionals working in music recording, film, television, game development, theatrical events and home theatre with hands-on, how-to experience of multichannel audio production technology. Its conference programme features cutting-edge tutorials on the latest production techniques.

States Tim Wetmore, Surround 2001 Conference Chair, 'Designed for those professionals who create, produce, and install multichannel sound, Surround 2001 Conference and Showcase is considered the most prestigious surround specific event of its kind. This year's Surround Conference is expected to draw over 1000 professionals and provide this influential audience of producers and content creators with information on the tools they need to create the future of audio entertainment.'

For conference details or to register for Surround 2001 go to www.surroundpro.com or call +1 800 294 7605 x507. To reserve private demonstration space contact Margaret Sekelsky at +1 212 378 0491 or via email at msekelsky@uemedia.com

Technical upgrade for BBC

THE BBC RECENTLY UNDERTOOK a major technical upgrade of the Golders Green Hippodrome theatre in North London, which it had first converted into a live-audience broadcast facility in 1963.

Alongside aesthetic refurbishments and an improved sound reinforcement system, the control room was kitted out by The Oxford Sound Company with an SSL9000J Series console and PMC 885/XPD monitors. OSC also provided Excel 201 nearfield and surround monitors, and out in the auditorium added a Soundcraft K3 mixer for FOH duties.

BBC project manager John Bowyer spoke to *Studio Sound*.

Q: How did you get involved in the project?

I project-managed the previous refurbishment of about 15 years ago, so I knew the place fairly well and was allocated to do a second one.

Q: How do you turn a music hall theatre into a studio?

What was the music hall stage is now the studio floor, and the control cubicle is built to one side where there used to be stalls—underneath the circle balcony.

Q: How isolated is the cubicle?

It's completely acoustically isolated. The sound reinforcement for the auditorium is totally independent of the broadcast sound, and the mics are split to the 9000 and the K3.

Q: So the Hippodrome regularly uses the 9000 as a live broadcast console?

Yes, the show *Friday Night Is Music Night* is often broadcast live through the console, with an audience. Most of the time they're mixing to stereo and straight to air. On other nights there are recordings, with an audience, but again to stereo. There is 1/4-inch analogue and DAT in the control room. There are multitrack facilities, if required—a resident Studer A800, plus the machine room is wired for rented-in 48-track digital machines.

Q: What was the key factor in selecting the console?

The 9000 was chosen because of the live on-air situation—you have to know that a knob is going to do what you expect it to do, without going through any layers of software. We looked at digital, but the confidence factor won through for the operators. If you do get crashes, it takes several minutes for a digital mixer to come back up again—and you can't possibly have that live on Radio Two.

Q: Were there many difficult constraints in adapting such an old building?

We had to comply with English Heritage, because it's a Grade 2 listed building. The main refurbishment actually restored and improved a lot of the ornate plasterwork, and all of the technical work had to be checked by English Heritage so that it didn't detract from the original decor. The control room was already there from 1963, so it was mainly a matter of being very careful with the cabling and, especially, the new lights. It's a TV studio, too, don't forget...

BBC Resources, UK. Tel: +44 207 765 3262.

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A CONFERENCE OF MANY PARTS

IBC organisers have put a conference together that compartmentalises the content in to subject topic streams. This year sees the introduction of 'Super Sessions' which combine paper presentations followed by panel discussion. Of particular interest to the audio fraternity within this category is *Digital Radio—Will It Succeed?* chaired by David Meares, of BBC R&D. As part of this Super Session papers will in particular review technical and business experiences of DAB and DRM and will review how advanced services will be possible using these systems. It is possible that the long awaited revitalisation of the AM bands, attempted with stereo and other techniques in the past, will provide a real opportunity for new prosperity as a result of digital technology. Additional papers will be included that review how digital systems influence the design of regional broadcast centres and in particular how archiving might change as well as the systematic monitoring of programme level. Other sessions cover the issue of *What Will Make D-Cinema Lift-Off?* chaired by Phil Barlow from The Walt Disney Motion Picture Group, USA and *Producing the Goods—TV Studio Video and Audio Production*



Technology chaired by Janet West from The Skills Zone, UK. The latter will look at how the changing demands placed on modern production facilities reflect the complex changes in the market for content and suggests that flexibility and high performance are key considerations for production technologies when specifying studio infrastructures that can support applications from news to HDTV. A series of briefings for producers includes a presentation by *Studio Sound* regular John Watkinson on *Getting the Audio Right*. Up to date Conference listings can be found at www.ibc.org



Audio's profile raised at IBC 2001

The IBC Convention (14th–18th September 2001) has established itself as an essential element of the annual professional audio exhibition circuit with a refreshing mix of audio production technology and a dedicated and well attended audio hall supplemented by a host of other audio manufacturers dotted around the expanse of the RAI Convention Centre in Amsterdam.

Aside from concentrating audio minds on developments and progress in broadcast, postproduction and multimedia production technology, IBC has far broader appeal than a pure audio show because it showcases mixed media.

The reality of converging markets and cross disciplining has created an information need among audio practitioners who will want to at least acquaint themselves with other segments of the production industry to spot trends and business opportunities or simply to learn and familiarise themselves with what the other side is doing. IBC represents the only annual opportunity in Europe to place audio in to its wider context.

This is facilitated by a high demo content throughout the halls and a conference programme that majors on sessions that, while they might not concentrate on audio, serve as excellent crash courses in its related disciplines. The sessions are decidedly application and business oriented and there's been something of a shift in emphasis according to conference committee chairman Dr Chris Dalton.

'Recent years have seen the Conference moving away from pure technology and focusing more on the needs of the business and production communities,' he said. 'We have taken note of previous year's delegates so this year we



have created six distinctive themes and are trying to limit the number of parallel sessions to no more than four. In this way we hope that delegates can plan their own Conference timetable with ease.'

The IBC Convention is a well organised show, which when combined with the convenient geographical location and excellent international transport connections of Amsterdam, makes a short visit an efficient and rewarding reality. However, the Convention is incredibly well attended and

requires planning in advance to make the most of the opportunity. The IBC runs an informative and helpful website (www.ibc.org) that allows attendees to save time by preregistering as well as offering details on travel, accommodation and the conference programme.

Audio attendee numbers have been rising steadily at IBC for good reason. International audio professionals are identifying and appreciating the unique opportunity that the Convention offers.

Produced by

STUDIO SOUND
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Studio Sound is producing its now regular audio@ibc supplement for the Convention with the aim of serving the information requirements of attending audio professionals. Distributed throughout the audio hall it will again serve as a rallying central audio resource with product news on all attending audio manufacturers.

Editorial contact: Zenon Schoepe. Tel: +44 207 579 4604.

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FORUM STUDIOS

An interesting history and refreshing ideology differentiate this studio in a Roman church. **Zenon Schoepe** decides that life is indeed beautiful

‘YOU COULD SAY that we’ve been blessed by our location,’ says Forum Studios MD Marco Patrignani of his studio’s location in the basement of an old church in a high class residential area of Rome.

It’s a curious package that actually works extremely well despite the fact that the only daylight in the 1000m² complex is from the entrance hall. Well planned air conditioning and the enormous ceiling heights involved

combine to provide an airiness that belies its subterranean position.

There are other benefits. The large organ in the working church above is tie-lined to the studio for recording purposes and the enormously overengineered physical fabric of the building has paid dividends in isolation between the studio’s rooms and the studio and its landlord. Isolation is remarkable. The fabulous 90-piece orchestra live area in Studio A has a stage and projection screen at one end and it took a full-blown performance with Zucchero, his band and full PA to get the one polite complaint from the business upstairs.

Forum’s origins are equally interesting. Composer Ennio Morricone and a partnership of other like-minded musicians and composers that represented the elite of Italy’s international musical output established a studio under the church for their own purposes and projects in 1970. More interested in refining their art than entering into the studio business with its associated staffing, investment and strategic issues, the project was taken over by Patrignani’s parents and in 1979 Forum studios were born with major restyling and a 32-channel Harrison desk that was in operation until around three years ago. Studio A was supplemented by a smaller Studio B with a hand-made Tassoni console and a sizeable live area.

It has remained a family business. Patrignani’s father, Franco, is an engineer of enormous experience, so is his brother Fabio, while Marco started in the firm as an assistant to his late mother Emma, who was managing director of the studio. He balanced a role as studio manager and producer with considerable success which led to the creation of his own Roadhouse Music record label.

‘Running a studio is a hard business and anyone any-

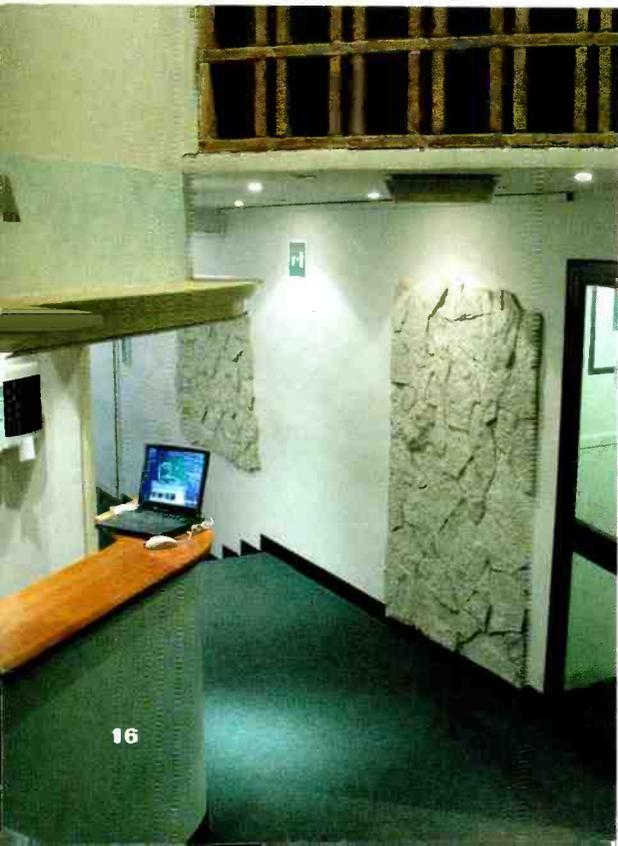
where in the world who runs one will know what I mean,’ says Patrignani. ‘Investing and investing, looking at new technology. It’s particularly the case if you have a room that is special like we do in Italy, people expect you to keep investing.’

The studio proved successful and took off commercially while retaining its work ties with its founding father clients. Since the 1980s, Patrignani estimates that the studio has hosted more than 80% of the most important orchestral recordings for film in Italy as well as many American productions that rode the ‘Made in Italy’ bandwagon. Oscar winning scores for *Il Postino* and *Life is Beautiful* were recorded at Forum.

Patrignani says there are many benefits for orchestral recording in Italy including location, tax breaks and the lower orchestral rates. ‘Of course we’re more expensive than Eastern Europe but I see us as being a compromise between them and places like London and LA for jobs that the client really needs to feel comfortable about the technical standards. Also spending a week in Rome on work is no hardship,’ he adds.

Some 15% of his business is of international origin and predictably Patrignani wants to increase this quota. ‘What you have to understand is that we are equipped to international standards and we pay exactly the same amount for our equipment as they do in America or England but our rates are lower and the return on our investment is lower and slower,’ he explains. ‘You would perhaps pay four times the amount for an identical studio to ours in America, England or Japan. So we are competitive and we have the equipment and the experience—there’s an orchestra in here pretty much every day.’

Studio A sports the very last AMS Neve VR Legend ever built, a 60-channel version. ‘In reality it looks a lot



like a VX, the panels are black. Our order coincided with AMS Neve's move over to the VX and the discontinuation of the Legend, it's all Oxygen free cabling, so it's a strange mix but a unique one,' says Patrignani. 'The desk went in in 1998 and I'll always remember the date because it arrived on the same day that my daughter was born. I think I'll be paying for her a little bit longer than I'll pay for the console.'

When the new desk arrived it was planned to upgrade the Urei monitors in the room as well, but minds were changed as soon as installation was complete. 'We put up some CDs through the desk and the monitors sounded fantastic. We've got Mogami cables throughout.'

One of the hidden benefits of the Forum package is access to a positive treasure trove of old and special instruments including masses of exotic percussion, and even the actual celeste that was used on so many spaghetti westerns.

Studio Master was opened in 1987 with an SSL 4000 E-G series and followed the concept of a large control room and small overdub room. 'It added a lot to our flexibility here because we need to have the big room recording whenever it is free and we could move a client over for mixing to the Studio Master. However, we do have tie lines from it to the Studio A live room just in case a client insists on mixing on the Neve.'

Studio B now houses a ProControl which underlines the commitment to Pro Tools at the facility—the studio runs three complete systems, each with expansion chassis and Apogee and Digidesign converters, and a total of two ProControls. The room is used for ADR, synchronisation, TV work and general editing duties.

'The Americans are asking for Pro Tools, it's becoming a standard so we have to have it. We used to back up to 24- or 48-track DASH, or ProDigi, or Studer A820

with Dolby SR, or even 16-track 2-inch 3M, always. The problem is that when you have 60 or 80 musicians you can get the shakes, it's bad enough with one. Now I'm beginning to see some clients gain confidence and trust with the system, but we always advise to make a back-up. The damage it would cause if something went wrong is not worth thinking about, you'd have to leave the country.'

Patrignani is a great advocate of the pivotal role of the assistant engineer. 'I believe in assistants because they are your people in the room for you,' he says. 'When you're working with Morricone and a 70-piece orchestra the thing he wants more than anything is to feel calm and relaxed. He arrives at 8am at the studio and he doesn't want to know about any problems, he's there to play his music. He tells us that the studio feels like his house, so we're doing something right.'

While the orchestral capabilities of Forum are its USP it also handles pop music with Patrignani enthusing about the possibilities of recording bands in Studio A.

Vangelis and Jon Anderson block-booked Studio Master for six months for *The Book* project. The studio is completely self contained right down to its own private entrance ensuring privacy for those who crave it.

There's also a small pre and postproduction room plus the area previously



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and originally used as the projection booth to plan for. 'Unfortunately no one now wants to work with projectors because video is faster and more convenient,' states Patrignani. 'So the projection room, which is directly above the control room of Studio A, is an interesting space that could be used as another control room with the live area. Another Pro Tools system will go in there for a fact.'

'Most of the composers who record their music here also want to edit it here and deliver it to film mixing in a finished form the way they want it,' says Patrignani of the small preproduction room. 'We need a room to do this in because it's a waste using the bigger studios for it. The other aspect is that when we're working on big projects we've got somewhere for the music editor to go and play.'

However, the big plan for next year is the conversion of the 40m² and very high-ceilinged live area adjoining the small control room of Studio B into a 5.1 DVD authoring suite.

'It'll be a fantastic room in acoustic terms and we've already checked with Dolby who have confirmed that the acoustic possibilities are enormous. It will be an important development for us because we'll be able to provide our big name clients with a far wider breadth of service.'

'For us, in our position, in our market, in this geographical location, it is difficult to invest,' he continues. 'If you're in LA then it is easier to justify investment when you look at the value of the market. Here it is different and more difficult but at least we know the problem, it's always been a problem, and we have sur-



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vived. But someone will have to do this because there is a DVD authoring market in Italy and there is a feel good factor about this studio among our clients, they have confidence in us.'

Rates are reasonable to say the least, and you get an assistant and whatever is in the racks stays in the racks. Studio A goes out for £100(UK) per hour, with around £90(UK) for Studio Master. 'We have suffered with smaller clients who regarded us as more expensive than our competitors but their minds have been changed. They've started to understand that if you spend a little more at the beginning you end up spending less in the end. Our philosophy works.'

The appeal of the studio's location in one of the poshest parts of Rome and within walking distance of many exquisite hotels and eateries should not be understated. Working at Forum while enjoying Rome is made easy and the studio boasts a relaxed and confident ambiance and the scale and flexibility of Studio A's live area has to be felt to be truly appreciated. It has the sort of worked in patina that only rooms that have absorbed the energy of countless great recordings have.

Patrignani was in the process of commissioning a batch of T-shirts bearing the slogan that the studio has always operated by. 'Without passion music is just another business'. He's right. More people should believe it. □

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Waves MaxxStream

The formative days of web streaming will see standards continually raised and facilities expanded. **Rob James** finds Waves' audio streaming processor setting the pace

STREAMING IS ONE OF THOSE WORDS. You know what I mean—magic incantations which generate excitement and dollar signs in the eyes of otherwise rational people. Despite general disenchantment with IT hype, streaming is still seen as having huge possibilities for the future. People looking to Internet broadcast, content provision, e-commerce music, web conferencing, enabling services and video on-line provision are all salivating

There are a number of factors to consider. The old computing adage GIGO (Garbage In Garbage Out) is equally applicable here, so the first requirement is for high-quality physical inputs and sample-rate conversion. For pre-conditioning the audio to compensate for the deleterious effects of the data compression processes in the streaming codecs Waves has included a number of audio processing plug-ins. The effect of these may be monitored in real-time from the processor card out-

off-air receiver to assess the effects of preconditioning on the material. While it is not too arduous to set up a second PC connected via a LAN to decode the streamed material, there is a considerable (20s–30s) delay. This is inherent in the codec process, not a MaxxStream problem. Therefore, arriving at optimum settings can be a rather long-winded process. It is a good idea to briefly mute the signal before each change to ease identification.



at the prospect. There are even those who would have you believe it's already hit the mainstream.

In the rustic, narrow-band environment of the UK, I see little evidence of this and, given the infrastructure decisions made during the eighties, the situation seems unlikely to significantly improve any time soon. With a so-called 56k dial-up connection there has to be a real desire for specific content, unavailable elsewhere, to persuade consumers to bother with video streaming.

While bandwidth remains scarce, decent quality audio-only streaming is more likely to find a ready audience and is cheaper to implement. Small radio stations in particular are not averse to the idea of improving their reach—provided the cost is modest or they can see a clear return on their investment.

Countries with broad(er) pipes are already enjoying the first real fruits of the 'revolution', access to new and archive material—audio and video—which would never have been available elsewhere. This is especially useful for niche interests (not just pornography) but needless to say, the established content providers are also looking for new ways to leverage their assets.

Currently, narrow-band streamed audio quality, even from national broadcasters is generally pretty execrable. In part this is due to ignorance but also to a scarcity of tools specifically designed for tailoring full range audio to the available bandwidth.

Waves will be familiar to most people in this business as developers of a highly regarded range of plug-in signal processors available in several formats for both PC and Mac platforms. With the MaxxStream suite of products the Israel-based outfit has turned its attention toward solving the real-world problems inherent in conditioning and converting audio for live and/or on-demand streaming.

However, this can be highly misleading since the whole point of the exercise is to improve the perceived quality after the encode-transmission-decode process. When heard direct the processed signal may well sound far worse than the original. To achieve good results it is essential to monitor the decoded signal(s) while adjusting the MaxxStream processes.

The MaxxStream driver has the extremely desirable and possibly unique trait of providing the processed output to as many encoder types and multiple instances of encoders as the host computer will support. This means simultaneous encoding to, for example, Windows Media and Real Audio formats at several different rates at the same time. This considerably simplifies and reduces the cost of preparing material for transmission by a service provider. The resultant streams are sent via a network connection to the service provider.

The idea of signal conditioning to suit the transmission medium and consumer preference is nothing new. From the earliest analogue days, signals were often 'adjusted' to this end. This single-ended adjustment is quite separate from any reciprocal pre-emphasis and de-emphasis represented here by the arcane processes inside the encode-decode loop.

It is now commonplace, if not universal, to employ some form of single-ended conditioning to signals prior to conventional FM or AM broadcast. Even purist classical music stations do it. The aims are very similar to the MaxxStream premise. Increased audibility, intelligibility, perceived quality and 'signature' sound. Some of the tools are equally familiar including dynamic range compression, equalisation, de-essing and peak limiting. There is one significant operational difference, however. With 'conventional' transmission it is comparatively easy to set up an

People from widely differing backgrounds are undertaking this work. In some cases conditioning is done by the IT department using software tools while in others, it is done by audio personnel using conventional outboard processors with the result passed on for coding and transmission.

IT people are generally quite happy with PCI card and software solutions whereas audio folk often prefer a dedicated turnkey system. Recognising this, Waves is shipping MaxxStream in several flexible configurations designed to meet the multifarious requirements of streaming audio applications. MaxxStream may be purchased as the MaxxDSP-100 PCI card and software package or as ready-to-go rack-mount systems with a choice of two different configurations. The M100 is a 1U-high rackmounting PC with a single MaxxStream card and software, while the 2U-high M200 has room for a maximum of four cards. The PCs are rugged, industrial strength machines and noisy, but for this purpose reliability is far more significant than noise since they are likely to be sited in machine rooms.

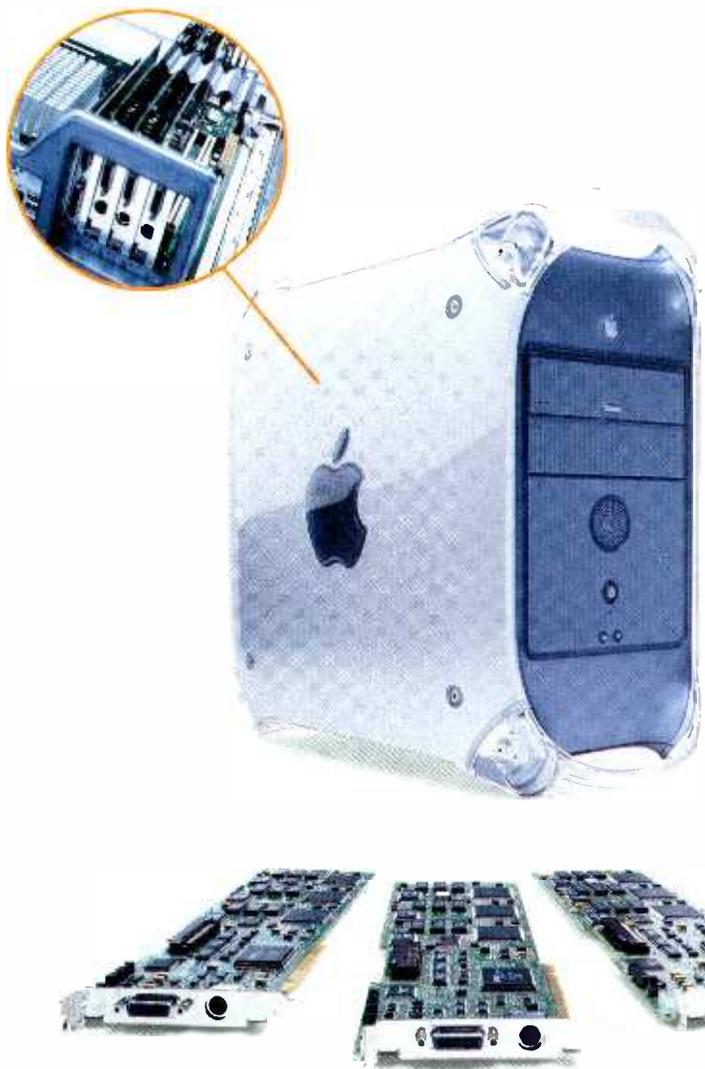
The system software runs under Windows 2000 or NT4 and the main application is, in effect, in three levels. Sessions contain racks which contain the processors themselves. A saved session will contain all the racks and all the processors within these racks together with their settings. Each processor card offers the choice of one stereo or two independent mono signal paths. Preset racks are included for mono processing of left, right or both inputs.

The supplied presets provide a quick means of dealing with a wide variety of material and webcast types, although optimum results will be obtained by making adjustments to these or rolling your own from scratch.

The bare 'rack' has MUTE and BYPASS buttons and a



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REVIEW

Card Sharp

THE MAXXDSP CARD comes in two versions. XLR has two sub-D connectors to handle balanced I-O, AES-EBU and analogue, via breakout cables. The other version has phons for unbalanced analogue I-O, and SPDIF digital I-O.

A-D and D-A conversion is 20-bit at sample rates of 44.1kHz, 48kHz, 88.2kHz and 96kHz. DSP power is courtesy of a Motorola Onyx 400MIPS 56301 chip.

Supplied plug-ins are:

- Q10 Paraphoric Equaliser.
- CI Compressor-Gate—four dynamics processors providing compression, expansion, limiting and gating.
- C4 Multi-band dynamics—4-band up-down

button with an arrow which pops up a list of processor options. The selected option places an icon in the rack and another 'arrow' button. Processors may be added anywhere in the chain, in any order. Clicking on a processor icon pops up a window with its controls. Each processor's settings can be stored and loaded separately.

Sampling rate clock is internally generated for analogue inputs or acquired from the digital inputs. MaxxStream can also capture audio from other audio applications in real-time via the PCI bus. Although rates up to 96kHz are supported the higher rates are not recommended or necessary for streaming and reduce the number of processors that can be used simultaneously. Multiple sample-rate conversion on the MaxxStream card output enables each encoder connected to the WaveIn system device (in effect the MaxxStream output) to request its required sampling rate. MaxxStream is encoder agnostic, conferring a degree of security in this rapidly changing area.

MaxxBass adds a little psychoacoustic necromancy to the package. This plug-in capitalises on the human brain's ability to 'fill in' the missing fundamental frequency in bass notes reproduced from small speakers, and-or after severe data compression. The input signal is split into two parts with a variable crossover point. HF is passed through and may be mixed with the processed bass. The bass signal is analysed by the MaxxBass processor, which creates a specific series of higher har-

monics of these low frequencies. The dynamics and the loudness of the original bass are duplicated in the synthesised harmonics. Used carefully this results in natural sounding enhancement of the original bass. The output mixer enables the proportion of processed to original bass to be adjusted. A high-pass filter can be inserted, plus an upward compressor. The decay control helps optimise the effect.

expansion, limiting and compression plus dynamic and conventional EQ.

● De-Esser—Reduces sibilance and related artefacts.

● AudioTrack 3-in-1—4-band parametric EQ, Compressor and Noise Gate.

● SI Stereo Imager—enables width control, M&S encoding and decoding plus Blumlein shuffling to enhance imaging.

● MaxxBass Virtual Bass Enhancer—psychoacoustic bass enhancement process which pitch shifts the source signal's low frequencies to a higher range in order to improve the perceived LF response of transmission systems and speakers with limited LF bandwidth.

● LI Ultramaximiser—limiter optimised for increasing loudness.

Regardless of what processors are used in a rack there is no appreciable load on the host computer's CPU. Of course, the amount of DSP is finite and if too many processors are added to a rack some options on the list will be 'greyed out' indicating there is insufficient processing for them. In practice I was able to do everything I wanted, in stereo or dual mono, without hitting the end stops. Anyone familiar with Waves plug-ins will already appreciate the power of this toolkit. The balancing act of 'what can I afford to lose so I can run this plug-in', so familiar from sequencer and audio editing systems is pretty much banished unless you get really silly.

Humans are very good at rapidly adapting to objectively poor quality audio sources—small radios, telephones and so on. Unfortunately, the artefacts found in narrow-bandwidth streamed audio are particularly annoying to many. I found MaxxStream, carefully adjusted, to be capable of compensating, at least in part, for most of the more egregious problems. The de-esser attacks the harshness so often present. Careful use of the powerful EQ and dynamic EQ minimises the almost

self oscillating quality you get with some codecs. The dynamics and Ultramaximiser can keep the dynamic range within the 'sweet spot' for the codec, again reducing artefacts and MaxxBass also manages to impress. Excessive stereo width can cause problems, but the SI stereo imager deals with these and other imaging issues. The supplied racks and presets give a good headstart in arriving at suitable settings although this is necessarily very subjective. For some people I dare say minor tweaks are all that will ever be required. The ground-up approach may suit others better.

Apart from the obvious web streaming applications, MaxxStream will also find uses in mastering audio for kiosks and theme parks where the final delivery system (speakers for example) are a known quantity. It occurs to me that MaxxStream may also be desirable to anyone in a production environment who wants access to Waves effects algorithms in a stand alone processor.

MaxxStream offers a way of minimising the audiences perception of the artefacts and anomalies introduced by the data-compression codecs used for streaming. There is also the opportunity to create a 'house sound' for a webcasting station. The subjective improvement can be huge even at the pathetic data rates commonly experienced over dial-up links. The result is certainly not hi-fi but intelligibility and, perhaps equally importantly, ease on the ear are greatly enhanced. In other words, something approaching a 'broad-band sound' from a narrow-band transmission. I would be far more inclined to listen to a web station using this technology than the dismal offerings I've encountered so far.

Waves has made this specialised audio streaming toolkit available at reasonable cost and in convenient packages to suit a variety of potential purchasers. Anyone serious about streaming audio should be investigating. □

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SSL MTP, MT Plus, Aysis Air+ & Avant+

The latest round of upgrades to SSL's digital desks takes in broadcasters, better video monitoring and faster control processing. **George Shilling** reports

JUST AS SSL'S 4000-SERIES garnered interest in the broadcast production arena, so has the Axiom MT, SSL's digital music multitracking console. And similarly to the way in which this led to the addition of features to the 4000 (such as Status Lock), the latter has spawned the MTP—the P standing for 'production'. One of the earliest inter-

ests in the MT came from NMT in America, who had designed a truck for HDTV coverage of sports events around a competitor's console. NMT needed a console earlier than it would have been possible to build a custom MT, and therefore plumped for an Aysis Air as a temporary measure. Several years down the line, NMT still has the Aysis and has installed a second

one, but it led to SSL thinking seriously about the MT as a console for trucks. Further Aysis customers expressed an interest in a digital in-line console with a large number of multitrack buses, so SSL looked at the necessary hardware and software changes that were necessary and came up with the MTP concept.

With the proliferation of trucks, especially in the US, more music engineers are making the sideways move into broadcast, so for them, an in-line console such as the MT opens up possibilities for extra feeds not available with traditional broadcast consoles. The MTP's development happened to coincide with upgrades to the existing A-series digital console range which have now been given 'Plus' badges to denote a number of improvements, while the Axiom name is dropped from the MT Plus. The major changes comprise a central processor upgrade, (dubbed HS), a new high-definition display monitor and new faders. Unusually in the area of digital consoles, these improvements are available as upgrades for existing owners, much like the situation when E-series desk owners were offered the G-series computer and EQs. Each part of the upgrade package is available separately, enabling upgrades to suit the owner's budget and needs. Another consideration for the design team was the issue of compatibility between old and new versions. New software features are therefore relatively few at this stage, allowing for a continuity and ease of upgrade for users. However, with typically three updates a year, it will not be long before upgraders and new purchasers will be enjoying further features. And customers who upgrade the CPU crate get a few hidden benefits, such as a 24-bit card and extra Highway cards.

The most important difference between the MT and the MTP are the latter's reduced size and weight. Although there are seven or so Axiom MTs installed in trucks, a number of customers required the features of the MT in a smaller and lighter package, so SSL duly obliged. The profile of the MTP is quite dif-





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ferent from the standard MT Plus. Although the channel width is the same, a great deal of space has been saved by removing the routing buttons from the top of the channel strips, leaving only the centre section routing section for bus assignment. Further space has been saved by moving all the routing indicators into the vertical plane beneath the meters, also making them easier to see from a seated position. The depth of the console body has been reduced by 20%. Aluminium alloy has been used extensively instead of steel in the construction of the frame, reducing the weight by 30%-35%.

The MTP is optionally available with a reduced-width centre section, so that a 48-channel surface fits across the width of a standard truck. The section housing the monitor is removed. The monitor can then be sited remotely, and essential buttons that normally live underneath it are relocated across to the bottom of the other centre panel, with that section's controls shunted upwards. Buttons that have been removed from this version can have their functions programmed into Macro buttons.

The MTP runs identical software to the MT Plus and is therefore completely compatible with that console. The differences are purely presentational, and now it seems that music studios are also expressing an interest in a compact form MT. The shape of the MTP has quite a vintage look, reminiscent of Helios and Trident consoles, and the benefits of a smaller footprint appeal to many.

All Plus consoles benefit from the new TFT monitor which can be tilted to best angle, although the screen used has excellent visibility of angles up to about 160°. It can also be tilted back to be flat and flush with the console surface, allowing a script tray to be placed across the desk, for example. The information display has been completely redesigned and runs in XGA mode, and with the new HS processor there is never any lag between moving a control and this being reflected on the overview display. The display backgrounds are now mostly a smart light grey, lending the graphics a modern look along the lines of PC and Macintosh operating systems, with better readability. A further feature of the new TFT display is that it features a secondary input that will accept a 1024 x 768 pixel, 24-bit, 75Hz refresh computer type input. Primarily this will be useful for Pro Tools or Radar display for example, or possibly for a video source when working to picture. This plugs in under the desk, and is activated by a button next to the display, and I suspect will be fully used by Avant Plus users in particular.

The other major physical change to the Plus desks is the introduction of new Info Faders. The large faders were previously in banks of eight faders. The new ones are individual, and slot into a bus card, much like those on the 9000-series desk. They are hot-swappable: when you pull one out, the channel continues to pass audio. When a new one is inserted, the fader runs through a self-test routine, then calibrates and re-nulls itself to the position the mix indicates, all within about 5s. Next to each fader is a 4-character display strip for various messages, most commonly grouping indication. Automation and protection statuses can also be indicated here. A new feature of the fader is an update to the much-loved AutoTakeover feature: when the fader reaches the null (take-over) point, a physical 'notch' can be felt in the fader, so you don't have to look at the fader while doing moves—especially helpful when working to picture. And with Motors Off selected the amount of Trim is displayed as a numerical value.

SSL claims that with the slightly enhanced feature set of the MT Plus compared to the Axiom MT, the new faster CPU is running at only about 10% capacity, so there is a huge potential for new features. These consoles function at around 12x the speed of their predecessors. Huge automation data edits are done in a few seconds, opening up the creative possibilities. The Avant Plus is probably the console that has benefited the most from



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REVIEW

the HS processor, with intensive use of automation more widespread in the field of film sound mixing. In direct operation, SSL claims these desks feel more 'analogue' in their response. Avant users in particular will notice the new machine control display on the main screen, which also features on the MT Plus and MTP. A parallel interface is now provided in addition to the four serial ports, and a new LTC output enables code-only slaving. Offsets can now be directly entered on the fly, and cute icons show each machine's current transport status. On the Avant, the new Premix Master channels feature enables the stacking of six or eight inputs under one channel fader. A single button push brings up the slave faders to one of the channel bays for individual tweaking. In this way, up to 64 inputs can be controlled within one 8-chan-

nel bay, and this is set up from a matrix-style menu where individual functions can be isolated from the group. Another Avant Plus-only feature is Super Grouping, which benefits from the increased processing power, enabling virtually any controls to be connected. This feature, developed from user requests, enables for example, linking a number of channels' aux sends, or simultaneously control of EQ with a pan pot. Inverse connections are available, and this feature enables complicated mix automation data creation from fewer passes. Automation naming structure has changed slightly, in order to clarify things: offline-edited mixes are immediately recognisable as such, for example.

With no dynamic automation, the Aysis Air Plus undoubtedly taxes the processor even less than the



other consoles. Snapshots are recalled absolutely instantly, with no 'rippling' across the console. The immediacy of operation is the most important benefit to broadcast users. The new faders come with the useful 4-character display to show grouping and a slightly different feature set, such as backstop stereo PFL. The redesigned display is far less complicated than the sister consoles' displays, as befits the broadcast situation.

While software for older systems will continue to be developed, some new tricks will inevitably be unavailable on non-Plus (nonplussed?) versions. Interestingly, as new software is written, the high-level code is flagged for compatibility with the older processor. Generally useful features which do not depend on the new processor will become available as updates for existing systems.

A new hardware option for Plus products is available in the shape of the modular Super Pre remote mic amp and headphone system using SSL's NiTech convertor technology. Clever analogue filtering reduces processing latency in overdub mode from around 2ms to around 0.8ms, which is claimed to be virtually inaudible to musicians. The analogue input stage outperforms the mic amps of the 9000 desk. There is an analogue insert point in the rack before digital conversion, saving the need to convert between analogue and digital more times than necessary. The only disadvantage here is that the insert point is on the panel which will likely be located in the studio, potentially leading to long analogue cable runs.

I imagine the next task for SSL is to upgrade the audio and DSP capabilities to enable operating at higher sample rate standards: present models are internally fixed at 48kHz. However, they are giving nothing away at present, so we will just have to wait and see... □

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Mackie D8b v3.0

Mackie's compact digital mixer receives the blessing of v3.0 software and returns a more able and likeable character. **Rob James** joins the converts

SINCE ITS DEBUT Mackie's D8b digital mixer has been quietly winning friends and influencing people. Initial software had a number of shortcomings, however, with v2.0 being the first really useable release. But there was still a lot of untapped potential under the bonnet and v3.0 promises real improvements and useful additions to the feature set.

This is evident from the moment of switching on. A familiar 'take-off' level of howl from the cooling fans assaults the ears and then dies back to about the same level as a G4 Mac. On screen, most noticeable is a window displaying 48 faders at once. The top row shows the console surface while the bottom can display any of the other layers. Another new view shows all 48-channel surround pans plus effects and returns channels. MIDI mapping now allows any parameter available from a fader, knob or key to be transmitted or controlled via MIDI.

Fader movements are still pretty heavily damped; one 'improvement' in v3.0 applies to when two faders are linked as a stereo pair. The one you don't grab doesn't move until a couple of seconds later. Of course the audio tracks perfectly but this is rather off-putting.

A digital console control surface is really just a remote control. Perhaps to simplify software design or to make products more accessible, the relationship between channel strips and physical I-O is often fixed or artificially restricted. The real extent of flexibility possible has only been glimpsed on certain high-end consoles. Until now. Before, faders were fixed by bank—Fader 1 controlled either input 1 or 25 and so on. Mackie has now massively improved flexibility by enabling any fader to control any 'strip'. Less frequently used strips can be placed 'out of sight', so if you have several percussion sources re-routed through another strip for overall control you could put this on the surface and hide the sources. With a bunch of stereo sources, the pairs of faders can be a real pain. Version 3.0 allows linked adjacent pairs of inputs, as before, but once linked the faders can be reassigned to move one channel of the pair off the surface. So, say,

10 stereo sources can be on 10 consecutive single fader strips. Reassignment is simply achieved by clicking the fader number on screen. A window offers the choice of all possible assignments and you just click on the one required. The original number is also displayed to help return things to normal if you get lost. The meters do not follow this reassignment since they are tied to physical inputs.

Signal routing is vastly more flexible than before. Any signal inside the desk, including stereo digital inputs, may be routed to any of the first 48 channels—so bus masters may be sent up normal channels for group treatment, of, for example, dynamics. A single channel can be routed to multiple direct outputs and a Faders to Tape option now allows the direct output feeds to be taken post fader. Any or all of the eight bus outputs, Alt input returns, up to 16 plug-in effects outputs, the 16 FX sends and auxiliary sends may now be routed into the pre DSP (dynamics and EQ) input of any channel. Post DSP input is also pos-

sible for plug-in returns. Plug-ins can also be inserted into the LR Master.

Changes have been made to the DSP algorithms. Unless my ears deceive me, the EQ has been tweaked and sounds sweeter than before. The dynamics attack and release curves have definitely been changed for the better. A much needed 'soft knee' option and keying input have been added. The key input allows proper linking for stereo to avoid image shift. An equaliser may be patched into the sidechain for de-essing or other effects purposes. (Although you do lose the high-band of the direct signal path EQ.)

The surround panner has been altered in several ways. Channel assignments in LCRS and 7.1 modes now agree with the most common industry convention. The LFE is now an independent send and there is a divergence control dubbed Depth of Centre.

The long-awaited UFX (Universal Effects) cards are now available and supported in v3.0. An MFX card is still required to run the Mackie supplied plug-





ins and the IVL voice processor. UFX opens up the D8b to purpose written third-party plug-ins. This desk was loaded with the tc FX II, Acuma Labs TimePak, Filter Machine and Delay Factor, Antares Autotune, Drawmer ADX 100 and the MDW 2X2 (Massenberg DesignWorks) High Resolution Parametric EQ.

The tc reverb comes 'free of charge' with the UFX card along with the Mackie Mono Delay. The tc is up to the usual standard, in fact it seems to sound better here than as a plug-in on PC and Mac hosted DAWs. Autotune is, well, Autotune. If you need it then this is a good way to access it.

The Drawmer provides dynamics with more parameter control than the built-in ones and has a definite character of its own. Acuma is a new name but if these offerings are anything to go by we should be hearing more of them. My particular favourite is the filter sweeps generated by the Filter Machine. For me, the Massenberg EQ is the star turn. Tight notches (Q32), musical, without the usual artefacts associated with so-called 'musical' EQs. I reckon it is the equal of anything I've heard and I'm really going to miss it.

The real achievement here is the

way in which plug-ins are integrated into the D8b environment with full automation, although there is still room for improvement. For example, dynamic automation of a parameter disables existing patch changes.

The D8b has always had a strong dynamic automation system. Version 3.0 has improved handling of snapshots with filtering on recall—it is possible to exclude functions when recalling a snapshot without changing the snapshot itself. The new Event Track makes placing and editing patches and snapshots a lot easier. The Mix Editor now resembles editing on the HDR24/96. Other evidence of forthcoming integration may be seen in the undo history window which now has 200 levels. With this software release Mackie has begun to capitalise on the potential of 'plug-in' hardware and software effects architecture. With the other improvements (and there are numerous minor ones not mentioned here) the D8b's game has been lifted into a higher league, but I still miss touch sense faders and knobs.



Now Mackie has access to a new generation of touch sensitive moving faders I await the D8b's successor with considerable interest.

Meanwhile, this software version should please most existing users, win some converts and stimulate ideas for the future. □

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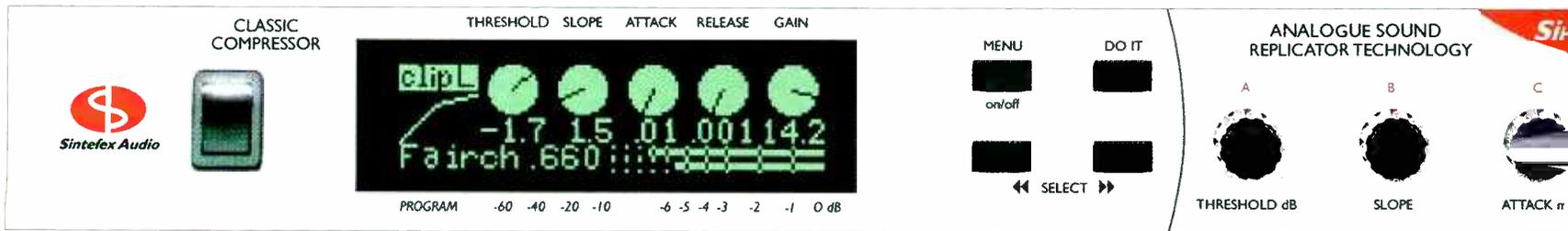
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Sintelex FX2000 & CX2000

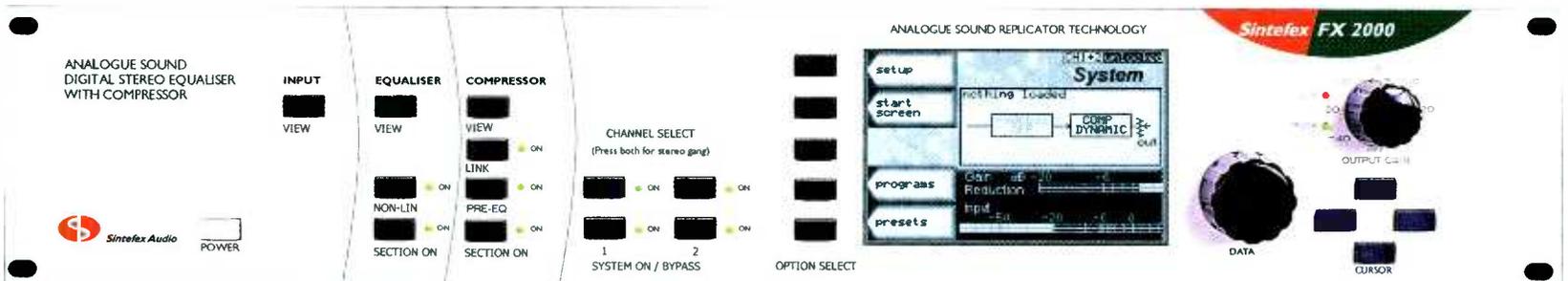
Following in the footsteps of the original Replicator, Sintelex' new processors sacrifice carefully-researched capability for carefully-researched affordability. **Dave Foister** investigates

THERE AREN'T MANY genuinely new ideas around in our game, but one of the few last year was the Sintelex Replicator. The brainchild of SADiE co-conspirator Mike Kemp, it's a digital processor that clones the behaviour of any external signal path by squirting it with impulses, analysing its response and using convolution to model that response digitally. The obvious use of this concept is the replication of classic analogue signal processors so that their

The original FX8000 was a very distinctive beast visually, and the new FX2000 is clearly the same thing scaled down a bit. Until it's powered up it looks baffling, because its operation is centred almost exclusively on the big screen. This is of a type I have only previously encountered on the FX8000, a white screen with black text and images that can be seen clearly from a surprisingly wide range of viewing angles. With this alight it's immediately apparent how dependent it is on softkeys, cursor buttons and

entry knob. Changes to the compressor curve are reflected in the graphic, and vu or bargraph meters can show gain reductions. In fact the screen can be filled with the meters once the parameters are set, and so effective are they that I had people poking the screen to see if they were real mechanical meters or not.

More on-screen knobs are required for the EQ presets, with some having three controls for each of four bands. Again a selection of familiar models is on offer, with perhaps a greater range of adjustment



characteristic sound can be used without the downsides—less noise and distortion (unless you actually want it), accurate duplication of settings across two or more channels, and of course the facility to have a large selection of processors in one box without the expense and space considerations of buying the real things. The system is powerful enough to emulate the dynamic behaviour of a compressor in fine detail, and to reproduce fixed EQ settings complete with phase response. It's even possible to build an adjustable EQ by taking multiple measurements of the device, although Sintelex suggested this was a laborious process best left to them.

It would have been easy for that to be the end of it; Sintelex the one-hit wonder. That would have been a shame, as the concept is so off-the-wall and effective that more people should have access to it. So it's pleasing to be able to welcome not one but two new processors from Sintelex, both using exactly the same technology but simplifying things by not offering the possibility of setting up your own replications. This is no big deal now, as Sintelex has a substantial library of sampled processors, and all the models have the facility to have new ones uploaded when they become available. Users can get them from the net or on floppy for upload via a PC.

a single data entry knob, but it soon becomes intuitive and reasonably easy to navigate.

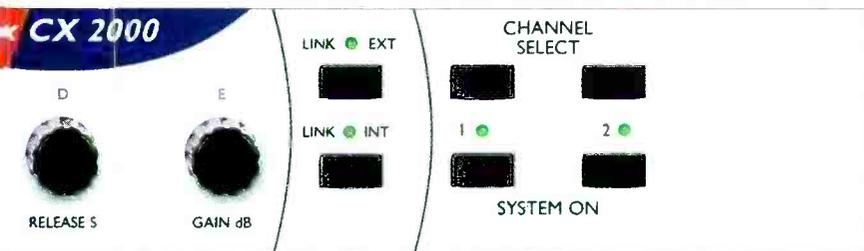
In the absence of the onboard analysis feature, the FX2000 is entirely dependent on its internal library of presets and programs, all contained on a clearly audible hard drive. The capacity of this drive is enormous in terms of the number of setups it can hold, and it's supplied with a healthy selection, carefully-sampled from more recent technology, while the programs seem to comprise full-blown adjustable versions of classic EQs, both valve and solid-state. In the case of a compressor, the adjustable parameters that appear in the window reflect those available on the original, although the ratio values run in the same standard steps that the Replicator's original analysis sampled it at. The screen shows a guide to the kind of curve on offer, so that a Fairchild 660 shows as a very soft knee while the Focusrite Red 7 is a clear hard turnover. In all cases attack and release times are fully variable, as is the threshold, and input and output gains are adjustable even where they might not have been on the source device.

Controlling this is done from a set of pictures of rotary knobs on the screen, all using the same quaint black Bakelite style. One at a time can be selected using the cursor keys, and then adjusted with the data

than is present on the originals. The sonic character of each is readily apparent, with some models far more aggressive than others while some have their expected smoothness. Where appropriate, the bands on the screen can be switched between variable-Q parametric and shelving circuits, and adjustment of gain is in 0.1dB increments for really detailed tweaks.

There's a hidden plus point on the EQ operation too; the whole equaliser can be made to work with linear phase. As the manual points out, this can't be done with the analogue originals, or with simpler digital EQ, and has never been done before with sampled EQ. The process of loading the preset takes some time longer if this option is selected, as it appears to modify the data as it comes off the hard drive rather than using a separate file, but the result is worth checking out as it makes a significant difference to the behaviour. It appears to open the sound up, lending a bit more transparency to the EQ; in a way this sort of defeats the object, as it's the very colouration that we're after here, but at the same time to have the very real character of EQ curve that the presets offer but a more open sound is quite an attractive option.

One huge advantage, already hinted at, of using replicated models of the original processors is that the two channels can be ganged together for accurate



stereo matching, which will appeal to mastering engineers who would perhaps love to have these treatments available but can't trust the matching of a pair of real devices. The same applies to the rest of us, with the option to apply classic processing to drum overheads, stereo submixes and complete mixes. The 8000, of course, has the facility to run up to eight channels, all ganged together, which will appeal further to the surround mixing fraternity.

At the same time the 2000 will happily run entirely different programs on the two channels, working completely independently of each other. This allows you to choose your EQs and compressors for individual channels, even allowing one channel to give you EQ while the other compresses. Only one will be on display and available for adjustment at a time, but switching between them is simple.

A full set of ins and outs is on the back, although the analogue interface is an optional extra, and the 2000 can actually work analogue one channel and digital the other if required. It's always 24-bit and the sample rates go up to 96kHz, with external clocking if needed. Although you can't analyse your own outboards, you can store your own setups of the provided presets in further program memories—the hard drive has space for over a thousand programs.

Simplifying things still further—as indicated by its only needing 1U of rack space—is the CX2000. This ditches not just the onboard sampling but the EQ as well, leaving a highly capable dual-channel or stereo compressor with much the same selection of preset types as found on the FX2000. The big difference is in the user interface, which is actually faster and more intuitive to use but lacks the detail on the display. This is a small low-resolution green-on-black window that still manages to show the positions of all the controls, the nature of the compression slope and the gain reduction, together with occasional error and overload messages. The meters are in fact quite high resolution at the critical top few dB, and the result is surprisingly informative for something that initially looks a bit crude.

Choosing one of the onboard presets is done by scrolling through a list that replaces the main display until

the selection is made. The initial range of types comprises an 1176, an LA2, an LA3 and a Fairchild 660, and all have side-chain EQ available. Adjusting the chosen compressor is actually simpler and faster than on the FX, because there are five data entry rotary encoders dedicated to the essential functions of threshold, slope (ratio), attack and release, plus make-up gain. All these are shown in the display, each with a cursor line pointing roughly in the right direction and a precise numeric value below it. I suspect this makes setting up faster than on some of the originals, and the consistency of approach is also a time-saver. As with the FX, independent 2-channel and fully ganged stereo modes are available, and your own adjusted setups can be stored in memory. The sonic performance seemed identical to that on the bigger FX, with real character in the presets and an even more direct feeling of control over its behaviour. This is much more powerful than it might look.

Again analogue inputs and outputs are on an optional extra card, as is the 96kHz facility, but as standard it runs 24-bit and has wordlock lock. An interesting point on the back is a digital link bus, allowing multiple CX2000s to be ganged together in terms of their gain using SPDIF signals.

Like the original FX8000, these two Replicators are the kind of toys that just make you want to play with them. At first sight the concept seems like either a rather far-fetched designer's concept that shouldn't rationally work, or a sledgehammer to crack a nut. In fact it's neither—the sound of the various sampled devices speaks for itself as being a convincing reproduction of the original, while the benefits of doing it this way become more apparent the more you use it. There's no denying that all three of these units are strange and unlikely beasts, but once you learn your way around them they are also powerful, useful, time-saving, money-saving tools and a load of fun. Set aside your opinions about whether it can or should be done, and give it a try. □

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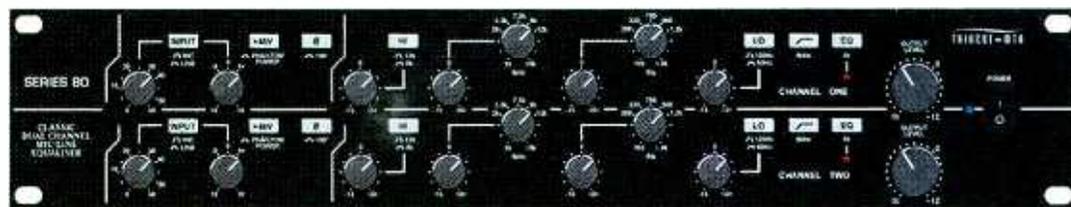
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Trident MTA Series 80B

It seems that everyone wants a piece of the Trident brand pie and a return to the Series 80B is offered by Malcolm Toft's camp. **George Shilling** slips off his kaftan and takes a look

THE SITUATION LEFT by the demise of the old Trident Audio company is unfathomably complicated. Discrete Technology, Tri-Tech Audio, Malcolm Toft's Trident-MTA and John Oram's Trident Audio are all names associated with the original Trident company and there's been a lot of public quarrelling about rightful connection.

According to the Tri-Tech web site (and the ghostly Discrete Technology web site, last updated in January 1996!), Trident's Series 80 console dates from 1980,



with the 80B being an update produced from 1983. In keeping with the Trident struggle, both the Joemeek-MTA and Oram web sites claim that the design originates from 1973, with both companies producing Series 80B 'boxes'. This MTA version takes a different approach.

The unit is a surprisingly lightweight black-painted, 2U-high box, containing two large circuit boards, one for each channel, with Channel 2's board also hosting power supply circuitry. Original op-amps appear to have been used, although the circuitry has been updated by Ted Fletcher (of Joemeek fame) and the layout of the circuits has obviously been designed to allow for modern production methods.

On the rear are six XLR connectors for mic and line inputs, and line outputs for each channel, with jack sockets also provided alongside the latter. Channel 1 is the upper of the two on the front panel, although the layout is initially slightly confusing in the EQ section, where Channel 2's mid frequency controls impinge on Channel 1's strip.

The front panel features clearly labelled push-buttons, but the pointer notches on the knobs are hard to see. Much of the knob legending is inaccurate, as we shall observe. Each channel features a selector switch for mic-line selection and there is 60dB of mic gain available using a 'lightly clicked' knob—although there is only a difference of 25dB between the 20 and 60 marks. There is a line gain knob with centre detent providing ± 10 dB adjustment, although the ± 5 indications are far too close to the centre. There are PHANTOM and PHASE switches, the PHASE switch unfortunately causing an extremely nasty and very loud click on the output, especially when using a phantom powered mic.

The EQ is a 4-band design, with limited controls. The high- and low-frequency bands each have two selectable pivot frequencies, with 12kHz and 8kHz at the top, and 60Hz and 120Hz on the low end. The ± 15 dB gain knobs are very powerful, and the treble lift is clear and pleasant. However, the 60Hz setting doesn't seem to boost nearly as much as the 120Hz setting. The two mid bands have similar GAIN knobs, and each has a sweeping frequency control (again

with inaccurate legending, although it is correct at the extremes). They boast wide ranges, and their GAIN knobs feel even more powerful than the high and low bands. There is a high-pass filter at 50Hz which the manual claims provides a -3dB cut at 50Hz. However, I asked Ridge Farm Studio's technical boffin Richard Kirk to make a few checks, and he measured a cut of -3dB at 100Hz and -7dB at 50Hz. At the far right-hand side of each channel is a useful fader knob, again with light clicks, although when it

indicates 0 to +12 it is actually 0 to +5dB.

Initially, the microphone input sounds very neutral: fairly open, not especially bright or woolly, somehow just 'right' without exaggerating anything too much. Working with a number of sounds recorded through the 80B, a very satisfying characteristic is evident, with resultant recordings easy to manipulate and process in any way. Their basic, solid character always seems to help give an impression of a 'proper' recording, and I found the mic amp achieves a satisfyingly 'dry' seventies sound on vocals and acoustic guitars with ease. The low end seems particularly stable and solid. However, I became aware of a slight undesirable loss of low frequencies. With the EQ switched out, there is a drop in the frequency response, which is 3dB down at 55Hz—I don't know if the original console exhibited this characteristic. There was also a very slight but noticeable hum on the review unit, which was more evident on Channel 1. Popping the EQ circuit in, I immediately found it a very powerful design and found myself backing off settings quite often, which seemed to be doing more than you might expect for the knob positions. The circuit's character is quite reminiscent to me of older Amek designs, such as the M2500 console from the early eighties—a real macho EQ with plenty of 'oomph' in reserve. The two mid bands interact, due to the circuit design, and this certainly has an unusual feel in the age of super-accurate Manley and Focusrite designs.

Although I was slightly disappointed by the front panel, I thoroughly enjoyed the sound and character of the 80B. If you are a fan of certain seventies and eighties British pop records, you should find this unit helps you recreate the character of the recorded sounds from those times. Perfection, it ain't, but then that is hardly the point. □

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NEW TECHNOLOGIES

Revitalised exciter

Aphex has unveiled a new, revitalised version of its Aural Exciter. The Model 204 replaces the Model 104



and features a new Optical Big Bottom for enhanced low-end response, two independent channels, new packaging with a revamped front-panel layout, internal power supply, XLR and 1/4-inch input and output connectors, plus updated circuitry for improved overall sound quality and user flexibility. The Model 204 has a 'new-Millennium' front-panel design and operator controls, plus a custom light-dependent resistor as the gain-control element. Dynamic range is said to be increased by 10dB.

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

Merging SACD

Merging Technologies and Philips Electronics have jointly developed a Pyramix DSD editor for SACD production. Pyramix covers the basic sequence of steps for production of a multichannel SACD recording, including recording, editing, signal processing and playback. Pyramix is based on current PC technology and provides the user with many advanced signal processing options, that also includes the capability of DSD processing. All features which distinguish the DSD signal used in Super Audio CD from other formats are maintained during processing. Future extensions will include Direct Stream Transfer encoding and authoring capability, creating a single workstation solution for the whole SACD production



chain. This co-operation on developing the Pyramix editor is claimed to prove that it is possible to easily extend PCM equipment to support DSD-SACD.

Merging Technologies, Switzerland. Tel: +41 21946 0444.

A-2000 console

The new A-2000 console from Wheatstone is compact enough to fit almost any studio countertop. Features include two stereo programme buses and two mono buses, and dual phone caller support using Wheatstone's Bus-Minus circuitry. The console can handle up to 23 input or accessory modules. Control room and studio monitoring with talkback are provided, while electronics LED-illuminated switching ensures good reliability. The new Wiremax Panels, are studio interface modules that make connecting studio equipment to a console an easy, no-solder process. Designed to be mounted in the studio's wiring bay, the Wiremax Panels eliminate the need

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NEW TECHNOLOGIES

for 66-type punchblocks and the documentation that they require for a studio wiring job. Wheatstone supplies the panels, console-to-panel wiring and hardware.

Wheatstone has introduced its latest digital audio router, the Bridge 2001, which provides a cost-saving solution for growing studios with mixed audio standards.

Featuring bi-directional fibre optic or CAT-5 interlocation connectivity and all digital domain AES switching, the product has analogue or digital inputs and comes in a compact 7-inch rackmount digital routing cage. Each cage can handle 512 simultaneous audio channels on its backplane. While easily handling smaller applications, the router offers growth potential via stackable units to upgrade to larger system configurations.

The manufacturer has introduced a line of studio furniture to meet a broad spectrum of styles and budgets. The top-of-the-line Preference series offers rounded edge wood-trimmed cabinet panels and countertops with hand-crafted corners and rounded wood trim, available in standard or customised colours. The Eclipse series is a mid-range option suitable for studio's that need to optimise



Elberg MP8

Purist microphone preamplifiers from Denmark, from a company you haven't heard of? **Dave Foister** finds Elberg's MP8 essential

EIGHT MICROPHONE PREAMPS in a box isn't news. These days there are plenty of choices—in 2U or even 1U. Most are plainly geared to the MDM market with either a dedicated analogue multiway or an 8-channel digital output, and often some kind of 'fairy dust' knob buried among the routine stuff. From that point of view, eight simple unadorned preamps in a 3U-high box with nothing but eight independent analogue XLRs on its outputs looks a bit tame; on the other hand, when its specs read more like what we expect from high-end single or dual units the interest level starts to rise again.

These are the priorities you'd expect from the small Danish company of ELT, who produce broadcast and recording electronics under the name of design engineer B Elberg. I was provided with very few details of ELT but the literature shows what is presumably a typical product, a tidy and comprehensive rackmount broadcast mixer called the Elberg BC15. Specifications refer to compliance with Nordic Radio spec sheets, so this is evidently the area where ELT is most active.

From this background comes the MP8, a plain functional box that's either a breath of fresh air or a bit dull depending on your viewpoint. Its panel colour and choice of button style both hark back to old Neve equip-

ment, and consequently it looks like the top bit of eight channels of vintage analogue console, a similarity I find hard to imagine is accidental.

The MP8 is purely and simply eight preamps that happen to live in the same chassis, and their facilities are therefore limited to the basics for a preamp alone. There is no attempt at EQ, enhancement or limiting, although the bare bones functions are implemented thoroughly and effectively. You could be forgiven for thinking it was a modular rack with eight individual preamp cards, but in fact the front is one big panel, hand-made to accommodate the eight sets of controls. The dangers of this were shown by the damage done to the review sample in transit, resulting in bent rack ears, scratched paint and a sticking switch; I trust the production packaging affords a little more protection.

But this is purely cosmetic, and the MP8 still managed to look the part, its appearance a nice blend of the functional and the elegant. All the push-button switches have integral LEDs, making it very easy to see at a distance how each channel is set up. A short but usefully-calibrated output level meter consisting of five LEDs lies alongside the controls and again is reassuringly visible from across the room. Each channel has an initial coarse gain control, switched in steps of 5dB, and a final out-

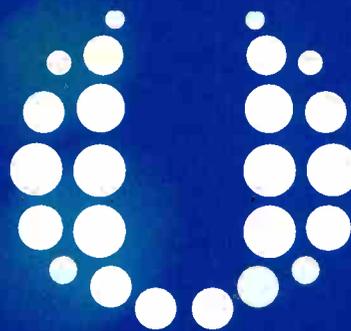
From 9th July United Business Media International will become CMP Information Ltd.

We will share a common CMP name and brand with all of our sister companies within United Business Media plc's professional media group. These include high-tech markets leaders CMP Media LLC, CMP Europe, CMP Asia and our own US and Netherlands-based companies.

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put trim pot that can add up to 6dB of additional gain. There are pushbuttons for phantom power, a 20dB pad, and phase reverse—for once silent in operation. Another switches in the high-pass filter, which is unusually capable in that its turnover frequency is continuously variable from 40Hz to 270Hz. This is a nice touch on an other-



wise unremarkable complement of controls; often the optimum setting lies between two switched positions and you're stuck with a choice between not dealing with a problem properly or eating into your wanted signal too much, whereas on the MP8 you can get it exactly right.

Inside the emphasis is on quality, bandwidth and longevity. FET switching is not used anywhere because of its poor performance at high frequencies; instead the pushbuttons operate gold relays, and the rotary gain switch is also gold plated. Elberg guarantees a life of 25,000 operations for this switch, and expects that in 15-20 years it will be the first component to fail! The reason for this degree of care is the now-standard assumption that frequencies beyond the once-normal range are necessary; the response of the MP8 preamps is within

0.5dB, 2Hz-90kHz. Inputs are balanced using custom Lundahl transformers, while the outputs are balanced electronically using a 'transformer-like' circuit, and the terminations for these are on XLRs, the only connectors on the back apart from the IEC mains input. There's no insert point, no line input (no instrument jack on the front either), no simple mixer, no digital outputs; these are straight mic amps pure and simple. But in a lot of applications this is exactly what's needed, with the main requirement being the kind of quality the MP8 aspires to. And in this respect the Elberg circuits certainly deliver, justifying the description 'High Resolution' that appears on the front panel.

The openness of the frequency response is immediately apparent, as is the virtual lack of noise, and it seems impossible to drive the things too hard. What the microphone gives is what you get—this is pretty close to being eight straight bits of wire with gain, and there can't be many consoles or workstations that wouldn't be improved by the addition of circuits like this.

What looks at first like a fairly routine product is in fact unusual in today's market because it sets out quite simply to deliver quality. ELT doesn't insist on selling to us on the basis of its circuit topology philosophy, or by adding idiosyncratic features of doubtful value; it wants us to buy the MP8 purely because it does its job properly, and we should be grateful and give it a listen. □

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NEW TECHNOLOGIES



space, while the Techline series has all the interior features and details of the other series but comes with cost-effective countertops edged in rugged vinyl bullnose. Wheatstone, U.S. Tel: +1 252 638 7000.

Automated audio archival

QUADRIGA is an automated 'capturing' station for quality-controlled A-D conversion of sound archives to digital interim data storage systems and/or digital mass storage systems. It provides automated monitoring and logging of analogue and digital audio streams for technical parameters of archival significance. The captured audio data can be stored in the Broadcast Wavefile Format (BWF) together with all related metadata and error reports. This frees system operators from monotonous and time consuming procedures, while guaranteeing quality control and dramatically reducing archive transfer costs. Cube-Tec has announced the CubeDVD-A DVD-Audio authoring module for the Cube-Tec AudioCube 5 DAW.

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Soundelux U95S

A striking addition to the catalogue of valve microphones, Soundelux' new baby is born a scene stealer. **Dave Foister** gives it the attention it craves

WE KNOW, DON'T WE, that what a device does is more important than how it looks. Whatever the world may think, we're far more interested in how it sounds and whether it helps us get a job done than in the button and flashing-light count. But if there is one piece of equipment where appearance matters, it's the bit you stick under the artist's nose—the microphone. This has led to some extraordinary contraptions in the past, and has clearly motivated Soundelux in the design of the new U95S, which is guaranteed to attract comment. No-one's going to miss the fact that this is a serious microphone, that it's got a valve in it, and that it's probably expensive. You're onto a winner before you push the fader up.

Some have emulated the appearance of microphones of old, while some have gone their own way and established a distinctive style that can't be confused with anyone else. Soundelux has gone for an unusual crossover of style; this is obviously a new microphone but the body shouts C12 while the power supply hints Neumann, and the cable is a law unto itself. In fact the body resembles the C12VR more than anything, with its bottle green sleeve and gold grille, although the gold is lacquered down and muted. Mounted in its elastic suspension—the only means of putting it on a stand—it unquestionably looks the part.

It's coming to something when the cable is a design statement, not because of the esoteric materials it contains but because of its outward appearance. Obviously as the U95S is a valve microphone it needs its own multicore

cable between the body and the power supply, but while most manufacturers make this fairly anonymous and unobtrusive, Soundelux has gone for a thick snake-like cable with a transparent outer sheath, which means that the defining material for its appearance is the silver screening braid. This is almost more eye-catching than the microphone itself, and the fact that it clearly identifies itself amongst the spaghetti in the studio floor makes up for the fact that it's a bit inflexible and liable to get snagged on cymbal stands. It's also not very long, but there's enough there for most purposes. So chunky is it that it's almost a let-down to find 6-pin XLRs on the ends where you'd expect to find a connector off a tank.

At the other end of this cable is the power supply, a deceptively simple box with microphone input and audio output XLRs on the front end, mains receptacle and switch on the other, and just the one control. Soundelux didn't feel constrained to fit a pad or a low roll-off filter—the handling of high SPLs makes the former unnecessary and the latter usually is anyway—so what's left is selection of the polar

pattern—and here the control is unusually flexible. The rotary control is marked up like that on a C12 or a Rode, with figure-of-eight at one end, omni the other, and cardioid in the middle, with intermediate dots. The difference is that this is a pot not a switch, so the polar pattern is continuously variable across its range. I've only seen this before on microphones from Brauner and Soundfield, and in both instances I found the extra precision it afforded to be useful in certain circumstances. Specifically, control

of a stereo image by fine adjustment of the patterns of an XY pair or of the M microphone in an M-S array more than warrants the inclusion of this degree of adjustment, and although nobody's likely to put up a crossed pair of U95Ses, it could usefully be tried in an M-S pair with a suitable fig-8 strapped to it.

This is not an entry-level microphone. It makes no attempt to sell itself as a lower-priced alternative to top-flight established models; rather it takes them on their own terms and at an equivalent price. The manual mentions details of the internal circuitry, such as an output transformer capable of handling +4dBm at 20Hz to cope with the capsule's infrasonic capabilities, making it clear that this is a no-compromise design. As such it should be expected to match top-flight performance criteria, and although no paper specifications are supplied with it, the sound it produces suggests it has achieved that comfortably. It's probably safe to say that this is what modern valve microphones are all about: that elusive combination of clarity and character. As a vocal microphone it shines, with a presence that's

hard to pin down to a specific attribute but that brings the voice into the room with you. At the same time its use on a variety of instruments, from horns to guitar amps (up close and personal on omni) shows it to be a more than capable all-rounder, with the breadth of frequency response to deliver what you want from almost anything. It's also extremely quiet, lending itself to delicate classical work as well, where two or three as spaced omnis or a tree would be a combination I'd like to try.

It's not easy to pitch a new microphone into the exalted upper echelons of the market like this; Brauner has done it successfully, and I see no reason for Soundelux not to hope for similar results. This is class from the moment you open the flightcase, and never disappoints. □

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NEW TECHNOLOGIES

Developed in co-operation with Nippon Columbia, CubeDVD-A supports Version 1.2 of the DVD-Audio Standard with 24-bit/192kHz in 2-channel and 24-bit/96kHz in multichannel formats.

CubeDVD-A is capable of reading 'Audio Assets' that have been mastered with NuendoCube.



without file format conversion, with immediate production of encoded DVD-Audio according to the CPPM Process. In addition, production of DVD-Audio with 8.5Gb dual layer DVD-9 is supported as is MLP, and SMART. CubeDVD-A files can be written to DLT and/or Disc Images. With an optional DVD-R Burner, media can be produced for immediate playback on DVD-A players for quality control and evaluation purposes. Cube-Tec, US. Tel: +1 905 469 8080.

DVD-Ram recorder

The new DV40 DVD-RAM recorder from Fostex has a Verify/Write mode which examines all data recorded all of the time while in record mode. It uses UDF file format mode to establish compatibility between normal computer-based work stations. Users chose SDII1 (Sound Designer II) or BWF as audio file format and either 24-bit or 16-bit resolution. Recording track modes can be mono, stereo or multi and various sampling frequencies can be selected: 44.1/48/88.2/96/176.4/192kHz and 0.1% pull-up/down can be applied to any selected rates. The recorder offers internal file conversion between 4-track or stereo files and multitrack mono files. The DVD-RAM disk can be formatted in normal (non destructive) or tape (destructive) recording modes. The machine's onboard I-O connectors include analogue input XLR x 4 with 24-bit/192kHz A-Ds; analogue output XLR x 4 and 1/4-inch phone jacks x 4 with 24-bit/192kHz D-As; and digital AES-EBU XLR I-O x 4. Synchronisation with word and video signals is included and a time code generator offers 24hr run, Rec run, Free run and Ext run modes and is also equipped for the 23.97F HD camera mode. An optional ethernet card offers audio file transfer between the DV40 and a targeted computer via general purpose FTP applications.

The RM 1 machine room rackmount stereo monitor from Fostex is suitable for monitoring in tight industrial environments. Features include two stereo balanced +4 inputs with Neutrik combo connectors; high intensity multicoloured LEDs for mode tallies; and onboard matrix switching for mono, stereo, mute, L channel only and R channel only. The front panel has stereo Gain control and a headphone jack with gain control and signal presence indicators that change with intensity of audio input. Fostex, US. Tel: +1 562 921 1112.

Yellowtec voiceprocessor

The second generation VIP/digital from Yellowtec in Germany, is a broadcast tool with extended features and increased digital performance. Announcers can carry their own personal sound setups by using the Yellowtec SmartCard, while Windows configuration software offers a wide choice of sound improvements. DSP algorithms are designed to allow mic processing to work in harmony with the station's general sound processing. Configuration software covers functions such as subsonic phase

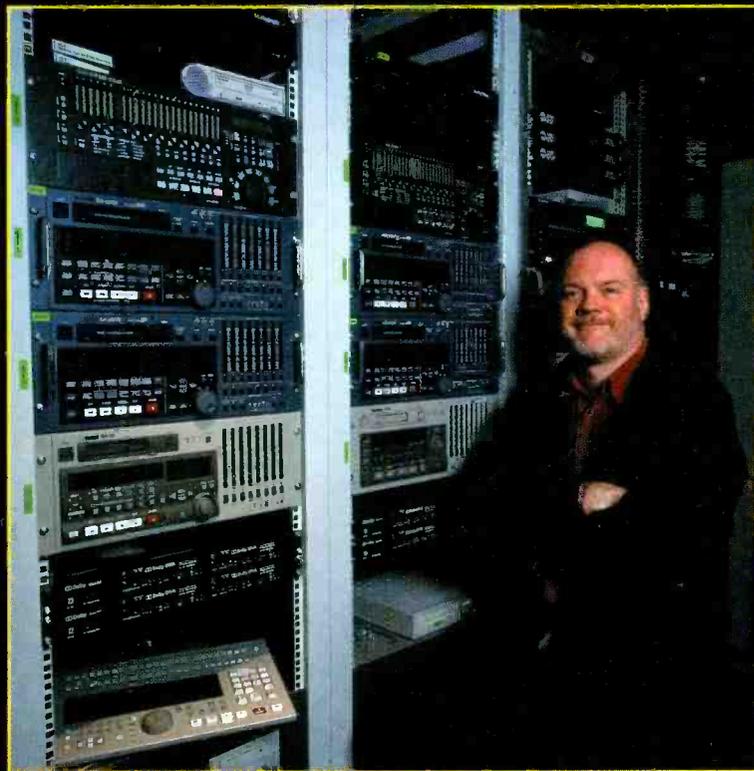
Lip service for MX-2424

New central London post facility Lip Sync Post, has equipped with four new Tascam DA-58-IR high performance DTRS recorders and two MX-2424 24-track hard disk recorders – all fully 24-bit.

The new facility offers four comprehensively equipped studios, including two Dolby-approved film rooms with large-format digital film consoles; the 24-track MX-2424 hard-disk recorders were chosen to provide stem layoff facilities for these.

Head of Sound, Steve Haynes: "I used digital tape machines for stem layoffs for some time and although they work well, they are slow to chase when jumping to various locate points. The MX-2424 offers us a more convenient way of laying off the stems.

"The great thing with the MX-2424 is that it still looks and feels very much like a tape machine but offers all the benefits of a non-linear system. The whole mixing process is now non-linear, right up until the final mixdown, which goes to the TASCAM DTRS machines."



TASCAM-MX-2424 24-TRACK 24-BIT HARD DISK RECORDING



The new MX-View graphic user interface software, available soon for all MX-2424 owners. Includes powerful waveform editing and much more.

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rotation; automatic gain control; four independent full band parametric equalisers; expander; compressor and de-esser; and a reverb plug in with a separate delay for postproduction applications.
Yellowtec, Germany. Tel: +49 2173 967336.

JLCooper

US company JLCooper Electronics has added the MCS-ClipShot to its MCS-3000 Media Command Station range. The instant video clip access or audio playback triggering device is a switch palette with 40 multicoloured



24 x 32 back-lit LCD buttons, 20 additional lighted buttons, and a 2 x 40 backlit LCD. It can be used as a stand alone controller or it can be interfaced with other MCS-3000 modules. The design features two MCS-3000 interface card slots for a variety of connections including RS-232, RS-422, USB, ethernet, quad MIDI, quad 422/9-pin and GPI. JLCooper Electronics has launched its 9PIN/NMMC Interface that connects popular hard-disk recorders including the Tascam MX-2424, Mackie HDR24/96, Roland V-S series, Fostex and most computer-based editing systems to a standard video edit controller or switcher. The product interprets standard RS-422/P2 protocol messages and converts them to corresponding MMC messages.
JLCooper, US. Tel: +1 310 322 9990.

Lindos launches Damascus

The Damascus digital audio mic amp single cable uplink system comprises a 1U rackmounted controller and remotely located pods. Each pod is located close to the mics and contains a 2-channel A-D. The complete system supports up to four pods—giving eight channels of AES3 digital audio output from the controller. All system functions are via the controller including gain control of the mic amp within the pods. Pods can be placed up to 100m from the controller.
Lindos Electronics, UK. Tel +44 1394 385156.

Marantz debuts portable PC card recorder

The new PMD690 stereo portable PC card recorder from Marantz provides stereo inputs, 48V phantom power and switchable stereo or dual level mono recording modes. The PMD series, designed for ENG and OB applications, record digital audio onto a removable PC card which can then be inserted into a laptop computer for easy editing, mailing, network distribution or processing. No moving parts means the product is resistant to shock and climate change. The product has an MSDOS compatible file system to provide instant access to recorded files via PC or Mac, without the need for file conversion.
Marantz, UK. Tel: +44 1753 686 080.

Musicam codec

Musicam USA has launched the Voyager digital audio codecs. The new POTs codec/mixer achieves 15kHz mono audio over a standard single analogue telephone line. The product offers 100ms delay and audio quality is said to be good enough to be used as a backup for ISDN music broadcasts.
Musicam, USA. Tel: +1 732 739 5600.

Focusrite Platinum Penta

Following the evolution of Focusrite's entry level Platinum processors has made interesting reading. **Zenon Schoepe** assesses its latest take on dynamics

THE PLATINUM SERIES is significantly different from most manufacturer's interpretation of what constitutes an entry level range. Rather than stripping back on features and building more cost-effectively, Focusrite has chosen to innovate at this price point with units that have chops that you won't find elsewhere in its own portfolio or in those of anyone else. The Penta is a case in point and not what you might have expected.

Front panel finish seems to be different from other Platins and is more obviously 'speckled' than the smoother, more polished finish of the Platinum Compounder I have, for example.

Pots and switches are typically Platinum and to be honest they look a little small and lost on the deeper expanse of the 2U fascia. Rear panel line dual-channel I-O connectors are on balanced jack with TRS side-chain inserts but in addition to this you get a front panel instrument input and an XLR mic input, with phantom, phase reverse and high-pass filter, which Focusrite is at pains to point out hangs on to the same mic preamp circuit as that found on the Voicemaster. It's also worth noting that the rear panel has a plate that will allow the fitting of a 24-96 digital interface.

In a nutshell then, it's a tweakable 16 preset compressor corresponding to default settings that are labelled as being suitable for a particular type of signal. TubeTran technology is used to emulate valve compressor sounds and the unit uses an optical element. Buttons either side of the bank of 16 presets

Indeed you can't knock the Penta for trying very hard, the presets are surprisingly (almost too) applicable to the short descriptions they're given and they do sound different, it's as if there's some sort of side-chain emphasis going on to achieve the results. However, those who earn a crust from their ability to achieve the same on totally manual units might be put out by the simplistic approach and may find the choice of stereo main mix presets, and their degree of tweakability, a bit limited. It is by no means the definitive redefined dynamics device but remember the price and the target market.

Focusrite will sell an awful lot of these because at £299 (UK), that's what I said, you get an awful lot of box for your money. And it fills 2U, and it's got lots of lights.

The concept of preset dynamics is not, in itself, that new although it seems to be enjoying something of a revival. Originally it was introduced because fully variables were too difficult and expensive to manufacture and besides, in those days, they probably didn't think we needed it. This time around it seems to be riding on the back of the simplicity ticket, 'fully manual' being clearly too complicated to grasp and handle by a substantial proportion of the target audience who must be simply so creatively gifted that they have no spare horsepower left. However, for those of us who can chew gum and walk the encounter can be a little trivial but the presets are of course only starting off points and all the pots remain active anyway. However, I'm sure that certain



scroll through the available options and if you want to hear them as intended then centre detent the pots. Otherwise you're free to play with pots for COMPRESION (threshold), RATIO (with switchable soft knee), ATTACK and RELEASE and the action you take is relative to the preset settings.

A stereo image width circuit works by analysing the difference between both legs and increasing or decreasing it. It sounds impressive on the ultra-wide Huge extreme although the process involved, while it certainly throws more activity to the edges of the stereo, can dilute and re-emphasise portions that you might not want to but this depends on the preset setting and the degree of tweaking. The Tiny extreme is probably more immediately useful as it adds power by shooting the majority up the middle as a good quick fix for a mix that is broader than you're comfortable with.

There is also a TUBE SOUND pot with a switch that adds that second harmonic type stuff and the effect is apparent, pleasant and most tasteful on delicate sounds when you're trying to sound expensive. There's INPUT GAIN and GAIN MAKE UP sitting at either end along with input metering, gain reduction metering and output level metering.

types of user will be pleased and reassured by the presence of these presets, providing that they can remember to keep breathing while they're flipping through them.

For the rest of us, I can confirm that the Penta does in fact sound very quiet, good and interesting particularly with the TUBE CONTROL and the STEREO WIDTH pot. It also continues something of an original twist on the dynamics issue that Focusrite introduced with the excellent Compounder.

While it is unlikely to be first choice in a suitably well stacked professional dynamics rack, working on the premise that you simply can never have too many compressors at your disposal and that variety is the spice, and indeed spark, of life in dynamics, the Penta equates to a different sort of box for not very much money at all. It's worth investigating purely for the fun of it especially as it's more than up to the job performance wise. □

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MULTICHANNEL THRILLER

One of the best-selling albums of all time recently made the transition to surround sound.

Rick Tozzoli quizzes Mick Guzauski about a *Thriller* of a remix

YOU MAY KNOW Mick Guzauski from the perpetual string of hits he's mixed for such artists as Toni Braxton, Britney Spears, Ricky Martin, and Eric Clapton—in stereo. Well, Mick has just entered the multichannel world, and entered it with a bang. He recently completed the 5.1 surround version of Michael Jackson's classic album *Thriller* at his comfortable Sony Oxford-equipped home studio in upstate New York. I had the good fortune to get a listen to his version of 'Billy Jean' and to ask him a few questions.

In what format did you receive the tracks for remixing?

They did the transfers over at Sony, because I didn't want to be responsible for the original *Thriller* masters. They transferred them from a Studer A-800 24-track to the Sony 3348HR at 48kHz, through the converters of the Oxford console there.

What was your first impression when you got the basics up in surround?

My first impression was: Wow there is all this extra space to put stuff in! I actually found it easier to do than a stereo mix because you don't have the clutter that can build up just from having to put all the elements into two channels. Also, you could make individual sounds bigger; you don't have to filter or EQ little portions of the range up or down to



Sound and vision: Toni Braxton, Ricky Martin, Eric Clapton and Britney Spears (clockwise from top left)

make something fit into a smaller soundfield.

What was your overall approach on taking this classic outside of stereo?

I wanted to have a shorter main ambience and main reverb in front, and have a longer pre-delayed

sound in the back in order to give the resemblance of a real hall.

From there, I wanted to have secondary reverbs that were only on certain sounds that I could move around. For instance, that little string line that is very familiar in 'Billy Jean' is in the left front but it has its own separate reverb in the right rear—only when that line comes in, and not at any other time in that track. Also, there is that rhythm guitar figure in the chorus, which is actually two guitars. They start left and right front, and I make them go to the left and right rear, crossing in the middle, on an X panning axis.

You did all the panning on the console?

Yes, and since the Oxford has two joysticks, when I wanted to pan something against something else, I could select both channels and move both joysticks simultaneously. I've been mixing pop records so long that I become bothered if there is an asymmetry of things. As far as panning goes, I try to keep a lot of movement, symmetrical. If something is moving from one side to the other, I usually have something complimentary happening to it.

How did you use the centre speaker?

In the centre I had kick, snare, bass, and vocal with no reverb. There was quite a bit of divergence on these



Mick Guzauski



Bruce Swedien: Thriller's original mix engineer

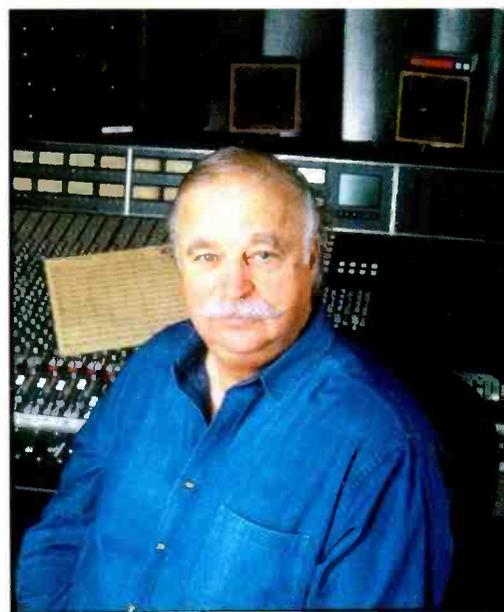
HE HAS WON Grammys for his engineering of Michael Jackson's *Thriller*, *Bad* and *Dangerous* albums courtesy of his long-standing professional relationship with producer Quincy Jones. These comments appeared in an earlier issue of *Studio Sound*.

"I can't be in the control room when Michael listens to a mix," Swedien opens. "He plays it so loud. We'll be in the middle of one of our huge mixes and he'll turn to me and say, "Bruce, hurt me!" So I'll turn up the speakers and leave the room. He'll then leave me a little laundry list, signed "Love, Michael" at the bottom."

Pointing to his work with the likes of Quincy Jones, Duke Ellington and Count Basie as well as with Michael Jackson, Bruce Swedien describes his role in the studio as that of "the fortunate student". As for the teachers, it is Quincy who stands at the head of the class.

"Music has only two categories; good and bad," he says. "Working with a great artist and great material brings more responsibility to a project, and I think the most important thing that I've learned from Quincy is never to take that lightly. We've worked together for over 40 years, and I promise you there is no one like Quincy in terms of the quality and the musicality and the good taste that he brings to every project. In the beginning I was 21 and he was 23, and one of the first recordings that we did was Dinah Washington's 'What a Difference a Day Makes', which was not a bad start.

"There again, both Quincy and I bring all of our experience to every session, and so another thing I've



learned from him is that the kaleidoscopic approach is really where it's at. When you play one of my mixes, for instance, you can hear it in a certain way, but then you can play it again and listen for something else. I mean, they're still trying to figure out some of the techniques that I used on *Thriller*, and I've got stuff buried in there that people will be studying for years.

"I don't believe in secrets," he asserts, "and I'm crit-

tracks. The bass, kick, and snare had the most because I wanted the most cone area with all three front speakers, so it had a lot of punch. The vocal also had a little bit of divergence on it. Mainly, I wanted to use the centre speaker—especially in the case of the vocal—to anchor the centre of the mix, so it was right there in your face. There was some divergence on the effects as well.

And the sub?

Kick and bass are really the only elements in the sub, but there's a subharmonic synthesiser in there too. I didn't want to put a lot of the low frequencies in the five

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INTERVIEW

main speakers in order to keep the cone movement a little less. That allowed me to keep the distortion down and really use the sub to get the bottom octave.

How did you handle the compression, and did you reference the original at all?

Yes, I did reference it for basic balances and also for mutes. The original, either done in the mix or mastering stage, features a lot of overall compression, as most stereo CDs do for apparent loudness. I did not use an overall compression but I had to compress individual tracks so they would stay solid in the mix. For example, I used it on the bass lines in order to keep them consistent and really pumping. I compressed the vocals as well, so



they wouldn't get lost, but I used it to keep the dynamics of the mix inline with itself. The only compression I used was the GML 8900 inside the board.

What was your approach to the reverbs on this song?

The two main reverbs I used were the Sony DRE-S777 and the tc electronic M3000. The S777 was run in dual stereo mode, with the Concertgebouw program Small and Large Halls. I used the small one in the front and the large one in the rear.

There was a little pre-delay on the large reverb to create an ambience where you are sitting closer to the rhythm section in the front and

icised by both Quincy and Michael for that. Michael especially. He'll say, "Bruce, you can't go telling people all this stuff", but I don't believe in that, the reason being that I have yet to find anybody who really understands what I'm talking about. As a result, I am more concerned about finding people who will understand my approach to what I do than I am about anyone stealing ideas. That's never been an issue. So, microphone technique, multitrack recording technique, I go through all of them."

In that case, what techniques did he use on Thriller and what kind of sounds are buried in there?

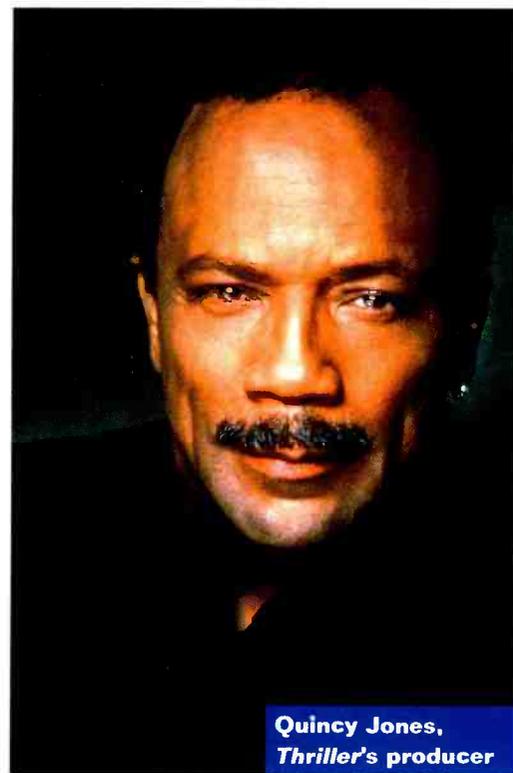
'There's the title track, for instance,' comes the immediate reply. 'On the intro there's a little rhythm track that commences the music, and I purposely limited the bandwidth on it so that as you listen to it your ear adjusts to that spectral response. Then, all of a sudden, the real bass and kick drum come in and the effect is really startling. So far I've told people about this but nobody has verbalised to me how it actually happens.'

'When we recorded 'Billy Jean', for instance, Quincy told me, "Okay, this piece of music has to have the most unique sonic personality of anything that we have ever recorded". Now, that's a hell of a way to go into a recording, so I thought and

thought about it, and when it came time to do the rhythm track—consisting of drums, bass and so on—at Westlake Audio on Beverly Boulevard [in LA] I did everything I could imagine to really make it sound unique, even to the point of calling my old pal George Massenburg and borrowing a super-high-quality small recording console from him.

'That was the first time that I began using a specially-built, 8ft², plywood drum platform, courtesy of the carpenters at Westlake, which is a great studio by the way. I also had a special bass drum cover made, and I took the front head off the drum kit, put cinder blocks in there to hold it still, put the cover on and slipped the microphone through. Then I made a special little isolation flap that went between the snare mic and the hi-hat mic in order to give much better imaging. Consequently, I think that track really is unique, because see if you can think of any other piece of music where you can hear the first three drum beats and know what the song is. That's what I call sonic personality.'

'Separately these elements are all small things, but as Quincy told me early on when we began working together, everything is important. Every little detail. Anything you can do to enhance the image is important, and I admired that approach so much early on that it's kind of become a part of my everyday life, and it drives people crazy.'



Quincy Jones,
Thriller's producer

to create the sense that you are hearing the large space behind you. Then there were other secondary reverbs on specific instruments, like the toms had an Eventide 2016 and there was a tc M3000 on that classic string line, where, again, the reverb was panned diagonally opposite the line, just for an effect. There were other 'effecty' reverbs in there, but it was all built around that simulation that you are front and centre in a hall.

Was the mix kept entirely digital?

Everything in this mix is in the digital domain, the EQ is also from the board, and even the de-essing on the vocals was done with a de-essing program on the tc M3000. The reverbs were all digital, and I kept a 24-bit digital data path. There were no conversions for processing at all. □

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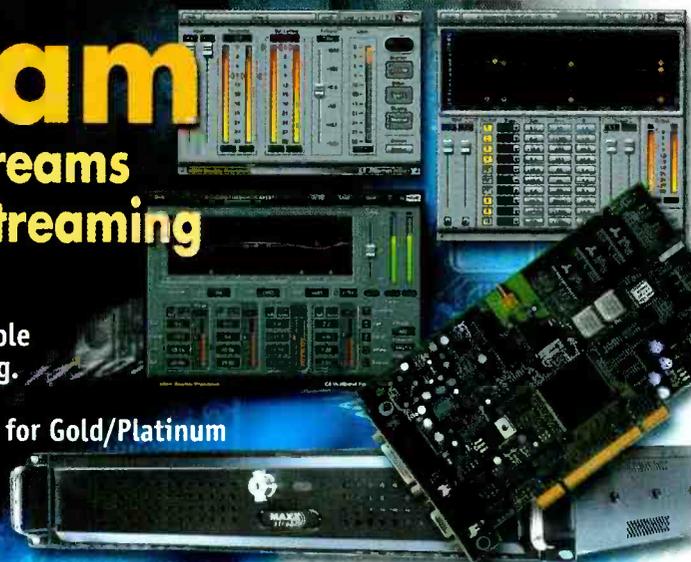
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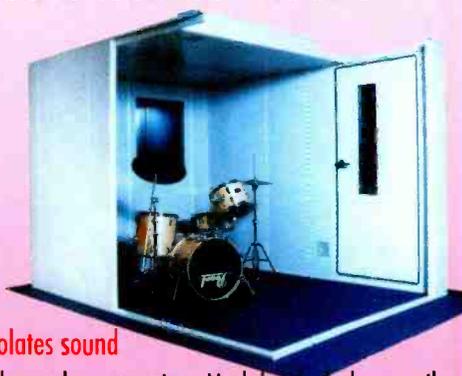
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BUTT UGLY POST

Casting repulsive Martians as kids' heroes makes as much sense as most science fiction and more than most television programming. Sound editor and dubbing mixer **Neil Hillman** gets ugly



Butt Ugly Martians has also been sold to networks in over 20 countries with the show being syndicated in the United States with approximately 400 television stations across the country expected to be airing the series by the start of autumn (fall). As the Just Group owns post facility Optical Image, set in the picturesque Clent Hills near Birmingham and from where I currently ply my trade as head of audio, the decision was made that the show should be track-layed and mixed here, with LA based co-production company Mike Young Productions handling the CGI pictures in conjunction with DCDC of Hong Kong. The basic story premise remains the same for each episode, although the variations on the adventures are immense: three Martians—with looks that only a mother could love—are sent to conquer Earth in the year 2053 on behalf of the evil Emperor Bog who is aided by an equally disreputable henchman Dr Damage. The Butts end up loving the pleasures of earth-life so much that they protect it—and the three kids who have befriended them—from all other attempts of invasion from Bog's hostile forces. They are however hampered in their attempts by the dogged alien-hunter Stoa Muldoon; a clean-cut, square-jawed, wholesome-valued guy, who through his own TV show and web site (www.stoatmuldoon.com)—and well worth a visit if you are worried about either invading aliens or the air on Uranus, tries unsuccessfully to persuade his viewers that aliens really do exist. The scripts are written with an adult audience in mind too, so that to-camera one-liners from key characters can also strike a chord with watching mums and dads.

Butt Ugly Martians has been showing the first half of its 26-episode series each Sunday morning at 10am in the UK—its premiered territory—to healthy viewing figures. The second-half run begins in the UK later this summer, just as my work on the show comes to an end. Commercial considerations and the logistics of international co-production has us on a very tight turn-around; and the key to our ability to turn around episodes in 7-day cycles has been the decision to standardise on a common platform in the audio department with our two Fairlight MFX3plus: one as a naked stand-alone editor, used by my assistant Paul Donovan to track-lay the atmos and spot effects; the other fully clothed in the guise of a Fairlight Prodigy, used by me to produce the final home and international mixes.

The Prodigy occupies an interesting middle-ground of postproduction systems, based on the established—and more sophisticated—Fairlight FAME, while retaining many of its features in a simplified, more affordable package. Just over a year ago, when I joined Optical Image, we became the first Prodigy installation in the UK. At first, it felt like it too, with niggling problems either with the Amek-built control surface or with the Fairlight Vivid hard-disk picture recorder-player; however the Fairlight after sales service has been, truthfully, exceptional. So much so that now it would involve either a spectacular fist fight to the death in the dubbing suite—or at least sizeable wad of cash—to separate me from my flexible friend. As some-

IT WAS MY GOOD FORTUNE that my first job when I left school was as a mixer. Some people, I know, wait years for the opportunity to mix, but I was thrown in at the deep end—an unashamedly nepotistic benefit of working for a kindly uncle. But years before Eminem was singing about Stan, I was working for him; mixing with him while he cast an approving eye over my shoulder.

He was always at hand with a ready quip or to offer advice: 'never forget son, your basic mix is two of sand, one of cement and one of gravel' and 'look after your shovel, and it will repay you in spades'. Suitably, as a builder and therefore not acquainted with the concept of precision or indeed a commitment to accuracy, Stan's favourite motto was: 'does it matter—does it really matter?' A question that has from that day to this dogged my professional judgement—and it's a question I would

wager that every sound engineer, mixer and recordist ask themselves each time their quest for an ultimate recording or balance cannot be achieved; generally through the necessity of compromise that is required in the mixed-media production process of marrying sound with pictures.

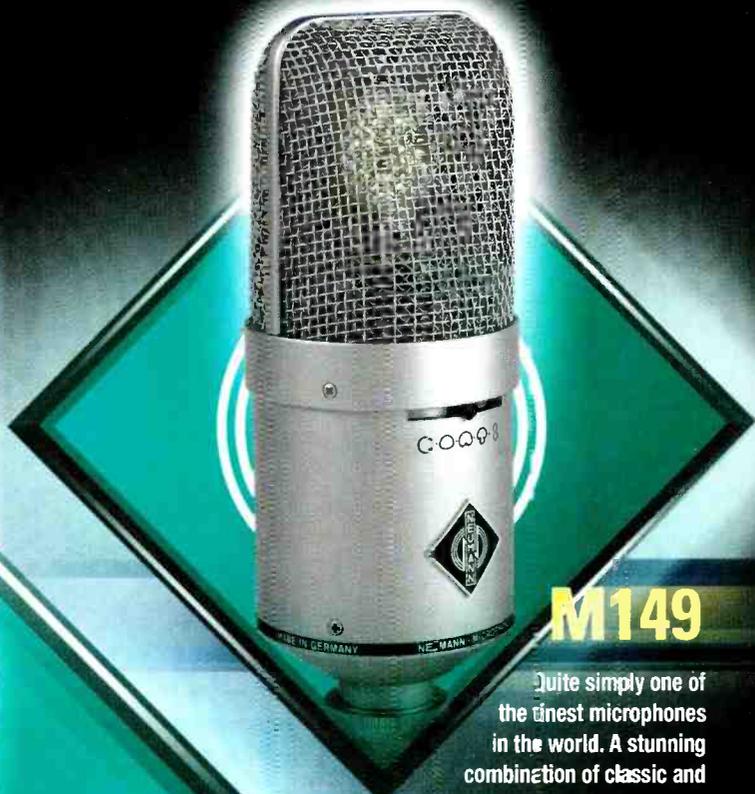
More recently, my good fortune has extended to being responsible for the sound on *Butt Ugly Martians*, a CGI children's programme that brings together British, American and Hong Kong companies, and to being credited as the show's sound designer and re-recording mixer; in UK terms, both the sound editor and the dubbing mixer.

The show's owners, the children's entertainment company Just Group plc, has agreed television network deals with Super RTL in Germany and other broadcasters as far afield as Italy, Australia and New Zealand.

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POSTPRODUCTION



one who not only mixes and edits on it, but also records location material for diverse programmes anywhere—between documentaries or drama to be dubbed on the Prodigy, I appreciate the way that the system can easily accept different ways of working.

The audio production process for *Butt Ugly Martians* is relatively straightforward with the American voice talent being the first recording, made at Salami Studios in LA whilst the CGI is drawn and rendered. From that studio session we get a marked-up script and 'circle take' and session tapes on DAT. We then match the session tapes to the script and look at the storyboard. Where there are conflicts between the script and the storyboard, we go with the storyboard because that's what the animators will be cutting to.

These placed tracks are then sent back to the States on a time-coded, cloned DigiBeta so that they can digitise the dialogue into an Avid, to produce their animatic and hence animation for us. What comes back to us is a 'locked cut' DigiBeta which has the dialogue taken in very roughly off our dialogue DigiBeta, and gives us a vocal guide track to compare to the pictures which are in their final position. The Avid project disk also comes across, and we re-confirm the audio from the original DAT tape that we created. We start the mix build from here.

Paul Donovan and I watch the incoming episode through and discuss the overall feel of the programme and decide on the backgrounds I wish to establish and the specific spot effects that have occurred outside of the, by now, established 'signature' effects library that we have built up over the run of the series. Most—but not all—of the effects have had to come from commercial libraries rather than being original recordings, mainly because of the time constraints in turning the programmes around. These sounds are taken in to the MFX3s off a PC from the fast-access networked MP3 database that we had custom written by Paul Perrins at NetSource Solutions Ltd. These library clips almost certainly will not be used straight; they are pitched or stretched to give them a more nearly unique sound and to prevent the same familiar sound clip being heard by other dubbing mixers. We 'Foley' footsteps in a similar manner for this production, again for time conservation.

As I mix, I generally start with atmos tracks to set the environment that we are in. So for instance the bridge of the Martian battleship—the Bog Star—will have a few tracks of beeps and boops to imply its telecommunications, and a middle-distance, deep LF rumble with a higher component as if from the ship's engines. The pneumatic hatches that gasp and blow help identify the Bog Star, in homage to the

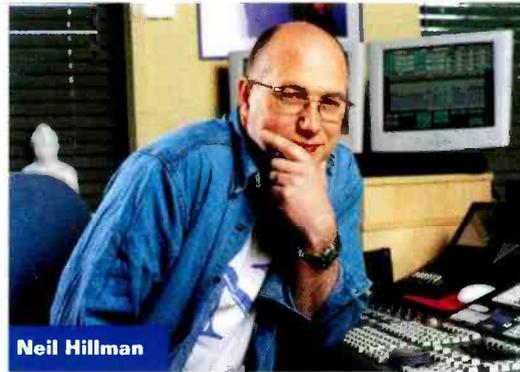
distinctive door-open slide of the early Starship Enterprise of Star Trek. As with the spot effects, the atmos tracks are a combination of three or four different backgrounds to give a greater sense of depth and width.

We generally run about 3,000 cues per 23 minutes which obviously makes it a very busy show to mix, with lots of almost simultaneous events taking place. The Prodigy takes it all in its stride, giving the feel of semi-transparent automation—its hardware controls are kept to a minimum which certainly keeps the mixing process moving, but there is sufficient depth of

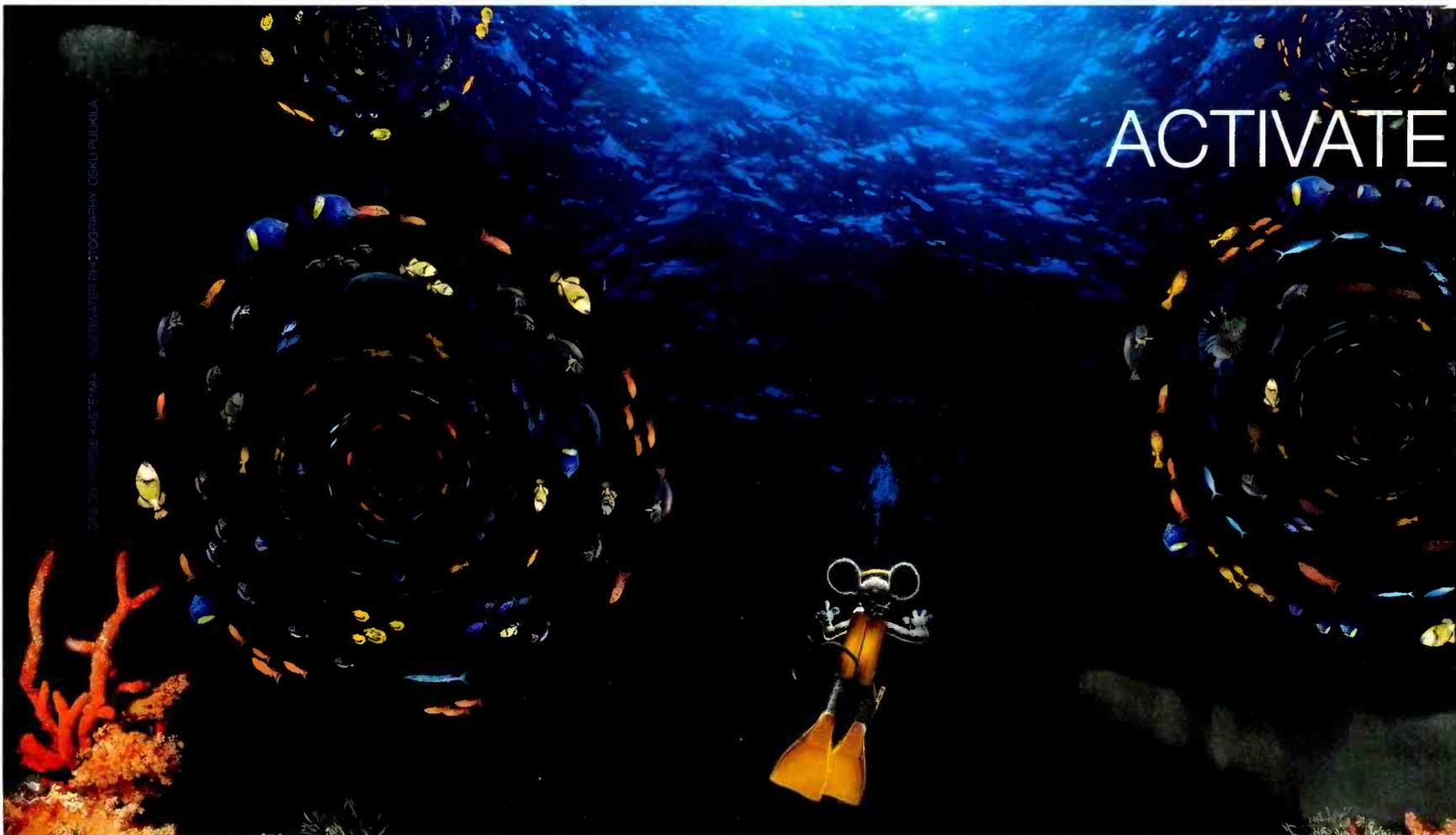
resources should the need arise. I'm sure that this will be the way forward for a lot of postproduction houses in the future—smaller rooms with a 5.1 capability and a sound editor-dubbing mixer hybrid operation; and although I wouldn't predict the imminent demise of top-end dubbing theatres, it's my guess that the 96-input

film desks are going to become increasingly rare beasts even for theatre release projects fairly soon.

Probably the most worked peripheral device in the suite is the electronic TC6000 multi-engine effects processor. I use two separate reverb tracks generally; one for the voices, the other for the effects so that when the voices are removed from the mix for foreign M&E sales, the same overall feel is

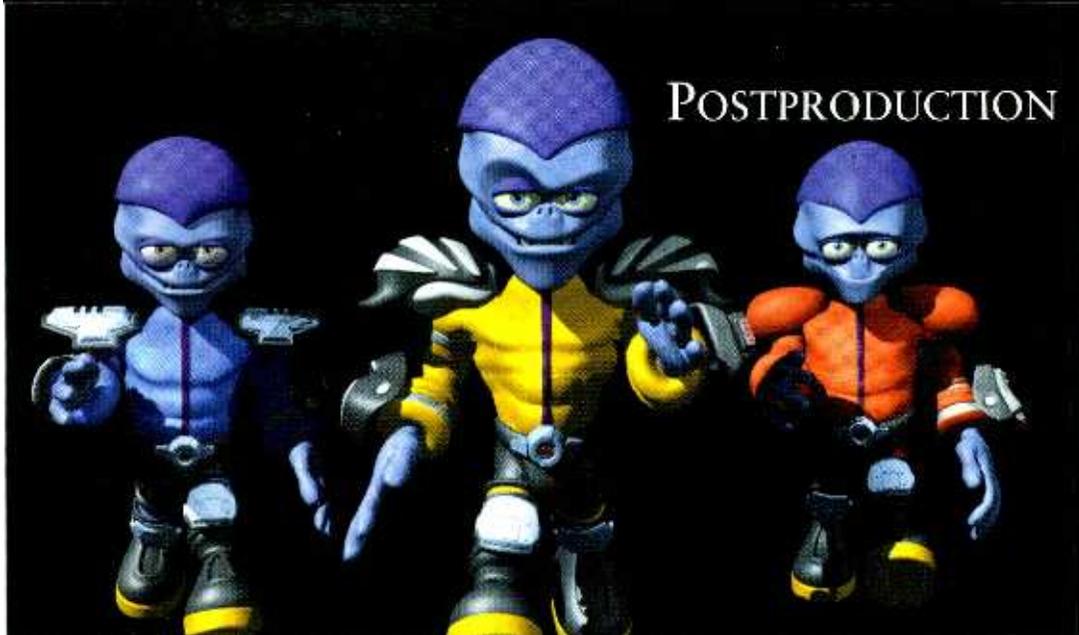


Neil Hillman



retained. The TC6000 is simply superb at room emulation, and it is so quick and easy to flick from one setup to the next literally by two finger prods on the touch-screen. I also use the TC6000 to provide the overall limiting of the output of the Prodigy, which curiously does not carry an output limiter; although a compressor is available it has too low a ratio to sensibly act as a limiter.

The Mike Tavera music score is fantastic for a kids programme. We receive it as a time-coded DA-88 from Tavera, sent across from the States. It usually has the mixed track on Tracks 1 and 2, unless there's a second crossfade which will go on to tracks 3 and 4. It's also very dynamic, but I don't compress anything at all—the voices come in with the same compression they are given at Salami Studios. I think it's a bit of a lazy way of mixing too, but because of the pace of the programme I don't like compression in there because it makes the programme tiring to listen to—comparable to listening to 23 minutes of constant radio ads. So hopefully there is a reasonable dynamic range in there, and although I have to bear in mind the punchy nature of the programmes that will sit around the *Butt Ugly Martians* when it gets transmitted, I like to think that things like little ricochets are there in the HF part of the mix and on the Bog Star bridge it becomes very low and throbbing. I look to create light and shade and try to avoid ending up with something that just sounds middly. For me the emphasis always has to be the dialogue. If the kids have to struggle to listen to the dialogue they will mentally switch off, so that has to be the first priority. The effects and explosions have to be pretty obvious and then it's a scaling down from there of the amount of subtlety that gets put in. The music is the



third element and then some nice little effects which if you're looking for them, are there.

I mix the programme in TV surround, LCRS, but I tend to monitor for the most part in straight stereo, flicking across to mono. I'm aware of the fact that like my children, most kids when they get up in the morning and switch on the TV are listening out of a mono speaker at the side of the set. So I'm generally flicking between mono and stereo while the mix is happening, but when I review it I will be looking at the surround elements as well. I don't put anything in the surround at the detriment of the flat stereo image, so when I pan things from the back to the front the effect will still be present in stereo, but the sound will arrive later.

In the final analysis, this series is obviously no *Ben Hur*—no matter how much it feels like it is when you are

immersed in it—but I do care deeply that the end result is as crafted as if each programme was an individual track on a super-group's concept double-album comeback; each one with its own unique identity, yet still recognisable as part of a bigger whole. The competition in the form of wonderful work that other re-recording mixers, designers and editors that I admire are producing certainly concentrates the mind and increases the effort expended into creating the best product in the given time.

So the thing is Stan, yes—it really does matter.



YOUR

BYTES



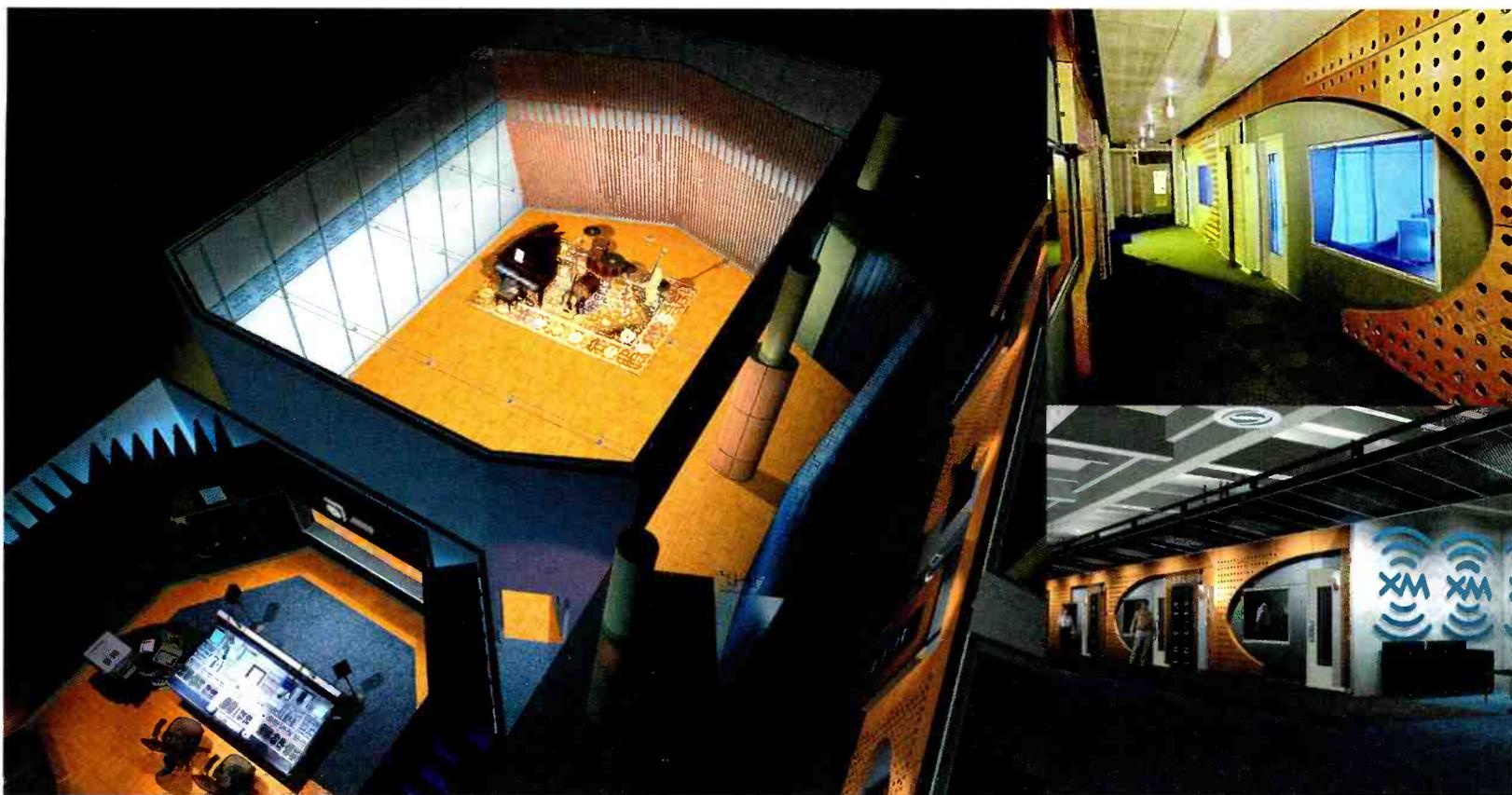
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THE RADIO EVOLUTION

XM Satellite Radio's massive Washington facility sets new boundaries for broadcasting, as well as a new sense of scale for the notion of the broadcast facility itself, writes **Dan Daley**

THERE'S THE OLD TED KNIGHT LINE from the *Mary Tyler Moore Show* back in the 1970s, when the pompous, self-centred news anchor, in repeating his biography for the umpteenth time, leads off, 'Well, it all started in a small, 5,000W radio station in Encino, California...' The notion of mom-and-pop establishments in radio broadcasting were pretty much gone even then, plowed under by corporate conglomerates like SFX, and centrally programmed by committees using focus-group data in underground bunkers somewhere in the deserts of the Southwest. Now, XM Satellite Radio is taking things a giant, evolutionary step further.

It certainly won't bring us back to small, low-wattage cottage stations—the company's new facility uses 133,870ft² of space, of which 60,000ft² is dedicated to audio production and broadcasting, in a cavernous building in the North East quadrant of Washington, DC. From here, when it commences broadcast operations in late summer, XM will pour out 100 channels of digital audio via a pair of Boeing 702 satellites (named, rather lamely, Rock and Roll) launched into geosynchronous orbit earlier this year by means of a Russian/Ukrainian-built rocket from a former North Sea oil rig platform towed to an equatorial mid-Pacific site supervised by Norwegians and whose orbit is now controlled by Canadians.

(That's about as international as this proposition gets. America's nearest borders will be impervious to digital radio; the frequencies assigned by the FCC here won't work in either Canada or Mexico. But another US company, World Space, also based in Washington, is already positioned to run satellite digital radio for Africa and Asia.) Via these satellites, XM Radio will be able to deliver a steady stream of music, talk, sports, news, weather and everything else audio and allow subscribers to stay with the same station from Portland, Maine to Portland, Oregon, covering the entire continental United States.

There's nothing small about XM. But while it won't offer quixotic music choices determined by how a station owner feels on a given day, it will create the kind of national, coast-to-coast familiarity that television did a half-century ago. Currently, only a handful of radio personalities, such as Howard Stern, Rick Dees or Paul Harvey, are household names, and that's due to syndication, which uses or creates networks made up of dozens or hundreds of individual stations with a regional reach at best. That has been the conventional radio business model since regular broadcasting began in the US in the 1920s. The potential to create nationally known on-air personalities via a national digital system is enormous. People in Los Angeles and New York will be able to spend drive time with the same DJ.

Make no mistake, you don't get a \$1.1bn company by going the bed-and-breakfast route. XM Satellite Radio has big backers, including terrestrial radio broadcasting conglomerate Clear Channel and automaker General Motors, which will put XM digital-capable radio receivers into its cars starting with the 2002 Cadillac line. And major consumer electronics manufacturers, including Sony, Pioneer and Alpine, are already lined up to provide OEM hardware for automotive, portable and home devices. And XM is coming on line just ahead of another massive digital radio player, Sirius (formerly CD Radio), which will commence its operations from a huge new facility in New York City a few months later and will add the element of competition early on in a very new field. Digital radio as a concept had been a quiet entry to the entertainment technology scene, virtually lost amid the clutter and din surrounding other frontier formats such as HDTV, DVD and new game platforms. Hardly anyone outside the radio business noticed when the Federal Communications Commissions (FCC) raffled off some of the radio spectra a few years ago for digital radio. But it is now taking centre stage with a suddenness and seeming confidence that none of the other, more glamorous contenders for consumers' attention have managed to muster.

Subscribers to XM's digital radio service will have

quite an infrastructure to show for their \$9.95 monthly fee. Aside from the two satellites—which cost upwards of \$400m to build and launch—the huge new master facility combines and applies a number of new disciplines to the production and management of radio broadcasting.

'Around here, you can't walk around saying, "It's not rocket science", because the guy in the next office often *is* a rocket scientist,' says Tony Masiello, XM Satellite Radio's vice president of operations and a 22-year veteran of terrestrial network radio broadcasting, with CBS and ABC networks. Masiello oversaw the entire implementation of technology and digital infrastructure at the facility, and in the process says that new combinations of expertise are already changing the way radio works. For starters, an outside vendor, Loudeye, of Seattle, Washington, was hired by XM to 'rip' a 1.5-million-song catalogue from tens of thousands of CDs and send it, in the XML file format on linear tape, to XM's operations centre, where it was then loaded into a 22-terabyte server system, created by French firm Dalet Digital—the largest ever built, according to an IBM analysis. The audio is compressed from the CD level of 16-bit, 44.1kHz using the MPEG2 format at 384kbps (approximately a 4:1 ratio), which Masiello describes as 'the most benign level of compression' for music, and is broadcast in its compressed form. Along with the audio comes metadata, which is also broadcast along with the music and provides information such as song title, artist. 'Without some compression, we'd be looking at an 88-terabyte server, which just isn't feasible right now.'

Each of the 82 on-air control rooms at the facility will have access to the server. This degree of access, combined with the sheer amount of data, makes information management critical to XM's success. 'That's another area where disciplines that are normally outside the loop in terrestrial broadcasting become integral here,' Masiello explains, noting that the data management system Dalet installed along with the server is a design that would be instantly recognisable to any IT department manager. 'This is all about controlling the flow of audio information.' (More than a few military types would also recognise it—the operations model for the facility was set up by XM's senior vice president for engineering and operations, Jack Worthington, a retired US Air Force brigadier general.)

It's also about ensuring that flow; the Dalet system has significant redundancy built into it, including two independent fibre-optic loops which can instantly re-route any single-point failure in any of the digital

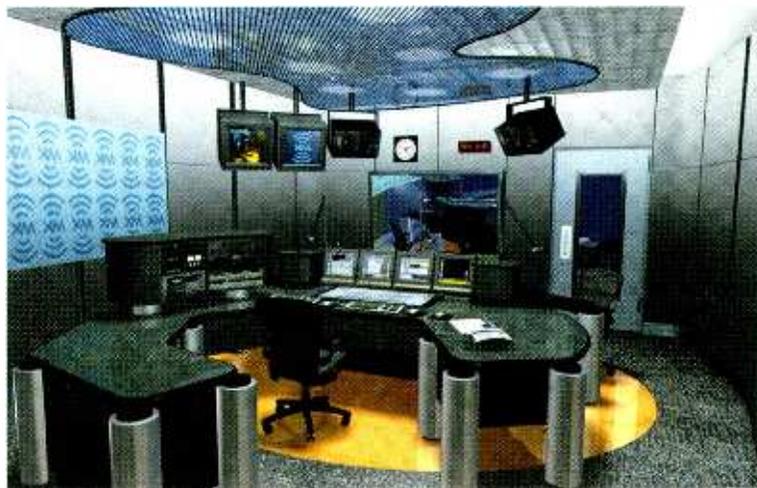
signal paths. Operationally, all of the server system's drives are scheduled to be changed out well before their manufacturer-specified average predicted failure points are reached, and all the drives are hot-swappable.

All of this is controlled from a central data management centre in the facility, which itself is the nexus for a 2,500 x 2,500 audio matrix, made by Klotz Digital (which also supplied virtually all of the on-air digital consoles). 'All a jock in a studio needs to know is what he wants to hear,' says Masiello. 'The routing is done by a technician in the Broadcast Operations Centre, who finds it and views it on a screen and can route it to the appropriate studio with such a high degree of control that the fader level can be changed beneath the jock's fingers even as he speaks.'

Actually, the entire facility is divided into three operating centres: a Technical Operating Centre, essentially a massive machine room; the Broadcast Operating Centre, which monitors each studio's configuration and operations; and the Network Operating Centre, which controls uplink operations, multiplexing management, information processes including subscriber data, urban repeaters (which are deployed in 66 US metropolitan areas to boost signals degraded by tall buildings) and all other satellite operations. Synergising and integrating their operations was one of the most fundamental departures from conventional radio station management, Masiello observes. 'And it's a model that radio is going to follow from now on, now that the digital age is upon us,' he says.

The statistics of XM's facility read like a Guinness record. They include 630,000-linear-ft of fibre-optic cabling and 1,650,00ft of CAT5 computer data cabling, wired by Radio Systems' StudioHub-plus system using all RJ45 connectors, which feed 288 digital control surfaces, such as on-air consoles, in 82 individual studios (all of which are on-air capable); 320 audio workstations, such as the facility's 14 fully-fitted Digidesign Pro Tools systems; 279 relay racks; 185 ethernet switches and 37 individual LANs.

But as gargantuan and complex as the digital environment is, it offers tremendous benefits, including pristine signal throughout the facility, multiple simultaneous access to programme material, enhanced failure detection and rectification procedures, and nice touches such as instantly recallable presets for such parameters as EQ and effects for every individual on-air talent on all of XM's channels on all of its consoles. This system also takes the often-used 'tips and tails' method of creating prerecorded pattern-and-music programming to a new level, allowing jocks to do 'wet' intros and outros over the first and last 10s of a song, while the rest of the track simply rests in the server until it's needed on air.



'This way, you can compress the time it takes to record a real-time 4-hour programme to a fraction of that,' observes Masiello.

There are a few turntables at the facility, used to play club mixes of dance songs from vinyl, which are then digitised and loaded into the server. The only point at which audio regularly touches copper cable, Masiello says with a mixture of pride and awe, is at the back of a microphone. Even the Genelec speakers, he adds, have AES inputs and integrated convertors. All this, and the broadcasts are also capable of being interactive in a way terrestrial broadcasting never dreamt of—each on-air studio has an Internet terminal, so listeners can email requests, as well as call them in on their digital cell phones from anywhere in the US.

You might be asking the same question that occurred to me at this point: what about surround? Surround audio broadcasting is theoretically possi-

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ble with digital radio. But, Masiello points out, it would be way in the future, if it proves economically feasible at all. As he notes, not

only would multichannel broadcasts take more than double the bandwidth to transmit, and possibly two

more satellites, as well, but the consumer infrastructure isn't there yet, in cars or homes, certainly not in personal portable devices. And there's hardly any content to broadcast", he adds.

Two elements were critical to the design of the overall facility and of the individual studios: the entire facility was laid out first on the electronic drawing board of CAD, and construction of interior components, such as the studios, was done using modular construction. Though the term 'modular' often has negative construction quality connotations to some, Masiello says that the reverse was true in this instance, thanks to a high degree of engineering and quality control of each modular component. Acoustic Systems, of Austin, Texas, supplied over

1.2 million pounds of modular surface components, which each averaged 4 x 10ft, and each of which fit precisely into a design plan that New York City-based Northeastern Communications Concepts (NCC) had measured out on its CAD programs, neatly fitting what would become 82 studios spaces into 60,000ft². This essentially enabled the construction of the studio rooms to be done off site, while the building and its other major systems, such as the massive HVAC system and other utilities, were being simultaneously completed. This approach allowed the entire project to successfully come together within the extremely tight schedule of 11 months.

This speed did not come at a cost of acoustical quality, Masiello points out. Each studio is floated on its own slab resting on neoprene isolation pucks. The precision with which the CAD and modular construction techniques came together was all the more remarkable because of the diversity of the types of studios that XM needed. These range from small, one-person rooms for voice-overs and news reading, through larger rooms that can accommodate talk-radio shows and 'morning-zoo' multiple host drive-time shows, all with varying levels of noise that they will generate.

Al D'Alessio, president of NCC, is intimately familiar with radio acoustics, having worked in his youth at the legendary WOR in New York, one of the last stations to maintain an orchestral broadcast room. He also incorporated the psychology learned from decades spent in radio into his work for XM.

"The whole goal was to make rooms that were completely identical to each other," he explains. "Not just for the usual reasons of being able to schedule things in any room, but also so that talent and producers don't become attached to any particular studio, which is something that happens a lot in broadcast."

D'Alessio mapped out the acoustics of all of the studio on a CAD program, determining the properties of each type of room—talk, music, multipurpose—and then codifying them to create a rubber stamp model from which each would be built. The resulting rooms are nearly anechoic, with just enough ambience left in to make them comfortable. That, says D'Alessio, was achieved mainly with low frequency handling. "You have to pay close attention to frequencies under 125Hz," he says, accomplished in this case with thick (4-inch minimum) absorptive wall treatments, corrugated melamine ceilings, and, very importantly, corner treatments, the areas of a room which D'Alessio says are the most overlooked when dealing with acoustical tuning, but which offer the best return for the least amount of effort expended treating them. In this case, he placed curved diaphragmatic resonators in the corners to tune low frequencies.

Dealing with the larger bandwidth of digital broadcasting meant that the 'tricks' that D'Alessio says are so common to radio, to cover the inherent noise issues that accompany amplitude (AM) and frequency (FM) modulation, are not necessary. "There's plenty in the human voice under 1kHz," he continues. "Just put a filter on a male voice at 80 cycles and you'll find that much of what makes that voice distinct is missing. The notion that the voice resides mainly in the 1kHz-1.5kHz range is the TV and film theory. In digital broadcasting, a lot more of what makes a voice distinct is going to be able to be broadcast, so the rooms have to accommodate that by being as neutral and as quiet as possible."

Only two rooms diverge from the uniformity that D'Alessio sought. A partnership studio is located in the recently opened new Country Music Hall of

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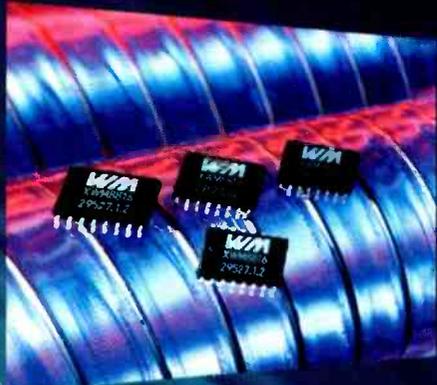
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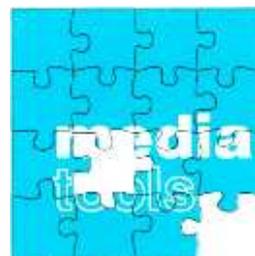
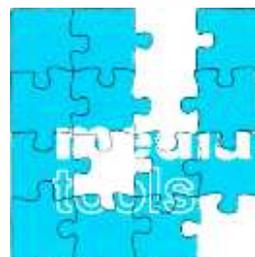
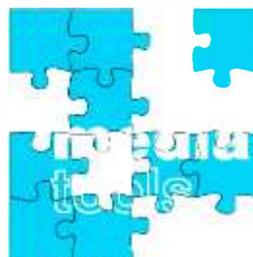
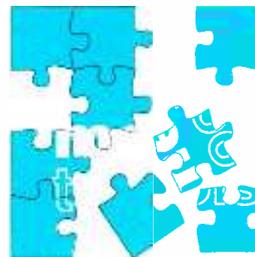


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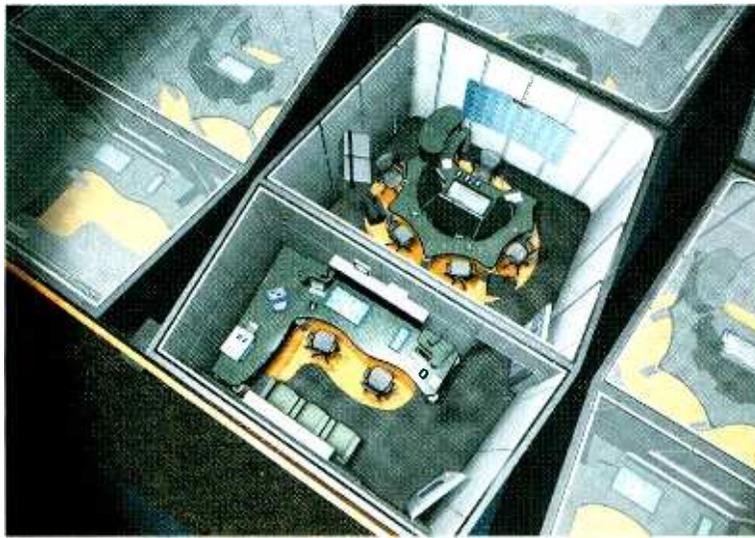
Fame in Nashville, from which veteran country music radio personality Bill Mack and others will send live feeds back to XM for nation broadcast. The studio in Nashville only offered about half the space as the ones at the XM complex in Washington, which meant that D'Alessio had to compromise sonics to some degree. '[The studio in Nashville] won't match the others in the rubber stamp sort of way,' he says. 'But we were able to at least give it kinship with the others.'

The other non-identical studio could also be considered the crown jewel of the facility—a large studio designed specifically for live performance broadcast and recording. Fitted with a 96-input Sony Oxford digital console, the 2,600ft² room's acoustics were designed by Francis Daniel, of West Palm Beach, Florida-based FDCA. The control room is described by Daniel as a 'zero environment' enclosure, with absolutely no sound reflections at all, again in an effort to minimize or eliminate noise in a digital audio ecosystem. 'At the same time, I wanted to approximate as close as possible an actual live performance space,' Daniel explains. Three of the recording room's walls, as well as its floor and ceiling, have the sorts of reflections one would associate with a quality concert hall; the fourth wall is the imaginary audience, which Daniel made purposely absorptive to approximate the effect of people in seats.

The intent of this studio is as a live concert space which can also digitally document and broadcast

performances done there. In a very real sense, this studio hearkens back to radio's roots, when music broadcasts regularly originated in performance venues.

As impressive as XM Satellite Radio's facility is, the impact that digital radio will have on the enter-



tainment business, particularly the music industry, will undoubtedly be pervasive and profound. Just the ability to reach a national radio audience in the world's largest entertainment market itself will likely radically alter the impact of syndication and network affiliation forever. For record labels—especially independent ones—the ability to use that kind of reach could make a record a national hit in a week or a few

days. Advertising will undoubtedly be affected, as well, though XM maintains that it will run only one-third the number of commercial minutes that conventional broadcast radio now does, relying instead on subscription fees for the bulk of their revenues.

What's particularly exciting about digital radio is that it is ready to roll now, and its intended mass audience should be equally ready for it. As Masiello points out, digital radio's distribution is analogous to that of satellite television, which is already a fixture in the American consumers' lifestyle. You don't have to explain the concept, which is something that DVD and other new entertainment formats have labored with in the past. Another positive point is that XM and its interested-party investors, such as General Motors, for instance, have their individual and collective goals on the same page: sell more cars, sell more digital radio; sell more digital radio, sell more cars. Compare that to SACD and DVD-Audio trying to share the same cab.

But if one were to look for the most salient observation, it might be this: the measure of any technology's impact is definable by its effect on the language. Consider that the music recording industry rarely had need for the word 'analogue' until the widespread use of 'digital' created the need to identify all that came before it. Now, the phenomenon that started back in the 1920s will now require its own modifier to distinguish it from the new: 'terrestrial radio.' Welcome to the revolution. □

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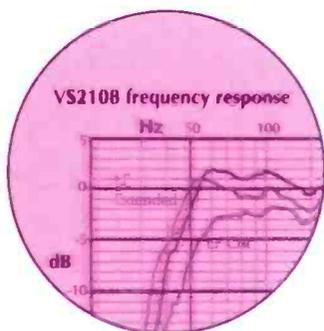
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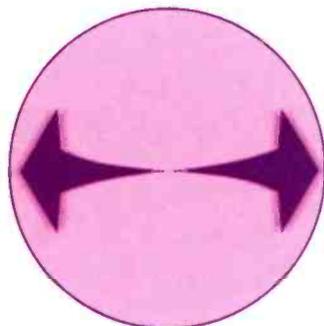
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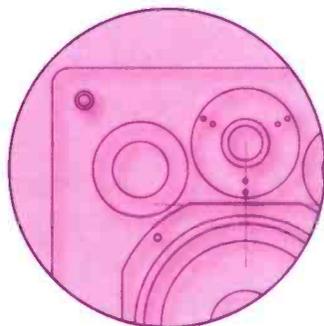


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THE NS-10M



Over the past 20 years, Yamaha's NS-10 close-field monitor has become an industry-standard reference speaker as well as becoming part of dance music's 'cult kit'. With Yamaha's decision to withdraw the NS-10M from its catalogue comes the last chance to understand its appeal and the necessary qualities of its successor. **Phil Newell** balances *Studio Sound's* bench test with producers' and engineers' opinions

IN THE SIXTIES, it was customary for pop producers and engineers to check what a mix would sound like on a transistor radio before approving it. It was 'understood' that what people heard on the radio had a big influence on whether they bought a record, or not. That said, I seem to remember buying Rolling Stones singles on their day of release without having heard them at all... Nevertheless, radio was a big influence on sales and the consoles such as the Neves of the late sixties, had small, built-in loudspeakers as a radio reference.

As awful as these things were—and to a large degree they were not really representative of anything—they did sometimes help to get a more appropriate balance between guitars, vocals and the reverb levels. They were inconsistent, though, and recording engineers were always complaining about them.

The quest for consistency saw the same people playing cassette copies of a mix on domestic equipment either inside or outside the studio.

Some time in the early seventies, Auratone's Sound Cube loudspeaker appeared. This produced prodigious outputs from a relatively tiny loudspeaker when driven by Crown D150 amplifiers, or similar. Its small size caused little obstruction of a studio's main monitors when mounted on the meter bridge of a mixing console. The fact that it was single-driver loudspeaker ensured a smooth phase response through the vocal region, contributing to its usefulness against multi-driver main monitors.

The Auratone reigned supreme for almost a decade, although not everybody used it or liked it, but in the early eighties came a challenger—Yamaha's NS-10. Designed as a domestic hi-fi loudspeaker, it was generally badly received by the critics. But this little loudspeaker had a rock 'n' roll punch which caused the recording industry to take note. It was to become a common sight at all levels of studio operation and is generally regarded as a *de facto* monitoring standard. The thing that has puzzled rival loudspeaker manufacturers for the past 20 years is why it became so popular. What characteristics did it have that led so many people to have confidence that their mixes would translate well to the street?

In the wake of its withdrawal, the test measurements presented here offer us an opportunity to apply an analytical approach to the NS-10's performance

and to compare its performance to the cross-section of the loudspeakers which have been tested in *Studio Sound* over the last three years along with the Auratone which will be measured imminently. While this is underway, I canvassed the music industry in the hope of gaining a greater insight into what made these loudspeakers so special.

I started with Bob Clearmountain, one of the great exponents of the NS-10. He now principally uses KRKs, but in the early eighties his favourite mixing loudspeaker was the KLH17. The problem here was not the sound, but fragility—the speaker could not withstand the punishment of studio

often used in the UK was something that he found very difficult to deal with, but NS-10s on a large Crown amplifier was something that he had achieved good results with. Like Clearmountain, Douglas' current preference is for KRKs, but he also had used the Auratones many years ago.

'If you can get a mix to sound good on an Auratone, then you know you're really in business', he explained.

Nick Cook spent much of the last 10 years as the head of Fairlight's European operations, and as sales director of Amek. From the mid-seventies though, he was a busy recording engineer working in some of Britain's best facilities.

'I always used to check the core sound on the large monitors, then do the equalisation and balancing on the NS-10s,' he recalls. 'They are bright and harsh, and the old ones without the loo roll led to too little top on the mixes. The change from the old domestic NS-10 to the NS-10M studio version caused a short period of confusion because the reference changed, but the sound had essentially the same character and people soon adjusted.'

Cook believes that the recording and mixing processes require very different loudspeakers: 'During the recording you need to hear the instruments in detail, whilst at the same time being able to inspire the musicians to great performances. The subtleties of fine balance are not important at that stage. By the mixing stage, you should already have well recorded multitracks, so the mixing process becomes more a question of balance.'

Cook also believes that one early benefit of the NS-10 over many other of its contemporaries was its ability to accept a solo'd bass drum without expiring. 'They also sounded good when sitting on the top of SSL consoles, and once their reputation had been established in such a position, and had been used on top recordings, the industry in general saw them as a reference.'

Cook also commented on the solidity of the NS-10 cabinet construction, and that the cabinet itself, was not audible. There was thus no boxy sound, which helped it to have more of the character of built-in monitors. Furthermore, the solid cabinet did not tend to excite mixing console resonances, which could be a problem with some of the NS-10s more flimsy rivals.

'What I've also noticed', he continues, 'is that the general sound of recordings has changed over the years, and some of the reason for that could have been that



use. He was introduced to the NS-10 in its early domestic form, and was impressed by the way that the mixes 'travelled'. The only problem was that mixes lacked 'top' outside of the studio, so a toilet paper 'acoustic filter' was used to cover the tweeters during mixing. When the NS-10M 'studio' version appeared, the toilet paper disappeared, and the NS-10M remained his mainstay for many years.

'They helped to pay my rent', he says, 'because I could have confidence in the work that I did on them. I'm not a very technical guy, I'm a music mixer, and I use the tools that I can work with best. Why they work is not too important to me'.

I also spoke to Alan Douglas, the Grammy-winning engineer from the *Riding with the King* duet album from B B King and Eric Clapton, on the day before he was to start recording with Annie Lennox. He said that he thought that NS-10s sounded hideous, but they had a rock 'n' roll sound which, if you got used to it, could give good results in a mix. Douglas said that the Quad amplifier/NS-10 combination,

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Although Chris Jenkins has worked for SSL for the last 20 years, he was BBC trained and spent some years with Virgin. He has been well respected as a musician, recording engineer, maintenance engineer and console designer. Surely he must have some insight into the popularity of the NS-10... 'Personally, I now like KRKs,' he says, 'but I used to be able to perceive a lot of dynamic detail on the Auratones'.

Again, his technique was to get a clean recording by using the main monitors, then switch to the NS-10s or Auratones to get a balance between the instruments. 'Once you learn to trust the balances that you get on a certain loudspeaker that you can rely on, then from the engineering point of view there is really no need to know why—you just get on with it. I tended to prefer the Auratone to the NS-10,' he said, 'because I got more of a sense of the dynamics; perhaps due to the fact that it was a single loudspeaker with no crossover'.

So, not only could a person as musical and technical as Chris not put his finger on the 'why' but he didn't even seem to care. Only the results counted.

Finally I turned to Mick Glossop, producer-engineer of artists such as Frank Zappa, Van Morrison, and Sinead O'Connor. Glossop uses NS-10s and Auratones. 'I don't really discuss what or why with other people, because it is only the results that I get that count', he says. Confronted with a notorious quote from George Massenberg ('I believe that there are no ultimate reference monitors, and no golden ears to tell you that there are. The standards may depend on the circumstances. For an individual, a monitor either works or it doesn't... Much may be lost when one relies on an outsider's judgments and recommendations') he replies, 'Absolutely!'

'If things sound too good on the loudspeakers, then it makes you lazy and you don't work on the music,'

he adds. 'You then take things home and realise that you could have, and should have, done a lot better. I use large monitors, from time to time, to check the bottom end, but often I do whole recording sessions on NS-10s. I really don't like them at home, though; they're for work only. I have often noticed that during the mastering, I need to add something around 2.8kHz, because I tend to undermix those frequencies when using NS-10s. I still use Auratones to set the bass and vocal levels in a track. I can also hear distortions better on the Auratones, and they have a lot of detail when quiet. I can get a good balance on Auratones which works well when switched to NS-10s, but I won't use the Auratones from scratch.



'I dread having to change monitors, because I have become so used to the ones I use. If I had to change, I would probably go to KRKs, but I also really like Questeds. I use the large monitors when available as a low frequency check, but if I don't know the room that they're in, it can be misleading. Essentially, though, I want to put all my energy into the mix, and I don't want to have to waste time thinking about the loudspeakers'.

Where do these observations leave us? It seems that none of them are the slightest bit interested in loudspeaker design—they just want to use the ones which work for them. They all appear to agree with George Massenberg's statement and almost universally saw the NS-10 as a mixing tool, not a recording monitor, and it is perhaps in this area where so many small studios miss the point. They see top name engineers using NS-10s for mixing and fail to realise, firstly, that they often use large monitors during recording and, secondly, that they are immensely experienced people who can rely on that experience to interpret what they are hearing. They are perhaps not taking what they hear to be Gospel.

All use the monitor systems that work for them, and all tended to agree that they wanted to use loudspeakers that made them work hard at a mix. This was summed up by Alan Douglas' comment that 'If you can make a mix sound good on Auratones then you know you're in business'.

No-one spoke about frequency response, transient response, or any other technical aspect of performance. They all spoke in subjective terms, even though some of them have deep technical knowledge. My own opinion of any monitor is not that it should sound good, but that it should scream when things are wrong. This philosophy is borne out by the number of top producers and engineers who, when relaxing at home, want to hear the problems smoothed over. They do not want to listen to the loudspeakers that they work on.

For me, the NS-10 has been a useful tool. I consider that I can set up almost any multiway monitor system, to within a dB of how they would be set up with the measuring equipment, solely by reference to a pair of suitably driven NS-10s. I cannot claim to do this with any other loudspeaker.

In fact, Yamaha didn't even get it right. The NS-10 was a dismal failure in the market for which it was designed, and the niche which it found for itself was found more by luck than judgement. The NS-10 has also contributed to recordings in hidden ways. In a modern recording world where enthusiasm tends to far outweigh experience, the perception of the NS-10 as being 'professional' has led to its use in many small studios which would have otherwise opted for somewhat more flattering loudspeakers, and the recorded results would have suffered. The downside to this is that the lack of fine resolution in the NS-10, when used as a recording quality control monitor as well as a mixing tool, has allowed some bad recordings to get to the mixing stage. On the other hand, that has provided work for the mastering engineers to clean things up.

The reasons for the popularity of the NS-10 is hard to discern and what—if anything—will replace it is still unknown? Hopefully Keith Holland's measurements and their comparison with those of other loudspeakers will throw some light on this enigmatic little loudspeaker's performance. Apart from anything else, if somebody else can produce a loudspeaker that sounds identical to the NS-10M, they will have a ready-made market waiting for them. □

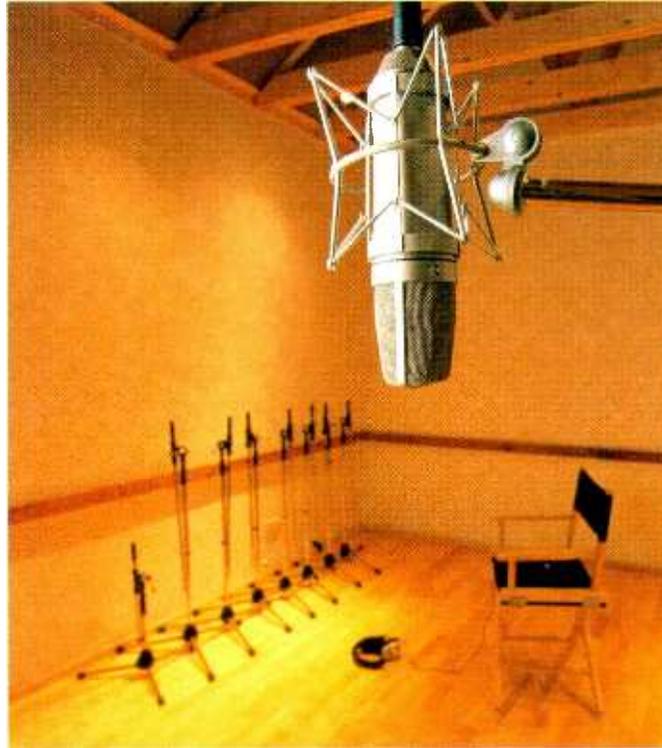
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Yamaha NS-10M

The contrast between objective and subjective loudspeaker assessment is well recognised. **Keith Holland** presents *Studio Sound's* 'bench test'

THERE CANNOT BE many people reading this review who do not have first-hand experience of the Yamaha NS-10. So common are these loudspeakers in recording studios the world over that they are certainly the nearest thing to a 'standard reference monitor' that there has ever been. Given this background, it seems a bit pointless to write a description of the NS-10 but, in the interests of compatibility with the other reviews in this series, here it is... The Yamaha NS-10M is a 2-way, passive loudspeaker consisting of a 165mm paper-coned woofer and a 25mm soft-domed tweeter mounted in a sealed-back cabinet of dimensions 380mm wide x 215mm high x 180mm deep. The tweeter is surrounded by a ring of sound-absorbing felt and is covered by a large, protective grille. The manual supplied with the loudspeaker, and the writing on the front panel, indicate that the NS-10 is designed to be used in the 'landscape' orientation, with the tweeter alongside the woofer, although Yamaha do state that 'they may be placed vertically with no effect on reproduction quality'. The loudspeaker is quite distinctive-looking with a black finish and bright white woofer cone; each loudspeaker weighs 6.3kg.

Fig.1 shows the on-axis frequency response and harmonic distortion for the NS-10M. The response is seen to lie within ± 5 dB limits from 85Hz to 20kHz; a somewhat disappointing result, well outside the usual ± 3 dB limits. The low-frequency roll-off is 2nd-order with -10dB at about 70Hz. The harmonic distortion performance is good, with the 2nd harmonic peaking to -35dB (1.8%) at 80Hz and all harmonics remaining below -40dB (1%) at all frequencies above 120Hz. Figs.5 to 7 show the directivity of the loudspeaker in terms of the frequency response at various angles away from the axis. Because of the suggested landscape orientation of the loudspeaker, two plots of horizontal off-axis responses are presented; one to the left, the other to the right, and a third one for the vertical plane. As the loudspeakers are sold in 'handed' pairs, it should be stated here that it was the left-hand loudspeaker (tweeter outermost)

that was tested for this review. The interference notch at the crossover frequency, which is characteristic of most non-concentric loudspeakers, can be seen in both horizontal directions, but the off-axis responses are otherwise well controlled, with some mid-range narrowing but little evidence of high-frequency lobing.

The step response (Fig.3) demonstrates good driver time-alignment, with the high frequencies preceding the mid frequencies by less than 0.5 milliseconds. The power cepstrum (Fig.4) shows evidence of activity after 0.2 and a distinct echo at 0.5 milliseconds, which give rise to the uneven frequency response at high frequencies. The acoustic source position (Fig.2) demonstrates the benefit of a sealed cabinet and consequent 2nd-order roll-off, shifting only 1.3m behind the loudspeaker at low frequencies. This benefit is further demonstrated in the waterfall plot (Fig.8) which shows a rapid decay at low frequencies. There is also only a little evidence of mid-range ringing.

Overall, the NS-10M is a mixed bag. The low harmonic distortion and accurate time domain performance is let down by a poor frequency response. The low-frequency extension may look poor in comparison to other loudspeakers of this size, especially those with active equalisation, bass reflex ports and high-pass protection filters, but this should be offset against the accurate low-frequency transient response demonstrated by this model. It is interesting to note that the pronounced mid-frequency 'hump' in frequency response seen in Fig.1 is a characteristic that is shared with many other monitor loudspeakers reviewed in this series; is this a fault inherent in the classic 2-way loudspeaker design that we have all gotten used to, or is the 'hump' beneficial in a monitor loudspeaker? Watch this space... □

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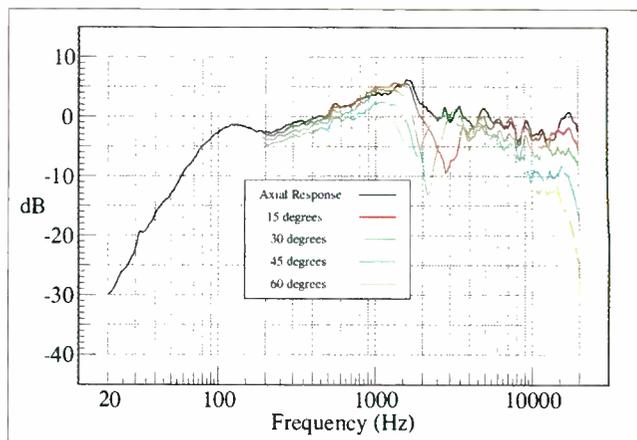


Fig.5: Horizontal Directivity: Left

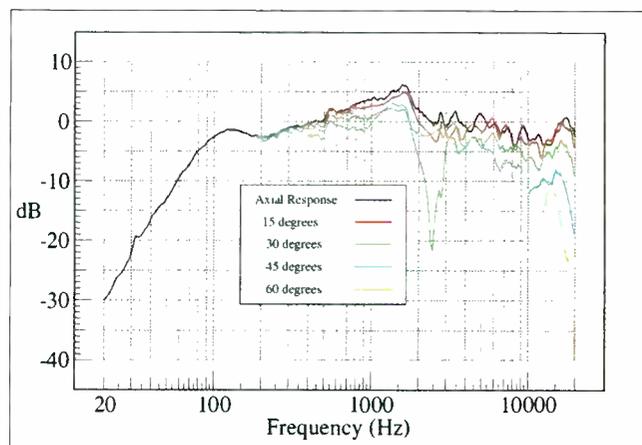


Fig.6: Horizontal Directivity: Right

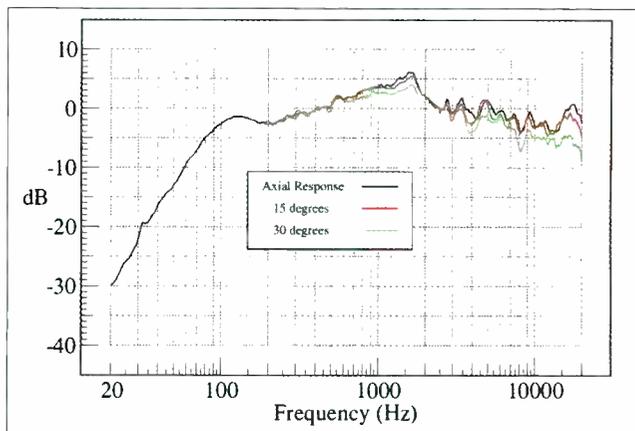


Fig.7: Vertical Directivity

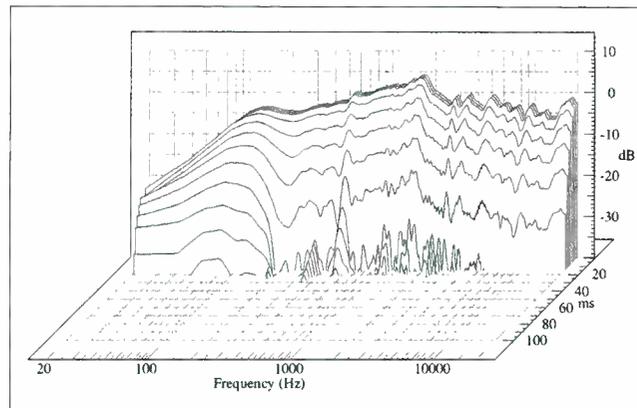


Fig.8: Waterfall

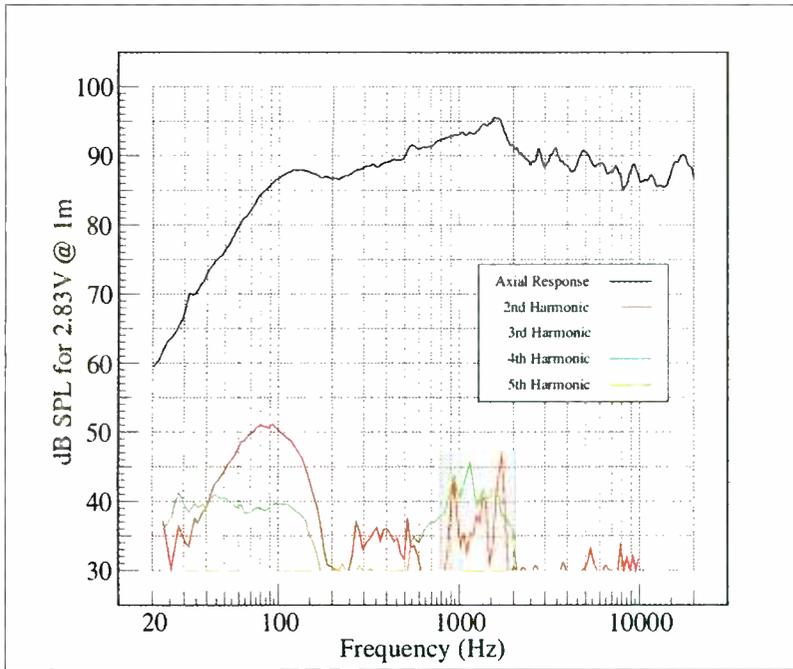


Fig. 1: On-axis Frequency Response and Distortion

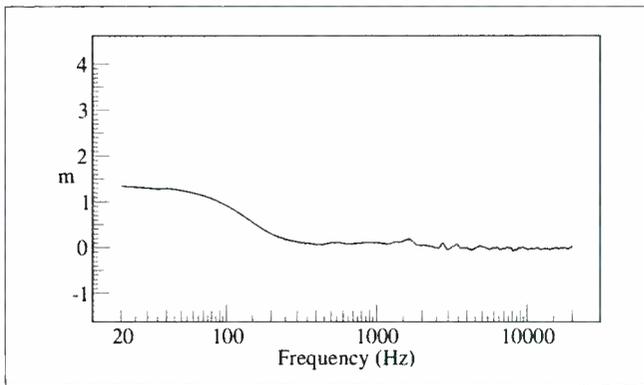


Fig. 2: Acoustic Source

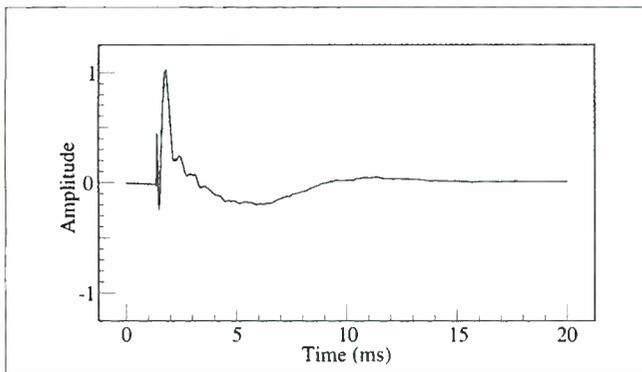


Fig. 3: Step Response

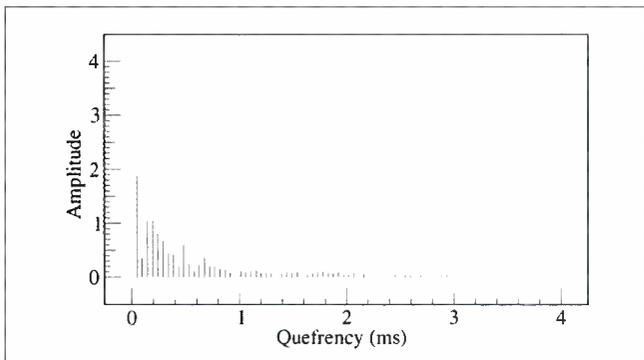


Fig. 4: Power Cepstrum



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The politics of manufacture

With its liberation from Philips' control, Marantz is set to realign the support offered to emergent delivery formats through its consumer product, writes **Barry Fox**

FOR 20 YEARS, Marantz has been a subsidiary of Philips, and all that entailed—like trying to sell 2m Digital Compact Cassette decks into North America. Now Philips has sold enough stock to put Marantz back in the driving seat. Although there will still be a close working relationship, with Marantz producing Philips high-end equipment in its Japanese plant, the move frees Marantz from the obligation to back Philips blindly.

Ken Ishiwata, now formally dubbed Marantz brand ambassador because that is what he has been doing for years, was very frank during a recent seminar. 'We are now free to introduce conflicting technologies. We do not have to fight format wars. We are free to work with other manufacturers. We do not need to drive prices down because we don't own formats. We can now sit and wait and see'.

So although Marantz has so far obediently backed Super Audio CD, the Japanese company will now drop it if there is no demand, and no strong software (music) support. Marantz is already selling MiniDisc decks and has decided against supporting the Philips DVD+RW recording format—or the other two rival formats, DVD-RAM and DVD-RW—until the format war shakes down.

Ishiwata recently collated market statistics from all around the world to prove what many people know from their gut feelings. Despite all the hype for new recording formats, the old audio compact cassette and VHS videocassette are still selling well all round the world. 'They just go on for ever,' says Ishiwata.

One reason is the replacement market. So many people have so many old recordings that they just do not want to start again with something new and incompatible. Also, the music and movie industries are crippling all the new formats with absurdly complex

and confusing copy control systems. No-one is confused by compact cassette, because there is no copy control. Pre-recorded VHS tapes, and DVDs, are processed with Macrovision, which distorts the synchronisation pulses. But anyone who really needs to copy can buy a black box buster through the 'small ads' in appropriate magazines.

Recordable CD, like DAT, was the first format to be clobbered with digital copy control but the rules are reasonably easy to grasp, and they can be defeated anyway by using a PC burner.

DVD-Audio obstructs copying by downgrading the Advanced Resolution surround sound signal to 16-bit stereo PCM through the SPDIF digital outputs. The lower-priced Sony SACD players will not read CD-Rs (because of budget laser optics) and the new top-end Philips SACD 1000 player puts no PCM out of the SPDIF output—only DTS or Dolby Digital bit-stream. Why? Philips first tried to make excuses, but has since come clean: there was never any intention to deliver any PCM from SACD recordings but the failure to put out PCM from ordinary CDs was a goof. It will be 'fixed' in future versions, but Philips cannot say when or whether existing players can be modified. Significantly the Marantz version of the player does put out a PCM signal...

The SDMI's plans for copy control on Internet downloading are so mind-bendingly muddling that most people only get a fix on what they are when they find they cannot do something they wanted to do.

SDMI 'rules' come with the music, as embedded control signals, both analogue and digital. The rules can limit the number of copies made, control what equipment can be used for playback and limit the time for which music can be played. The music can be tied to a specific device—music can be stored on a PC, and transferred to a memory card portable, on a check-in, check-out basis. Although the music remains on the PC's hard disk it cannot be played until it has been returned from the portable. And the portable cannot digitally dub to another device.

Watermarking controls analogue dubbing. SDMI devices recognise coded changes to the analogue waveform, and work by whatever rules are embedded in the code. The analogue rules are overridden by the digital rules: they are there to scupper anyone who tries to bypass the digital rules by making an analogue copy.

The Verance watermark was adopted for Phase 1 SDMI devices, and for DVD-Audio to prevent players from playing unauthorised copy discs. This raises the question of how watermarking can be optional for DVD-Audio, as Verance claims.

Phase 2 was to let the music companies sell music by Pay-downloads, with Phase 1 devices upgraded by software download. A combination of robust and weak watermarks would distinguish between music coming straight from a CD, legitimately posted on the Internet for free use, or for sale, and music ripped from a CD and posted on the Internet without authority. The weak mark would be lost by the ripping compression, but the strong mark would survive.

The SDMI could not agree on technology for Phase 2 and gave up on it. But Phase 1 and the Verance mark are still used. By now your glazed eyes tell why dubbing onto cassette and CD-R will remain the music industry's real problem.

Pro? Tools

With Digidesign's ubiquitous Pro Tools system reshaping entire sectors of the audio market, ever greater parallels with man's past endeavours arise, writes **Dan Daley**

EVERY NOW AND THEN, some great notion sweeps like a zephyr through the minds of men, some shimmering vision which sends them forth on an undeniable mission. At one point in history, it was the search for the Holy Grail. Later, it was Ponce de Leon's quest for the Fountain of Youth.

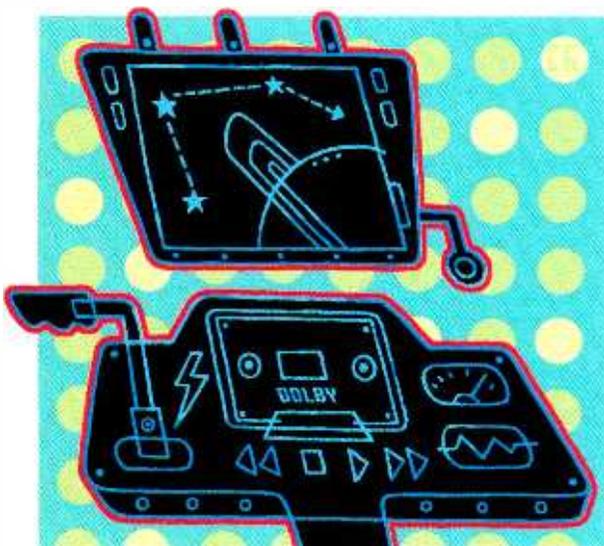
And now the studio business—for which a similar capacity for self-delusion is an entry-level requirement—has its own new vision to pursue. Specifically, entire large facilities based around Pro Tools systems. In just one week, I have had no less than four enquiries from those considering joining this very non-exclusive club, but on a Titanic basis. We're talking about upwards of 10 studios under a single roof, each based on Pro Tools as the sole audio engine.

Some of these trial balloons come from actual, experienced studio facility owners looking to create some kind of affordable future for an addiction that still courses through their professional veins. But others have come from the dilettante side of the entertainment business. And while if it seems as if studios have been becoming exclusively the province of the idle rich, this time around, the Pro Tools studio business model actually makes a lot of economic sense for everyone. The very ubiquity of the platform ensures that everyone can start from a relatively level playing field—the scale simply becomes a function of depth of pocket, scope of vision, testicular fortitude and-or dosage of the appropriate psychotropic medication. Two rooms. Four rooms. Ten Rooms. Twelve rooms. Mix 'em and match 'em. Link them together fibre-optically and you have the ultimate in modular thinking.

Like I said, this concept has taken hold rather deeply over here, and it's well dispersed. Nashville, New York, LA and, of course, Miami, where the whole thing started, are all candidates. Each already has facilities that are multiple rooms which are solely hard-disk based. The initial economic attraction of being able to create a large-scale facility for a fraction of what such a plant would cost if it were to use conventional high-end consoles and tape decks is obvious. Rates can be kept low, yet still high enough to amortise an investment within seven years or so. Less than \$1m could technologically outfit a 10-room studio operation. Spend an equal amount on the real estate and interior design and you're still ahead of the game versus even a 2-room conventional facility with a pair of top-flight consoles.

It's a neat idea. And no one, as far as I know, actually sat down and dreamed it up. It just happened, which gives it a kind of organic validity lacking in the music business in the era of Boy Bands.

But it's not quite that simple. Remember the film



DAB hands

It's over-priced and over here, but not yet over-sexy. So just how will digital radio win the acceptance of the masses, asks **Kevin Hilton**

SINCE THE END of the summer, I have been living with digital radio. This is having had a Technics receiver on extended loan from Digital One, operator of the UK's commercial DAB multiplex (actually, it's become even more extended as they haven't got round to picking it up yet, despite the loan period having expired long ago). This has given me the opportunity to appreciate the consistency of the sound, which is clear and very similar to CD. As is now common in discussing digital audio, quality is taken pretty much for granted: it is good without being exceptional, although it is possible to crank the level up and for it to remain solid.

Oddly, this solidity is not consistent. Perhaps it is naive of me to think that digital radio—or digital anything—is going to be drastically different and therefore superior to analogue. But I have been surprised as how easily the receiver is prone to interference. Just walking past the thing when it is having an off day can make the output sound like Radiohead interpreting 'Sparky & His Magic Piano'.

This strange, wobbly effect is even more pronounced on days when the weather is not that great. Hot, still, sunny days are not a problem but, as I live in the UK, these can be more unusual than someone who has invested in their own DAB receiver. DAB tuners have sockets for both external and internal antennae but as this last implement is merely a floppy piece of rubber that has to be attached to the wall with Blu Tak, people could be forgiven for thinking that things have not moved on greatly from the days of FM tuners and their hard plastic antennae (although the one I have is, thankfully, not pink).

Some readers may be thinking, 'Doesn't this guy understand basic physics?'; but sometimes it is good to be naive, because I'm sure that consumers are going to have similar thoughts. Just before I got the receiver, I wrote a story for *Pro Sound News Europe* that mentioned the fact that broadcasters would have to re-think production techniques as the DAB carrier was very unforgiving, further compromising audio quality.

On the back of this I received a phone call from the amiable Jon McClintock, sales manager at compression specialist, apt. He appreciates the need for more attention being paid at the production stage but added that it was also a case of how many data compression processes the material had been through. 'Considering the proliferation of Layer II and III ISDN codecs and Digigram cards for radio automation and storage systems, it is conceivable that some content may have suffered several psychoacoustic passes,' he observes.

After two or three passes, McClintock says, certain types of music (particularly classical and solo female voice) can sound 'muddy' or 'tinny'. As the final DAB emission is in Layer II, McClintock muses whether this problem

will finally signal the death of compression algorithms that use psychoacoustic masking.

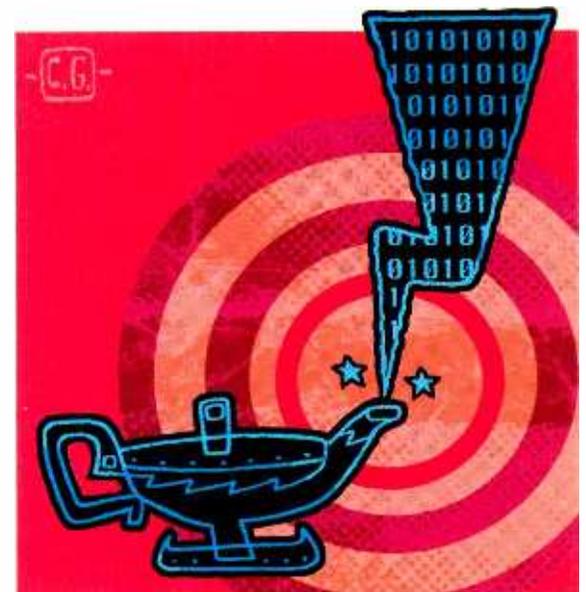
This may necessitate a major re-think in the way DAB is handled—but a general change in attitude is probably required to bring on the wide-scale acceptance and adoption of digital radio. A major barrier has been the low number of receivers, particularly home units, on the market, a problem exacerbated by high prices. Progress is being made: Psion has repositioned its Aladdin's Lamp-like Wavefinder, which connects to PCs and provides extra multimedia material, at £199.

Digital One recently formed a strategic alliance with Imagination Technologies to develop, fund and market a low-power, low-cost digital baseband chip and receiver module that will enable the mass production of low-cost digital radios. The intention is to bring prices down to under £150, with the ultimate aim being to break the £100 barrier (we're talking pre-Euro UK prices here, you understand).

Despite this, broadcasters, standards organisations and service providers continue to make problems for themselves. Eureka 147 is the most widespread DAB standard but the US is still heading towards IBOC. The iBiquity Digital Corporation, formed by the merger of USA Digital Radio and Lucent Digital Radio, has submitted new test data on FM transmissions to the FCC and announced collaborations with Harris Corporation and the Harman Consumer Group. This last deal aims to bring digital FM and AM equipment to US homes by 2003. With FM DAB 'established', AM digital radio was formally recognised in October 2000 by the ITU after evaluating the system proposed by Digital Radio Mondiale and iBiquity.

Digital radio has always been a political issue and recently the Green Party in Germany—regarded as the most important DAB country in Europe—criticised the amount of investment put into launching services in all 16 of the country's Federal States. The party's comments were challenged by the president of the World DAB Forum, Michael McEwen, who called them 'mischievous at best and destabilising at worst'.

Consciously or not, this comment sums up the problems still facing DAB. It is a matter of stability—and the state of the carrier signal is just the start.



Glengarry Glen Ross—the scene where Alec Baldwin, playing the hatchet man for the holding company that was pressuring its sales force to get out and sell its worthless properties? His motivating speech was, 'First place wins a Cadillac. Second place wins a set of steak knives. Third place, you're fired.'

A couple of friends who are studio designers have already sensed this avalanche about to fall, and are lined up on the starting gate like anxious jockeys. That's because the sense is that the first serious player into each major market will likely be the big winner. The second entry could do well. The third is likely to be toast.

This is a fundamental change in the nature of the studio business. The fact that the technological core of such facilities is essentially the same means the emphasis in the phrase 'studio business' finally shifts to the second word.

Is this a good thing? We'll see. We know that the digital audio revolution has been viewed as the democratisation of pro-audio and music businesses; anyone could now be a player, for less than the cost of a Ford Escort, with A-T and air. Democratisation, though, has been revealed over time to be, in reality, commodification. When you build a few expensive things really well, their implicit unavailability tends to put them into the hands of those most apt to use them most well. Think Boeing 747 and the pilot who flies it. When you build a lot of something very cheaply and make it available on a mass basis, it implicitly diffuses the talent level needed to operate it. Think another fine aviation-related product—the Frisbee. We have more new album titles released per year by more record labels; does it follow that we have on average raised the quality of the music as a whole? Or the recordings themselves?

You decide the answer to that one. It's totally subjective, as it should be. But you see where I'm going. It was one thing to put affordable, powerful digital audio equipment into many more hands than it had ever been before. It will be quite another thing to create the equivalent of audio motels to house the stuff in.

No one could have predicted the landscape of the music business today even 15 years ago. But just as sampling created entire new genres of music and ways of approaching the recording of it, the way the studio infrastructure evolves will fundamentally affect how studios—and the music that issues forth from them—are used.

THE SERIAL DIGITAL INTERFACE

As in audio, video interfacing between the analogue and digital domains is an essential aspect of a practical equipment setup. **John Watkinson** looks at the strength, weaknesses and workings of the SDI

IN THE SAME WAY that professional audio equipment has standardised analogue and digital interfaces, television production equipment also adheres to interface standards. One of the most common of these is the Serial Digital Interface, generally known as SDI. Most professional digital video equipment will now carry such a connector.

The serial digital interface (SDI) was developed to allow up to 10-bit samples of standard definition interlaced component or composite digital video to be communicated serially; 16:9 format component signals with 18MHz sampling rate can also be handled. As if to emphasise the gulf which then existed between television and computing, the SDI as first standardised had no error detection ability at all. This was remedied by a later option known as EDH (error detection and handling). The interface allows ancillary data including transparent conveyance of embedded AES-EBU digital audio channels during video blanking periods.

SDI is highly specific to two broadcast television formats and does not support progressive scan or compression. Pictures of arbitrary size or frame rate are not supported. Subsequently the electrical and channel coding layer of SDI was used to create SDTI (serial data transport interface) which is used for transmitting, amongst other things, elementary streams from video compressors. ASI (asynchronous serial interface) uses only the electrical interface of SDI but with a different channel code and protocol and is used for transmitting MPEG transport streams through SDI-based equipment.

The serial digital interface was designed to allow easy conversion to and from traditional analogue

video for production purposes. Only 525/59.94/2:1 and 625/50/2:1 formats are supported. The component version operates only with 4:2:2 sampling whereas the composite version (little used now) sampled at four times the relevant subcarrier frequency. The sampling structure of component digital video was detailed in a previous article and only the serial transmission techniques will be considered here.

The SDI component interface has to convey samples which are a multiplex of Cb, Y, Cr, Y running at 27MHz. As these may be 10-bit samples, the bit rate will be 270 Mbits/second. At this kind of bit rate, the cable is causing a delay very much longer than the bit period and has to be classified as a transmission line.

In transmission lines, the transmitted signal is subject to serious frequency-dependent loss. The difficulty is that raw digital signals contain a wide spectrum (Fig.1 shows some examples). A series of identical bits generates a low frequency, whereas alternating bits generate a high frequency. If the number of '1's is not equal to the number of '0's, the result is a net DC offset. In a transmission line, the DC offset will suffer hardly any loss, whereas the high-frequency components will. As a result, in the received waveform the high frequencies will be attenuated in level as well as being shifted by the DC component which has not been attenuated. The result is known as 'baseline wander' and it makes slicing the signal back into binary very difficult.

Another problem with a run of identical bits is that there is no clocking information in the waveform which could help count the bits out at the receiver.

The solution to both of these problems is not to

send raw data. Instead, a modulation scheme is used which reversibly modifies the raw data bits into a bit-stream having very low DC offset and a rich clock content whatever the characteristics of the raw data.

SDI uses a coding technique known as convolutional randomising (as shown in Fig. 2) in which the signal sent down the channel is the serial data waveform which has been convolved with the binary impulse response of a recursive digital filter. On reception, the signal is deconvolved to restore the original data. This will be explained in more detail presently.

The components necessary for an SDI link are shown in Fig. 3. Parallel component or composite data having a wordlength of up to 10 bits form the input. These are fed to a 10-bit shift register which is clocked at 10x the input rate, which will be 270MHz (or 40 x Fsc for composite). If there are only eight bits in the input words, the missing bits are forced to zero for transmission except for the all ones condition which will be forced to 10 1s. The serial data from the shift register are then passed through the scrambler of Fig. 2, in which a given bit is converted to the exclusive-or of itself and two bits which are five and nine clocks ahead. This is followed by another stage, which converts channel 1s into transitions. The resulting signal is fed to a line driver which converts the logic level into an alternating waveform of 800mV pk-pk. The driver output impedance is carefully matched so that the signal can be fed down 75Ω co-axial cable using BNC connectors.

The scrambling process at the encoder spreads the signal spectrum and makes that spectrum reasonably constant and independent of the picture content. It is then possible to assess the degree of equalisation necessary at the receiver by comparing the energy in a low-frequency band with that in higher frequencies. The greater the disparity, the more equalisation is needed. Thus fully automatic cable equalisation is easily achieved. The receiver must generate a bit clock at 270MHz (or 40 x Fsc) from the input signal, and this is the function of the phase locked loop in Fig. 3 which will make a phase correction whenever it sees a transition. It is important that the phase locked loop is correctly centred so that its free running frequency is the same as the bit rate in service.

The recovered clock from the phase locked loop drives the input sampler and slicer which converts the cable waveform back to serial binary. The local bit clock also drives a circuit which simply reverses the scrambling at the transmitter. The first stage returns transitions to ones, and the second stage is a mirror image of the encoder which reverses the exclusive-or calculation to output the original data. Since transmission is serial, it is necessary to obtain word synchronisation, so that correct deserialisation can take place.

In the component parallel input, the TRS codes mentioned in an earlier article are present and the all 1s and all 0s bit patterns these contain can be detected in the 30-bit shift register and used

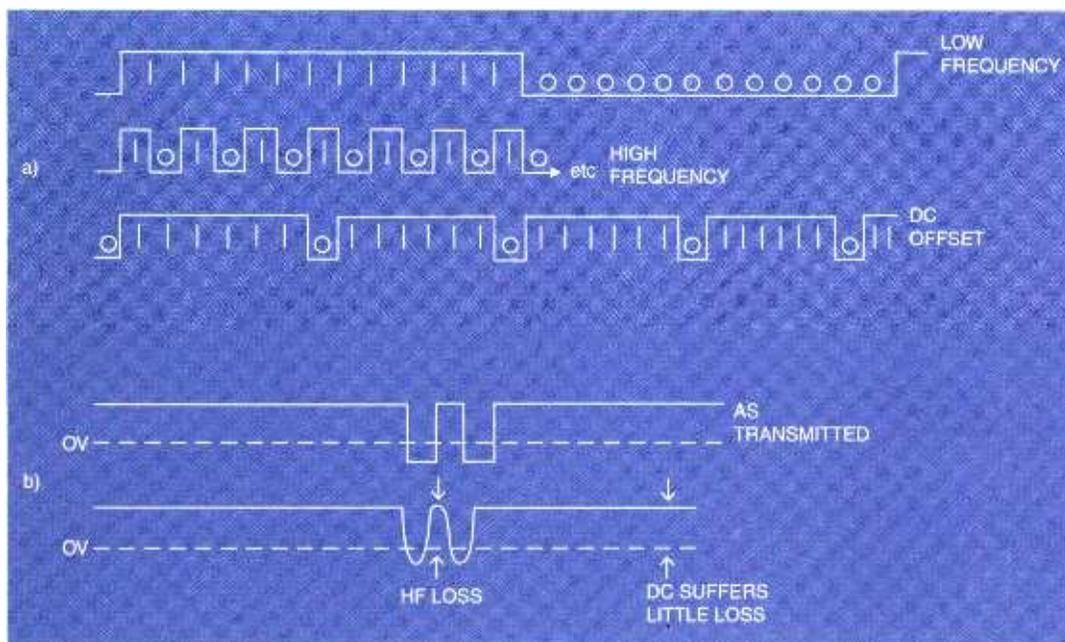


Fig. 1: (a) Different bit patterns can produce various frequencies as well as DC offsets. (b) DC offsets make slicing the signal back to binary very difficult

to reset the deserialiser.

On detection of the synchronising symbols, a divide-by-ten circuit is reset, and the output of this will clock words out of the shift register at the correct times as well as providing the output word clock.

It is a characteristic of all randomising techniques that certain data patterns will interact badly with the randomising algorithm to produce a channel waveform which is low in clock content. These so-called pathological data patterns are extremely rare in real programme material, but can be specially generated for testing. Such a sequence will test the phase locked loop adjustment because a low clock content signal will result in greater phase errors if the loop is not centred.

Since the development of SDI, it has become possible economically to compress digital video and the SDI standard cannot handle this. SDTI (serial data transport interface) is designed to overcome that problem by converting SDI into an interface which can carry a variety of data types whilst retaining compatibility with existing SDI router infrastructures.

SDTI sources produce a signal that is electrically identical to an SDI signal and which has the same coding and timing structure. However, the digital active line of SDI becomes a data packet or item in SDTI. SDTI items are described by an SDI-legal ancillary data block incorporated in horizontal blanking.

The data capacity of SDTI is about 200Mbits/sec because some of the 270Mbits/sec is lost due to the retention of the SDI timing structure. Each digital active line finishes with a CRCC (cyclic redundancy check character) to check for correct transmission.

The asynchronous serial interface is designed to allow MPEG transport streams to be transmitted

over standard SDI cabling and routers. ASI offers higher performance than SDTI because it does not adhere to the SDI timing structure. Transport stream data do not have the same statistics as PCM video and so the scrambling technique of SDI cannot be used. Instead ASI uses an 8/10 group code.

SDI equipment is designed to run at a closely defined bit rate of 270Mbits/sec and has phase locked loops in receiving and repeating devices which are intended to remove jitter. These will lose lock if the channel bit rate changes.

Transport streams are fundamentally variable in bit rate and to retain compatibility with SDI routing equipment ASI uses stuffing bits to keep the transmitted bit rate constant.

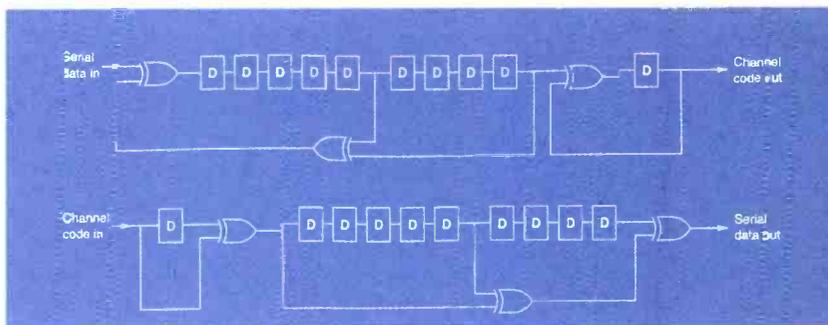


Fig. 2: Coconvolutional randomising coding as used in the SDI

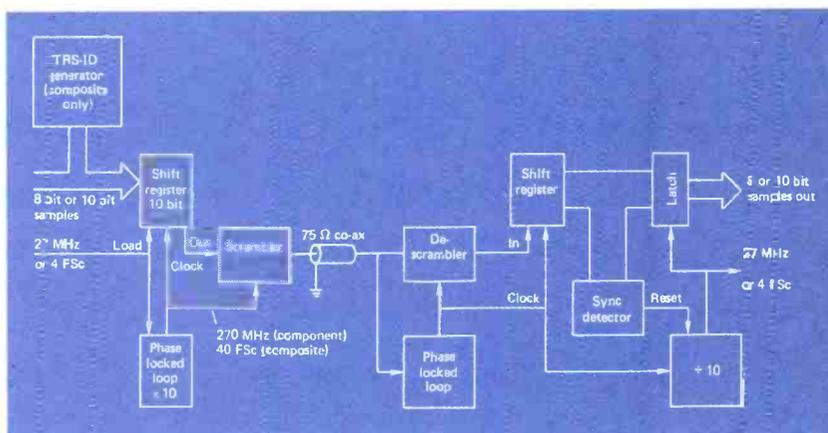


Fig. 3: Schematic of SDI implementation

The use of an 8/10 code means that although the channel bit rate is 270Mbits/sec, the data bit rate is only 80% of that—216Mbits/sec. A small amount of this is lost to overheads.

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MIC MECHANICS

The latest installment of our vintage valve mic masterclass considers the Neumann Gefell, Schoeps and Telefunken microphones that sometimes appeared with the badges of distributors such as Elam. **Ashley Styles** tells all

IN FRACTURED POST-WAR EUROPE, Neumann Gefell found itself a casualty of the division of Germany. In the East, the company we have since come to know as Microtech Gefell busied itself producing a selection of excellent microphones, of which many are still in use to-day.

Similar in size to the AKG C28, Gefell's M582 and capsule, is constructed in the same way as the CMV563, using the EC92, single triode valve for impedance conversion. There were two types of capsule produced for the M582, being either the omni M58 or the cardioid M62 unit. Both these capsules used a relatively larger than average size, small diaphragm—approximately 21mm diameter. This gives the microphone a warm and somewhat 'plummy' sound. These capsules, because of the material used in the construction (nickel) suffer from the same corrosion problems as those used on early Neumann KM53s, KM54s and so on.

It is interesting to see how the model numbers came to be. Neumann produced the CMV3—the legendary 'Bottle'—using the famous RE084 valve. Then, when Neumann Gefell was formed, the company produced a somewhat smaller version called the CMV5, this used the relatively smaller EF12 valve. As valves became physically smaller with the appearance of the EC92 and 6AB4, so microphones could also be produced proportionally smaller. As a result, Neumann Gefell went on to produce yet a smaller version of the CMV5, the CMV511, and then the more common CMV563.

All of these models, sometimes with the aid of adaptor plates or in the case of the CMV3, a different endplate, used the original M7 cardioid-type capsule, together with capsules offering different polar patterns. The majority of these capsules were normally mounted on a bayonet type fitting.

The CMV511 was the forerunner of the CMV563, both being like a miniature Neumann CMV3 Bottle. Various capsules can be fitted to the 511-563 preamp-impedance convertors via either a bayonet or, in later years, a screw fitting. An adaptor is available (intermediate link type G/B) to enable the older bayonet fitting capsules to be fitted to the CMV563, incorporating a screw fitting.

Over years of servicing CMV 511s and 563s, I have seen many and various configurations of capsule mounts used on different model preamp-impedance convertor. This has confused the issue of what is the difference between the CMV511 and CMV563. All the models I've ever seen are basically identical, apart from a few component value changes here and there. The most obvious difference would appear to be the way that the capsules are attached to the body, in that 'original' CMV511s used the bayonet fixing and 'orig-

inal' CMV563s use the screw-type fixing.

Each of the various capsules available have a different polar pattern, enabling the microphone to be used for a variety of applications. The range of capsules includes the M7 (cardioid), M8 (fig-8), M9 (omni) and M55k (omni).

Later manufactured capsules, that use a screw thread fitting, were identified by the suffix 's' after the type number—for example, the M8s.

control, from either pushbuttons or a rotary switch on the PSU, the UM57 can be used in the same way as the CMV511 or CMV563 microphone. The only real advantage of the CMV511-CMV563, over that of the UM57, is that of the ability to use 'true' omni capsules, such as the M55k and M9-M9s. There is also the ZUM64, which is the stereo version of the UM57, with the electronics being designed around two EC760 miniature triodes.

The Schoeps CM51 and CM61 are fairly rare microphones, yet they work very well. The CM51-61, uses the EF94-6AU6 pentode valve, as is also used in the Sony C37. The CM51 is very similar in size to the Neumann Gefell CMV511 and like it, the CM51 uses a bayonet fitting capsule assembly. However the Schoeps capsule fitting is of much smaller dimensions and totally incompatible with that produced by Neumann and Neumann Gefell. A range of capsules were produced for the CM51—these include the CM51/8 (omni), CM51/9 (cardioid) and CM51/N9 (cardioid, with fixed collar). These were very similar in size and construction to the later models used on other Schoeps valve microphones.

The Schoeps CM61—also known as the Philips EL6051/01—is more akin to the size and shape of the AKG C28. The electronics of the CM61 are very similar to those of the earlier CM51, still being based around the EF94 valve. The CM61 has a novel capsule mounting arrangement, whereby the capsule—which is mechanically switchable from omni through to cardioid—is mounted in a tilting cradle that rotates about the top of the microphone. This enables the microphone to be used in really tight situations such as miking a snare drum.

As with some of the early Neumann microphones, Schoeps used a Nickel diaphragm for many of their capsules. Therefore, sadly, the same problems with corrosion can occur. The mounting of the electronics in both models is somewhat delicate

and the suspension method used for holding the valve socket assembly, this is very prone to damage. This, then leads to the microphone electronics becoming microphonic (transmitting mechanical handling noise).

The preamp-impedance convertor input connector tab can lose its tension, or in the worst case, it can be broken off and replaced with a material that has no 'spring' to aid the correct contact required. This can cause noise problems and increased physical pressure stressing the electronics framework structure. There are never any long-term short-cuts in the maintenance of microphones.

The Schoeps M221 is a small pencil-type microphone, offering very good performance. The fragile



Different capsule fittings, Neumann M7 bayonet and M7 screw with Schoeps CM51/N9 small bayonet

UM57: Inside view of electronics

The M55k capsule screws flush onto the top end of the CMV563 body. However, because of the large physical size of the M55k capsule and its position in relationship to the body of the microphone, the HF response of the combination, makes the microphone behave more like that of a cardioid model. The M55k-CMV563 combination is therefore very suitable as an ambience microphone, with a 'steerable' HF response.

Basically, the UM57 is a CMV563 with a fixed double-diaphragm capsule. The electronics of the UM57 are almost identical to those of the CMV563, the UM57 LF response rolling off slightly earlier than that of the CMV563. This roll-off can be removed, to restore a flat response to the UM57. Together with its remotely-controlled polar pattern



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Ad Index

AMS Neve	5
Aphex	OBC
Audionics	49
Audio-Technica	26
C-Lab	22
Clarion Events-PLASA	65
D&R Electronica	41
Digidesign	21
DK Audio	31
DPA Mics	17
Fairlight	19
Focusrite	29
Funky Junk	13
Genelec	46/47
HHb	56
IBC	73
IBTS	63
Junger	24
KT Group	27
Lydkraft	25
Mackie	IBC
Manley	11
Media Tools	51&53
Point Promotions-SBES	59
Profusion	50
Reference Labs	35&52
Richmond Film Services	52
SADiE	23
SCV Fostex	57
Sennheiser	45
Sintefex	10
Soundtracs	9
SPL	18
SSL	IFC
Studer	33
Studio Spares	43
Studio Technologies	35
Tascam	37
Total Audio Solutions	39
Waves	42
Yamaha	55



Schoeps CM61, Philips EL6051/01, showing capsule tilting/rotating arrangement

mechanically-acoustically and there can be a very large, low frequency pulse. Of course, other types of microphones also produce damaging thumps when changing polar patterns, but the acoustically altered Schoeps models, appear to have much more destructive power behind them.

Telefunken was a distributor's logo and not a 'legitimate' manufacturer of microphones. In the early days of microphone production, leading manufacturers of that time, such as AKG, had no means of distribution, especially in the area of export, and so relied heavily, if not exclusively, on selling products under larger company names like Philips, Siemens and Telefunken. Consequently, many microphones are labelled with a distributor's name but were actually produced by one of only a handful of manufacturers. To name but a few, I've seen the Siemens logo used both on AKG C12 and Neumann U47 microphones, and the Telefunken logo on Schoeps M221 and Neumann U47 types.

The model type and number of a microphone, together with its looks, will allow you to find the manufacturer of that microphone. For instance, a Telefunken SM2, is a Neumann manufactured stereo microphone—Neumann SM2. For some reason, microphones badged Telefunken, fetch a higher price than their OEM-badged counterparts. The electronics design and construction are identical, so it must all be in the magic of the logo.

The Telefunken Ela M250-M250(E) and Ela M251-M251(E) range are based around the famous CK12 capsule, but wired differently to that in the C12. These units were manufactured by AKG and distributed by Telefunken. The commonly named Elam 250 and-or Elam 251 are very fine microphones by any standard.

The suffix 'E' purely means that model was designed for export. The standard 250 and 251 were designed around the AC701 valve, which were only readily available at that time in central Europe. To take sales of this microphone into other areas of the

framework that holds the AC701-based electronics and associated input pin are the only areas in the microphone that are likely to suffer physical damage. These microphones can also suffer from diaphragm corrosion, such as that of the CM51. It is worthwhile noting, when using Schoeps capsules with adjustable polar patterns (like those with the M934 capsule) that it is advisable to keep the monitoring level turned down when changing polar patterns. Whether changing from omni to cardioid or from cardioid to omni, the

polar pattern is modified



Inside view of CMV563 with M7s capsule and outside view of CMV563 with M55k capsule

globe, it was required to design a preamp-impedance convertor that was based around a valve that was more readily available in other parts of the world. As a result, the E models use a plug-in valve—the American 6072—rather than the continental or European hard-wired Telefunken AC701. Whatever model the microphone is, the electronics are 'standard' to the valve type used.

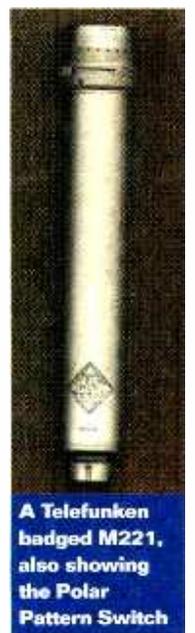
The electronics of the Ela M250-Ela M251 series, are standard to the valve type used, and are housed in a large-diameter perspex cylinder. This was all part of an idea by AKG's design team, which enables the microphone to be easily dismantled into interchangeable sections. The idea being that you could dismantle the microphone down to the basic modules and replace them without the use of any tools—it was quite a novel idea. However, the perspex cylinder encasing the electronics proved to be very fragile. The screws and their captive nuts that hold the two halves of the cylinder together act as 'crushers' if over tightened. Therefore when changing a valve on these delicate units, take great care not to over tighten the fixing screws. With all the space available, it seems a shame, that a larger audio transformer was not used, such as that used in the early AKG C12, type V2148. This would have given the microphone such a wonderful increase in LF dynamics. However, the smaller T14/1 and lower value coupling capacitor was used. A modification is available: this enables an increase in LF performance of the microphone, which it well deserves.

The capsule head assembly also requires the same gentle approach. If the capsule requires inspection, never force the cage, to disengage it from the head assembly. It is a simple twist action on a bayonet fixing. The pattern switch is also very delicate, so again take great care when using these microphones. I have spent many a tedious hour

manufacturing and repairing broken perspex parts of Elams.

AKG also manufactured the Telefunken-badged M260 and M261 microphones. These were similar to the AKG C28, however the electronics being based around the AC701 valve. Their size is similar to that of the C28, however the diameter is more like that of the slender C60-C61—only 21mm.

The M260 uses the CK28 (cardioid) type capsule, with the option of using extension tubes. Whilst the M261 used a multi-pattern capsule, offering omni, cardioid and fig-8 responses. □



A Telefunken badged M221, also showing the Polar Pattern Switch

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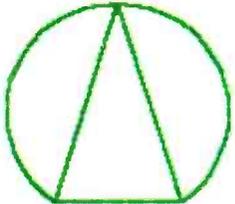


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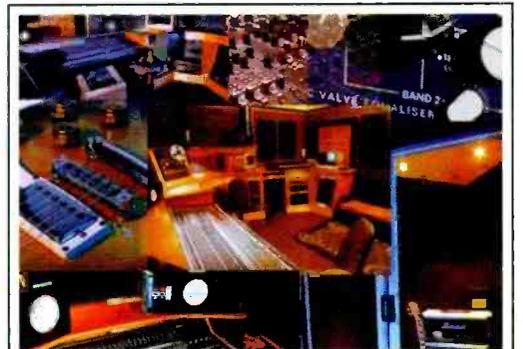


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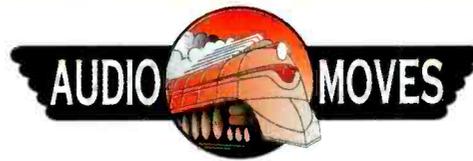
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LETTER OF THE MONTH

Reviewer reviewed

I WANTED TO TAKE A MINUTE of my time and yours to congratulate you on your selection of Dave Foister as a reviewer. I hope that this does not come off as entirely self serving. I would be writing to you with regard to the insightfulness of Mr Foister even if his review had been less positive than it was

The fact is that as the head of the marketing and sales departments at Audio-Technica US I find myself both qualified and gratified to say that the many points Mr Foister mentions in his review of our new AT3035 (*Studio Sound*, May 2001) are almost exactly the same points over which we poured in the development

process. Rarely have I been reading a review of a product and felt that the reviewer had been in the development meetings with me. This is the case with Mr Foister's article. Even his closing comment I take seriously and will consider carefully when developing our next advertising campaign. My only regret is that we failed to consider the shock mount thread adaptor to Euro standard in the development process. But this input too is well received and has already been addressed with Audio-Technica Japan

Paul Hugo, vp sales and marketing, AT US

This month's letter of the month wins a free copy of *Modern Recording Techniques* from the Focal Press range

News from the Frontier

WHILE SOME OF MARVIN CAESAR'S recommendations regarding preprocessing audio for webcasting hit the mark (*The New Frontier*, *Studio Sound*, April 2001), his company's position as a manufacturer of an analogue dynamics processor for webcasting has clearly slanted his presentation. He claims 'analogue processing is much more natural sounding, as well as more effective [than digital]...'. Mr Caesar is entitled to his opinion, but one important question that he entirely glosses over is whether any clipping at all is desirable when one is preprocessing for the lossy codecs used in all webcasts. He continues by quoting Mapes-Riordan, who concluded that digitally matching the performance of analogue clipping requires a sample rate of 5MHz.

While this is true for the most naive clipping algorithm, it is also true that at least two companies (including Orban) have already introduced anti-aliased DSP clipping algorithms (in products for FM broadcast) that essentially duplicate the performance of analogue clipping at practical and sensible sample rates. However, this begs the question of whether clipping has any place at all in a pre-processor for lossy codecs.

All peak limiters are essentially amplitude modulators, multiplying the unprocessed signal by a gain control signal to produce sidebands around each Fourier component of the unprocessed signal's spectrum. Using DSP technology, Orban's products for preprocessing webcasts employ no clipping at all for peak control. We made this design choice because clipping introduces

wideband 'junk' into the processor's output spectrum. This wastes precious encoder bits that the lossy encoder could otherwise use to code the program's undistorted spectrum.

Instead of clipping, we use very fast look-ahead limiting. The bandwidth of the modulation distortion introduced by a good look-ahead design is limited to a few hundred Hertz, whereas clipping produces very wideband modulation distortion that splatters throughout the audio band. Further, a look-ahead design can control peak modulation very tightly, effectively using the limited dynamic range available in the webcast.

Because fast, low-modulation-distortion look-ahead limiting typically requires several milliseconds of delay, it is essentially impossible to do this entirely in the analogue domain, requiring (at least) a hybrid approach, where the delay line is digitised. Once the audio is digitised, one might as well do all of the dynamics control in DSP, gaining DSP's well-known advantages of stability, repeatability, and programmability. Moreover, because we use no clipping in our DSP processing, Mapes-Riordan's conclusions are simply irrelevant to this situation.

DSP also allows tighter integration of the dynamics processing with the webcast encoder. At NAB, Orban showed a DSP-based dynamics processor (using look-ahead technology) on a PCI card that could reside in the same computer as the webcast encoder, simplifying the overall system and reducing its cost. This is another application where DSP provides a cleaner, quieter, and more efficient solution than analogue processing.

Robert Orban, chief engineer, Orban US

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1-3
Broadcast & Cable
Sao Paulo, Brazil.

8-10
Broadcast & Networks
Bangkok, Thailand.

12-17
Siggraph 2001
Los Angeles Convention Centre, California, USA.

23-26
BIRTV Broadcasting
Beijing, China.

September

5-7
NAB Radio
New Orleans, USA.

9-12
PLASA
London, UK.

11-13
PALM 2001
Nehru Center, Worli, Mumbai, India.
Contact: Exhibitions and Events.
Tel: +91 22 660 3443.
Fax: +91 22 660 4923.
Email: palm@studio-systems.com
Net: www.studio-systems.com

14-18
IBC
RAI Convention Centre, Amsterdam, Netherlands.
Contact: Exhibitions and Events.
Tel: +44 20 7611 7500.
Fax: +44 20 7611 7530.
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Now established as a major event for audio professionals in the exhibition calendar, IBC is bigger by some 11% over last year and again boasts a well subscribed dedicated audio hall. Amsterdam in September is not to be missed

21-24
AES 111th Convention
Jacob K Javit Convention Centre, New York, USA.
Contact: Exhibitions and Events.
Net: www.aes.org

October
4-7
Nordic Sound Symposium XX
Bolkesjø Mountain Hotel, Norway.
Contact: Exhibitions and Events.
Email: soundsymp@nrk.no
Net: www.nrk.no/soundsymp

4-8
IBTS Exhibition
Milan Trade Fair, Italy.
Contact: Exhibitions and Events.
Tel: +39 0248 15541.
Fax: +39 0249 80330.
Email: assoexpo@assoexpo.com
Net: www.assoexpo.com

15-16
DVD Update 2001
Hilton Hotel, Barcelona, Spain.
Contact: Understanding & Solutions.
Tel: +44 1582 607744.
Email: DVD2001@UandS.com
Net: www.UandS.com

16-19
Broadcast Radio & TV Equipment Exhibition
Madrid, Spain.

22-25
SATIS
Paris, France.
28-30
CAB
Calgary, Canada.

November

1-3
Broadcast India
World Trade Centre, Mumbai, India.
Email: saicom@bom2.vsnl.net.in
Net: www.saicom.com/broadcastindia

4-11
SMPTE
Pasadena, USA.
8-12
Audiovideo
Jakarta, Indonesia.
14-15
SBES
NEC, Birmingham, UK.
Net: www.sbes.com

15-17
Interbee International
Tokyo, Japan.
23-25
Music Live
Birmingham, UK.
Net: www.musiclive.co.uk
27-30
Radio, TV & Comms
Nizhny, Novgorod.

December
6-8
ICE India 2001
Bombay Exhibition Centre, Mumbai, India.
Email: exhibitionsindia@vsnl.com
6-8
BCS & Comms India
New Delhi, India.

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THE WISH LIST

< Continued from page 74

Plug-ins

Waves Gold Bundle, Serato Pitch 'n' Time, Lexiverb, Focusrite Red range.

'The Gold Bundle is very interesting. I really like the stereo plug-ins where you can do M-S as I enjoy working in M-S and different stereo formats and converting back and forth. The Serato is a very high-quality pitch shifter, while in terms of outboard reverb we have the Lexicon 300 which is terrific because it has this LTC time code event list which I use all of the time. The Focusrite Red plug-ins, for their part, are also very high quality. All of this is just for starters, and then depending on how much money is left I would get into some weirder plug-ins.'

Interconnection infrastructure

Fairlight MediaLink

'The aforementioned Fairlight ViVid HD video recorder, together with a

mid-priced, mid-fi stereo TV made by Grundig, Sony or Panasonic. I always check commentary on TV speakers and one of my colleagues mixes entirely on them. As with the Auratones or the NS10s in the music studio, they provide you with your connection to the real world.'

Outboard

tc electronic System 6000, Lexicon 300, Weiss EQ1-MkII, Weiss DS1 MkII, Cedar DNS 1000, Dolby DP563 surround encoder, DP562 multichannel encoder, DP563 multichannel reference decoder, DP571 and DP572 Dolby E encoder and decoder, Waves L2 Ultramaximizer, Sony DAT PCM 7040, Tascam DA-98HR, Marantz CDR631, Eventide DSP4000B, Sony DVD player, PPM metering (RTW 1020E), digital metering (RTW 1022), DK Audio multichannel meter

'I prefer the System 6000 to the Lexicon 960 because it has a lot more, like 5-channel compression and de-noising. This is very useful in postpro work, because I do need 5-channel limiting and compressing, not only reverb.

'The Lexicon 300 especially for the time code feature. Others might buy MIDI and a sequencer, but this would mean an additional box. The 300 is one of the very few where you can just plug in the LTC, program your time code list, and off you go.

'The Weiss EQ1 MkII is a 7-band parametric with a Q-factor of 650; the best EQ in the toolbox and the Weiss DS1 MkII is a terrific de-esser. I currently have the EQ1 and the DS1 in the OmniMix suite, and they're just perfect. They're very high quality and I think they're the only ones where you can really zoom into a single frequency with a Q-factor of 650. I use them all of the time for problem solving and also for voice-over sweetening.

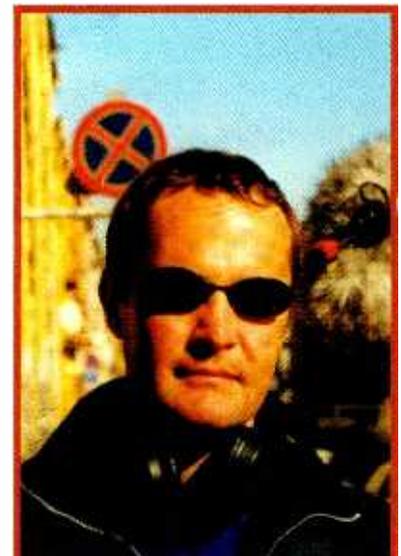
The Cedar DNS 1000 is a perfect example of the ideal broadcast box. It's a brilliant tool. It is so easy to operate, anybody can be up to speed in five minutes and produce very usable results.

'Plenty of Dolby gear for 5.1 transmission via satellite. Right now there isn't much demand for this—to be honest, my multichannel work is done in my spare time—but there definitely will be. In the home market and DVD it's already very much a reality, and this is paving the way for broadcast.

'At ORF we have several Waves L2 Ultramaximizers and we're very happy with them. You can throw anything at any level at them and they eat everything.'

Miscellaneous

'An Internet connection for downloading FX—Gallery, Sound-Dogs and so on—hardwired FX, and a patch-bay with all of the ins and outs.'



THE BALANCE SHEET

Total expenditure: <£500,000

THE BALANCE SHEET

Well, frugal in his choices, Florian is under budget. So, with a tidy sum still remaining, what does he want to do: save it or spend the lot?

'I'm going to spend it on an adjacent voice-over booth, big enough for some small Foley sessions, together with a couple of Martech MSS-10 preamps, a Weiss ADC1, a Neumann U89, a selection of Schoeps and Sennheiser mics, Sennheiser HD-25 and AKG K1000 headphones, and an MOD drive for project backup and external sound library. In my ORF OmniMix suite there is no voice-over booth at all.

Everything is done in a separate little analogue studio, and that's fine, but if I had the choice I'd love to have the booth right there with the OmniMix.'



CURRY TOP 10 (SLIGHT RETURN)

- | | | | | | |
|---|-----------------------|-------------------------------|----|----------------------|-------------------------------|
| 1 | Chana Girl | ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ | 6 | Pilau Talk | ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ |
| 2 | When I Faal in Love | ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ | 7 | You Can't Curry Love | ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ |
| 3 | Sharp Dressed Nan | ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ | 8 | Bindi Navy | ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ |
| 4 | Girlfriend in a Korma | ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ | 9 | Love Me Tandoor | ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ |
| 5 | Dansak Queen | ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ | 10 | Blowin' in the Wind | ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ ⬆️ |

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FLORIAN CAMERER'S BROADCAST POST ROOM

Studio Sound asked ORF's Florian Camerer to equip a front-line multichannel broadcast post room with intense time pressures an overriding consideration. **Richard Buskin** takes notes

VIENNESE NATIVE Florian Camerer joined the Austrian Broadcasting Corporation (ORF) in 1990 as a sound assistant and boom operator, and thereafter he mixed small shows and worked on location. Within a few years Camerer had developed an interest in multichannel audio, and by 1995 he was a staff sound engineer (or 'tonmeister') in production sound and postproduction. Specialising in high-quality audio for documentaries, he mixed ORF's first Dolby Surround broadcast.

Now, with £500,000 to spend on a multichannel broadcast post setup, Florian Camerer is prioritising work efficiency in his choice of equipment. 'It's really important to be able to work quickly, and the right gear will help that process,' he says...

Mixing Console Fairlight Fame2

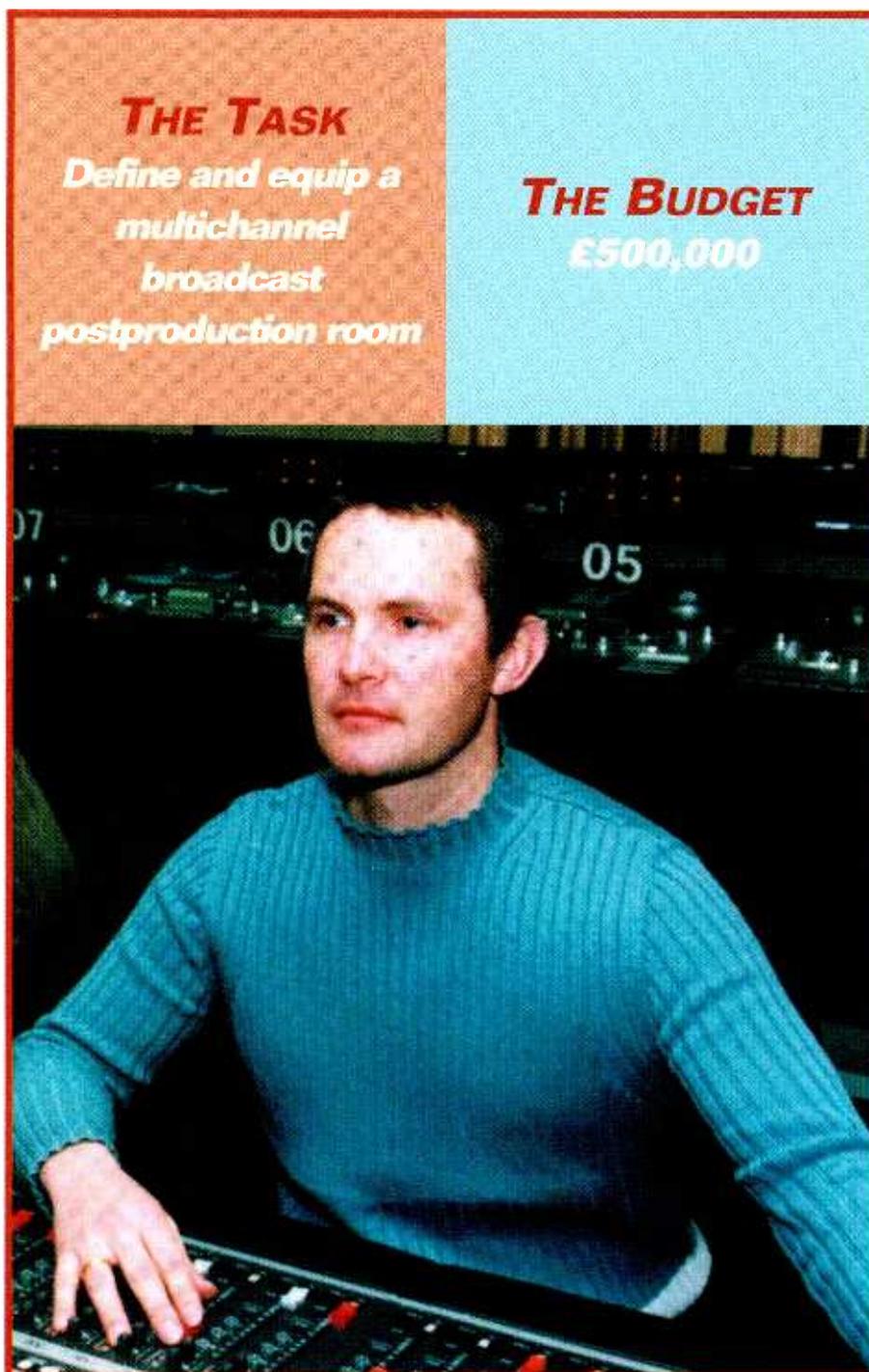
'If money wasn't a consideration my first choice would be a 24-fader SSL Avant Plus. However, given the budget, I'm choosing the Fairlight Fame2 integrated audio workstation with the 48-track MFX3Plus editor and ViVid HD video recorder—the DSP Media Postation II also appears to be very promising, but I haven't had enough time yet to get to grips with it.

'I like the integrated approach quite a lot, because I've been working with the SSL OmniMix for the past seven years and it has caused very little hassle. It may not be the most common way to go, but it does have its merits concerning less bugs and downtime. Among the attractions of the Fame2 and the MFX3Plus are multi-wordlength files in one project, extensive OMF capabilities, a very fast editor with dedicated keys, and M-S decoding. I do a lot of M-S work. The DLT-based backup system is also very reliable.'

Monitors

Studer A5s, Studer A3s, Genelec 1094

'For the front, three Studer A5 active monitors.



Special time-alignment of the three systems makes them very accurate, the phantom images are pin-sharp, you can spot problem zones very easily, and data reduction is also very audible. I can barely stand listening to MP3 on the Studers; lifeless and colourless. As for the surrounds, I'll have four

Studer A3s, two per side, providing a more even distribution of the ambient soundfield. The subwoofer will be a Genelec 1094.

'It's very important to me for the room to be quiet, and I say that because up until now the acoustics at ORF have been very low on the priority list. With the Studers this is not as much of a consideration as it is with very directional monitors where you have to get everything exactly right, because they have a very broad radiation pattern and so it's okay if the room is quite live. I've now had the Studers on trial for a few months and I won't give them away. They're very accurate and you can listen to them for hours on end without getting tired.'

Acoustics Consultancy

'As the Studers have quite a broad radiation pattern the studio acoustics needn't be too elaborate, so I would contract a local acoustician in Vienna to design the room. This wouldn't be too dead, and there would be very little background noise from things such as air conditioning. With TV work we always have to put up with computers whirring, cooling fans, 15kHz monitor line noise and so on, and I hate it. I suspect that my tinnitus partly stems from all that, which is very disturbing. The room should be big enough—a minimum of 30m²—to manage those low frequency nodes.'

DAW

Pro Tools Mix24

'This comprises a basic Pro Tools Mix24 connected to a central FX server and Avid server, in order to directly access projects edited in our Avid suites (sometimes mixed by audio-inexperienced editors in Media-Composer). An 888 Interface for Digital I-O and USD for syncing.'

Continued on page 72 >

"REASONS NOT TO BUY A MACKIE D8B...ZERO."

—Roger Nichols, EQ Magazine

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- **New surround capabilities** including depth-of-center control (LCR mixing with divergence), multiple surround panner window, individual LFE channel level control.
- **Multiple direct outs** per channel.
- **Optional level to tape** fader control.
- **Assignable, bidirectional MIDI control** of all parameters.
- **Cross patching** allows substitution of channels between various banks.

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2 DSP PLUG-INS!

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IVE Technologies' VocalStudio provides real time vocal doubling, multi-part harmonies and pitch correction in an easy-to-use interface. A free demo is built-into the Digital 8 • Bus. Just add a second MFX card to own this innovative plug-in from a world leader in vocal processing.



TC Electronic Reverb (bundled with the D8B UFX card) provides Reverb 1 and Reverb 2 algorithms from the renowned TC Electronic M2000 Studio Effects Processor.

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Stephen Krause, award winning recording engineer and producer with over 60 films, 10 TV series and 20 records to his credit, is always in search of better tools. He compared just about every preamp that came on the market to his favorite. Nothing impressed him—until he tried the Model 1100 tube preamp from Aphex Thermionics.

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