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REVIEWS

- Fairlight DREAM preview
- Ultrasonne HFI-2000
- Sony CDR-W66
- Roland DS-50A
- Lucid AD9624
- Lucid DA9624
- Apogee Trak2
- XTA SIDD

Abbey Road: Studio One's renovation in words and pictures

Band of Brothers: Dolby E TV tour de force

Cabling: Cat 5 explained and applied

Net gains: The Internet embraces quality audio



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Strange times

THE ATROCITY OF 11th September threw a lot of things into grim and unforgiving context. The fragility of life, of ordinary carefree day-to-day existence and even of the razor's edge of peace. Down in among the personal tragedies, disruptions and unforgettable emotional scarring even our tiny industry has been thrown in to turmoil.

The fact that the continent's largest gathering was scheduled to take place in Manhattan a week after the disaster impacted on the entire business. To its credit the AES has managed to reschedule the event in the same Javits venue for 30th November through to 3rd December in a move that has surprised some and been applauded by others. Whatever your gut feeling about this is, you have to concede that the move is a genuine solution to a predicament caused by terrible circumstances and as such it deserves the industry's whole-hearted support.

This is not just to flick the Vs at terrorism and the disruption that it craves but to show solidarity with the AES in what are troubled times for the industry. A strong AES is a strong professional audio industry regardless of economic climate or pressure as it represents our tower of power and encapsulates our



energy and our future.

The situation is not ideal but makes the best job of a bad lot in exceptional times but that so often is what business is all about. Support the AES and your industry and you'll feel better for it.

Zenon Schoepe, executive editor

When worlds collide

FRAGMENTED, INCONSISTENT and ultimately unbelievable, the news trickles through. Sitting on the steps of the church in San Pedro's square, in a remote but gloriously sunny piece of northern Spain, my radio offers a torrent of Castilian with little to corroborate or refute the fragments of news breaking on someone's news txt... something about the World Trade Center. The little I can make out seems to refer to an explosion in the American capital. The locals aren't big on spoken English, so speculation substitutes for information.

Little by little a story of sorts starts to take shape. An aircraft has collided with one of the towers of the World Trade Center in downtown Manhattan. A terrible accident, surely. No, there is more... a second aircraft... a further collision... a mistake, surely. No mention of Washington.

Back to work: the Gabrieli Consort is performing music that has been unheard for around 400 years. Paul McCreesh is directing and conducting while Classic Sound's engineers capture and document everything for a future Deutsche Grammophon release. Chris Alder takes the producer's role while I am to report on the proceedings. But the 'news' prompts disquiet among the musicians. McCreesh

is moved to ask everyone to put New York out of mind and concentrate on the performance. It works for a while.

That evening in the hotel the BBC news tells how, just one hour and 44 minutes after a hijacked airliner struck the North tower, both of the World Trade Center towers have collapsed leaving an estimated \$8bn bill for their insurers. Washington's Pentagon is struck by a third hijacked airliner and a fourth is down somewhere near Pittsburgh with scant explanation. The likely death toll is phenomenal. Unnamed terrorists are responsible.

Stepping back out onto the streets of Lerma, we watch the news impact on the locals. And on each other. 'The world just changed,' I mutter, without realising by how much. Some of the players are from

Boston; they have a better idea, but we're in such a remote location that the whole thing is quite surreal. Even more so than had we been in any of the world's major cities.

The recording has only a couple more days to run, then in spite of the apparent refuge offered by the serenity of our present surroundings, we will all be going home to a world obsessed with the events of 11th September and their consequence. A world with a renewed interest in the news media and a renewed need for music and romance.

Tim Goodyer, editor



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CONTRACTS

France: Paris-based Les Auditoriums de Joinville has replaced the SSL 5000-series analogue console in its Audi 5 room with its third AMS Neve DFC. The installation is of identical configuration to the DFC already installed at Joinville's Audi 8 in Boulogne. With similar acoustics and volumes to both rooms, this allows ready transfer of projects between the sites. Les Auditoriums de Joinville, France. Tel: +33 1 45 114600. AMS Neve, France. Tel: +33 1 34 276753.

UK: Chrysalis Radio flagship station, London's Heart 106.2, has installed Orban Optimod-FM 8400 digital processors on all its audio output. Following the successful introduction of the 8400 at Heart 106.2, Chrysalis Radio is expected to replace its existing Optimod-FM 8200 units at Heart FM in the West Midlands and also at its Galaxy dance music stations in the North East, Yorkshire, Severn Estuary, Manchester and Birmingham. Concurrently, Metro FM (Gateshead) and TFM (Stockton) have installed Audionics broadcast consoles for sports coverage as part of their respective refurbishments under owner the EMAP Radio Group. Heart 106.2, UK. Tel: +44 20 7468 1062. Metro Radio, UK. Tel: +44 191 420 0971. Orban-CRL, US. Tel: +1 510 351 3500. Audionics, UK. Tel: +44 114 242 2333.

US: Burbank-based Moonlight Mastering has chosen a Lucid ADA8824 8-channel, 24-bit ADA convertor to accompany its Sonic Solutions system enabling integration of a Manley Massive Passive EQ, Manley Variable Mu comp-limiter, and expanded tc electronic M5000. Moonlight's clientele spans Disney and Dead Kennedys' DH Peligro. Lucid's SRC9624 sample rate convertor and DA9624 high-frequency convertor are already on the shopping list. Moonlight Mastering, US. Tel: +1 818 841 2887. Lucid, US. +1 425 742 1518.



111th AES rescheduled

US: Following the horrific events of 11th September and the inevitable postponement of the American AES Convention, AES executive director Roger Furness issued the following statement:

'In view of the tragic events that took place yesterday there has been a lot of speculation as to whether the AES 111th Convention would proceed next week, as planned. There were several factors to be taken into consideration and a necessity to have discussions with other parties. For this reason we did not make a hasty statement.

We have just returned from the Javits Center where we had a meeting with their top management. We learned that the New York City Mayor's Office of Emergency Management and the Federal Emergency Management Agency (FEMA) have taken over large portions of the Javits Center for use in co-ordinating emergency services.

We also learned that FEMA will have complete control of these spaces and any others that they need, for an undetermined period. This obviously makes holding the event as planned impossible. However, we were able to reschedule the convention, rather than just cancel it. Most of the people who contacted us hoped that this would be the solution. The new dates will be Friday, 30 November to Monday, 3rd December 2001, with the same exhibit, demo and conference space as would have been used next week.

We at the Audio Engineering Society would like to thank those of you who took the time and trouble to inquire about the safety of the staff here in the New York Office and to wish us well and give us your support. This was much appreciated.

Lastly at this sad time, we would like to spare a thought for those who have had their lives so much more severely disrupted than any of us. We were, and are, very sensitive to their feelings. Let us hope that we can look forward to better times ahead.'

Special K

SATELLITE AND BROADBAND applications provider, Kingston Inmedia, has made its digital creation and distribution facilities available for commercial hire. Based in Buckinghamshire, UK, the Kingston Communications operation has changed its name from Kingston MediaStream in repositioning itself as a one-stop shop: the entire broadcast process is now available on-site, from virtual studio to edit suite; audio postproduction and graphics; and satellite uplink, Internet streaming and other playout options. Newly appointed head of sales Marc Genin spoke to *Studio Sound*.

Q: *Is it truly digital, all the way?*

It's all ones and noughts, end-to-end. A lot of people say they have digital edit suites and dubbing theatres, when they really mean digital components within the area as a whole. We have a true, binary end-to-end system. It starts with our v4 Orad virtual studio, installed a few weeks ago—the first installation in the world of this version—and ends with Digital Betacam.

Q: *Are there digital playout options, too?*

Yes, the studios are linked up to the teleport and to webcasting facilities, so there is a real sense of a digital end-to-end delivery system as well.

Q: *What's in the dubbing suite?*

The monitors are ATC SCM100A Pro Series, left and right. We're planning to augment these with Genelec 1030As for surround. The AMS Neve Logic One console, which we bought in 1996, had surround software from the outset. We knew it would come, and we're just about there now. There are virtually limitless

auxes—you can reconfigure it for any project. Really, the whole concept of auxes is analogue, and almost meaningless in a studio like this.

Q: *What are the specific advantages of the Logic?*

If, for example, you've just finished a drama and the director wants to reference the audio, he can review every scene and change any individual sound—right down to a doorbell—very easily indeed. Instead of having to do a completely online dub again from scratch, you can point and click on that particular track, remove it and replace it. It tears up the old way of sound dubbing.

Q: *What are main target markets of the complex?*

It's designed for TV. The disk format of the Logic is interchangeable with the Avid suite, and everything is backed up onto Exabyte. We can handle all video formats, and audio is often distributed by CD and Tascam DA-88. But the most telling thing is a Japanese ASC Virtual Recorder—a basic 3U box for reference video that stores one hour of video or two hours of audio. With hard disk solutions like this, you can almost feel tape teetering on the edge.

Q: *Isn't this site the one used by the British Armed Forces Services Network?*

Yes it is. Our Forces television output is huge, still. The facilities here are unique across Europe, and as a commercial resource can service a whole range of clients.

Q: *Such as?*

If you're a start-up cable station with good ideas, deep pockets but no platform—come to us. We can do it all for you.

Kingston Inmedia, UK. Net: www.kingstoninmedia.com.

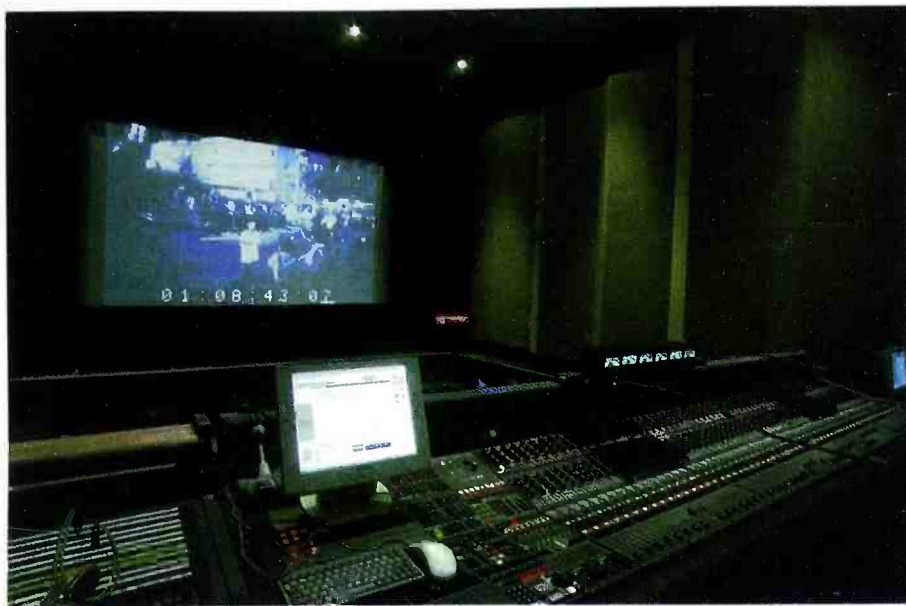
BBC expansions

UK: BBC Technology is to design and construct a new Multi-Channel Transmission Area at BBC Television Centre in London. Scheduled to go on air in October, the installation includes Omnibus Systems' Colossus Automation, Omneon Video Area Network servers, Eyeheight PresTX presentation mixers, BNCS control and a custom ATG Broadcast control panel to interface directly with the Colossus system.

The new installation will transmit the digital BBC Choice channel and interactive services, and has already been used on-air for interactive broadcasts of the 2001 Wimbledon tennis tournament and Open Golf, both broadcast via digital satellite.

The ATG panel allows rapid manual intervention on any channel to readily be adapted to allow additional transmission channels to be installed when additional capacity is required. ATG Broadcast MD Graham Buchanan commented, 'Adding a new television channel to a traditionally-designed installation can easily take six months. The system developed for the BBC Multi-Channel Transmission Area allows a simple extra channel to be added in two weeks.' One of Europe's leading broadcast systems integrators, ATG Broadcast offers comprehensive design, build and installation of broadcast studio facilities.

BBC subsidiary BBC Monitoring has entered a partnership between Netia distributor Clyde Broadcast and Cambridge Imaging Systems to implement Netia's digital AV distribution system. The system will serve BCCM in its role of monitoring all state radio and television stations throughout the world and relaying its findings to



Japan: Tokyo-based film facility Nikkatsu has installed an AMS Neve DFC console for film dubbing and mixing. The first film mix to take advantage of the new desk was *Merdeca*, which was completed in the digital domain. Subsequently, the Japanese films *Taiga Noitteki* and *Hotaru* both saw the DFC in action again. Of *Merdeca*, Nikkatsu's Giko Nakayaama said, 'This film had a very clear sound image and the music sounded very beautiful. This clear sound image required a different approach and experience with equalising to simulate an analogue touch.'

clients such as CNN, the FBI, and foreign administrations.

The system is composed of four different kinds of station, each equipped with one of NETIA's digital audio Radio Assist range: acquisition (Feed-In), network consulting (Quadro), Intranet consulting (Insider) and production (Snippet). Feed-In automatic recording software continuously records hundreds of sources onto the archiving server over an ATM network. The Audio material is transferred from existing receivers to stations which all contain three dual-channel MPEG 1 Layer 2 encoders. This allows it to combine mono and stereo sources which can co-exist on the centralised storage system. Each workstation has access to the different audio documents which are stored on the server thanks to a multicriteria searching tool (channel, date, time...). The final aim is to come up with a wholly digital system: acquisition, storage, production and distribution. BBCM monitors more than 2,000 radio, TV, press, Internet and news agencies around the clock.

Meanwhile, Digigram is to provide over 1,000 high-quality PCX sound cards in the move of the World Service from analogue to digital operation. Jutel's RadioMan Software is to be combined with hardware and systems for the World Service's 43 language sections which are broadcast out of BBC headquarters in London. The value of the project was not disclosed. The two-year project will call for the use of 908 PCX924 sound cards, 174 PCX822np cards and 82 PCX440np cards.

'Digigram Powered solutions have been the overwhelming choice of radio networks worldwide for digital audio broadcast for over 15 years,' said Philippe Girard-Buttoz, president of Digigram. 'Long-term partners, such as Jutel, are vital to our success due

to their ability to create custom solutions based on our technology for networks as well as individual radio stations.'

ATG Broadcast, Net: www.atgbroadcast.co.uk

Creative Studio Solutions

US: Offering custom turnkey audio systems for 'traditional and Internet' broadcasters, the new Creative Studio Solutions operation is based in Colorado and has key links with leading high-tech manufacturers, including Aphex, Comrex, Symetrix, Lighthouse Digital and Wheatstone. CSS designs, builds and fully tests all studio equipment before it is shipped to the selected location for installation by CSS' engineering crew or by in-house staff. The stringent documentation standards of CSS assure that assembly and operation guidelines are easily understood.

'The industry has few places to turn when it comes to studio design and integration,' says CSS CEO and chief engineer, Andrew Rosenberg, an experienced studio design engineer who has designed and installed studios nationally for major-market broadcast and Internet clients. 'Facilities are delivered to the client tested and ready for installation and integration. We stand by our work, and are ready to perform any service and training that is required.'

CSS also provides companion custom networking and serving systems. In addition to studio design and installation services, CSS designs custom audio racks, remote broadcast recording packages and remote broadcast vehicles.

Creative Studio Solutions, US. Tel: +1 303 425 5004.

Waging war on Thai pirates

Thailand: Having lost an estimated 300m baht (about US\$6.6m) to record piracy last year, Thailand's Grammy Entertainment has begun taking steps to curb the flow of money into the hands of the pirates by slashing the prices of its CDs and VCDs.

Grammy has cut the price of its Thai music CDs by over 40%—from US\$6.45 to \$3.45. At the same time, the price of VCDs, which sell well in Asia, has been cut to almost half, from \$6.65 to \$3.45. Pirated music CDs currently sell for between \$1.30 and \$2.60 each, while VCDs of popular western films are often available in Thailand for as little as \$2.20. (For this price though, viewers sometimes have to put up with heads occasionally obscuring the image as some films are pirated in the cinema.)

Included in Grammy's price cut are more than 30 music albums that the company has released in the past six months. Grammy Entertainment's chairman, Paiboon Damrongchaitam, believes the move will boost sales, which will offset the loss from cutting prices. Currently the company sells about US\$13.33m worth of CDs and VCDs a year, although it estimates that it lost around 50% of its potential sales to the pirates. As part of the plan to fight piracy and increase legitimate sales of its music, in a novel move, Grammy has agreed to accept the return of unsold CDs from music retailers. The company sees this as a way to encourage shop owners to sell Grammy CDs, since, so far at least, pirate operations do not offer such an option.

Sinking in the Sea of Sound

Korea: With the uptake of broadband connections taking off faster in South Korea than most other Asian countries, the increasing threat of music piracy is worrying the local recording industry. Recently, two young US-educated Koreans were arrested in Seoul in connection with the illegal copying of music. However, rather than simply facing charges relating to piracy, with its less-severe penalties, the two face criminal charges of copyright violation. This stems from their production of song-sharing software which allegedly encourages music piracy.

The Yang brothers, Il-hwan, 32, and Jung-hwan, 28, who work out of their parents' flat, authored the Korean-language file-swapping program a year ago. It allows computer users to search each other users' hard disks for music, and then download any of the wanted items. With broadband connections, a song can be copied in about 10 seconds.

In seeking the brothers indictment, the Recording Industry Association of Korea, which groups 133 labels, claims that last

CONTRACTS

Germany: Cube-Tec Quadriga audio archival system systems have been installed by various German broadcast operations including Bavarian Broadcast, Southwest Broadcast, North German Broadcast, and Radio Bremen. Established broadcast installations include RTE in Ireland, Finnish Broadcast, Austrian Broadcast, and ScreenSound in Australia. Cube-Tec, Germany. Tel: +49 7435 910942.

Mexico: Estudios Churubusco's Studio C has been redesigned by LA-based Studio 440, turning an ADR-Foley stage into a THX-certified 5.1 mixing room. The project sees a 192-input SSL Avant digital post-film console taking centre stage to meet the growing demands of its film mixers. The facility's next move is further towards digital with an SSL Hub Router. Established some 60 years ago, Churubusco recently saw Studio C's work on *Otilea Rauda* appear at the Cannes Film Festival. SSL, US. Tel: +1 323 4643 4444. Estudios Churubusco, Mexico. Tel: +525 544 9054.

UK: Soundsense broadcast rental specialist has added a 12-fader Soundcraft RM1D digital console to its inventory to meet the needs of Restricted Service Licence users. Early takers of the company's RSL packages include Stone FM, the official station for the 2001 Stafford and Stone Festival; although Stone FM has registered as a trial radio station with the Radio Authority. Soundsense, UK. Tel: +44 1952 403884. Soundcraft, UK. Tel: +44 1707 665000.

Luxembourg: RTL has installed an AMS Neve Libra Live Series II digital broadcast console in an existing control room at its headquarters where it replaces a Studer desk. The console is part of RTL's move to digital operation and will serve a variety of Flemish programmes including live news, game shows and current affairs. RTL, Luxembourg. Tel: +352 42 142 7772. AMS Neve, UK. Tel: +44 1282 457011.

UK: The Alchemea College of Audio Engineering has upgraded its computer workstations giving it Apple Mac G4 computers running Logic Audio Platinum, Cubase v5, Pro Tools 5.1LE, Recycle, TC Spark V2, Native Instruments Pro52 and Adaptec Jam software. The new workstations are equipped with Digi 001, E-mu Ultra 5000 samplers, E-mu Proteus 2000 sound modules and Soundcraft Folio Mixers. Alchemea, UK. Tel: +44 207,359 3986.

CONTRACTS

UK: BskyB has installed a Cedar DNS1000 to remove hiss, hum, buzz and other unwanted noise from films broadcast on Sky Digital's Movie Channels. The unit has also been used to remove location noise and sync sound from documentaries broadcast on The History Channel. Recent projects include *A Forgotten Odyssey*, a film about the 1.7m Poles sent to labour camps during WWII, and *POW: Japanese Prisoner of War*. BskyB has also ordered three BCD Audio RS485 network-based RMOS Express routing and monitoring systems and has placed orders for further routers for Studios 7 and 2, and for a new multi-camera SNG truck being built by SISLink. BskyB, UK. Tel: +44 20 7705 3325. Cedar Audio, UK. Tel: +44 1223 881771. BCD Audio, UK. Tel: +44 1753 620454.

US: New York City's Harmony 534 Studios in has installed an AMS Neve Libra Post mixing console in Studio A at its new facility on 534 West 43rd Street. Studio A is one of four networked studios within the facility serving post house TRA Productions, music recording company Doug Romoff Productions, facility designer Rich Oliver Productions and real estate entrepreneur Michael Pain. Initial duties for the Libra include posting all Sesame Street television episodes as well as film mixing. The first film project is *The Devil and Daniel Webster*, starring Alec Baldwin. Harmony 534, US. Tel: +1 212 586 0041. AMS Neve, UK. Tel: +44 1282 457011.

Eire: Dublin post house, Tommy Ellis Studios, has installed a Fairlight Prodigy



system in a new studio for radio and television advertising, television programmes and documentaries. Clients include independent film and documentary originators and many of Ireland's leading advertising agencies. Tommy Ellis Studios, Eire. Tel: +353 1 6611494. Fairlight, UK. Tel: +44 20 7267 3323.

Belgium: The eight studios operated by Flemish national radio and television broadcaster VRT begin streaming their output from September using 12 Waves Maxxstream M200 units. VRT, Belgium. Tel: +32 2 7415005. Waves, Israel. Tel: +972 3 6081752.



UK: London's Metropolis studio complex has opened a fourth surround mastering room, overseen by technical director John Goldstraw and tagged 'Woody'. Monitoring in the new room is taken care of by a PMC setup comprising MB1 XBD Actives (for LR), and MB1 s for centre and rear channels. The sub channel is folded back into the main monitors 'eradicating the need for a separate .1 effects speaker'. All channels are driven by PMC-series Bryston power amps and crossovers mounted externally to the main units and wired with OFC 'audiophile' cable. PMC, UK. Tel: +44 870 444 044.

year local record companies lost \$154m, due to the 4.5m registered uses of the Soribada—or Sea of Sound—program, the Korean equivalent of Napster. If convicted, the brothers face up to five years in jail, and a fine of up to \$38,500. However, they have offered to transform the free Soribada service into a paid one. The record industry has countered that the service must be shut down before any negotiations can begin.

Almost half of Korea's population of 46m has access to the Internet, and an unusually high proportion have broadband connections.

IBC2001

Netherlands: IBC2001 opened at 12:03 on 14th September following a three-minute silence marking events in New York only days earlier. Arnold Campbell, Consul General to the Netherlands from the United States recorded a special message of encouragement for IBC delegates which was screened at Sunday evening's IBC awards presentation.

Exhibitor and attendee numbers were expected to be down as a result but fewer than 20 US-based exhibitors failed to arrive in time for the start. The show organisers ensured that their booths had relevant signage and contact details. Many larger US-based companies pulled in extra European staff to cover for the absence of their American colleagues and the event counted in 19,625 delegates after the first day. Last year's IBC attracted 45,000 attendees from 120 countries including around 5,000 from the US, and the organ-

isers stated that early indicators for this year weren't that different although no final figures were available at press time.

Down on the exhibition floor things were quieter and far more civilised with far less of the 'demo clumping' that can make IBC something of an obstacle course for those in a hurry to get somewhere. It was a comfortable show to do with the usual class-leading facilities and organisation and none of the 'bear pit' moments that typify NAB.

Best news of the show was that *Studio Sound* sister publication *TVB Europe* has won the contract to produce the official *IBC Daily News* next year and with *Studio Sound's* help will continue raise the profile and standard for audio representation at this important international event.

Web site attacks music industry

UK: A six-month-old web site providing low-cost, royalty-free music is bracing itself for a battle with the 'old school publishing industry', which it has likened to a Masonic lodge.

For a nominal charge, visitors to www.3qSound.com can download pieces of pre-composed, royalty-free music intended for markets including television production houses and web site authoring. Operated as a division of Lapworth print and new media agency, One Design, the site has already picked up a nomination for a UK Online Music Award, though sections of the music industry are treating the site and its

one-stop shop pricing structure as a threat to the perceived value of bespoke music composition—a threat heartily encouraged by the site's co-developer, Mike Wilkie.

'I think people have had to pay too much,' Wilkie explained to *Studio Sound*. 'The industry is incredibly expensive. I think in some ways there has been a clandestine arrangement in the past and, morally, perhaps we should look at those areas again.' Wilkie added that he didn't believe 3qSound would affect the way that large television production companies did business. 'Big companies will always charge big people big money, but maybe big companies have sometimes charged medium sized companies too much,' he explained.

Nevertheless, Wilkie attributes 3qSound's success to the growth in its natural market—he explains that increases in Internet bandwidth capacity have brought new distribution possibilities plus a new market of web site developers looking for high-quality, low-cost music. 'This is fantastic new market potential,' he said. 'Don't overprice yourself for new users. It's no good saying people can't have anything for less than £750.'

Perhaps significantly, however, the publicity that 3qSound.com has generated has already helped the company to reap a high-value contract from Carlton Television as well as a contract from an unnamed Australian production company. Wilkie, meanwhile, remains bullish. 'There are going to be those who attempt to shoot us out of the water,' he said, 'but I feel that what we're doing is right.'

3qSound, UK. Tel: +44 1564 786827. Net: www.3qsound.com

Soho lures new trade

UK: London's Sohonet media network has found a partner in data storage specialist Scale Eight to greatly improve its service to London's postproduction, TV and film industry. The partnership will allow media companies to electronically transfer film, video and sound content, such as large streaming media files. Scale Eight's global data storage solution complements the Sohonet network as it provides near infinite scaleable data storage for media rich files and access to the same files from multiple locations.

'Our partnership with Sohonet has great strategic importance for Scale Eight,' said Patrick Rogers, executive vice president of Scale Eight. 'It gives us access to a core customer base that has an increasing need for data storage—media companies dealing with media rich data files.'

'This partnership will enable the media industry to improve communications between client and supplier, streamline production and postproduction work, and remove the need for expensive duplication of tapes and couriers,' added Gareth



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www.soundtracs.com

CONTRACTS

Germany: Film facilities in Berlin and Munich have recently ordered DPC-II digital consoles from Soundtracs.

Berliner Union Film's 96-fader desk is to be installed in a main mixing room for dubbing work on major film projects. In Munich, leading post house Westpark Studios has a 48-fader DPC-II earmarked for the THX mixing theatre at its new location where it will work on film, TV movies and documentaries, and commercials for the likes of Audi, Honda and Disney.

Berliner Union Film, Germany.
Tel: +49 30 7578 2000.

Westpark Studios, Germany.
Tel: +49 89 9577014

Soundtracs, UK. Tel: +44 1372 845600.

Czechoslovakia: Brno-based

G-Studio has become the first studio in the Czech Republic to take delivery of an Audient ASP8024. The purchase is



part of Project DUKLA 2000, the redevelopment program of the well-known old radio station, Studio DUKLA under which the 36-channel console is being used daily for studio recording projects and to record live musical productions.

Expotus, UK. Tel: +44 1923 252998.

Wredde, Sohonet's managing director.

Smoke & Mirrors, one of Soho's leading postproduction facilities, and ImageState, a leading digital content delivery provider are already conducting service trials of the new service. Mark Wildig, Smoke & Mirrors' managing director commented, 'The alliance between Sohonet and Scale Eight is a big step forward in terms of commercially viable electronic file transfer and management services for our industry. It could dramatically change the way we work in the future.' Blair King, Image State's CTO added, 'The combined services will allow us to further improve the way we share digital content with our partners and customers.'

Net: www.sohonet.co.uk www.s8.com
www.smoke-mirrors.com

Classic synths on the Net

Net: VEMIA, reckoned to be 'the largest electric musical instrument auction, Internet or otherwise' and noted for the patronage of the likes of Brian Eno and Oasis, has teamed up with spheremusic.com for a relaunch of its service. The new look auction site has completely new software offering pictures and automatic proxy bidding 'but still with the personal supervision and customer service which sets it apart from the rest'.

November sees the launch of the new look service, with the established roster of 'predictable, interesting, or downright weird' old synthesizers, effect units, amplifiers, mics and drum machines. As before, buyers and sellers from the famous to the unknown are expected to be using the site—all protected by the registrations and lot descriptions being fully vetted by the VEMIA team, who are also there to help with packing, payment, servicing and transport issues. Vemia, tel: +44 1363 774627. www.vemia.co.uk



US: The Metropolitan Opera House in New York's Lincoln Center was rocked by the live performances that highlighted this year's MTV Video Music Awards. Key to performance from the likes of Missy Elliott (pictured) was Wireless First's use of 'a truckload of Sennheiser gear and 200-plus frequencies'... 'Wireless guru' Kevin Sanford began by making a list of bad frequencies for New York in general and then contacted all of the sound engineers at Lincoln Center's various stages to find out what frequencies they use. 'That gets you 90% there,' he commented. 'However, the blessing and the curse of this industry is that it's never the same twice. We work out most of the final details on the spot. That's part of the reason why I like Sennheiser so much; their equipment is agile and

Building faith in Yugoslavia

Yugoslavia: The Federal Republic of Yugoslavia (FRY) has taken delivery of its largest mixing consoles in 15 years, prompting talk of a financial resurgence in its embattled audio industry. In a deal described by Milenko Skaric, general manager of distributor Sky Music, as a sign of new investor confidence, two 36-channel Audient ASP8024 consoles have been supplied to Studio 011 and MN Studios in Belgrade. 'The most important thing now is that people aren't afraid to invest,' explained Skaric. 'We expect a lot of foreign investment. It's

the only way for us.'

Despite the popularity in the FRY of the region's indigenous folk music, Yugoslavian industry in general has long suffered due to the political instability of Serbia and its neighbours. Skaric surmised that prior to the Audient sale, 'the best consoles we had were old MCI consoles. We had some Studer equipment but it was from a long time ago and it was owned by the government. Those studios don't function well anymore. We have some Pro Tools now, but for a long time we didn't have enough money for a serious mixer.'

Skaric believes, however, that the region's recent political shifts may have triggered new growth. 'After the political changes, we don't have more money but the companies

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The bus structure of the DREAM Console has been expressly designed for multi-format projects for the simultaneous generation of multiple, multi-channel formats up to 7.1 with individual level trims for each independent mix. The extensive automation system encompasses every parameter of every onboard function, including processing, routing and third-party plug-ins. With the same recording, editing and mixing capabilities as DREAM Station, but on a much larger scale, the DREAM Console delivers resources which have been hitherto unavailable on any system, at any price, and puts them within reach of any facility aiming at serious production and mixing work.

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CONTRACTS

Japan: Tokyo-based Japanese film company Toei has ordered an AMS Neve Digital Film Console to replace a Soundcraft TS24 on its dubbing stage. The order follows a three-year evaluation period and will provide the centrepiece to the stage's refurbishment. The DFC will be primarily used on films and TV programmes. Toei, Japan. Tel: +813 3886 72731. AMS Neve, UK. Tel: +44 1282 457011.

Croatia: Croatian national broadcaster, Hrvatska Radio Televizija, is to install an SSL Aysis Air Plus digital broadcast console in its main TV production studio in Zagreb. The 32-fame console is fitted with 48 processing channels and supplied with the RIO Grande option for extended I-O. It will be installed in a multi-purpose facility in Studio 7 serving live TV productions. Croatian National Television Channel 2, meanwhile, has chosen On-Air Systems' On-Air InfoChannel to deliver the latest news and sports results. News is fed to the system direct from news desks and automatically configured for transmission. Stock exchange information is automatically refreshed from dedicated web sites. SSL, UK. Tel: +44 1865 842300. On-Air Systems, UK. Tel: +44 20 7636 7474.

feel that they can see the future,' he explained. 'The prices are even higher now—they're more Western than Eastern—but it's easier to do business. Our banks are functioning and companies feel that if they invest then the money will come back.'

Both Studio 011 and MN Studios are using their new Audient consoles primarily for folk music, though the consequences of the sale are likely to reach beyond the studios' immediate competitors. 'In the studio industry, once you take a step forward, everyone has to follow,' asserts Skaric, suggesting further high-profile sales will follow.

Sky Music, Yugoslavia, Tel: +381 11 311 4094.



Australia: The Sydney HQ of television broadcaster Network Ten has seen the installation of a Fairlight Prodigy2 workstation in its promotions post suite where it produces promo spots for the Australian version of Big Brother along with station promos, radio promos, competitions and other marketing spots. Any downtime is devoted to posting TV specials such as the recently-screened V8 Superstars and forthcoming high-definition documentaries such as The Young Australian of the Year Awards. 'The Fairlight system represents a change of direction for us, commented Ten's Jason Tuendemann. 'Prodigy2's technology can deal with these new demands of mastering to 5.1. We also needed speed, versatility and reliability, and real-time networking to allow us to scale the system in the future.' Fairlight, UK. Tel: +44 207 267 3323.

DVD novelty is old news

UK: Metropolis DVD UK has warned that DVD's honeymoon popularity may be coming to an end, and that distributors must produce more exclusive content if the format is to retain its popularity. In a press release announcing the company's involvement in producing *Louder Than War*—a DVD trailing rock band The Manic Street Preachers on their recent trip to Cuba—Metropolis Group Business Manager Mike Gillespie suggested that distributors will lose market

share if they continue to bank on DVD's novelty value.

'So far, some distributors have been able to cash in on the fact that early adopters will buy almost anything on DVD because it's a new format,' he commented. 'But that is no longer the case. They're paying premium prices, so they expect premium products. This means content is becoming more important than ever.'

Speaking to *Studio Sound*, he added 'As a consumer, if I'm going to pay £20 for a disc then I want more than I could get on CD or VHS. Distributors realised that they could make a lot of money because early adopters of DVD would buy anything. That has now come full circle and content is King.'

Louder Than War, produced by Gillespie and Alex Sanders, includes exclusives such as a video diary of the Cuban trip, a full-length recording of the Manic Street Preacher's meeting with Fidel Castro, three radio interviews, a discography and hidden out-takes. A portion of the material was previously shown on UK television.

Gillespie added that he believes the maturing of the DVD market applies not only to the music sector but DVD production in general. 'I think it's like the Internet,' he explained. 'After the initial excitement wore down, everyone realised that a web site is worth nothing without content.' *Louder Than War* was released on 24th September on Epic.

Metropolis DVD UK, Tel: +44 20 8742 1111.

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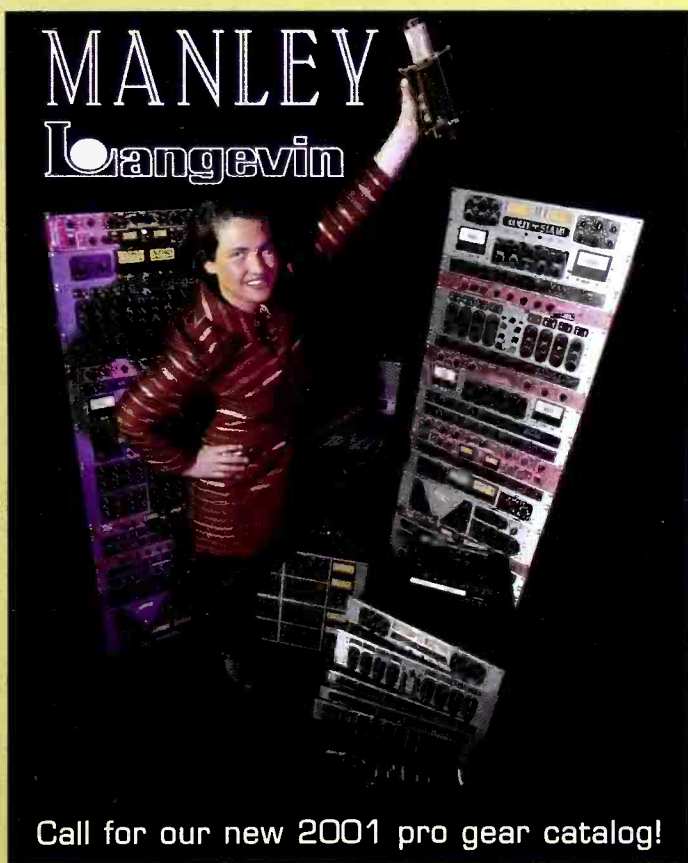
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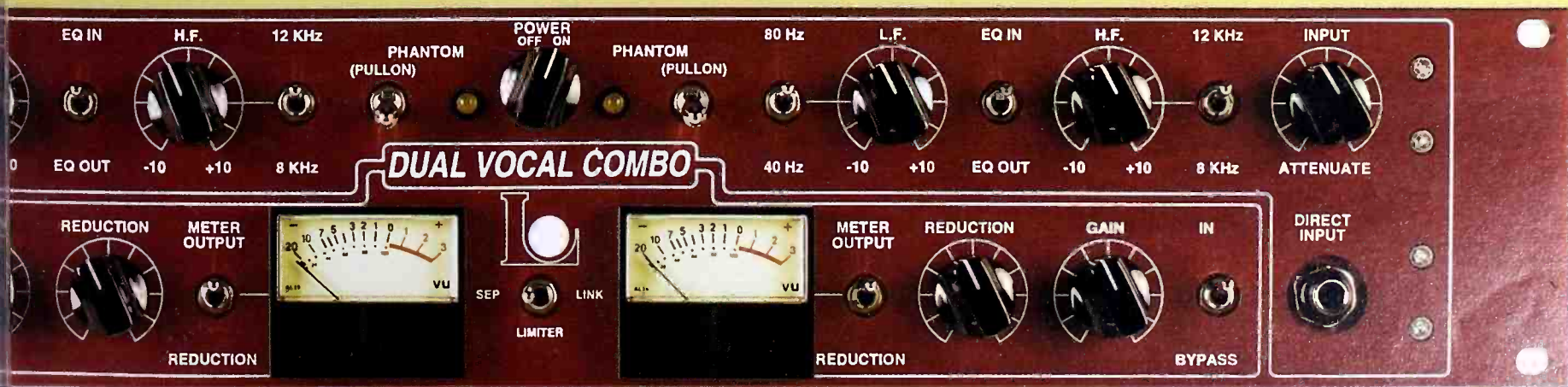
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APPOINTMENTS

iZ Technology has appointed David Ward as President and COO. Owner Barry Henderson will continue to focus on long term corporate and product strategy and vision while Ward manages day to day operations.

CRL Systems has promoted four senior management personnel: Jim Seemiller becomes vice president-COO from vice president-CFO; Orban founder Bob Orban becomes vice president (and continues as chief engineer); Gary Clarkson, formerly VP and general manager of CRL becomes vice president-secretary for Orban-CRL; and controller Robert McMartin becomes vice president-CFO.

Lawo has appointed Klaus Peill international sales manager with



responsibility for the development of new markets outside Germany. Peill was previously with Barco-EMT, Harman Deutschland, Dialog4, Scheck Audio and the local German branch of Studer Professional Audio.

beyerdynamic has appointed Jon Stanley as product manager for XTA and biamp systems responsible for systems integration, customer support and to seek feedback on product development.

Sennheiser has appointed Karl Winkler as director for marketing communications from being brand manager for Neumann. He will oversee all advertising, public relations and field communications for the Sennheiser, Neumann, Innova-Son and DAS Audio brands and be responsible for corporate web site development and maintenance.

QSC has appointed Duke Ducoff to audio design liaison where he will assist in specifying product including signal processing, signal transport, and audio network systems. Ducoff spent over three years at White Instruments and 10 at The Jones Sales Group. He is also a member of the AES and NSCA.

Expotus has appointed Luke Baldry as sales manager. He has previously represented Apogee Electronics in the UK and Europe having previously run his own recording studio.



UK: The new offices of Cedar Audio saw an all-star line-up when winners of the 2001 Cedar Awards were invited to eat, drink and be appreciated recently. Pictured are Jon Astley (Award winner), Tony Williams (Mackie), Gordon Reid (Cedar), Chris Buchanan (Abbey Road Studios), Ted Kendall (Award winner), Clive Osborn (Cedar), Nick Ashton (ITN; Award winner), Helen Thorogood (AMS Neve), Alan French (BSB Forensic; Award winner). The occasion also saw the announcement of Cedar's support for the Mackie-owned Soundscape platform and a forthcoming collaboration with AMS Neve (see next month's Soundings). The complete list of winners includes Jon Astley for George Harrison's *All Things Must Pass* (CD Remastering From a Modern Recording—Post 1949); Ted Kendall for *Eddie South—Black Gypsy The Complete Victor, Gramophone and ARC Recordings, 1927–1934* (CD Remastering From a Vintage Recording—Pre 1950); Novastar Digital Sound Services for *Vincent Price —The Invisible Man Returns* (Postproduction of a Film Soundtrack); ITN for live coverage of the *British General Election results (Audio Restoration For Broadcast Use)*; Alan French, BSB Forensic (*Audio Restoration for Forensic Use*); and Dave Dysart at HHb Communications Canada (*Dealer of the Year*).

Ally in Germany

Germany-UK: London-based facilities house Digital Audio Technology (DAT) has acquired a six-room studio complex in Munich to aid its European expansion. The acquisition creates an inroad for DAT to the lucrative German market, and the first project for the new owner is the remixing of the *Ally McBeal* TV series for DVD-Video release across Europe. The studio, formerly a music recording facility called Country Lane and now known as DAT Munich, has employed Florian Strucken as both technical manager and DVD author. Strucken was lately head of audio post at Film & Fernseh Synchron in Munich.

The complex will feature five rooms dedicated to audio postproduction and (in three of them) mastering for DVD—adding to the four rooms run by the company in North London; a 5.1 mix room with mid-field monitoring; and a DVD authoring suite. Each room is based around Pro Tools MIXplus systems with 888 I-Os and USD, along with Genelec BM6A monitoring. DAT's own Euphonix R1-based Studioblab package—which unites the R1 with Pro Tools—will also be available in Munich. The mix room has yet to install a console.

DAT-based producers Haydn Bendall and Tony Platt are to lead an initiative to corner the market for film and TV mixing in 5.1, according to DAT's Barry Hilton. He com-

ments, 'Tony is starting off the *Ally McBeal* job together with our engineers Simon Sheridan and Alberto Vidal. They will at the same time interview and train new recruits from the local market.

'There will be no rental operation, such as there is in London,' adds Hilton, 'apart from Studioblab and similar location packages. Repurposing audio for 5.1 broadcasting and distribution is driving this market forward, and DAT intends to be a major international player.'

Platt is uncertain at this stage as to which console will be chosen, but he reveals, 'I would like an analogue console with a digital control surface, because I'm still not satisfied regarding the latency issues when it comes to 5.1 mixing. I want a mixer compact enough to operate from the centre of the 5.1 footprint.'

DAT Munich, Germany. Tel: +49 8984 5054.

Business as usual

UK-based: Allen & Heath has secured a £9.6m loan package of debt and equity from the Bank of Scotland Corporate Banking together with 3i to fund its Institutional Buy-Out from US manufacturer Harman International Industries (originally reported in Soundings, August 2001). 'We are very pleased that Bank of Scotland and 3i have recognised the qual-

ity and potential of the business and the management,' said Glen Rogers, A&H MD. 'They understood our requirements and developed a funding structure to match the nature of our business needs. The backing we received will assist us in growing the business and will further strengthen our position in the marketplace.'

With turnover of £11m forecast for 2001 Arthur Sherry, director of structured finance at Bank of Scotland added, 'This is a good opportunity to support a long established and successful incumbent management team in a market leading business with good growth potential. The deal demonstrates Bank of Scotland's commitment to delivering bespoke funding solutions to match individual company's unique and complex financial requirements.'

The **Fairlight** group used the recent IBC conference to announce its controlling interest in Montreal-based video workstation manufacturer **Lightworks**. The move marks Fairlight's move from minor shareholder through the purchase of shares from OLE Canada Inc and will see Fairlight take on management of Lightworks' manufacturing, sales, marketing, international distribution and London-based development team. Fairlight's technical support will take on Lightworks service issues with company founder and executive director Kim Rylie supervising the integration of Lightworks into the Fairlight group. He will be assisted by Fairlight's John Lancken and Lightworks' Joanna Verthy. OLE president, CEO and director Mark Pounds has resigned from the company. 'Lightworks is a brand leader,' commented Rylie, 'and one of the original pioneers in the development of computer-based editing equipment. Fairlight has always been a keen supporter of Lightworks due to its console-based user interface; this approach follows our philosophy that dedicated hardware controls are faster and much less stressful for professionals who work long hours when compared to the zero-cost cursor-mouse regimen.'

Cambridge (UK) technology development company **Imerge** has completed a funding round of £2.5m from The Generics Group, Residex Venture Capital Network, Aberdeen Asset Managers, Yorkshire Fund Managers and JVB Private Equity LLC. Imerge develops Next Generation Home Media Appliance Technology (XiVA) for licensing and finished product, and the funding will support the launch of additional products and services based on XiVA media appliance software, including XiVA-Net, as well as strengthening continuing progress with XiVA licensees. Products powered by XiVA include the SoundServer multiroom audio player, and products from leading licensee brands including Linn and Revox. XiVA-Net is a new Internet-based service from Imerge dedicated to delivering music-related information and services to XiVA media appliances. Net: www.xiva.com/xiva-net.com

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By tube. Just under a mile from Finsbury Park (Piccadilly and Victoria lines) right down Seven Sisters Road and left down Thane Villas (the last left turning before the Hornsey Road intersection).

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ON THE ROAD

Studio One was recently the scene of Abbey Road's most ambitious ever expansion, involving a rebuilt control room and dramatically expanded facilities. **Chris Buchanan** and **Dave Holley** take you on a pictorial tour of the project

FOUR MONTHS AFTER closing its doors for major refurbishment and improvement, Abbey Road's famed Studio One reopened for business. As the moon rose over the studios' garden, press and patrons celebrated the opening of the new facilities, and projects were queuing to use them. First in line was the conclusion of a recording of the LSO conducted by Sir Colin Davis which started before the improvements were begun—an appropriate measure of their success.

Sometime between February's torrential rain and June's tentative sunshine, the control and machine rooms were demolished and rebuilt from foundations up. Sitting on a floated floor, a bigger control room now offers better acoustics, better surround monitoring and a better view of the studio. Also adjacent to the control room are two permanent iso booths. A new first floor level offers a new equipment room, two iso booths, quiet working area and private relaxation space as well as an elegant balcony overlooking the studio.

The development follows lengthy consultation with clients and the in-house staff as well as a tour of LA facilities and the services of Sam Toyashima and ADC. The resultant studio is able to bring together people on



The new Studio One control room—bigger, better, and booked



1. In the early eighties, we linked up with Anvil Films because they were losing their sound stage. Until then we did purely classical recording but in 1984 we built a bigger control room to accommodate Anvil's film work. The old control room was to the right-hand-side of the picture and outside of the earlier building. Surround sound hadn't got going then. (Week 1)



2. The machine room being dismantled, which was originally built c1984 in the space which was the side entrance to the building. (Week 1)



3. Emptied of equipment, you can see the control room cable trench and the studio, which became a temporary workshop and store room during the project. (Week 2)



4. Looking into the stripped control room from the outside world prior to demolishing the walls and ripping up the foundations. (Week 4)



5. The heavy plant moves in. It was a four-month job running from February to June. The heavy rain during February caused some flooding because the water table is high here. Additional drainage was added as part of the rebuild. Also, consideration had to be given to one of adjoining walls as it belongs to a neighbour—before starting we invited the locals in to look around and to explain what we were going to do. (Week 5)



6. Looking into the control room from the studio; showing ceiling mounting for video monitors and the projection screen that retracts into the ceiling. Main monitor speakers are free-standing. (Week 13)



7. The studio area is in use for storage and provides a small workshop (rear right) in which the desk wiring was completed. One thing we didn't have before was isolation booths and that was a temporary room we used from time to time that was used as a workshop during the project. (Week 13)



8. The front of the new control room with its bigger window. The window sits beneath a structural girder that limits its height. The challenge here was to work around this to improve the lines of sight between control room and studio. (Week 15)



9. Reinstalling the Neve VRP Legend with VSX film panels—we refurbished it and expanded it from 64 channels to 72, to fill the frame. (Week 16)



10. Equipment being reinstalled in the equipment room. It is more than twice the size it was before allowing for future expansion so there are a lot of blank panels. There are so many formats coming and going right now that we need a big space where people can bring stuff in. (Week 16)

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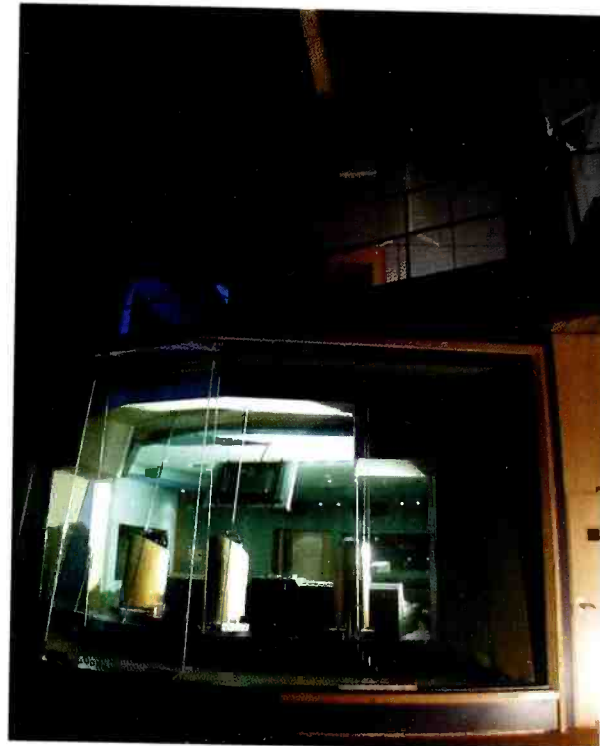
Acknowledgement: Focusrite would like to thank these artists and our countless other customers in the world of music recording.



11. The second layer of glass going into the control room window. (Week 18)



12. Looking across the studio towards the new first-floor facilities and the balcony. This design is the product of discussions going back over a number of years—at one time we looked at having the balcony going right across the room so that we could put a whole choir up there, for example. But there was concern that, even if it didn't affect the acoustic, it would restrict the entrance to the room and you'd feel you were coming in to a restricted space. (Week 20)



13. The completed control room viewed from the studio floor

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a project who would previously have been spread around the site—a claim supported by the recent use of three Pro Tools rigs all of which found comfortable space in the new rooms.

'It becomes its own world now discrete from the rest of the studio, and we find people are using it in lots of different ways,' comments commercial director Dave Holley. 'We're looking to see if we need to tweak it but they use it for everything from showering to composing and scoring.'

'It's a nice marriage between keeping the wonderful acoustic room and adding a top-of-the-range client area,' adds Chris Buchanan. 'We didn't want to alienate the classical people in attending to the needs of the film people. It's the continued evolution of Abbey Road. The reaction we've had since it's been open has been phenomenal; it's given us the best reaction we've ever had.'

Predictably coy about the cost of the exercise, Holley and Buchanan are adamant that the sums had to add up. 'We had to make an internal business case for it,' Holley asserts. 'There were discussions and a few modifications...'

'It was a pretty strong case,' Buchanan elaborates, 'and four months of downtime for our main studio was a major consideration. But the American work coming to the UK has been growing for the last 10 years quite dramatically as has the amount of scoring work. They are among the few growth areas in music recording.'

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Apogee Trak2

Making the audio workstation a working reality challenges the original concept but brings it into the practical world. **Rob James** assesses Apogee's elite 2-channel mic-pre/convertor



WHENEVER NEW TECHNOLOGIES appear they frequently inspire fear and uncertainty in the established areas of related business. But as users develop methodologies incorporating the new tools, confidence rises and new working considerations are identified and addressed. A case in point, digital audio workstations have fundamentally changed many working practices and brought with them a real need for purpose-designed ancillary equipment. Apogee's Trak2, then, is a product which, on paper, appears to address many of the items on DAW users wish lists.

In the early days of digital working there was a stark choice between affordable convertors and stratospherically expensive ones. Although high prices did not necessarily guarantee performance, it is probably fair to say only the totally cloth-eared did not consider some of the pricier examples noticeably superior to the mass produced. Times change, however; chip sets have improved dramatically and designers are more adept at implementing them. The result: arguments over the quality of conversion are less relevant except to the 'golden eared'.

The more intelligent manufacturers have sought to differentiate their offerings and add value in other ways. Making products which fit the way people want to work is one of the more laudable approaches.

Trak2 is perhaps best thought of as several separate units rolled into a cohesive whole. A mic preamp, 2-channel A-D convertor, optional 2-channel or 8-channel D-A convertors and optional digital I-O to feed the D-As or for format conversion. Meters, oscillator and a pair of D-As feeding a headphone monitoring output complete the picture. It just might be the 'one-box' solution to DAW audio input and output.

For acquisition and output, the quality of the

preamps and conversion must be impeccable. If analogue preamplification or the A-D conversion is compromised there is no going back, and any degradation will be evident from this point onwards. Similar considerations apply to monitoring and final production. If you cannot trust the D-A conversion (not to mention amps, monitors and acoustics) then accurate judgements become difficult or impossi-

Panel work

RUNNING DOWN the left-hand side a massive purple anodised finned aluminium heatsink adds a touch of colour. Front panel adornments start with a latching power switch and cruciform cursor keys. The blue, backlit LCD screen is reasonably legible given the amount of information it has to convey. The data input wheel is also the enter key with three modes of operation - single click, double click and press and hold for 2s. Ten Status LEDs indicate clipping on the mic pre inputs, +48V phantom powering, phase reverse for the mic preamps and Inserts. When Inserts are active the A-D convertors are fed from the line inputs on the rear panel. The mic preamps remain active and useable. Two user assignable Quick keys lie beneath the status LEDs. Meters are LED ladders scaled from -30dBFS to 0dBFS with 'over' indicators. Meter modes include peak, average or both, with or without 2s or infinite peak hold. Over indication may be set to require between one and four consecutive full-scale samples. The **METER** key clears peak holds when pressed momentarily or engages Phase Meter mode when pressed and held. In this mode the top meter indicates the sum and the bottom compares the relative phase of left and right channels. A 1/4-inch jack provides headphone output and two Neutrik dual XLR-TRS aux input sockets can accept a mic

ble. If the final product is analogue, do you want to compromise on the final conversion?

Trak2's mic preamps provide ± 90 dB of gain. Under normal conditions relays are used to switch between gain ranges to keep the digital attenuator operating in its optimal range. The relays may give rise to an audible click so Apogee has included a Gain Ride mode for live recording which, when engaged, freezes the relays in their current position whilst allowing the full range of gain adjustment. A high-pass filter acts at 40Hz or 90Hz as required. The Mic Protect feature, when activated, switches off phantom power whenever a mic is unplugged. An external analogue processor may be patched into the inserts or the mic preamp can be used separately while the line input goes to the A-Ds. Also included are analogue signal processing options. Apogee's Soft Limit is supplemented by the re-appearance of Soft Saturate as found on the AD-500 (which aims to mimic the compression obtained by overmodulating analogue tape; settings vary from mild to outrageous).

At the heart of Trak2s other functions lies an 8x8 routing matrix. The inputs may be sourced from one of the optional AMBUS (Apogee Multimedia BUS) cards or any of the inputs may be replaced by the outputs from the A-D convertors—Channel 1 A-D output fed to all eight matrix inputs or

input or balanced line input via the XLRs or a high-impedance instrument via the TRS jacks.

Analogue I-O may be globally switched by software between Pin 2 hot and Pin 3 hot. Similarly, the data structure changes between AES-EBU and SPDIF are software controlled but the level and impedance changes involve moving two internal jumpers. Since a total of 24 screws hold the lid on, this is not something you'll want to be doing on a daily basis.

Word clock I-O is BNC and a 15-pin Sub-D compact is provided for MIDI. Mains is IEC.

A single card slot accepts optional 2-channel or 8-channel D-A convertor boards, specific to this unit. The two AMBUS (Apogee Multimedia BUS) slots can accept any of the following cards:

Digi-8+	for Digidesign Pro Tools
ADAT-8	ADAT format Toslink optical
TDIF-8	Tascam Digital Interface format
AES-8	Word clock may be derived from any signal pair
SDIF-8	Sony 3348 recorders
SSL HiWay	For SSL Digital consoles
FiberDX	Glass-fibre optical eight channels of 24-bit audio up to 5km.

An optional video board may be fitted internally adding video sync and 0.1% pull-ups and pull-downs.

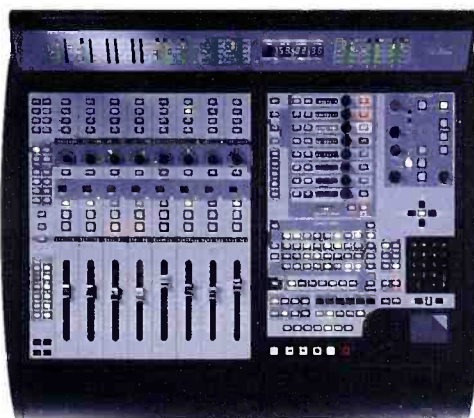


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REVIEW

Channels 1 & 2 in pairs fed to the eight matrix inputs and so on. Four presets are provided and a user preset. If one of the supplied presets is selected then modified this becomes the user preset.



Similarly, any stereo pair of the eight output buses can be fed to the built-in AES-EBU/SPDIF output as well as the AMBUS card(s) with or without UV22HR processing applied. UV22 is well known as an alternative to conventional dither as the final process before recording a master. UV22HR Super CD encoding is the latest development.

There is fine control over every parameter you might wish for. Navigating all this through the relatively small 'window' works well and frequently used functions can be attached to the Quick Keys. Setting up from scratch is time consuming since there are so many things to tweak. However, there are 127 user memories to store system settings. Once basic setups are memorised to suit the applications, Trak2 becomes simple to operate.

Trak2 caters for all the stereo analogue sources many of us will ever need, but it is the rest of the unit's facilities that makes it unique. In addition to the built-in 2-channel D-A that feeds the headphone output there is the option of adding two or eight channels of D-A for analogue output and or monitoring. Whichever workstation is used there is an

8-channel digital I-O option to suit. If two AMBUS cards are installed, Trak2 will also function as a format changer (but not a sample rate convertor).

I used a DAW running Steinberg's Nuendo to record some solo sax with very satisfying results. The Gain Ride function really comes into its own with wide dynamic

range material and soft saturate seems well suited to the sax.

The Trak2 concept is brilliant. Unfortunately, there are a few snags in the execution. Control sometimes seems a little slow and I experienced a couple of crashes.

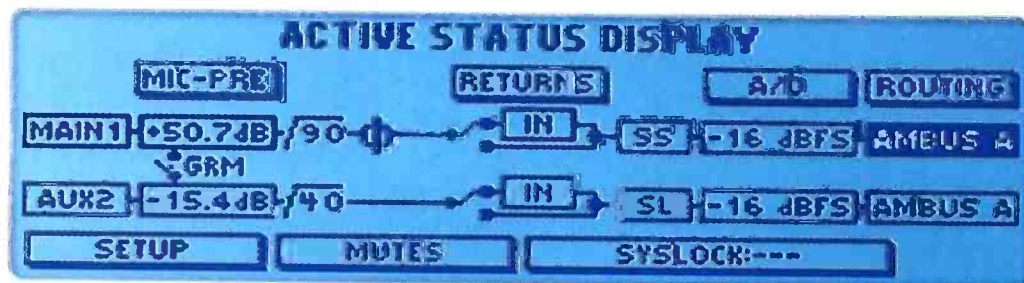
Despite the compact 1U-high packaging, the unit really needs 2U-3U of rack space to provide adequate cooling. The linear power supply is laudable from an audio point of view but, together with other heat producing components in such a small space, necessitates the use of not one but two cooling fans. The larger one runs constantly and does not produce too much noise but the smaller, thermostatically controlled specimen runs pretty much constantly once

the unit has warmed up and produces more noise than my (admittedly quiet) computer. Apogee says it is working on improving airflow in an effort to minimise use of the second fan. If this can be achieved, Trak2 would be the natural companion to a workstation setup, but I can't help wondering if this is one occasion where a bigger box and-or a separate power supply would have been a better answer. Apogee does supply a remote control application (Mac only) but I feel remote mounting the unit would considerably diminish its appeal.

In terms of sound and operation, there is little to criticise. Convertors at this level are largely a matter of personal taste and the analogue circuitry sounds friendly to my ears. The proprietary Soft Limit, Soft Saturate and UV22HR processing are a bonus and Trak2's convertors are certainly a cut above the standard fit items supplied with most workstations. Add a monitor controller, amps and speakers and you have the complete kit. □

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Fairlight DREAM

Fairlight has introduced a family of complementary and integrated DAW products that also redefine and refine its approach to the business of editing and worksurface ergonomics. **Zenon Schoepe** reports his preliminary findings



FAIRLIGHT HAS PREVIEWED the DREAM (Digital Recording, Editing And Mixing) family of multichannel, multiformat production systems as the next generation of product based on its QDC Technology platform which provides enhanced functionality, connectivity and processing power, and a new internal architecture for digital audio processing. QDC uses a dual-processor control system with embedded Fast Wide SCSI and Sync System coupled with an array of independent DSP processor cards, each of which contains four pairs of SHARC DSPs.

QDC systems claim gapless-seamless punch-in/punch-out capability across 48 discrete tracks simultaneously at 48 kHz/24-bit resolution within a single hard drive with unlimited simultaneous real-time crossfades available across all 48 tracks. Performance is extended for 96kHz operation with 48 tracks of 24-bit, 96kHz audio being delivered from the same single hard disk.

The DREAM family includes the DREAM Satellite editing workstation together with the DREAM Station and DREAM Console editing and mixing systems and represent a stand alone editor, an integrated editor-mixer with expandable fader modules, and an integrated mixer-editor presented as a large format mixing console. All are able to work together or independently and are based on an open-architecture framework for third-party plug-in development.

The DREAM Satellite is a 16–48-track digital audio production system with the first major iteration in the Fairlight editing model in over 10 years by employing Binnacle Editing which is said to reduce the keystroke count in editing by 30–50% for the most common actions compared to the MFX3.48.

The Binnacle (named after the housing of a ship's compass) centralises all editing and transport functions around the jog wheel and enables operators to edit eas-

ily and quickly in one-handed or two-handed mode using dedicated keys for TRANSPORT and RANGE, PLAY-JOG, JUMP, FROM-TO, COPY, CUT, ERASE, TRIM-SLIP, and FADE. There is also a blue key that changes the functions of the FROM, TO and JUMP keys and a dedicated macro keypad that features 27 macros arranged in three banks. A 'To Panel' function displays all macros on the main screen.

With the Binnacle's Universal

Availability feature, the basic editing functions are always available on dedicated keys regardless of where the user navigates in the system. Using Finger Memory, users can 'play' keystrokes with both hands.

The Binnacle builds on the functionality of Fairlight's MFX Series consoles and edits are 'constructed' on the basis of the type of edit, the options associated with it, and the target of the edit. New operations include Track to Track razor mode, Multilayer Cut and Paste with Sync Point, Insert Space available at all times, Split Clip-Layers available at all times and Fill and B-F fill available at all times.

Binnacle-powered DREAM series modules, including Satellite, Station and Console, also feature enhanced Zoom functionality, which allows users to change the horizontal scale of the video display, display greater detail on the screen and set the video screen scale to a predetermined ratio. Jog speed is doubled while the blue key is held down.

Designed for use with a studio's existing analogue or digital mixer, Satellite is offered in 16, 32 and 48-track configurations with a choice of analogue and-or digital I-Os and is compatible with QDC-based and MFX3plus-based project formats. Satellite is said to be suited for producing finished projects in track laying, autoconform or ADR rooms for transfer to a DREAM Station or Console for completion.

The DREAM Station is a fully integrated editing and mixing system and in its largest configuration offers 48 tracks of recorder and editor plus eight live returns mixing into any format up to 7.1, plus auxiliaries. It is fully automated with custom manufactured, tri-colour moving touch-sensitive controls, and the control surface can be expanded using Station Sidecar fader expansion modules. Every channel in the system offers full-time 6-band equaliser and dynamics processing and every bus

has full dynamics and EQ as well as insertion capabilities. With third party plug-ins rounding out effects processing, a Station and a set of speakers is said to be all that is required to equip a complete medium scale editing and mixing facility.

For larger facilities, a fully configured DREAM Console offers 48 tracks of Binnacle editing integrated with 96 audio channels with 6-band EQ and 2-stage dynamics plus 48 returns and 48 auxiliary inputs simultaneously mixing a total of 196 inputs for simultaneous generation of multiple formats up to 7.1, with individual level trims for each independent mix.

Buses may be mixed together for stem-based work, and the monitoring system permits compatibility mon-



itoring between formats and speaker sets. A 'unique' grouping and panning system allows smooth and simple manipulation of the mix matrix. With the same EQ, dynamics and plug-ins capabilities as the Station, projects may be transferred between the platforms.

The developments should be regarded as a significant step up in activity from the Australian company which happily coincides with its majority ownership in the Lightworks operation (see Soundings p12). Prices and shipping dates are still to be confirmed but the company is keen to stress the affordable nature of the new product range which should offer a logical upgrade path for existing Fairlight owners and entice a new group of users. □

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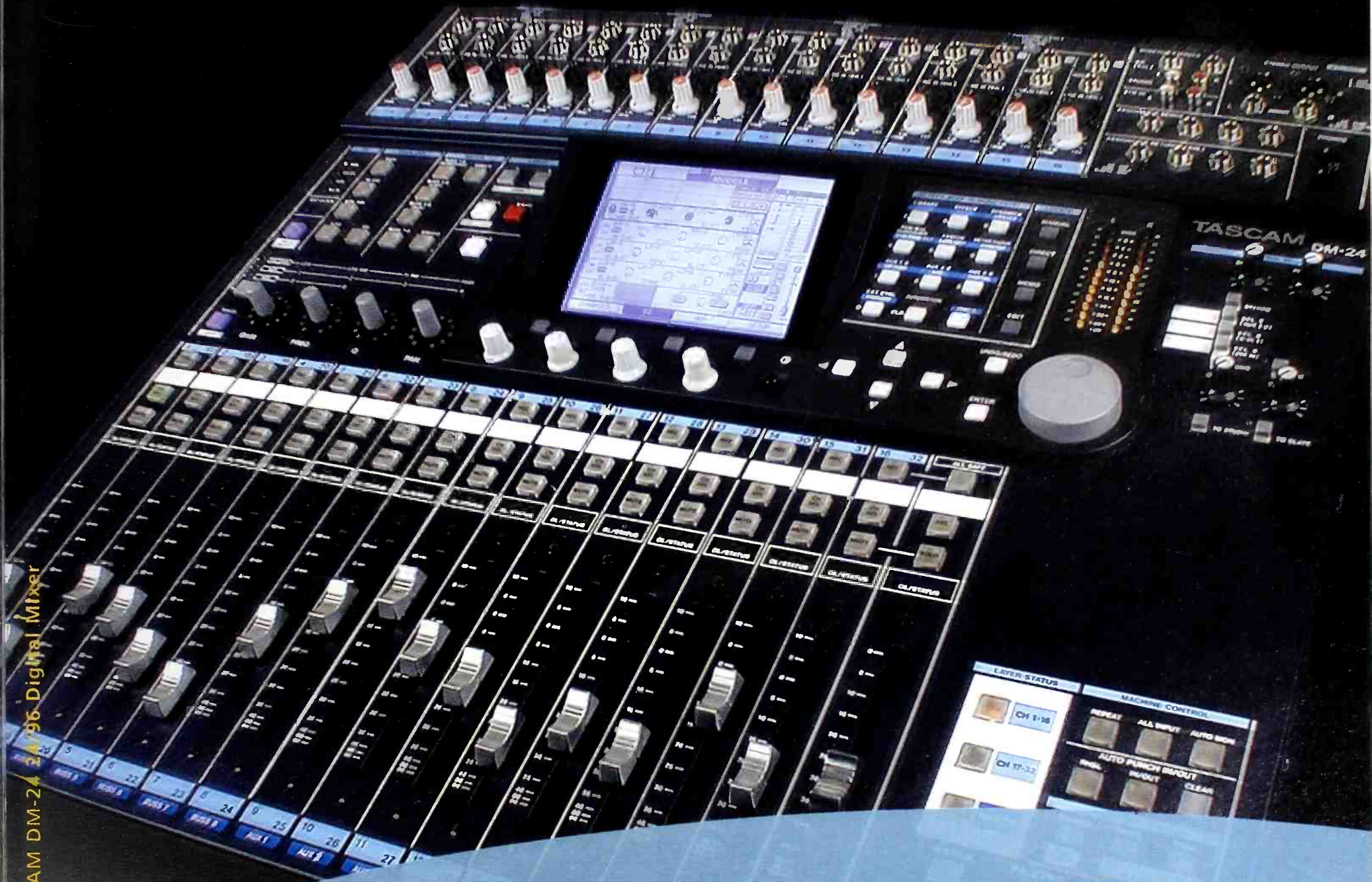
the TASCAM DM-24. why compromise with a more expensive desk?

The new DM-24 is a digital mixer with ideas way beyond its size and price tag. At just 58 cm wide and 62 cm deep, the 24 input, 32 channel, 8 bus console boasts professional features and quality with which mixers several times its size and cost cannot compete.

Sound quality is determined by a 24 bit / 96 kHz signalpath and analogue I/Os are armed with the best TASCAM 24 bit converters yet. The powerful on-board automation controls 4 band parametric EQ, high-quality configurable 2 stage dynamics processing, digital delay and moving faders on

every channel. Also fully automated on every channel are 2 multi-effects processors, featuring reverb, spatial effects and mic/speaker modelling by TC Works™, Antares™ and TASCAM.

There is enough I/O to connect up to anything; XLR and 1/4 inch jack inputs on every channel, 24 channel TDIF and 8 channel ADAT digital interface, SPDIF and AES/EBU stereo, and two card slots for extra TDIF, ADAT, AES/EBU or 24 bit analogue cards. The large LCD screen, LED ring encoders and 100mm long throw faders provide the most professional user interface on any compact console.



With such powerful features and its highly flexible routing system, the DM-24 is a perfect mix partner for TASCAM's MX-2424 hard disk recording system. Expansion is simple with two DM-24s operating as a single console in Cascade Mode; which at this price is not going to break the budget.



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TASCAM DM-24 24/96 Digital Mixer

Roland DS-50A

Studio Sound's 'bench test' loudspeaker reviews continue with the DS-50A. **Keith Holland** reports

THE ROLAND DS-50A is a 2-way active loudspeaker with analogue and digital signal inputs and built-in crossover and amplifier electronics. A 120mm plastic-coned woofer and 19mm soft dome tweeter are arranged vertically in a ported cabinet with external dimensions of 200mm wide x 310mm high x 265mm deep; both drivers are magnetically shielded allowing the loudspeaker to be placed close to CRT monitors and so on. The crossover is specified as 3rd-order at 2.3kHz and the power amplifiers are 30W for the woofer and 20W for the tweeter. The rear panel of the loudspeaker has optical and coaxial digital input sockets along with a coaxial digital output (thru) socket for connecting the other of a stereo pair, and a switch to select right, left-plus-right or right assignment for the loudspeaker (they are not supplied in 'handed' pairs). The digital input uses a 24-bit D-A convertor and conforms with SPDIF with sample rates from 32kHz-96kHz. Also on the rear panel is an XLR-jack analogue input socket for either balanced or unbalanced connection, and controls for level, LF trim (± 3 dB at 80Hz) and HF trim (± 3 dB at 10kHz), along with the usual IEC-type mains socket and power switch.

Fig.1 shows the on-axis frequency response and harmonic distortion for the DS-50A. The response is seen to be fairly uneven, lying between ± 4.5 dB from 50Hz to 20kHz. Low frequency roll-off is approximately 5th-order, indicating the use of a high-pass protection filter, with -10dB at about 40Hz which is good bass extension for a loudspeaker of this size. Second harmonic distortion performance is good, peaking to -40dB (1%) at 150Hz, but the 3rd harmonic is disappointing with a peak to -26dB (5%) at 90Hz (with another to 0dB (100%) at 30Hz which is less important). There is also a peak in 5th harmonic to -27dB (4.5%) at 60Hz. The off-axis perfor-

mance is shown in Figs.5 and 6 for the horizontal and vertical planes respectively. Directivity is seen to be wide with slight mid-range narrowing and some evidence of lobing at around 11kHz. The characteristic interference notch at the crossover frequency is only seen at 30° in the downwards direction.

The time domain performance of the DS-50A is demonstrated in Figs.2, 3, 4 and 7 which show the acoustic source position, step response, power cepstrum and waterfall respectively. The step response shows good driver time-alignment, with the high frequencies preceding the mid frequencies by less than 0.5 milliseconds. The acoustic source position is

seen to shift to 3m behind the loudspeaker at low frequencies which is equivalent to a delay in the low-frequency components of transients of about 9 milliseconds compared to the mid- and high-frequency components. The power cepstrum shows a very pronounced spike after about 40 μ s which suggests that the uneven frequency response (Fig.1) may be due to a very early reflection, possibly from the mouth of a shallow horn through which the tweeter radiates. The waterfall plot demonstrates a rapid decay at all frequencies except for some ringing at 300Hz which corresponds with a sharp kink in the on-axis frequency response.

Overall the Roland DS-50A is a fair performer. The promise of flexibility of application, through digital and analogue inputs, compact dimensions and high- and low-frequency trim controls is let down by below average frequency response and harmonic distortion performance. On the plus side, the transient performance and directivity are both respectable, as is the low-frequency extension for a cabinet of this size. This loudspeaker may prove popular where flexibility and perhaps portability are more important than ultimate accuracy. \square

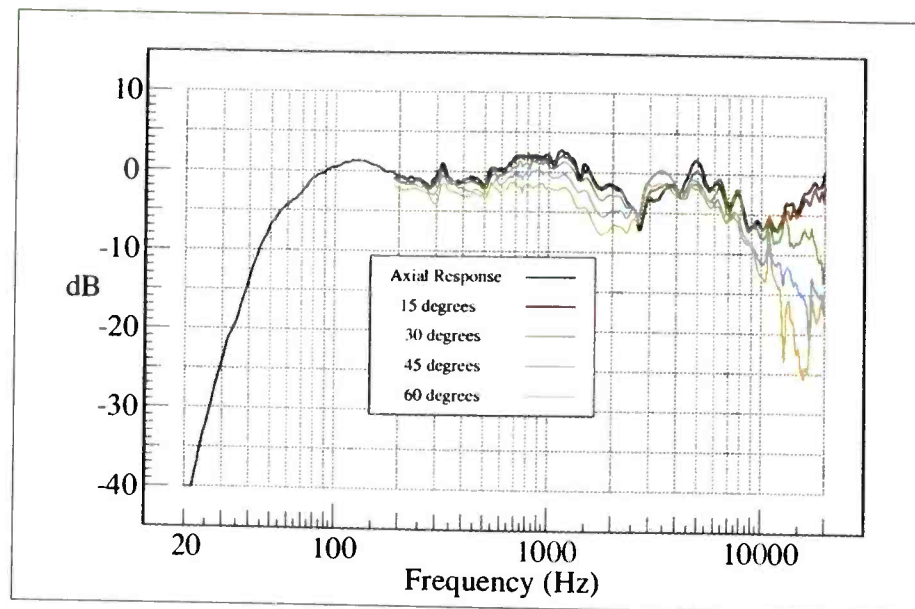


Fig.5: Horizontal Directivity

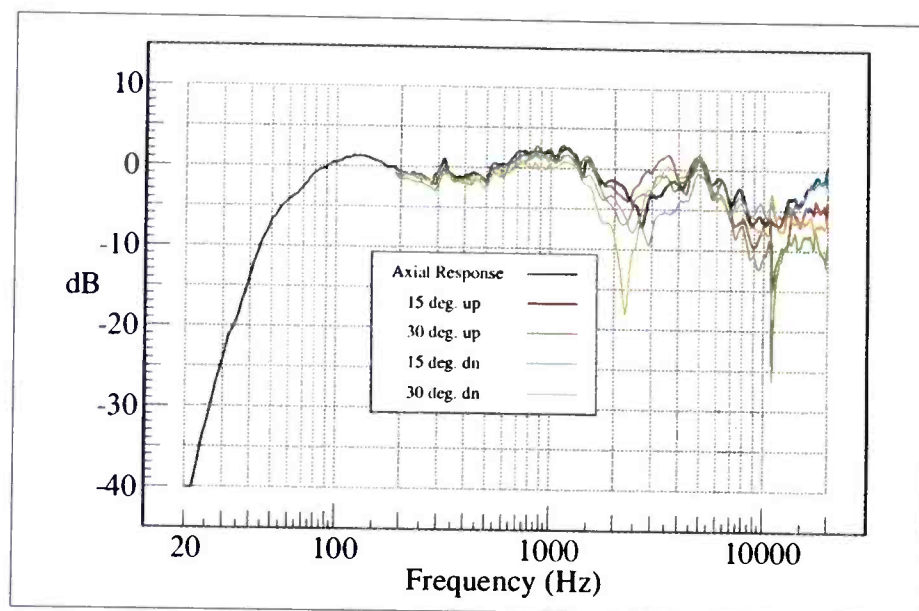


Fig.6: Vertical Directivity

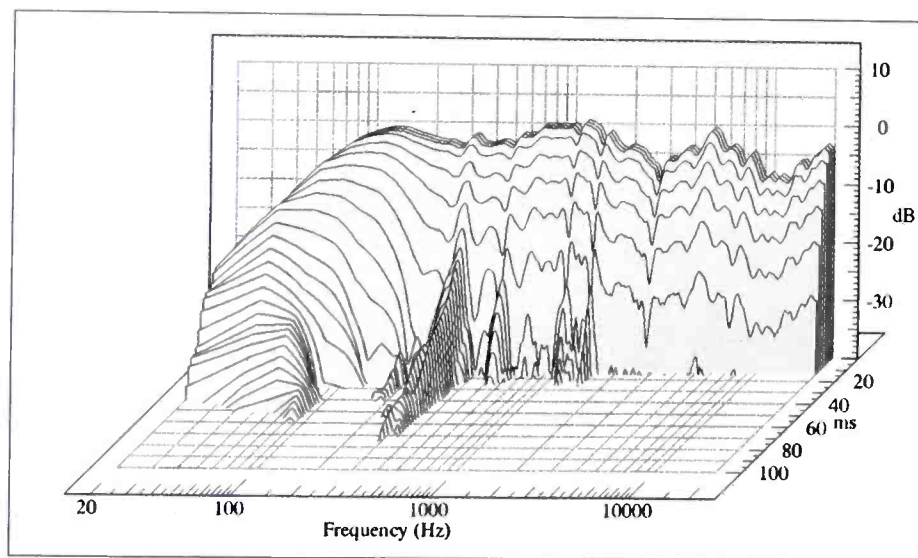


Fig.7: Waterfall

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Methodology

Studio Sound, April, page 14.
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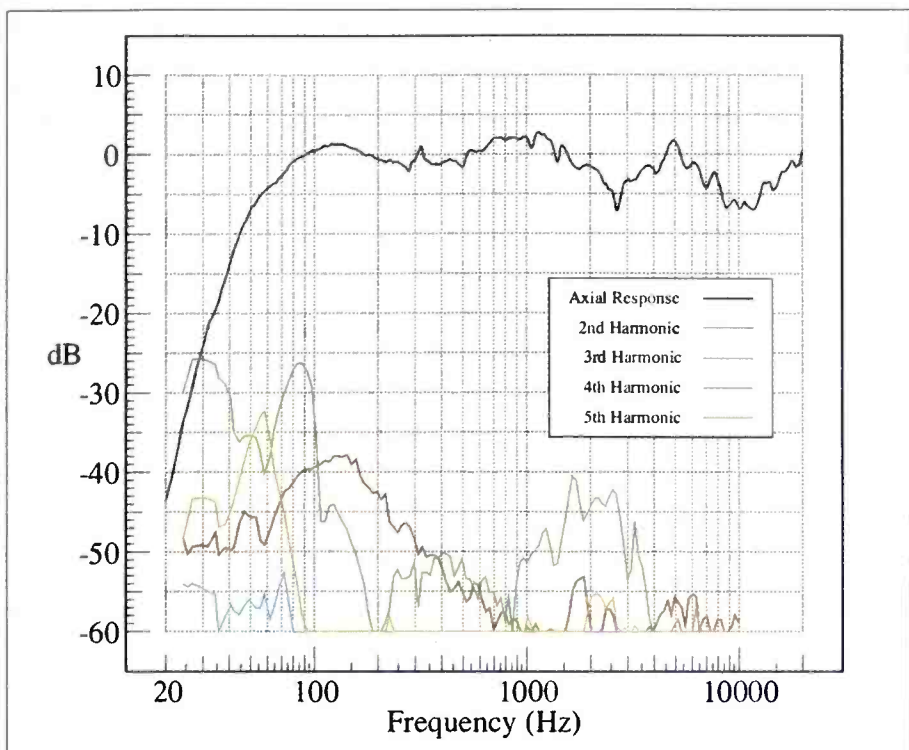


Fig.1: On-axis Frequency Response and Distortion

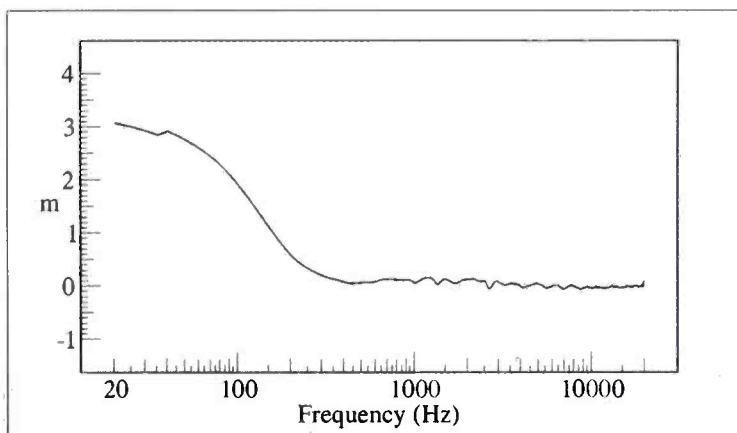


Fig.2: Acoustic Source

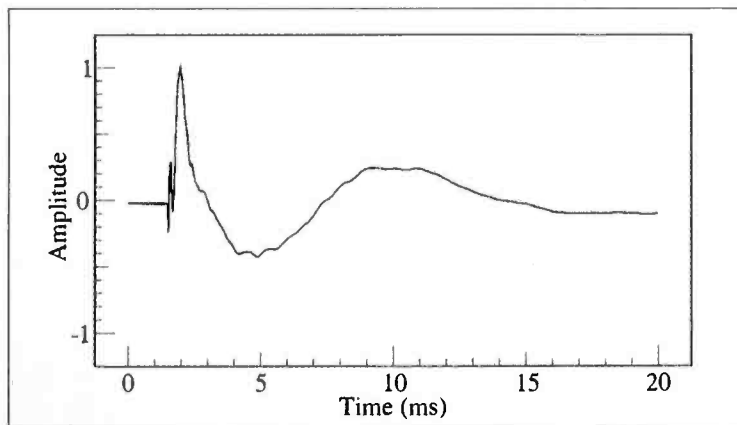


Fig.3: Step Response

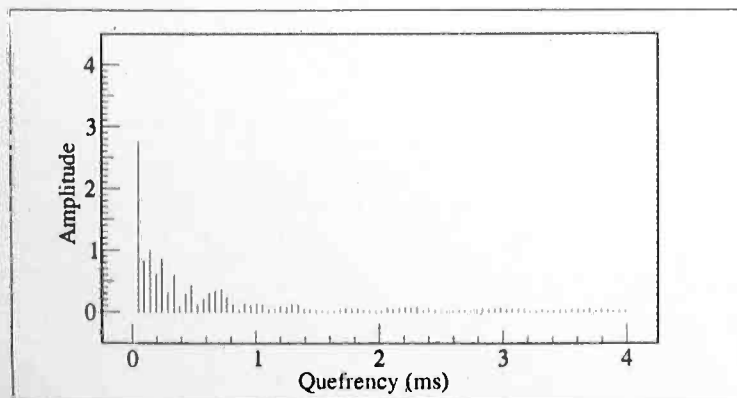
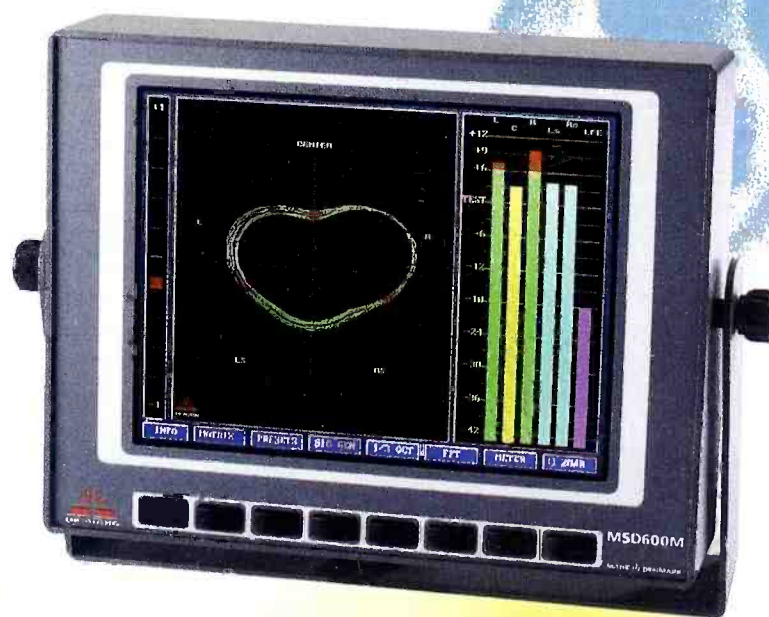


Fig.4: Power Cepstrum

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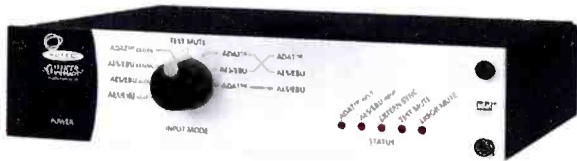


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NEW TECHNOLOGIES

Format converters

Mutec has released two digital audio format and sampling rate converters. The aa version includes ADAT and AES-EBU interfaces while the ta version includes TDIF



and AES-EBU interfaces. Both 8-channel bi-directional devices can handle 24-bit to 88.2kHz or 96kHz and synchronise SRCs to an external Word Clock or Super Clock signal with automatic detection. SRCs can be hard bypassed. Power supplies are included in their 19-inch rackmount cases.

Mutec, Germany. Tel: +49 30 7468800.

Quadriga import modules

The CD-Inspector Jukebox links Quadriga to a CD-Jukebox which can hold up to 575 CDs and contains four high-speed CD-ROM drives, working simultaneously at up to 16x speed. In addition to the supervision of the capturing process it will automatically recognise related data such as track number, index, pause, ISRC and UPC-EAN codes, copy mode (ok-prohibited), emphasis (on-off) and CD text, which can be exported to a connected database. The 9-Pin-Module broadens the spectrum of machines that can be controlled remotely by Quadriga and also handles machines that cannot be controlled remotely, such as wax cylinders, wire

Lucid AD9624 & DA9624

A pair of new audio converters from Lucid aims to do more than offer affordable conversion options, it marks a return to operational simplicity. **Rob James** reports

THERE IS A MYTH that life used to be much less complicated. In the far off days before digital, all you had to worry about was level, impedance, balanced or not and whether the plug would go in the hole. Lucid's AD9624 and DA9624 converters are intended to return some element of that earlier simplicity to our lives, as we shall see.

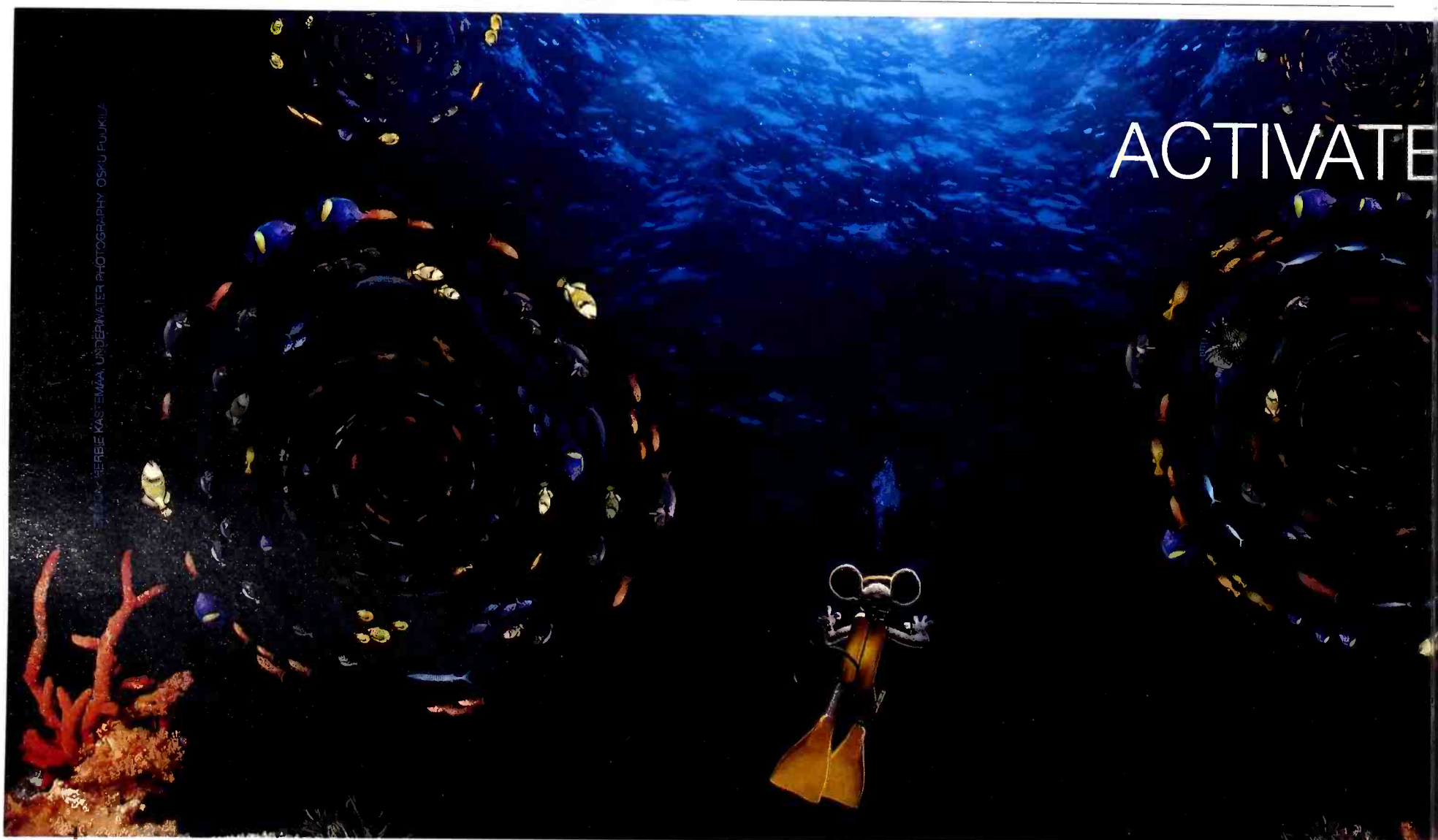
To this commendable end, Lucid has opted to include both of the most popular digital interface options—AES-EBU and SPDIF—in co-axial and optical flavours. In the case of the AD9624, A-D converter, all three output formats are available simultaneously. And recognising that both units will be used in a wide variety of environments, Lucid has made provision for changing the analogue output of the DA9624 D-A from differential balanced to floating balanced. This is accomplished by moving four jumpers, accessible once the lid has been removed. This has the advantage of maintaining the output level whether the unit is feeding balanced or unbalanced destinations. The downside is dynamic range reduction of 1dB.

Both units are 1U height, half rack width. Construction is solid, thick steel cases with chunky alloy front panels. The converter chipsets employed in both units are 24-bit sigma-delta devices. Power is provided by an external

in-line unit—while preferable to 'wall warts' I would like to have seen a locking connector (Molex or similar) rather than the 7-pin DIN currently employed.

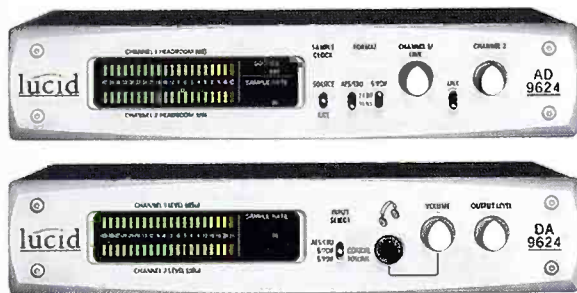
The front panel window of the AD9624 has 20-segment horizontal LED bargraph meters calibrated from -42dBFS to clip. Clip indication requires three consecutive clipped samples to register. The right-hand side of the display indicates internal or external word clock source and sampling rate. Sample clock is set by a 3-position, centre-biased toggle switch. Up selects between internal and external clock and down toggles through the internal frequencies 32kHz, 44.1kHz, 48kHz, 88.2kHz and 96kHz. Two FORMAT toggle switches independently select the output word length for AES-EBU and SPDIF outputs. Noise shaping is used when 16-bit outputs are active. Two knobs with a LINK toggle switch between them set the analogue input gain. When linked the Channel 1 pot controls both channels. The switch links the channels in the up position which is counter-intuitive for markets where light switches are down for on. There is no LED indication of whether Link is engaged.

On the rear, analogue inputs are XLRs, electronically balanced, using a simple differential amplifier. Maximum input level for 0dBFS is +25dBu. Outputs are XLR AES-EBU and both co-axial and Toslink



SPDIF. Word clock input is BNC.

The DA9624's 20-segment meters are calibrated from -33dBu to +24dBu. Indicators show sample rate, 32kHz, 44.1kHz, 48kHz, 88.2kHz or 96kHz and whether the unit is locked. A 3-position toggle switch selects between the three digital inputs. A TRS jack and volume pot



allow for headphone monitoring and a single pot controls output level from both channels.

Analogue outputs are on XLRs and TRS jacks connected in parallel, electronically balanced. Digital inputs are XLR AES-EBU, co-axial and Toslink SPDIF.

There are a couple of curious stylistic differences between the twin units. The AD has sculptured front panel and metallic knobs whilst the DA eschews such fripperies with a plain square front panel and black plastic knobs. I guess one could be an earlier version...

The cost of half-way decent convertor chip-sets has been falling rapidly. As a result, DAW, console and recorder manufacturers have incorporated them into their products at all price points. However there is still a place for stand alone units which offer good quality conversion, connectivity, metering and analogue control. Apart from any other considerations, keeping analogue signals away from electrically noisy areas such

as PCs is always a good idea.

In operation, both units are a model of simplicity. Changing sync source or sampling rate is accompanied by a rather fetching 'curtain closing' effect on the meter display. It's irrelevant from the sound point of view, but it is a nice touch.

I experimented with a range of sources, destinations and material. Both units acquitted themselves well. Control is smooth and the meters are informative with well chosen time constants. The DA9624 is capable of driving up to the full +24dBu if this is important to you.

Sound wise, to my ears at least, these units do a more than adequate job. I compared them with a number of 'built-in' convertors and whilst there is a discernible improvement on some material they lack that certain something exhibited by the best of the breed. However, that rare sense of sweetness and air only comes at considerably greater cost, in some cases many times the asking price here.

Lucid's boxes provide a cost-effective solution to a wide variety of conversion and connection conundrums. Mount them side by side in the optional RM-4 rack tray for a 1U-high answer to 24-bit stereo analogue conversion in both directions at sampling rates up to 96kHz. Used individually, they should prove very popular as an upgrade or just as a simple and convenient means of getting into or out of the digital environment. □

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Net: www.lucidaudio.com
SCV, UK.
Tel: +44 20 7923 1892. **Fax:** +44 20 7241 3644.

NEW TECHNOLOGIES

recorders and standard turntables, with a simple audio connection. Like all other Quadriga import modules, when used in conjunction with Analogue Observer, the 9-Pin-Module supports automated monitoring and logging of audio streams for technical parameters of archival significance. Cube Technologies' Cube Waveform Restorer provides an additional seven algorithms, significantly enhancing the AudioCube's manual interpolation capability included as standard in AudioCube's Wavelab editor. For smaller sections of disturbance (5ms), with a low level of background noise, the 'Optimal Small Clicks' algorithms should be used first. 'Long Clicks' is optimised for longer clicks (up to 100ms), but can also be used for small clicks, or disturbed regions. Both algorithms can be used in a from left or from right only versions, if the clicks reside within a region of general disturbance.

Cube Tec, Germany. Tel: +49 7435 910 942.

Pegasus multicore

The Pegasus from Sommer is described as a studio multicore for high-end applications. Two opposite 'crossover' wires achieve a very low capacitive value of 38pF and almost loss-free transmission even for longer lengths. A tight stranding technique and fine oxygen-free copper litz with a diameter of 0.05mm achieves a high bending cycle and a long life expectancy. The multicore is equipped with overall shielding and paired shielding and available in 2, 4, 6, 8, 10, and 16 wire pairs. Sommer, Germany. Tel: +49 70 824 91 330.

YOUR BYTES



Genelec S30D and 2029B - the two Digital Monitoring Systems which match the sophistication and performance of the finest digital studio equipment, combined with an unparalleled ease of use. When you need a powerful full bandwidth nearfield monitor from 35 Hz to 50 kHz, then your choice is the S30D, and for precision closefield monitoring, the 2029B is the one. With both you have 96 kHz/24 Bit digital interface with AES/EBU connectors. And analog as well, of course. Activate yourself and visit our website: www.genelec.com to learn more about about your digital future.



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Sony CDR-W66

Despite its role in the creation of CD Sony has been late to the stand alone professional audio CD-RW game. **Zenon Schoepe** reviews its overdue response and concludes that it can take on anyone

AT LAST. A CD-RW from Sony and a machine that pretty much answers all the objections that I have levelled at existing products with its feature and performance list. However, you can't buy a more expensive CD-R machine.

Build quality is what I would describe as 'first generation' which is a complement because as CD-Rs have got cheaper and more widely available the trend has been for largely lighter weight devices. The Sony is compact but feels substantial and the use of plastic isn't especially evident although the drive door and platter is particularly lightweight and 'modern'.

Front panel arrangement follows the lines of logic established by Sony's excellent MDS pro MD machines in the use of a dial with associated buttons. It's very easy to operate because

you can read what it can do from the front. There's a MENU button that accesses the deeper functions such as track ID marking

mode, recording threshold level, recording balance, fade in-out time, DSP functions, clocking mode, copy bit status, and remote pin assignment. Unusually for a CD-R machine you can go into the menu while it is recording and change values—which is really how it should be.

There are four switches beneath the dial that concern themselves with CD text entry and checking but they are largely redundant as this is the first CD-R to offer a PS/2 keyboard connector which makes text entry as natural as we all know it really ought to be. However, 23 characters for each disc name and each track name is barely enough. You can also remotely control the machine from a keyboard which tends to eclipse the supplied and excellent remote control which can operate in wired or infra-red modes.

You get traditional transport controls (track location is performed via the dial) fader switch and music sync button for simplified synchronised recording with a suitably able Sony CD player. Record mute is 4s, longer if you hold your finger down. Interestingly the playback orientated controls are placed on the drive side of the front panel leaving the real business to be conducted on the busy side of the panel along with the excellent display with switchable peak hold metering. It's here that you'll find the input selector and a switch that makes the CDR-W66 special. The converters are 24-bit and you can insert a SBM filter into the process for AES-EBU and analogue signals. You can also employ a variable limiter and 3-band EQ, the latter being swept in three frequency bands with HF and LF shelves plus a mid that has three Q settings but all offer ± 6 dB of gain. I couldn't bring

myself to use the EQ but the limiter was certainly a useful safeguard for unpredictable analogue incoming. You'll have SBM on all the time.

The SRC will run from 32kHz to 96kHz on the AES-EBU connector and is bypassable totally on the coaxial and optical inputs.

The back panel really has it all in all flavours of digital inputs and outputs (XLR AES-EBU, SPDIF coaxial and optical), balanced analogue I-Os (independent trimmers on each) plus paralleled analogue I-Os on phonos. There's also a parallel port, RS232C, word sync connector, a socket for dubbing between CDR-W66 machines at double speed, and a socket for the wired remote.

Quite frankly, no other CD-R exceeds the connectivity of the CDR-W66 and most of the ones

currently available fall substantially short of it.

All this and a timer switch, a captive mains cable and those annoying little rubber feet that you have

to prise out otherwise it won't fit the allocated 2U. Hmm.

But it is extremely hard to fault. You're getting first generation build, a best of current generation features set and then some, and, it has to be said, comparatively first generation price. This is not a cheap machine and it places itself right at the very top of the stand alone CD-R scale. As such this is going to be nobody's first step into CD-R, the features and price are not going to turn first timers on, if there are any actually left to the format. However, what it undoubtedly will do is tug at the heart strings of experienced users who can appreciate the difference and want it.

The SBM feature is unique on such a machine as is the EQ and the limiter and the level of connectivity cannot be beaten. It is in a class of its own. From an operational standpoint the keyboard connection deserves mention as it makes CD Text entry simple and you can remote from it too.

Perhaps it won't be a massive seller but there will be some for which it will hit all the right buttons and will make the decision a no brainer. It sounds fantastic and Sony should be commended for choosing to address the very top-end of the format with something special and professional while most of the energy seems to be directed at seeing how low it can go. I have to recommend it.

Contact:

Sony Broadcast & Professional Europe, UK.
Tel: +44 1932 816340.
Net: www.pro.sony-europe.com/professional-audio



NEW TECHNOLOGIES

A-T's 30 Series sticks

Adding to the AT3035 large-diaphragm side-address cardioid condenser microphone, A-T has introduced the



AT3031 cardioid and AT3032 omnidirectional small diaphragm condenser microphones to its 30 Series. The low profile mics have a claimed frequency response of 30Hz–20kHz, high SPL handling, 48V phantom power operation, and an 80Hz, 12dB/octave switchable roll-off. Audio-Technica, UK. Tel: +44 113 2771 441.

AES 42 digi mic receiver and pre

Stagetec has released an input card which supports the newly standardised AES 42 protocol for digital microphone receivers. The neXus AES-EBU Receiver XER card allows a digital microphone to be connected directly to the Nexus digital audio routing system and offers phantom powering for digital microphones as well as remote control of microphone functions such as pattern control, pre-attenuation, synchronisation modes, low-cut filter, phase change, and light control. The card reads and monitors the factory ID, serial ID, and model ID of the connected digital microphone. It is also prepared for future developments such as digital wireless microphones where it shows parameters like link loss, battery low, and squelch. The company has also shown the TrueMatch reference microphone convertor with 153dB(a) and 96kHz capability which allows the direct connection of a microphone and claims to make conventional analogue mic preamps and A-DCs obsolete. The patented technology offers a resolution of 28 bits and claims to work in a completely linear fashion. It can handle input levels from -128dBu to +22dBu without gain adjustment. It's available in variety of versions from a stand alone system up to a built-in version for the Cantus console or Nexus routing system. The stand alone version can be equipped with ADAT, TDIF, MADI or AES-EBU interfaces. Stagetec, Germany. Tel: +49 9545 440 300.

Radical monitor

Developed by Fujitsu Ten, the Eclipse TD 512 is based on Time Domain technology and claims to represent a fundamental re-engineering of speaker design. The Eclipse TD 512 speaker is supplied with its own Eclipse A 502 pre-power amplifier. Aside from the loudspeaker's 'egg' shape the single driver is decoupled from the cabinet fascia and mounted internally via a massive integrable stand, which provides mechanical 'grounding' of the driver assembly. The enclosure



Ronald Prent

on EMTEC tape



"If the choice is left to me,

I use **EMTEC Studio Master 900 maxima**. It is such a high-class analogue tape that I could not find a better one even after comparing several tapes with it. You get a super performance from **EMTEC Studio Master 900 maxima** even when you push up the level. The clarity is phenomenal. The little bit of noise that does come off the tape is much warmer and not offensive at all, making the tape very musical and punchy. I don't use anything else now."

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

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XTA DP234 SIDD

Better known for its live sound products, XTA has arrived at a unit that delivers digital dynamics and a lot more to all who would listen. **Zenon Schoepe** reports

THERE REALLY ARE INCREASINGLY fewer boxes that are comfortable straddling the live and studio domains but this is one of them. While it sports a number of features that reveal a live sound bias, much more in the DP234 SIDD (Seriously Intelligent Digital Dynamics) will appeal to those who want the repeatability and precision of digital in other walks of life.

The front panel will be quite unlike anything you will have seen before as it sports an incredibly high LED and switch count for the available area. However, once you get your head around what's going on and what it means all becomes surprisingly straight forward.

The SIDD offers two inputs and outputs plus a pair of aux outputs, which can be configured to monitor the Listen circuit among other things. All are balanced. What you are looking at on the front panel is two identical blocks of LED-switch cluster, corresponding to the two channels, and a data entry



section. The former informs you of input and output level on bargraphs, and little sections that indicate the activity and status of the unit's dynamic EQ, expander, compressor and limiter sections within each channel. This means that the busy right-hand half of the panel's predominant purpose is to feedback information and status, it's the altogether simpler left side that concerns itself with parameter adjustment.

You press a relevant channel's processor 'block' button and this calls up its parameters in the clear but not overly huge LCD. You scroll through a processor's parameters using BACK and NEXT keys and adjust them using three soft dials. A BYPASS button switches processing blocks in and out of a channel and can be used to flatten an EQ band.

I'll try to be brief, but what you have to play with on each channel is six fully-parametric bands of 20Hz-20KHz EQ with +15 to -30dB gain and shelving options, high- and low-pass filters, compressor with variable knee and look ahead delay plus two bands of sidechain EQ, noise gate-expander with look ahead plus high- and low-pass filters and two parametrics in the sidechain, a rather fine dynamic equaliser, delay with separate ADT module, brickwall limiter with look ahead and side chain EQ, and a 2nd and 3rd harmonics generator for valving things up.

A MENU switch accesses deeper system-wide and setup functions—there can't be many units that allow you to dim or brighten the intensity of the front panel LEDs.

There's a slot for a PC memory card to add to or copy, for the purposes of removal, the internal 256 patches. It's worth noting that you can store individual processing module settings or complete

channels. Channels can be stereo linked by linking all their processing modules.

The highlight of what might otherwise be a pretty involving editing process is that you can listen to each module individually as you are working on it. An enormous amount of control is on tap which, in honesty, can become mind boggling with the operational method if you choose to use every module available to the max. However, in practice you're more likely to be after a particular module or pair of modules which slips the whole operation back in to the realms of comfort. While working on a module, on-screen metering keeps you in touch with what is happening and the core parameters of each takes up no more than three screens and the parameters are grouped intelligently. The aforementioned front panel LED count is employed to surprisingly good effect to meter individual module activity.

Everything works as it should. The compressor is excellent as is the limiter and, while I'm not about to get drawn in to the analogue-digital dynamics

debate, they behave predictably and sound fine. I particularly liked the dynamic EQ and you can decide whether processing is to cut or boost above or below threshold. It's a simple little circuit but clever enough to do the things that you can't achieve with traditional EQ.

The Harmonics are subtle but getting around and staying on top of six bands of parametric EQ is a tall order with the operating system and small display but the immense scope for adjustment and full bandwidth nature of each band means that you can often get away with using just two. It's the versatility and power of the SIDD that lingers.

There's an AES-EBU I-O and balancing transformer option but MIDI, RS232 or RS485 derived remote control is standard. A software package allows you to run and manage multiple units from a PC.

So many digital boxes employ a variation on what has become a fairly standard and largely accepted mode of navigation and adjustment. This is all well and good for familiarity but it doesn't exactly move the cause of accessibility and improvement along. It's more of the same. The SIDD is different in this respect and enjoyable to use as a consequence.

Repeatability is one of digital's greatest strengths and with the SIDD's individual take on the interface and excellent performance, it may be enough to cause you to rethink your stance on digital dynamics in recording. □

Contact:

XTA Electronics, UK.
Tel: +44 1299 879977. Net: www.xta.co.uk

NEW TECHNOLOGIES

is floated from the movement of the driver assembly and an integral 3kg damping anchor immediately behind the driver provides further inertial weight.
Fujitsu Ten, UK. Tel: +44 20 7328 6100.

Flexipatch from M&M

Mosses & Mitchell has developed a range of flexipatch jackfields using PCB technology and available with B gauge or miniature jacks with plain or bright nickel



plated brass bushes for reliability and hard wear.

The PCB feature connects the jacks to a 56-way EDACS connector on the rear panel and a DIP switch mounted on the PCB allows simple configuration for normalising.

B gauge jackfields are available in 1U or 2U sizes with 24 jacks per row, mini jackfields are available in 1U with 48 jacks per row in equal or stereo spacing.

M&M, UK. Tel: +44 1753 637900.

Combined mixer-codec

AVC has released a portable remote broadcast mixer with built in 15kHz FM quality ISDN and POTS codecs.

The I-Mix Intelligent Portable Remote Studio features proprietary POTS modem technology for the same stability and audio quality over a standard telephone line as broadcasting over an ISDN link. It has five mic-line switchable inputs with mix minus on each input channel, channel ON-OFF buttons, CUE and RELAY control buttons for local and even remote control of equipment over the link.

Operational features are software controlled and I-mix also has PA output controls and G3 GSM Cellular and IP data network interfaces. Users can choose from proprietary full bandwidth 15kHz ISDN and 15kHz POTS speech and music algorithms delivering 100ms delay or interface with generic ISDN Codecs using the G722 algorithm.

The I-Mix can stream text, control data and perform remote control tasks via an ancillary data channel.

AV Communications, Australia. Tel: +61 8 9249 6688.

Digigram net solutions

Digigram has announced that Peak Audio's CobraNet technology will be implemented into Digigram-branded products and Digigram will offer CobraNet OEM developer modules for integration into third-party products.

The Aztec AZ100 FM Navigator is now compatible with Microsoft MapPoint software and Aztec FMTEL5 for remote monitoring and analysis of FM signals via standard IP protocols. The combination is said to make data analysis simpler and more powerful by allowing field measurements to be represented on MapPoint-generated maps. AZ100 FM Navigator can be set to measure single or multiple frequencies, and includes a built-in GPS receiver for completely automatic signal mapping. The Aztec FMTEL5 FM 'intelligent' FM tuner and RDS receiver comes with Aztec Radiomedia IP2 remote control technology and enables the remote supervision of multiple FM transmissions and their respective RF, audio and RDS parameters. IP2 technology permits high-level open administration via common browsers and standard Internet services. MiXart is described as not just another sound card but an entirely new development platform for audio applications. New for the show are an AES-EBU I-O option and an option for onboard real-time MPEG audio encoding



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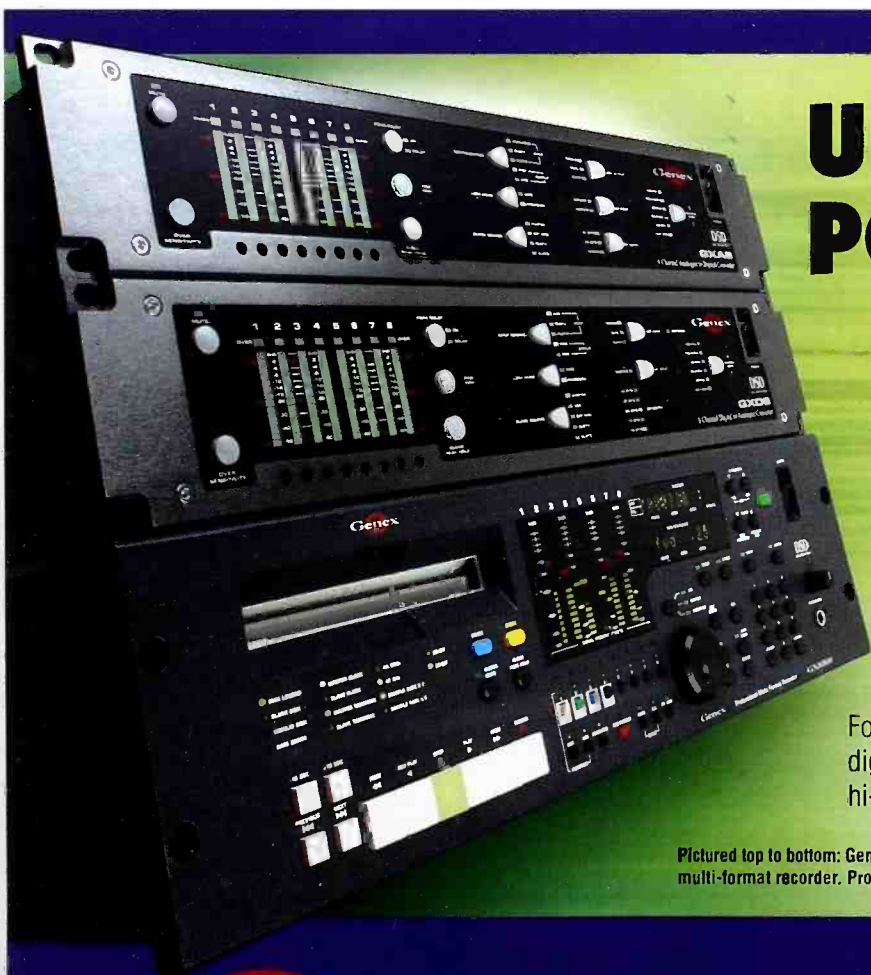
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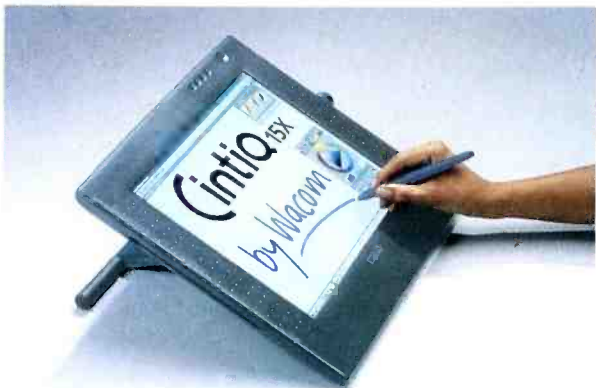
www.hbb.co.uk

NEW TECHNOLOGIES

and decoding. It combines powerful onboard processing with comprehensive audio mixing functions and the cards are based on Motorola's PowerPC processor. Digigram, France. Tel: +33 4 76 52 4747.

WACOM launches Intuos2

Targeted at computer users wanting to try something different to their mouse, WACOM has introduced a professional graphics tablet with a powerful expandable



toolset. The Intuos2 range of five tablets include a new ergonomic input device design and a revised colour scheme. The Intuos2 Grip Pen has a wider rubberised grip area and a fully programmable double side switch and a pressure sensitive tip and eraser. The original accessories: the Classic Pen, the Stroke Pen, the Ink Pen, the Airbrush and the Lens Cursor have been updated for Intuos2.

WACOM, Germany. Tel: +49 2151 3614 304.

Ultrasonne HFI-2000

A relatively new player is making an assault on the headphones market with a couple of technology twists all of its own. **Zenon Schoepe** plugs in

ULTRASONNE HAS BEEN DOING the rounds at the exhibitions for some years with a noticeable recent increase in profile coinciding, unsurprisingly, with the company going to limited status in its native Germany.

Two major issues differentiate its headphone designs from the many other manufacturers vying for your ear time—so-called 3D sound and reduced magnetic emissions. Dealing with the first of these, Ultrasonne attempts to replace the 'in-head' localisation of headphones signals with an out of head experience. This it has achieved, according to its R&D, by what amounts to an off-centre positioning of the drivers which it says exploits the structure of the ear and gives the brain a little more information with which to assess and interpolate. It's worth mentioning that this process involves no DSP or other electronic trickery relying instead on a different interpretation of traditional headphone design—a better headphone is what the manufacturers would like us to think therefore. You plug them in, wear them on your head and treat them entirely like any other headphone.

The emission issue is one that has made a lot of news recently, particularly with regard to mobile phones, and while there is no conclusive proof to say

that any of this stuff actually hurts us, once you are made aware of its presence you think again about the build up of ear wax being the only side effect of prolonged headphones wearing. I mean, look at drummers and cameramen.

Ultrasonne conveniently has some stats for digestion and makes the HFI-2000 available in two reduction levels: the low emission LE model for a reduction of at least 60% compared to average conventional headphones and the ultra low emission ULE model for a reduction of at least 95%.

To put this in to the context that Ultrasonne does, in the TCO '99 spec pertaining to magnetic emission from computer screens, 200nT (nanoteslas) at 30cm is the upper recommended limit.

Recommendations for the low-frequency magnetic emissions in the case of headsets and headphones are still pending or not thought of as being important but Ultrasonne's own research into 60 current headsets (1999-2000) found that the average magnetic field emissions was more than 1000nT with a peak maximum of 2100nT and that's for items that are clamped to your head. Ultrasonne ULE cans achieve 90nT.

Build wise these headphones don't look particularly different or remarkable, the only point of special



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note being the fact that the HFI2000s are an open design, not what I prefer to use, and feature cloth covered cups rather than the more usually encountered leatherette. There's a broad widely adjustable band that pivots on a coupling just above each cup



holder and the cable is fixed into the left cup through a nice quality kink-free cable culminating in a gold plated mini-standard TRS jack combo. Pulling the earpiece off quite easily reveals a polished plate, which is involved with the reduction of emissions presumably,

and an off-centre driver firing through neatly drilled and angled holes.

And they are comfortable, and like many open designs, almost too comfortable as initially I thought they might slip around. But stay fixed they did.

I have to admit that the degree of out of head experience that was forthcoming to me was not staggering although I'll acknowledge that the image seemed wider and deeper. Ultrasonne supplies a demo CD which aims to demonstrate the principle in action through a variety of recording types and configurations. I'll come clean and admit that as an individual I seem remarkably impervious, as a rule, to psychoacoustic effects and have been left looking around quizzically, on more than one occasion, while others marvel at flying tambourines and saxophones from demonstrations of pseudo 3D

sound from two-speaker stereo systems, for example. As a consequence I would recommend you hear a pair for yourself and see what it does for you.

I would say that they are relatively untaxing to wear and listen to and I might be persuaded to suggest that perhaps I did err on the side of fractionally less SPL inside that I might have applied traditionally. Frequency range is quoted as 15Hz to 25kHz and impedance is 75Ωs. The response seems smooth and there's a brightness that is apparent but not unpleasant and you become accustomed to them very quickly and forget they're on which is always a good sign. By definition the whole stance of the HIFI-2000 is one of critical listening and this is likely to be wasted on a drummer wishing to recapture his Madison Square Garden experience. Ultrasonne does produce closed models which share the company's philosophies and features and I've heard these and like them too. However, the model looked at here is the flagship of the range and would without doubt qualify for serious consideration by anyone who has to use headphones regularly and for extended periods as they are certainly comfortable and pleasant in response and character.

The 3D properties and the stance on emissions are commendable and surely endow Ultrasonne with a unique selling point. Make the time to hear and work with some for an extended test. □

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RAFA SARDINA

It's an anomaly that few Spanish engineers work outside of Spain and few Latin music engineers are Spanish.

George Shilling discusses Rafa Sardina's unique profile at Abbey Road's revamped Studio One

RAFA SARDINA IS an LA-based engineer with an impressive client list and a couple of Grammy's under his belt. He has worked with names such as Macy Gray, Angie Stone and Dru Hill and has engineered a number of movie score and soundtrack recordings. He was recently ensconced in Abbey Road's recently-refurbished Studio One for three days of orchestral recording.

How did you get started in the music business?

I started doing live sound for mainly folk, world and jazz music in Northern Spain and the south of France. I was doing live sound for an artist, and he happened to need an assistant in his studio, so I started fooling around there, once he knew he could trust me. Being in a small studio was a great experience; I didn't have the constraints of bigger studios which have more rules about how you do things. That was my beginning.

Afterwards I studied for a while in the United States and I happened to have the big opportunity of getting an internship at Ocean Way Studios in Los Angeles. It wasn't really planned, it just happened. I was studying recording engineering; I wanted to learn more about different aspects, even music! I play guitar and bass—I still play. That was why I got into the business. After a

few years—I think this happens to every engineer, especially when you start engineering—you stop playing. You don't have the time. I've tried to get back to playing and it really helps to focus more on the main reason why all of us are in this business.

Did you assist on any particularly notable sessions?

The second week I was working at Ocean Way was the prerecording for the Academy Awards, and it was a really big orchestra with lots of invited people, from Celine Dion to Natalie Cole. It was seven days of non-stop recording. That I think was the best thing about Ocean Way. At the beginning of the nineties, it was one of the few studios that, because of the nature of the room acoustics, had a lot of bands. It allowed you to use the room as an instrument, and learn miking techniques, which doesn't really happen any more.

What happened after Ocean Way?

I got my break with a very good friend of mine—and still a very good client of mine—Camara Kambon, a great producer. He's involved in scoring for movies and R&B and hip-hop music. Back then I started doing work for Dr Dre and Dru Hill. At the beginning Dru Hill

was a big client, he was number one in the Billboard charts, and that was a great thing for me.

Did you take projects back to Ocean Way?

Some of them I did, I really like the kind of environment they have. It's a very old school type of studio. The whole environment reflects that, the colours of the décor. The technical department is just exceptional, and that's one of the main factors of working in any studio—how good the people are. There's rarely anything that doesn't work. Plus the acoustics are amazing. They are smart enough not to try to modify something that was really good from the very beginning. That happens way too often, even in the United States, so many rooms have been remodelled, and they tear the floor apart just to realise later on that the floor was a big part of the sound. Over a year ago, half of Ocean Way became Cello, but I still consider them Ocean Way, and they still smell the same!

What is your philosophy when recording an artist?

I try to connect people. Besides working on how you approach a project sonically, I think the most important thing is how you make the client feel dur-

ing the session, how you build their confidence. Because I think that's the biggest risk, having insecurities. They are always going to happen, but helping the client, the way you interact and how you respond to their music, even how you form your opinion of what they are doing. I wouldn't say I'm a diplomat, the opposite in a way, but you have to express yourself in a way that something positive can come from a situation. When you think something should be done differently, you have to make the client realise on their own, that, 'Yeah, that's the way to go.' You can't really tell them... sometimes you can, but it depends on personalities. Most often you have to suggest it so they realise.

You have won Grammy's for your work with Luis Miguel. Who is he?

He's an international artist with a Latin background. I have been working with him for four years and have done four albums with him. He is a big artist in Latin America, and in Spain. He does a big range of musical styles, including orchestral recording and even Mariachi.

And how was it to work with Macy Gray?

She's such a sweet girl, she really has a talent. She's very spontaneous, the kind of artist where you'd better have the first take, even if it's with the talkback microphone or something, because she's quite brilliant.

Is she interested in what happens in the control room?

Not that much, she's just interested in the result, which is what most people can hear.

What's your favourite console?

For tracking I have plenty of my own gear to work with, I have old Neve 1073s, APIs, Mastering Lab pre-amps which I love. In those circumstances I don't rely that much on the mixer, I just use it for bringing back the tracks. But for tracking I love old Neves. I like 8032s, APIs, those types of console. Even though, in the world of new mixers, I think the SSL 9000, even for tracking, it's one of the best. And for mixing the 9000 is my first choice. I think the automation is quite brilliant and you can move fast.

What other gear do you have?

I have a couple of microphones, I have a Neumann U48, which is pretty rare. It's like a U47 but with figure-8 and cardioid.

Do you always use the 48 for vocals?

No, I try not to. I love U47s, Telefunken 250s, and C12s, and M49s work great with some singers. If I haven't worked with an artist before I try to put up a couple of microphones because you always find surprises, you surprise yourself. I have been trying all types of microphones, a 58 or Audio Technica. And I love the Sony C800, and the new Neumanns, the 149 and the less expensive TLM103, they all sound really great given the right application.

What kind of monitoring do you use?

I've been using JBL monitors for the last year. I work with JBL testing speakers, and I think they are quite brilliant. Monitoring is like food, different people like very different things. The JBL LSR28Ps are the mid-sized ones. I usually take a pair of them with me. I still use NS10s but they just stopped making them, and the ones at home I just blew before this trip! I like to use big main monitors but only in the few places where I know how they sound and how they translate. In the land of big monitors it can be really tricky, because from studio to studio, or even in the same studio it has happened to me when you go back they are not calibrated right. So you have to be really aware of that and rely on the small monitors.

How loud do you listen?

About average... sometimes I crank it really loud, like with my NS10s! Often with small monitors I match them with a self-powered JBL sub-woofer which I can turn on or off. That really helps me, especially for mixing. I usually monitor with it turned off, but then switch it on when I need to really check something.

How do you approach mixing?

I like to push up the faders and work really fast on the different elements, on everything. Most often I pull everything down again and work in a more progres-

sive way, but at the very beginning I try to be very fast, because it brings the spontaneity and you don't lose focus on what's good about the music. And once you grab that very moment, it's clear in your head, you can really approach the rest of the mix. I hate that kind of approach where you put overheads, kick, and you're only listening to the drums. For me, I like to pull everything up, work on a few different things and go from there. Lately I've been doing a few different things; with Pro Tools especially, there is a tendency to have way too many tracks. And that's where you really spend some time, which has nothing really to do with the mix. It has to do with housekeeping and production issues when you have to decide what elements of what you have really make it to the mix. I actually don't like to spend more than a day, tops, on a mix.

Do you still use analogue tape?

Yes, because there is a difference in sound. It's not better or worse, I'm not stuck in the past. But certain instruments really benefit from analogue. At Ocean Way they have the Ampex ATR124s which really have a phenomenal low-end. Sadly, not that many projects agree to use analogue, because most producers know it's going to slow down the creative process, they are going to have to wait for the tape to rewind, they know they are going to be limited. With editing, I still cut tape, but they know it's not going to be done in five seconds. People use Pro Tools, or Cubase or any of these systems on their own, and they expect you to be as fast as



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they are, if not better. And if it's a low-budget project, it adds to the cost to work analogue, especially because you are going to use analogue plus another format, and people prefer just to use the 'plus'.

Do you use Pro Tools?

Yes I have my own Pro Tools. And it's a great tool, when you don't abuse it. It has to be a tool, when people forget that, that's when you start getting into

trouble. I think the one aspect that suffers most in a project is not having a definite product. Because of the nature of Pro Tools, not having the limitations of tape, many people have a hard time committing, they have too many options. Lately I have been mixing lots of stuff from Pro Tools, where people just bring endless numbers of tracks...

How do you deal with that?

I have to make the final decisions at the mixing stage, and I think that's kind of fresh for them too. When you listen to the project for the first time you don't have time to worry too much, so you get more ruthless, and you get what really impresses you about the project.

How do you prevent the situation of having endless takes in the first place?

Erasing! That's the only way. Once I get a few takes I comp, and I force myself to erase.

Doesn't that sometimes lead to conflict with the artist when they know you have more tracks available?

Yes, even if you work on analogue they don't believe you if you say you've run out of tracks!

How do you like surround work?

I think it's very satisfying. I'm still not sure about how it translates in homes. I worked on a lot of films in 5.1 and even 6.1. And I have compared Dolby and dts, and dts is a much higher-quality encoding. Although when you put a DVD on it defaults to Dolby, I guess because they were the first. I think there is a market for audio only 5.1, but I don't know how big it is. How you set up your speakers in the home is going to be the biggest fight, with wives—the first time I brought my speakers into the living room my wife wouldn't let me put any speakers at the back. My setup is imperfect, so what chance is there of other people getting it right? I went to a theatre playback and it sounded unbalanced. It turned out that everything was out of calibration. That is my only fear...

Is there any new equipment that has caught your eye?

I really like the Sony sampling reverb, I've been using that quite a lot lately. It's quite limited, but it works great, especially if you are working with an orchestra and you want to sweeten what you've got.

Where is your home studio?

I live in Woodland Hills in Los Angeles. I have a room within my garage which is my preproduction room where I work with artists and the place where I listen to stuff. I have a fairly professional setup with patchbays, so when I bring my own gear into my home I can interface everything pretty quickly. Everything is in racks, and I have a ProControl so I can very easily plug everything in 15 minutes and I'm rolling. Otherwise I wouldn't do it, I couldn't go through the hassle.

Do you use an assistant at home?

Sometimes I do, but not very often. I've been freelancing so often that I haven't had a chance to work at home that much. Even with artists I have been developing, I've been working outside my home. It's nice to work at home but you've got to be disciplined. There is the danger of either not doing much work or working too much.

You do development work?

Yes, usually it comes through a referral. That's what I think record labels are interested in now, I think they stopped a big deal of their A&R searching, they depend more and more on producers. And I think more producers, engineers and DJs are becoming A&R men. I enjoy it; if you really believe in a project and get it signed it can be very rewarding.

Who would you like to work with?

Sting. And I would have liked to engineer something with Frank Sinatra. I assisted on one session with him and got to meet him. Al Schmitt invited me to the session. □

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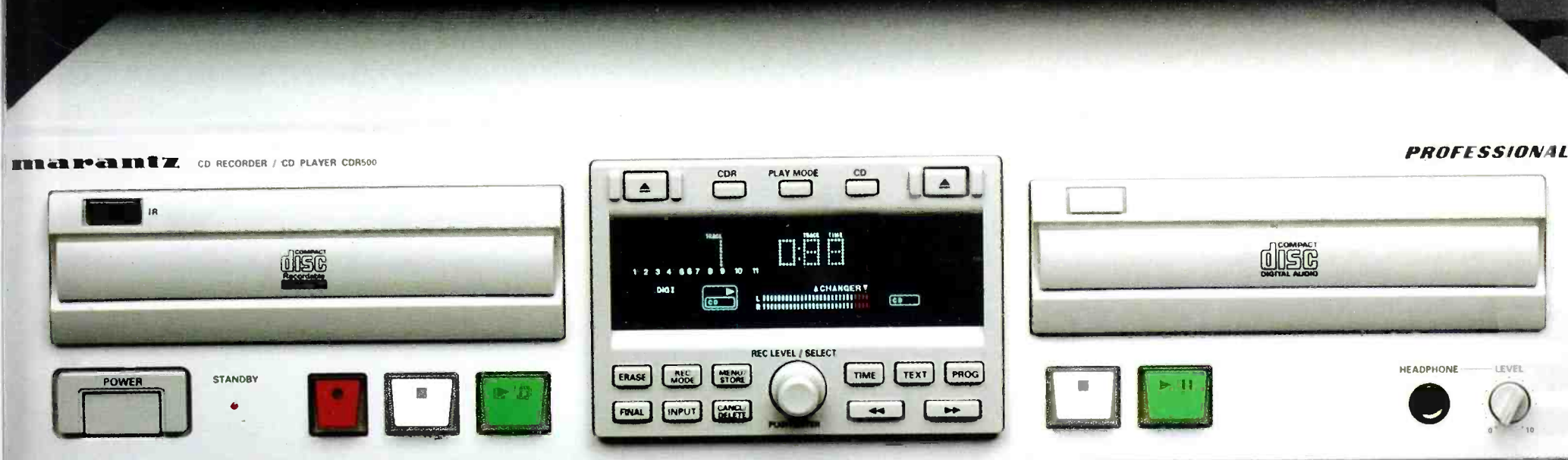
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GRASS ROOTS

Earl Scruggs, inventor of the bluegrass banjo technique and co-inventor of bluegrass itself heads into the studio with a few friends and finds that some things never change. **Dan Daley** reports

STING, ELTON JOHN, Steve Martin, Billy Bob Thornton, Roseanne Cash, Melissa Etheridge, Johnny Cash. If you had friends like these, would you wait 17 years to make your next record? Actually 17 years doesn't seem like a long time in a professional music career that goes back to 1945, when then 21-year-old Earl Scruggs was paired with guitarist-singer Lester Flatt by the late Bill Monroe, as part of Monroe's legendary Blue Grass Boys. The group's name came to be eponymous for an entire genre of music, which musicologists credit Monroe and Scruggs for inventing. In the process of refining the 3-fingered rolling pluck technique which he had discovered as a 10-year-old in his native North Carolina, Scruggs' banjo gave bluegrass its signature percussiveness, the perfect counterpoint to Monroe's mournful vocals. He also invented the Scruggs peg, a device fitted to one of the banjo's tuning pegs which allows the player to precisely change the pitch on the string while playing, another element that places Scruggs' association with the banjo on a par with that of Les Paul and the electric guitar.

If Earl Scruggs had stopped right there, he would have had a place assured in music history. He didn't. In 1948, he and Flatt broke with Monroe—bluegrass's first schism—and created their own group, Flatt & Scruggs and the Foggy Mountain Boys. With Flatt, who died in 1979, Scruggs took bluegrass mainstream with two recordings which have become pop institutions. 'Foggy Mountain Breakdown' has become the 'Johnny B Goode' of bluegrass, the first song any aspiring banjoist learns, and which was immortalised as the driving theme music for director Arthur Penn's 1968 film *Bonnie and Clyde*. But Flatt & Scruggs' work may be more widely recognised for their 1962 recording of 'The Ballad of Jed Clampett', the theme song for the sitcom *The Beverly Hillbillies*, which remains a staple of late-night cable television around the world.

Scruggs and Flatt parted company in 1969, and Scruggs formed the Earl Scruggs Revue, an adventurous bluegrass unit featuring two of his sons, Randy and Gary, and which perfectly fit the musical eclecticism of the times. The Revue became an inspiration for many of pop music's acoustical ventures in the 1970s.

The Earl Scruggs Revue was also a good way to meet people, since it kept Scruggs on the road for much of the group's dozen years of existence. And a few of those chance meetings helped along the creation of *Earl Scruggs and Friends*, the maestro's first studio recording in nearly two decades.

Indeed, Scruggs had never stopped playing; he had stopped making records for a while, but continued to play sessions for other artists. So he was eager when, three years ago, he and Randy and MCA Records began discussions about a Scruggs-and-guests record. The timing of the release could not have been better: interest in bluegrass has been reawakened by artists like Gillian Welch, David Rawlings and Allison Krause, for whom the increasingly narrow confines of Nashville's country music no longer allowed any headroom. And



Melissa Etheridge and Earl Scruggs

the soundtrack record to the film *Ob, Brother, Where Art Thou*, a bluegrass and gospel double-platinum-selling surprise hit, continued to top several Billboard sales charts well into September, about when Scruggs' record hit the stores.

But *Earl Scruggs and Friends* was not calculated to do anything more than establish another benchmark in bluegrass, same as Scruggs had been doing throughout his career. The command centre for the project, which commenced in 1999, was Randy Scruggs' studio, in Nashville, which houses a vintage Neve 8232 desk and a 'digitally vintage' Mitsubishi X-850 32-track deck, a format which has persisted in Nashville for decades. With well over a dozen guests slated for the record, it would be a peripatetic project, and a few basic threads of consistency were established at the outset. Randy Scruggs tapped long-time Earl Scruggs engineer Ron 'Snake' Reynolds. (He got his nickname as a musician in a rock band years ago when an FOH engineer decided he 'moved like a snake' on stage.) Reynolds, in turn, chose a pair of powered Mackie monitors and an Audio-Technica 4033 microphone which, after being chosen in a shoot-out, also accompanied the core group of producer, engineer and a handful of musicians to various locations when Earl's guests couldn't get to Nashville. 'We wanted something that could capture the warmth of Earl's banjo but still keep it clear,' explains Reynolds. Adds Earl Scruggs, 'If you don't pick the microphone right the banjo can be very brittle sounding. The instrument was designed

to stand out in a crowd. 'Course, in the early days we took what they could give us in the way of microphones.' Beyond that, says Reynolds, the attitude was that a studio was a studio, and all it was intended to be was a momentary stage for this travelling bluegrass roadshow. 'Every place you go is going to have the basics, and that's pretty much the way I work—a Shure 57 for the snare, a [Sennheiser] 441 for the toms, and so on,' he says.

As with any other acoustic instrument, placing the microphone is as critical as choosing it. The banjo is part high-pitched string instrument with a relatively piercing timbre not unlike that of the Japanese koto when plucked, and part percussion instrument—its tensioned, round resonator is about the size and volume of a small snare drum head. 'I always mic the banjo off the head,' says Reynolds. 'I put it just below the [player's picking] hand, about six to eight inches away from the head and pointed directly at it, not on an angle.' Adds Randy, 'Some space between the microphone and the banjo is important to let the sound develop before it gets to the microphone.' It's not a recipe that begs interpretation: Reynolds says he's been doing it that way since the mid-1970s, when he started as an engineer, which dovetails well with the fact that Earl Scruggs continues to play the very same banjo that he has played since 1948.

The first session, which produced the lead-off track of the CD, was a duet with Elton John doing a rendition of his pop-country paen, 'Country Comfort'. The recording



Steve Martin and Earl Scruggs

was done at Tree Sound, in Norcross, Georgia, a suburb of Atlanta, where John has made his home for years. Randy Scruggs recalls that John entered the studio holding an Earl Scruggs boxed CD set, which he asked Earl to autograph. It set the tone for the entire project: guest artists acknowledging the influence Scruggs has had on their careers and lives. 'Elton was at the top of the short list we had of guest artists to consider,' says Randy. 'But he and everyone else we called got back to us quickly saying they wanted to do it.' The Elton John session also set the stage for the rest of the project: that it was to be created in an ensemble manner to the extent possible, with musicians playing together in the same room. 'It's not about isolation; it's about feel—when it comes to this kind of music, as an engineer, you don't try to build a performance, you try to capture it,' says Reynolds, encapsulating the approach to audio engineering that remains a Nashville trademark. 'You set the stage and let it happen. You have to go into it with the thinking that, this is the record as we're recording it. We're not going to fix it later. This is it. It's like live recording. As a result, the final mix is not a lot of pushing and pulling of faders. It's just there on the tracks. When we showed up in Atlanta that day, and had seven or eight musicians playing together in the same room at the same time, they were amazed—they had never seen that before.'

The choice of 'Country Comfort' as the lead-off track acts in stark contrast to the second, a song with LA-based country music renegade Dwight Yoakam. 'Borrowed Love' strikes closer to the bone of bluegrass, with Yoakam's pained vocals evoking the mournful call of bluegrass's other progenitor, Ralph Stanley. And underscoring the spontaneity which Randy Scruggs says was paramount in the project (no track on the record required more than three takes, observes Reynolds), 'Borrowed Love' was written in the studio—at Hollywood's Conway Recorders—as Yoakam, Earl Scruggs and the band were warming up on another tune. 'Dad started playing a riff, not thinking about it,' recalls Randy. 'Dwight walks over and starts playing his guitar and mumbling some words and the three of them sat there knowing a song was in there somewhere. Then my mom [Louise Scruggs, Earl's wife and no-nonsense manager with an encyclopaedic memory for every moment of her husband's career] came over and said "Dwight, you need to write that song and I mean right now!" We all just looked at each other and took a 30-minute break and came up with the basics of the song. Then we recorded it, adding a few more lyrics later.'

The longest reach in terms of time and space was Sting's contribution, 'Fill Her Up'. The Scruggs and Sting had discussed various songs and had decided on this relatively obscure one from an earlier Sting album. The Scruggs core band, abetted on this track by guitarist John Jorgenson and Dan Dugmore on Dobro, cut the track at Randy's studio, using Sting's original track as a guide but not trying to emulate it. In the end, the song is more of a set piece than a single track: it goes from its start as country song into a legato no-percussion

breakdown, before a jam session returns as the coda. The game plan had been to catch Sting as he swung through Nashville on tour earlier this year, but the time frame of 24 hours in Nashville including his show there made the window too tight to be comfortable. Instead, Ron Reynolds took the track, which had been recorded to the Mitsubishi 32-track, and transferred it to Sony 3348, then shipped a safety master of that to Sting at his home studio, Steerpike, in Wiltshire. (Some of the rest of the project was also transferred to a pair of Otari RADAR hard-disk recorders.) Earl Scruggs used a scratch vocal sung by Randy, as well as Sting's vocal from the original, as his guide around which to fill on banjo. 'There's a thing called "gettin' on top of their lines"—an instrumentalist getting on top of what the vocals are doing—and I don't like that,' he says. 'I want to give

the vocals room.' Sting returned the favour: the harmonies were done by his wife, Trudie, and son Joe.

The most geographically convoluted production was the Scruggs signature song, 'Foggy Mountain Breakdown', which ranged from Nashville to Los Angeles to New York and back again. The basic track was recorded at Scruggs' studio, and it was a full enough session, with both Scruggs's and a host of Nashville's best session players, including Glenn Worf on bass and drummer Harry Stinson, abetted by Leon Russell on organ and Vince Gill (first electric guitar solo) and Mary Stuart on mandolin. The track was then taken to Los Angeles where, at Conway Recorders, actor-comedian Steve Martin overdubbed a banjo solo (the second one on the track) and Albert Lee played the second electric guitar solo. It then wound its way to New York, where

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Paul Shaffer, musical director for the *David Letterman Show* (and who played regional record promoter Arnie Fufkin in *This Is Spinal Tap*), put on a piano part, at Sear Sound, where the crew also recorded Roseanne Cash's vocals on the track 'I Found Love'.

If Shaffer at first seemed an odd choice, it made sense after Randy Scruggs noted that Shaffer had been using 'Foggy Mountain Breakdown' as one of his repeating themes for commercial break music on the *Letterman Show* for years. And, Earl adds, 'He's just such an up kind of guy. You want to have a guy like that on a session, who has positive energy like that.'

Less immediately apparent is Steve Martin's presence. Unless one were familiar with his early work as a stand-up comic, especially at the old Boarding House club in San Francisco, you might never know Martin plays the banjo. And plays it quite well. Earl Scruggs remembers meeting Martin while Scruggs toured with his Revue. 'He would always come to the concerts,' Earl recalls. 'One night we were playing this club for three nights in a row near San Diego. He and his manager would come every night to every show and he would sit down in front and watch me. He wanted to learn to play a song called 'Sally Good'un' and I have never seen anyone try so hard to get something down. When he wanted to learn something, he could be intense. After the show, he and I would get to have jam sessions back stage.' Earl Scruggs still likes to play 'Foggy Mountain Breakdown' fast, and the high bpm of this track caused Martin to raise his eyebrows a bit, and to quip at Earl, 'Earl, it seems you would have the decency to slow down after 50 years.' Martin's banjo was miked with a Neumann U-87.



Elton John and Earl Scruggs

Billy Bob Thornton's guest appearance on the record follows that of Dwight Yoakam, who co-starred with Thornton in the latter's riveting film *Slingblade*. Thornton had been a musician in his youth in Arkansas, and had spent part of the spring and summer in Nashville cutting his first solo record, *Private Radio*. Randy Scruggs had been called to work on that record as a guitarist, and remembered that Thornton's bar band had opened for the Earl Scruggs Revue when it passed through Arkansas decades earlier.

Cash was also on Earl's record, appearing as a sort of cameo-within-a-cameo alongside Don Henley, on the track 'Only Passin' Thru', which was penned by Cash and Scruggs. Cash was recorded at Cinnamon Hill Studios, on the Caribbean island of Jamaica, where he has a vacation home, Scruggs and Reynolds filed down there for a day to capture Cash's sonorous baritone using an A-T 4033. As with the Sting song, the track was cut at Scruggs's studio, with a multi-track master accompanying the Scruggs's and Reynolds to TM Century, a studio in Dallas, Texas, where Henley (again the touring connection looms large: the Earl Scruggs Revue had opened several times for Henley's previous band, the Eagles) was passing through—pun intended—on tour. 'It went pretty quickly and easily,' recalls Reynolds. 'Don's only request was for an A-T 4060, just like Melissa's [Etheridge, another album guest vocalist] only request was an AKG C-12 for her vocal, or Elton wanting a specific kind of piano. That's the great part about working with so many real professionals: there were no demands or requirements. Just the desire to make the music.' □

"Come And Listen To A Story 'Bout A Man Named Jed..."

FLATT & SCRUGGS' greatest hit ever, 1962's 'The Ballad of Jed Clampett', the theme song to the television comedy series *The Beverly Hillbillies*, fit the mould of how many of the hits of that era were made: quickly, without great expectations, and with the anecdotal glitch that made them almost not happen in the first place.

The song was written by Paul Henning, the Hollywood producer who had devised the show. Given the nature of the sitcom and its characters, Flatt & Scruggs were the perfect choice to perform the track. The duo's performances on the expanding folk and bluegrass circuit in the 1950s and 1960s were usually sell-outs. At the same time, country music television programmes went into syndication and the duo became regulars on many of them. In the summer of 1959, the duo started a streak of Top-40 country singles that ran into 1968.

Henning had sent his musical director, Perry Botkin, to Nashville to supervise the session. The recording was done at the now-gone Columbia Studio A in Nashville, and was produced by Columbia's A&R director

Don Law and Frank Jones.

The track went down quickly—Flatt & Scruggs were using their seasoned road band, and there were no final vocals done that day; Henning had chosen singer Jerry Scoggins's deep, husky baritone for the lead vocal, to be overdubbed in Los Angeles later. Earl Scruggs recalls only two microphones: one to beef up the double bass and one for everything else. Nearly 40 years ago, Scruggs cannot remember with certainly the recording format, but he thinks it was mono.

But before the session ever started, it came close to not happening at all. Earl Scruggs's wife and business manager, Louise, initially turned the project down because of the possibility that the song and the show portrayed southerners in a less-than-positive light. The very word, 'hillbilly', is a derogatory which still packs a sting today. 'That word was a real red flag,' says Earl Scruggs. 'Louise wanted to know how someone in California was going to think about Southerners.' Louise Scruggs' concerns were allayed when Henning sent her a copy of the show's pilot episode.

'The show showed the Clampetts as smart in an uneducated way,' recalls Earl Scruggs. 'In the end, Jed and Granny outsmart the big-shot bankers. So we recorded the song.'

It was Earl Scruggs who made the suggestion to Paul Henning that 'The Ballad of Jed Clampett' could be a single. Henning agreed, as did Columbia, which was then still a sibling to the Columbia Broadcasting System, the CBS network, which broadcast *The Beverly Hillbillies*. The label authorised a version with Lester Flatt singing the lead vocal. The show became an instant hit, quickly rising to number-one in the Nielson ratings. That, in turn, boosted sales of the theme song's single version. Louise Scruggs has a memory like a steel trap, and she remembers December 8, 1962, as the night it all came together. 'Flatt & Scruggs were playing Carnegie Hall in New York,' she says. 'That same week the show became number one.' And within a few weeks, the single would become the first-and only-ever bluegrass record to go to number one on the Billboard pop charts. 'You could say that was big night,' she says.



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BAND OF BROTHERS

The most expensive TV series ever made is an American WWII drama called *Band of Brothers*. Along with high-definition pictures it uses a Dolby E soundtrack specifically tailored for television as reports **Kevin Hilton**

TELEVISION AND THE CINEMA have long been separated by a perceived difference in production values. In recent years, episodic TV drama has begun to emulate movies, with a more filmic look and similar working processes. Technicians on prime-time shows may pride themselves on this but the mini-series *Band of Brothers* goes beyond even those high standards and perhaps points to the future, combining high-definition visuals with discrete 5.1 audio.

Produced by US cable channel HBO (Home Box Office), *Band of Brothers* has been sold around the world; as different countries are at different stages of development in terms of 5.1, the production has made extensive use of the Dolby E encoding-decoding process to ensure each territory gets the soundtrack format it requires. This is one reason the show is being called the

most expensive TV series ever made, costing a reputed \$104m. Just about every penny of this is up on the screen—or in the loudspeakers. Which is hardly surprising, given that one of the executive producers is Steven Spielberg.

Due to his involvement and that of Tom Hanks, and the fact it is another tale of heroism set during World War II, the 10-part series is being seen as a TV version of the multi-Oscar winning movie *Saving Private Ryan*. Both are based on true stories but look at different aspects of the conflict in different ways. *Saving Private Ryan* was embellished in typical Hollywood fashion; *Band of Brothers* is perhaps closer to the truth and is based on a book by WWII historian Stephen Ambrose.

The complete title of Ambrose's book—*Band of Brothers: E (Easy)-Company, 506th Regiment, 101st Airborne from Normandy to Hitler's Eagles Nest*—

neatly sums up the action, following an American rifle corps that parachuted into France on D-Day as they push into Germany. Hanks wrote the teleplay, with others, and also directed one of the episodes. Among a large cast are Donnie Wahlberg, who appeared in *The Sixth Sense*, and David Schwimmer, making a departure from his role as Ross in *Friends*.

Locations ranged from France to Switzerland, which doubled for Germany when the troops reach the end of their mission. A great proportion of the production, however, was shot in Britain on a sound stage near Hatfield, some 30 or so miles north of London. This base was akin to an industrial site, hung with webbing and countless uniforms, according to Campbell Askew, the production's sound designer and supervising sound editor.

Askew began work on the project in May last year, a time when the vision editors were already cutting material and putting together visual special effects on Avid nonlinear workstations. Despite being episodic in nature, the shooting of *Band of Brothers* progressed with different stories being shot simultaneously. The location crews were designated in very military terms: Red Unit and Blue Unit. These worked on five episodes each, creating a great amount of material to be handled by the editors and latterly the dubbing mixers, with last minute special effects meaning that few episodes could be locked off and totally finished.

Location shooting began in April 2000. Colin Charles was the sound mixer on Red Unit, while David Stephenson was on manoeuvres with Blue Unit. Both were recording onto DAT—Charles on a Fostex PD-4, Stephenson on an HHB PortaDAT—and backing up on 1/4-inch stereo Nagra reel-to-reel. Mixing on Audio Developments AD146s, a recently introduced 8-in, 4-out portable mixer, the recordists used a mixture of boom and Audio radio mics. A selection of Sennheiser units were used as the open mics, while the radios were hidden in the actors' helmets, which was necessary to catch the dialogue as the boom mics could be overloaded by the explosions.

Stephenson says the nature of the material—gunshots, explosions and general mayhem—led him to raid his store cupboard. 'I went back to square one, pulling out various dynamic mics I hadn't used in ages,' he says. 'It was necessary to use these older mics to get as much of the effects as possible, because many modern microphones wouldn't have coped.' Among the mics called out of retirement were an old 'Ball and Biscuit' device and a number of AKG D25s, one of which had belonged to Stephenson's father.

Charles and Stephenson discussed how they might approach the shoots prior to work beginning. They talked about using an 8-track recorder, with the Tascam DA-98 being favoured in feature work, but decided against it given the amount of moving around *Band of Brothers* involved. 'Eight-track means bigger equipment and we had to opt for portability,' explains Stephenson. 'We were shooting in terrible conditions: muddy fields and lots of movement.'



The recordists were as much a part of the action as the actors, being carried around on a variety of 4-wheel-drive vehicles. After deciding on DAT, Charles and Stephenson twin-tracked everything they recorded. Stephenson explains this was done to give themselves the chance of achieving some balance between the dialogue and the gun shots. Charles says that on some occasions the recordists just had to go with the situation. On one episode, Bastogne, the director wanted driving wind and snow; the machinery needed to create this naturally caused more noise than the recordist could do anything about.

This episode, sixth in transmission order, required around 75% ADR. This was recorded at just about every studio in and around London with ADR capability but largely at Goldcrest, Shepperton and, to a lesser extent, Twickenham. Campbell Askew explains that he thought it best that one person should have complete control over this process and so called in Paul Conway to oversee ADR.

Conway worked in conjunction with the production's voice coach, who performed a necessary function as, apart from the principles, most of the actors were English playing Americans. British viewers may be surprised to see writer and comedian Simon Pegg, best known for the sublime series *Spaced*, as Texan William Evans. A total of 5,700 lines of ADR were laid down for the whole series. Because of the growing size and complexity of the project, Askew found himself moving towards a more supervisory and administrative role, rather than tracklaying.

The majority of tracklaying was done on Digidesign Pro Tools workstations; some work was carried out on Digi-Avid Audio Vision, with the stems being prepared on an Akai DD-1500. After initially working on the



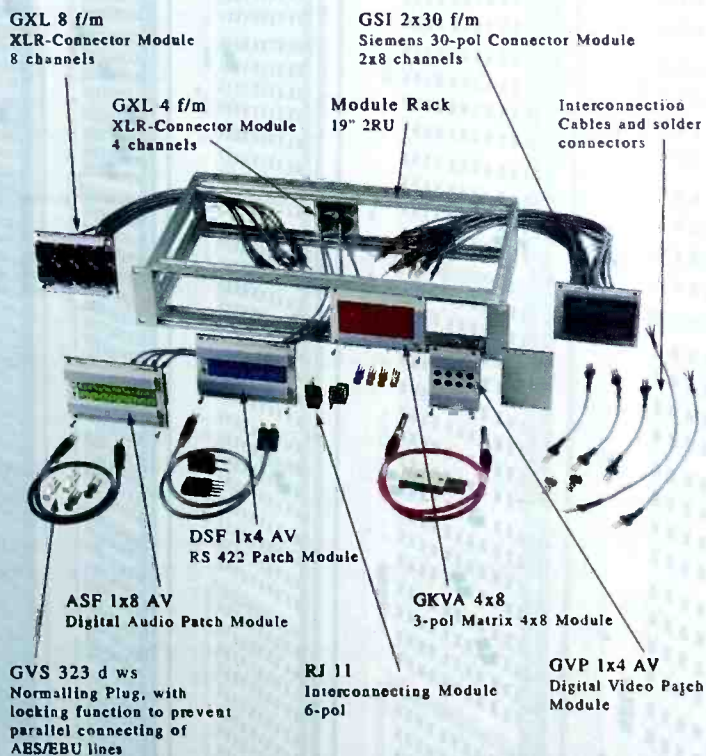
overall design and tracklaying, Askew and his assistant, James Boyle, moved on to other jobs: Askew overseeing and Boyle recording gunshots and tanks, mostly Panzers and Shermans at the Bovington Tank Museum in Dorset, which houses the world's largest collection of tanks and armoured vehicles.

Askew explains that a new technique using multiple microphones was developed to record the discharge of live ammunition, which was largely done at Bisley rifle range in Surrey. Askew says this was instead of the conventional single-mic method, which would have been overloaded by the sound pressure levels. He adds that



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POSTPRODUCTION

producer-director Tony To, whom he cites as the main creative force behind the production, wanted the sound to be as real as possible. 'He said, even if we lose a line of dialogue because of an effect, so be it,' Askew recalls.

Much research went into recreating the effects so that they were as real as possible. This involved talking to veterans of the campaign, who know all too well what a bullet whizzing past ones head sounds like. All gunshots, for both American and German weapons, were recorded specially; effects libraries provide the big explosions, some atmospheres and the aircraft.

The effects were edited by Ross Adams and James Boyle, with Bobby Gavin taking care of such things as shouts, screams, crowds and the general noise of battle. Howard Halsall handled all other original sounds and was also involved in the ADR. Derek Trigg was in charge of the Foley, which called for the recording stages to be festooned with all the relevant uniforms. 'It looked like trench warfare,' Campbell Askew says.

With such a massive mechanism in progress, Askew knew that it may be difficult to find a dubbing facility that would be able to take on the whole project. 'Having something the size of *Band of Brothers* descend on you would be both a great shock and mean that you couldn't do much else,' Askew says. 'It was my intention to work at Shepperton with Mike Dowson and Mark Taylor but it was a matter of availability.'

Shepperton was available and around September 2000, the *Band of Brothers* sound crew moved in, taking over a whole floor for administrative purposes as well as one of the facility's dubbing theatres. Then came the task of piecing together each episode. 'Some were quite different in formation to others,' Askew says, 'while some came together easily.'

With a different director for each episode, including David Leland (*Wish You Were Here*), David Nutter (who helmed numerous episodes of *The X-Files*) and Tom Hanks, the main creative input as to how the series should sound came from Tony To. 'He was the main energy behind the sound of *Band of Brothers*,' affirms

Askew. But, as in many other cases, initial thoughts as to style changed when work began in earnest.

The first episode to be dubbed was *No.3, Carentan*. After listening to the premixes, To declared that it was not what he had asked for. Askew countered that it was exactly what To had originally had in mind, that the sound was heard from the point-of-view of a single soldier. 'But it needed to be busier than that and have more added to it,' Askew explains. 'Once we realised that, everyone was working to the same ends.'

A guiding principle was that the more there was in the



soundtrack, the more dangerous it would sound. As *Band of Brothers* had been erroneously tagged as the TV version of *Saving Private Ryan*, you could be forgiven for thinking that the movie was a constant presence, if not an influence. Dubbing mixer Gary Rydstrom is widely admired and his work on the first 20 minutes of *Ryan*, when the troops land in Normandy, is hailed as amongst the finest sounding pieces of cinema ever.

Campbell Askew says there was no intention to recreate the *Ryan* soundtrack for *Band of Brothers*. 'We never thought of *Ryan* when we were playing back,' he says, 'it didn't seem right. There was only once occa-

sion when it came up. An editor said that one episode didn't sound right and I said "Remember *Private Ryan*". I don't think that went down very well. Tony To wanted it to be different, to be busier and feel dangerous.'

Dubbing mixer Mike Dowson says he did not think it was necessary to go for the *Private Ryan* sound. 'We wanted something that was as impressive,' he says. 'That opening 20 minutes of *Ryan* is a very clever piece of work but we had pretty much 10 hours of that. There are sequences in *Band of Brothers* that are as complicated, or more so. That's not taking anything away from *Ryan* but that was a more personal sounding piece of work. There is still the point-of-view shot in *Band of Brothers* but there is also an incredible amount of background detail.'

Dubbing began during the last week of January this year. Dowson and Mark Taylor worked on a 136-input, 72-fader Harrison MPC; all inputs were used, with another 64 accounting for premixes. 'We very seldom use premixes in the final mix,' Dowson says. 'But on a 5.1 mix, the number of premixes is enormous.' Dowson looked after the dialogue and music, while Taylor took care of effects and Foley.

Work progressed on an episode-by-episode basis, but not in the sequence that they would finally be broadcast. Campbell Askew has worked out that it took 12 days to mix each episode, which included both premixes and final mixes. Despite this, the episodes could not be locked off as last minute edits were made or new visual effects came in, all while the dub was progressing. Extra Sherman tanks could be CGIed in late on, or tracer bullets were added to battle sequences, meaning new sounds had to be mixed. In these instances, Dowson says it was sometimes better to start all over again.

All material came into Shepperton on Pro Tools; a workstation was specially installed into the dubbing theatre for this project. Pre-dubs were transferred from the Pro Tools into Akai DD-1500s or DD-8s for editing and the final mix. Each episode required approximately 250 tracks for each episode: dialogue always took up 16-tracks, Foley varied between 16



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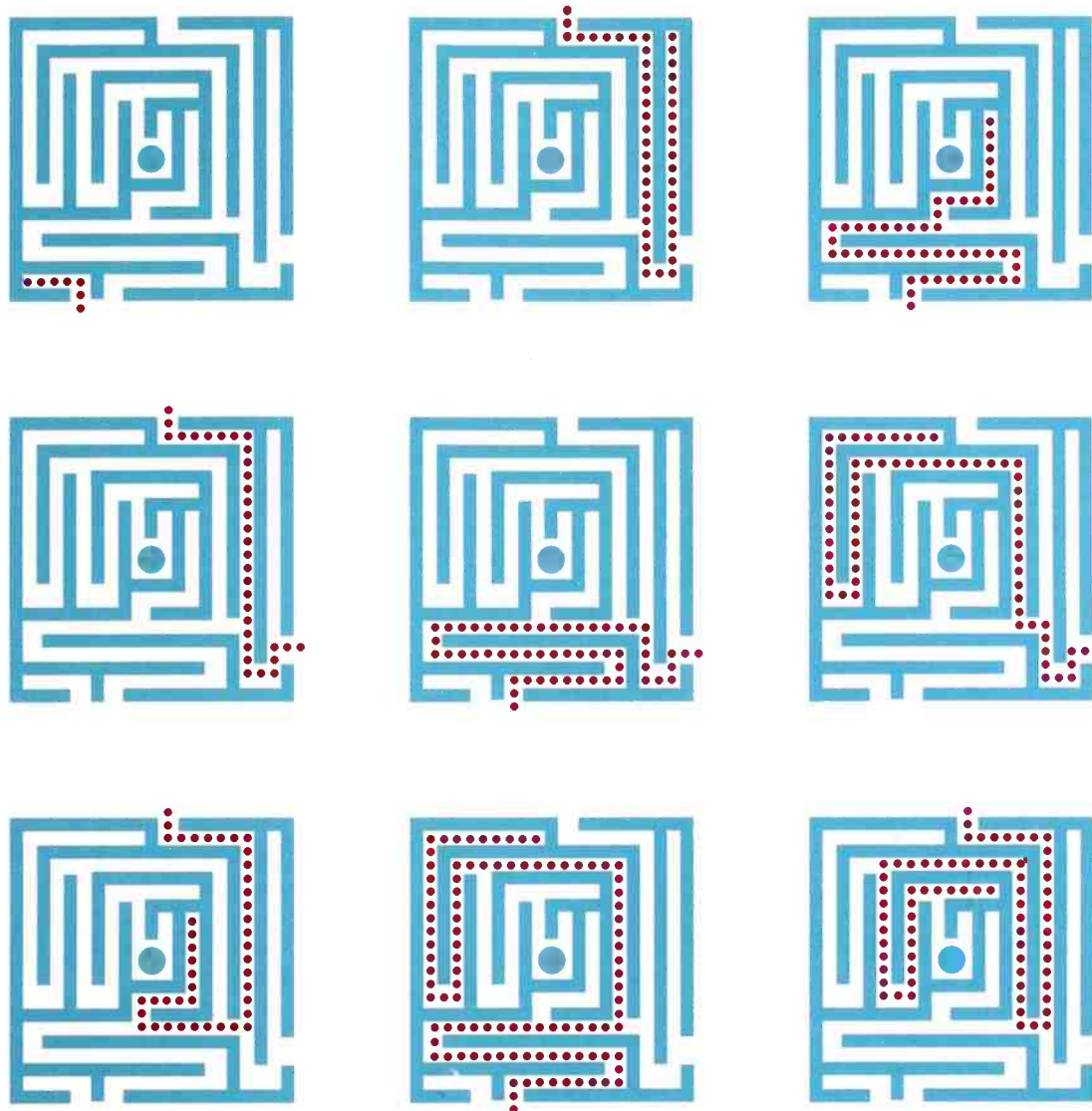
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POSTPRODUCTION

and 32, while there were 32 tracks per each category of effects (atmospheres, spot effects, guns, ricochets, aeroplanes and tanks). By July, the production had taken over a second dubbing theatre, also equipped with a Harrison console.

Dowson says the show was treated in the manner of a feature film. 'For about two months we didn't think about television,' he says. 'We couldn't forget about it completely but we mixed at feature levels in 5.1. It's much better to down-scale from that than try to up-scale into 5.1.' As Dowson says, *Band of Brothers* is breaking new ground in that it is a 5.1 soundtrack specifically for television.

There is sometimes much discussion as to what should be mixed into the surround channels. Dowson and Taylor do not see it as a novelty and put in whatever they

feel is right. 'On *Band of Brothers* we discovered that we could use 5.1 to explain the geography of a scene,' comments Taylor. 'We could pan something to place it in relation to the characters on screen, for example having the sound of German tanks to explain where they are in relation to the Americans.'

The approach to mixing was to create the 'world' in which the dialogue would sit, building up the background atmospheres, spot effects, gun clicks, gunshots, crowds and Foley. Music does play a part in the production but, in something of a departure for television, and especially American television, there are episodes where there is practically no music at all. The Michael Kamen score was recorded variously at Air Lyndhurst, Abbey Road, Sony Whitfield Street and Watford Town Hall (CTS). It arrived at Shepperton as a LCR mix on



8-track Tascam and was loaded into Pro Tools.

While high-definition and surround sound are regarded as the future for television, particularly in the US, the majority of broadcasters around the world that have bought *Band of Brothers*, are not currently transmitting either HD or 5.1. It was therefore necessary to produce a 2-track reduction of the soundtrack for syndication.


Central to this was the Dolby E coding process, which enables multichannel audio signals to be reduced to 2-track for easy distribution and play-out on existing infrastructures. This has been used on a number of previous occasions but it is thought that *Band of Brothers* is the first major use in terms of exchanging material between the US and the UK. The transfer was made at London audio postproduction facility Lip Sync Post by re-recording mixer Jerome O'Donohoe, with Dolby's multichannel audio consultant, Andrea Borgato.

The standard Dolby E setup was used: DP 571 encoder, DP572 decoder and DP570 multichannel audio tool (emulator). This last unit enables a mix to be monitored and for the appropriate metadata to be created, without encoding the audio at the same time. This means there is no latency introduced into the process; the audio goes in and out in the PCM format but the device is able to emulate how it will sound on transmission. 'It gives us instantaneous feedback,' explains Borgato.

Once this has been done, the audio itself is encoded; in this case the encoded soundtrack, with its accompanying AC-3 metadata, was mastered to Tracks 3 and 4 of a Panasonic HD D5 video recorder. HBO required the programmes to be delivered in the 1080 59/94i (interlaced) format but versions were also mastered in 24p and 54i, both with PCM soundtracks rather than Dolby Digital.

Jerome O'Donohoe explains he was interested to take on the project as Dolby E may prove significant for Lip Sync Post in the future, particularly in terms of digital cinema. A variety of soundtracks was created from the 5.1 master: Dolby ProLogic, stereo and mono. O'Donohoe says the only changes that had to be made to the mix were speeding the title music up to 25fps, something required by the BBC. Both O'Donohoe and Borgato say there were problems with the VTR; delays had to be introduced to ensure that the sound and pictures were synchronised. Despite this, Borgato says *Band of Brothers* is an important project for Dolby in proving what can be done with Dolby E.

Band of Brothers began transmissions in the US during September and is being screened by the BBC and other European channels starting from this month. Early versions of the show were screened for Steven Spielberg, Tom Hanks and a number of veterans on Utah Beach a few months ago. Those that survived the incidents portrayed in the show were reportedly impressed and satisfied by the end result. Which, ultimately, is the highest mark of approval all those involved could wish for. □



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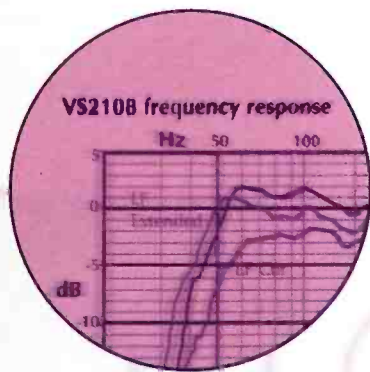


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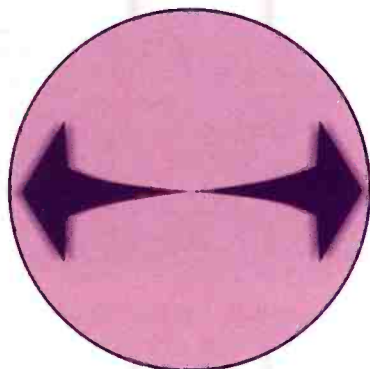


VS2108

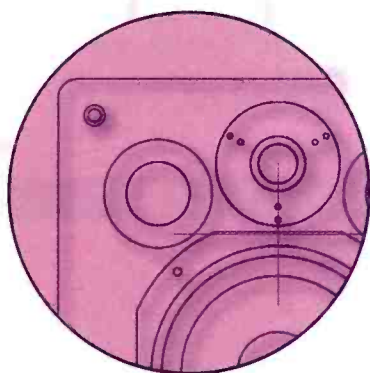
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'CASTING THE NET

Advances in the delivery of web audio signify the emergence of the Internet from its low-bandwidth infancy. **Rob Bridgett** welcomes sync-sound

THE MOVING IMAGE and animation side of the Internet equation has stealthily moved ahead of audio. Indeed many web designers still implement sites without consideration of sound, or worse, providing poorly thought-out, irritatingly repetitive, low-bandwidth spot effects, that do little more than provide the user with an excuse to leave the site. But with recent advances in the delivery of web audio, such as streaming MP3 and sound object action script within design software such as Flash 5 and Shockwave, web sites are taking their first steps into what can be considered in historical terms, the coming of sync-sound.



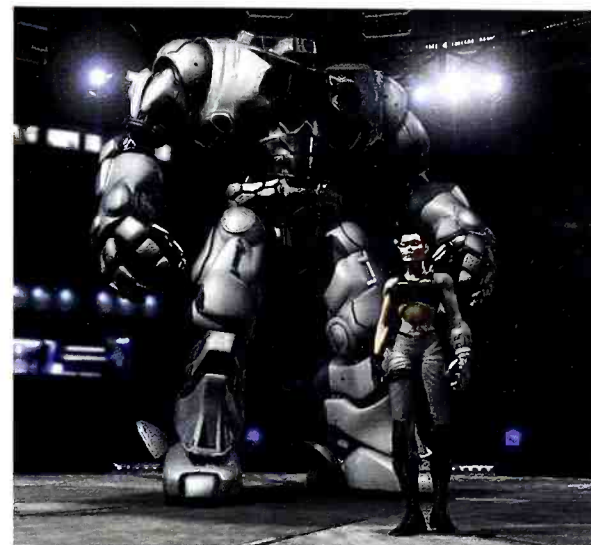
In e-commerce, it is widely accepted that the most important factor in generating revenue from a site is not the number of hits a site gets, but the amount of on-line time a user stays logged on to a particular site. And well-designed and implemented sound will, and

is, increasingly playing a part in this.

In terms of designing a site for sound, an initial phase will be syncing sounds to fit in with what is happening visually in terms of style and animation. Use of sound that stands out, drawing attention to its artifice will be seen as poorly implemented and badly designed. Sound should form a discreet, organic part of the user interface. Consideration should also be made to the amount of and type of information represented on the screen. A page consisting of a great deal of textual information, for example, would not be effectively serviced by a hectic drum 'n' bass track, rather a subtle slowly evolving atmosphere—in keeping with the stylistic context of the visuals and animation.

Certain information need not be represented visually at all, but can be materialised via (a carefully considered) voice-over, music or purely, through sound atmosphere. Certainly, the experience of a user to the site would be greatly enriched through sound's capacity to bypass the intellect, and appeal—almost subconsciously—to the emotions.

It strikes me at the time of writing that, even though the technological capabilities for high-quality sync-web-



audio have only just emerged, virtually all audio-enabled sites have a very impoverished approach to the use of sound and music. I suspect that this is symptomatic of a period prior to the establishment of dedicated sound departments within serious web-design companies. Instead, sound seems to be an afterthought of web designers, who are primarily visually trained, patching together spot effects and drum loops, erroneously thinking that 'something is better than nothing'. Indeed it is

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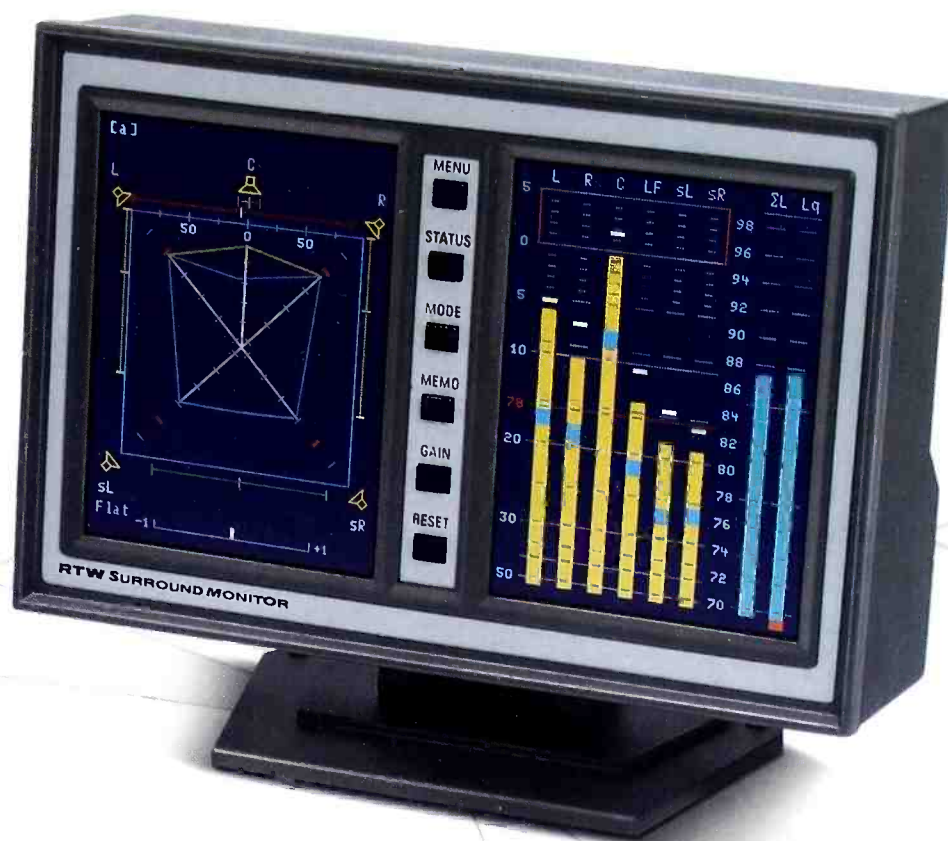


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► With Surround Sound Analyzer

SurroundMonitor

Modell 10800X

This multi-channel display unit with integrated surround sound analyzer is ideal for all audio productions, from simple stereo to 3/1, 3/2 or 5.1 surround projects. It is an invaluable aid for monitoring peak levels, loudness, channel balance and surround sound during live recordings, post processing and mastering.

- 8-channel peak level and loudness meters, analog and digital
- Surround sound analyzer for 3/1, 3/2 and 5.1 formats
- Sound balance and overall volume displays
- Indicators for centre presence and phantom sound sources
- 10-way correlator display with low-frequency analysis
- 31-band audio spectrum analyzer for individual channels or channel groups
- Real-time audio vector scope and AES/EBU status monitor



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The centre base display shows the width of phantom sound sources between centre and left or centre and right. Also shows crosstalk between centre and the left or right channels.

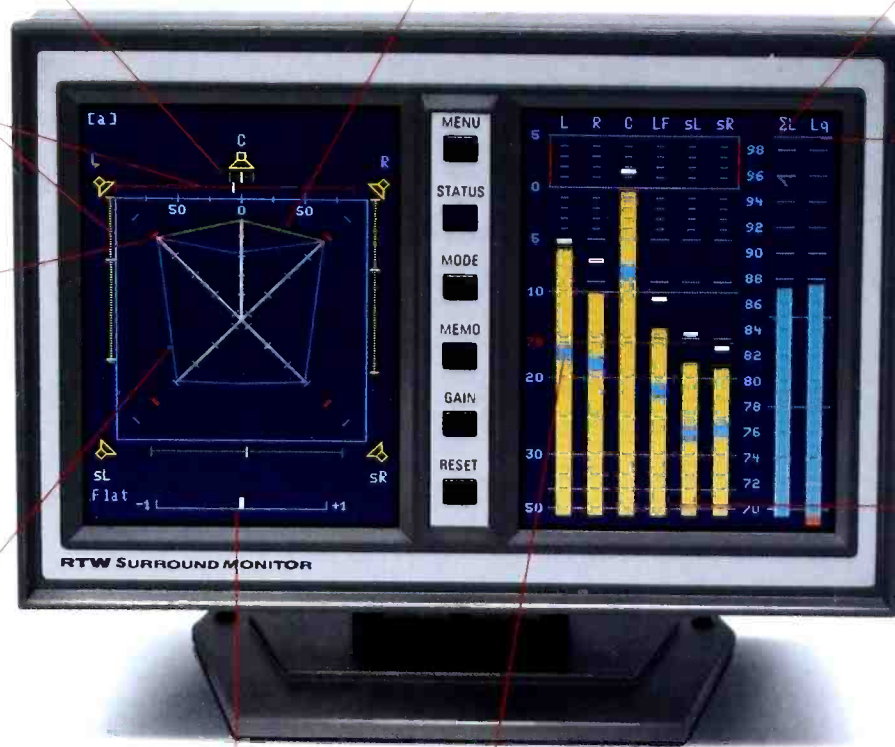
Centre channel loudness. The coloured indicator highlights the degree to which the centre channel is contributing to centre localisation.

Total program volume display.

Position and base width of phantom sound sources calculated from the level and correlation values.

Calibrated displays with reference marks for the listening sound pressure value.

Total program volume indicator: Shows the volumes of the individual channels and the overall programme. The enclosed area indicates the total volume, while balance information is provided by the relative distribution across the four fields of the display.



Display of mean volume level Le_{qu} with A, C or CCIR-2k weighting.

Multi-channel peak level meter for analog and digital signals. Track layout can be modified by the user and is configurable for 2, 4 or 8 channel displays supporting all leading standards (total of 17 scales selectable).

Correlation display for the surround channels with user-selectable low pass filter for frequencies below 300Hz.

Display of peak level, loudness or A, C, CCIR-2k weighted SPL for each channel.

All the information you need at a glance: Level and volume displays on the right, the graphical visualisation of the surround sound field on the left.

The new way to visualise surround sound!

Keeping tabs on all the parameters of surround sound projects is a lot of work for sound engineers – you have five channels contributing to the surround effect, and you have to constantly monitor their relative levels, loudness balance and correlation. To do this effectively you need an instrument that shows you more than the individual channels, one that provides an immediately-comprehensible representation the overall sound picture and the relationships between all its components. An instrument like the SurroundMonitor 10800X with its integrated surround sound analyzer.

The SurroundMonitor gives you access to all the important information about your surround programme at a glance: The multi-channel peak level meter monitors peaks and loudness levels of the individual channels for optimum recording levels. The surround sound analyzer calculates the dynamic relationships between the parameters of all channels and displays them in a graphical

image of the surround sound space. You can see everything you need at a glance, including loudness relationships, the positions of dominant and phantom sound sources, centre channel presence and signal components with negative correlations.

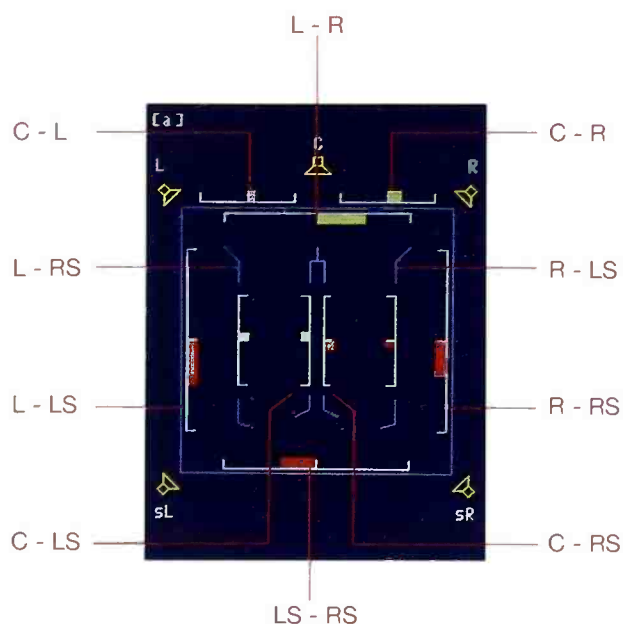
With the SurroundMonitor 10800X you have a whole suite of powerful tools for comprehensive signal monitoring at your fingertips, including the 10-way multi-correlator, the 31-band RTA, the real-time audio vector scope and the AES/EBU status monitor. But don't take our word for it – see for yourself how the SurroundMonitor 10800X makes your life easier in all steps of the audio production process, from recording to post-processing and mastering!

Explore the possibilities on

www.rtw.de



See your sound in action!

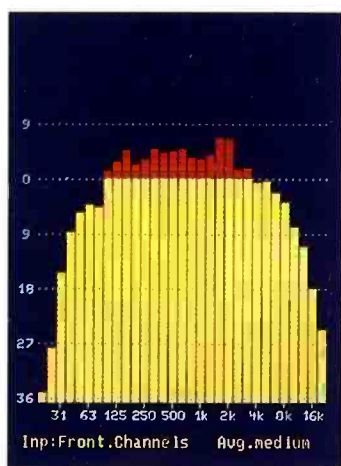


The multi-correlator display

The 10-way correlator provides an instantly-comprehensible display of the correlation relationships between all channel pairs. It is an extremely useful aid, and not just for live recordings with surround microphones.

For analysis of the "surround envelopment effect" you can also activate a 300Hz low-pass filter upstream from every correlator. This enables you to identify the low-frequency correlation that can detract from the spaciousness of the surround sound.

During mastering you can also identify low-frequency phase errors, for example of the type caused by the use of effect devices on the bass range.

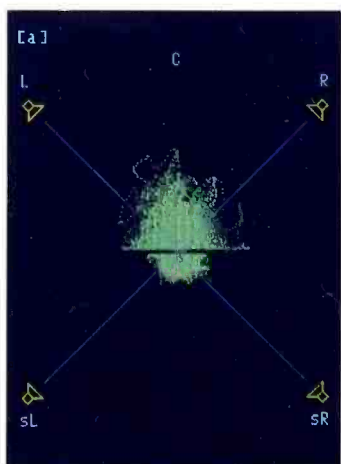


Shows you the full spectrum: The 31-band RTA

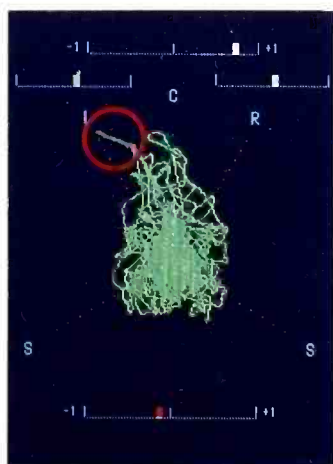
The real-time analyzer is a really useful tool in critical situations. Its 31 bands show you the spectral distribution of a single channel, the "front channels" or the "surround channels".

During LF channel measurements the system can automatically switch the frequency range to 5Hz – 5kHz – a useful feature if your surround production makes intensive use of the LF-channel.

The full picture: The multi-channel audio vector scope



The 4-channel audio vector scope mode is used to compare the front L and R channels with the LS and RS surround channels.



One common use of the audio vector scope is to identify distortions present in the source material.

The multi-channel audio vector scope is the instrument of choice when you want to analyse your surround signal in real time. It analyses and displays every signal peak in the resulting signal for sources with sample rates up to 96kHz.

Using the audio vector scope you can easily identify hidden distortion and the directions of very brief, impulse-type signal components. A special 4-channel audio vector scope mode also enables you to perform direct signal and phase comparisons between the front L and R channels and the LS and RS surround channels.



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Specifications

Functions	
	2 or 8 channel peak meter, analogue and /or digital • Surround sound analyzer for 3/1 and 3/2 (5.1) formats • Audio vector scope with 2, 4 and 5 channel mode • 10-way multi correlator display, digital over and mute detector • Numeric level display, weighted loudness display, Lequ measurement • Real-time 1/3rd octave analyzer and AES/EBU status monitor
Analogue Inputs	
Number of inputs	8 (mono)
Reference level	+ 6 dBu, adjustable from -2 dBu to + 13 dBu
Impedance	> 10 kOhm
Frequency range	Analogue: 30 Hz - 20 kHz or 30 Hz to 0.9xfs/2 in the mixed mode
Digital Inputs	
Number of inputs	4 (stereo), AES/EBU, transformer balanced, 110 Ohm (disconnectible)
Sampling frequency range	32 kHz - 96 kHz, real-time processing without SRC
Digital Outputs	
Number of outputs	4 (stereo), AES/EBU, input signal looped through
Peak Meters, General	
Level display	2 or 8 channels, peak hold indicator switchable, vertical bargraph display, additional correlator with spot indicator
Length of bargraph	95 mm
Display modes and bargraph configuration	2 channel stereo (inputs 1-2, 3-4, 5-6, 7-8 selectable) • 8 channel (8 x 1 channel, 4 x 2 channels or 2 groups of 2+6, 4+4 6+2 channels with individual selectable standard and domain) • Surround 3/1, 3/2 (5.1)
Peak memory	Yes, additional peak hold indicators
Numeric level display	Available for level, peak level, loudness, over count. A single value can be selected to be displayed permanently, a list of all values is displayed when the MEMO key is pressed
Correlation spot indicator	Switchable (available only in the 8 channel mode with 4 stereo channels)
Loudness meter	Additional spot indicator displayed on the bargraphs, RTW mode or A, C or CCIR-2k weighting, RMS
Analogue Peak Meters	
Standards	DIN-5, DIN-10, NORDIC, BRITISH Ila, BRITISH I Ib, ZOOM 20, VU
Reference level	+ 6 dBu for: DIN (display 0 dB), NORDIC (display +6 dB), ZOOM20 (display 0 dB), VU (adjustable lead from 0 to 10 dB) +8 dBu for: British Ila (display "6"), British I Ib (display "8")
Integration time	According to the standard or selectable 1 ms, 0.1 ms
Fall back time	According to the standard (DIN: 1.5 s/20 dB)
Gain	+ 20 dB (DIN, ZOOM), + 40 dB (NORDIC, BRITISH Ila, I Ib)
Digital Peak Meters	
Word length	16 - 24 Bit
Scales	Digital 1 (0 dB FS to -60 dB FS), Digital 2 (0 dB FS to -20 dB FS), Digital 3 (-18 dB to +18 dB), Digital 4 (-4 dB to +18 dB) Quasi-DIN: DIN-5, DIN-10, Nordic, British Ila, I Ib, Zoom 20
Headroom	Adjustable from -5 dB FS to -20 dB FS, 1 dB increment
Integration time (Attack)	Digital 1-4 Sample, 0,1 ms, 1 ms, 10 ms, Quasi-DIN: Norm, Sample, 0,1 ms, 1 ms
Fall back time	According to the standard (DIN: 1.5 s/20 dB)
Gain	Digital 1-4: +40 dB, semi-DIN, Zoom +20 dB, British, Nordic +40 dB
DC filter	Off, 5 Hz, 10 Hz, 20 Hz
Peak hold indicator	Integration time same as level display or 1 sample (selectable)
Digital over indicator	Red spot indicators above each bar graph
Threshold	Full Scale, Full Scale-1LSB, Full Scale-2LSB, -0,1 dB FS, -0,5 dB FS, -1 dB FS, -2 dB FS, -3 dB FS, selectable
Attack time	1 - 15 Samples
Word length	16 - 24 Bit
Mute indicator	Red spot indicators below each bar graph
Threshold	All bits digital "0"
Attack time	50, 100, 200, 300 ms or 5 - 80 Samples (selectable, increment 5 samples)
Total Loudness Meter/Lequ	
Display	2 bargraphs, only available in the surround mode
Calibration	SPL reference 72 - 80 dB (single channel)
Total loudness / SPL	70 - 98 dB (without LF channel)
Weighting filters	A, C, CCIR-2k, (fast or slow) RTW loudness, all RMS
Lequ	Range 70 - 98 dB
Surround Sound Analyzer	
Surround format	3/1 or 3/2 (5.1)
Function	Weighted loudness display (A, C, CCIR-2k, RTW loudness, RMS)
Indicators	TVI, Total volume indicator: graphics display indicating the single channel and total program loudness Dominance vector indicator Position and width of phantom (virtual) sound sources (Phantom source indicator, PSI) 2 channel real-time audio vector scope 4 channel real-time audio vector scope (L-R and LS-RS) Low frequency LS-RS phase meter

Multi-way Phase Meter	
Surround mode	10 phase meters for all possible pairs of channels
8 channel mode	4 phase meters for the channel pairs 1-2, 3-4, 5-6, 7-8
Display mode	Spot indicator or bargraph
Attack time	Fast: 1 second, slow: 2.5 seconds
Negative peak correlation memory	yes (included in the peak memory)
Weighting filter	300 Hz 1st order low pass (switchable) for each phase meter
RTA	
Filter	1/3rd octav, 31 bands
Frequency range	Normal mode: 20 Hz - 20 kHz, LF mode: 5 Hz - 5 kHz
Standard	IEC-225 ANSI Class 2
Measuring/display range	Selectable 15 dB, 30 dB, 45 dB
Integration time	Fast/medium/slow, RMS or peak
Peak hold indicator	Yes, selectable
Audio Vector Scope	
Modes	2/0, (stereo), 3/1, 3/2
Channel configuration	2, 8 channel mode: displays the channel pairs 1-2, 3-4, 5-6, 7-8, the odd channel is displayed as left. Channel configuration in the surround mode is set automatically according to the presets
Visible area	70 x 70 mm
AGC	Auto/manual
Calibration mode	Yes, 20° and 90° grids are available (only in the 2 channel mode)
AES/EBU Status Monitor	
Status display	Digital channels 1-2, 3-4, 5-6, 7-8
Audio data bit display	Displays the activity of the digital audio data bits
Display modes	Hex, binary, plain text
Remote Interface	
Parallel interface	Functions of the MODE, SELECT, MEMO, GAIN, RESET and SHIFT keys or preset recall
Logic	Selectable pos/neg, level or edge-triggered, (all TTL, active low)
General	
Supply voltage	24V (21V - 30V)
Supply current	800 mA (@24 V), peak 1400 mA during power on
Power dissipation	19 W max
Temperature range (working)	0° - 45° C
Temperature range (storage)	- 30°C to + 85°C
Display	
Technology	2 pcs. Color-TFT-displays, visible area 2 x 75 mm x 120 mm
Connectors	
Analogue inputs	25-pin D-Sub, female
Digital inputs, outputs	25-pin D-Sub, female
Remote	9-pin D-Sub, female
DC-connector	Type "Binder 710"
Housings and Dimensions	
10800X, 10800XPLUS	Desk top unit
Dimensions	215 x 145 x 65 mm (W x H x D, excl. stand) height with stand 172 mm
Weight	approx. 1200 g (excluding stand)
Color	Case: RAL 7024 (dark grey), Scale: RAL 7000 (light grey)
10810-203	Panel mount, fits into Studer D950
Dimensions	202,8 x 170 x 60,5 mm (W x H x D)
Weight	approx. 1250 g
Color	RAL 7016, matched to color of the console
10820-203	Panel mount, fits into different consoles made by LAWO
Dimensions	202,8 x 199,8 x 60,5 mm (W x H x D)
Weight	approx. 1300 g
Color	RAL 7035 light grey
10830-218	Panel mount, fits into SSL Aysis, Avant series
Dimensions	218 x 160 x 60,2 mm (W x H x D)
Weight	approx. 1250 g
Color	RAL 7016 (dark grey)
Items supplied	
	10800X, 10810-203, 10820-203, 10830-218: Manual, DC-connector 10800XPlus: Manual, tilt-adjustable stand, mains adapter
Optional Accessories (10800X, 10800XPLUS only)	
	13710 Stand (SurroundMonitor 10800X) 13715 Adapter for 190 - mm front panels 13716 Front panel adapter kit 1174-R Mains adapter 100 - 240V (SurroundMonitor 10800X) 1186 Snake cable 4m, distributes 25 pin D-Sub to 8 x XLR-F
Specifications are subject to change without notice	

greatly to the detriment of both web designers and the corporations who commission sites from them that dedicated sound departments and in-house sound designers and composers (and these creatives are usually one and the same person) are not yet an active feature—although it is worth noting that larger agencies such as Razorfish now employ audio designers in all of their offices.

The user-friendly interfaces on web-design software have eradicated the need for a 'technician-led' industry and made way for the creative designer. The technology itself is no longer enough, you have to know what to do with it, and unfortunately (or fortunately for those of us working, or wishing to work, in the industry) there is no substitute for a qualified and experienced sound designer.

Web design agencies are beginning to think of themselves as fully-fledged multimedia production facilities, rivalling and perhaps surpassing the production values and respective revenues of film, TV and advertising corporations (one could look towards agencies such as why not associates, in order to observe the holistic trend that advertising and multimedia agencies are becoming integrated.)

In a parallel development to audio within multimedia and web design, the games industry has a long history of making filmic and sensational 'immersive' use of sound and music within games, from vast arcade machines to gameboy.

Again, this is an interesting time for sound and music design within this industry, as new consoles with highly-designed audio specs are making the notion of a seamlessly organic, fully interactive and immersive audio track a real possibility. This is happening in several ways.

In the new wave of current consoles—such as x-box and PS2—the ability to program how the sounds will function, like Microsoft's Direct Music, is a significant step in creating this seamless skin of sound. Sounds can be filtered and effected in real-time, thus depending on the size and organic nature of a room that the player character may be in, the reverberation of, for example the footsteps, can be altered accordingly. Also sounds can be EQ'd to represent placement in different environments, in real-time.

In terms of music, the same is true. Music must now be considered in terms of overlapping 'layers', and the nature of these layers, if they are to loop or are one shots, how they will fade in-out and how they will dovetail with the other layers of sound and music. Taking into account all the possibilities of sounds that may co-exist at any given time during the game. Fortunately composers working with today's technology will be



well used to working with these layers already, and can bounce out each layer of a composition separately for implementation within the game code.

The most important and overlooked aspect here is creativity within the implementation of audio content. A sound designer-musician will need to be able to think the whole game through as a macro event or narrative, in the same way that we would with the linear medium of film. And allow innovative ways for the audio narrative to move forward with the progress of the game, using old sound designer's tricks of playing with silence, hiding crossfades, and tricking the brain with seamless loops and the like.

Another saving grace of current music production within games is that designers no longer need to rely on General MIDI and thin, cheesy emulation. Full audio-driven scores are easily employed making content sound as realistic and professional as any commercial music production. With use of software such as Gigasampler, T-racks 24 mastering, *et al* a sound studio can be almost entirely powered by software, no more sweaty dark rooms full of expensive rack-mounted units and hopelessly confusing blinking LEDs. And in a not too distant future we will be able to fully harness all this potential within a sleek laptop.

Another forward-looking feature of the new consoles is the use of 5.1 surround sound, which further re-enforces the links between this media and the immersive sound design philosophy of films—particularly IMAX formats and ride films, with their maximisation of the dynamics of sound and of the spectacle of moving images. Rendering as reality fantastical unimaginable landscapes, harking back to the very first flickering experiences of audiences seeing the films of Georges Melies. □

Links

FOR A SIGN of where things are headed try out the following links: although you will need Shockwave and Flash 5 installed into your browser

www.thesquareroofof-1.com
www.amontobin.com
www.center-of-the-world.com
www.estudio.com

Interactive entertainment
www.sound-design.org.uk
www.noiselab.org.uk



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WHAT'S NEW PUSSYCAT?

Subverting computer technology to audio's ends makes commercial as well as egotistical sense. BSS Audio's **David Neal** lets the Cat 5 out of the bag and we look at a few traditional cable solutions

THERE HAS BEEN a great deal of talk about Cat 5 and what it is bringing to the audio world. Like many such terms though, Cat 5 is simply a nomenclature for a cable specification, and determines purely the required performance and characteristics for a cable to be so designated.

It's not hard to find, either. Look around your office or telephone system and you'll almost certainly see some Cat 5 cable. It's the relatively flexible stuff that connects your PC to the network socket on the wall, yet in the audio world it has suddenly become a symbol of power for the distribution of digital audio.

There are many systems now available that can deliver 48kHz digital audio in multiple channels down Cat 5 cable. These systems use a variety of networking techniques to deliver the audio, but all essentially promise the same thing—multiple channels of high-quality audio over low-cost cable with no signal degradation over distance.

It all started, so the story has it, with the standard telephone service wiring used in houses and buildings. Originally these were optimised for voice, but the introduction of modems stretched the data carrying capability to its limits, and various 'categories' of cable were subsequently specified that would handle different data rates. For example, 'Category (Cat) 3' cable will handle data rates up to 16MHz, while Cat 5 is specified for rates up to 100MHz.

Physically a Cat 5 cable is just eight simple wires encased in a PVC sleeve. Configured as four twisted pairs, they form the basis for transporting network data around. The twisting of the pairs gives the cable a certain amount of immunity from the influence of unwanted external interference, for the same reason that the 'hot' and 'cold' signals in a microphone cable are twisted.

The benefits of Cat 5 cable in our audio world are that the cable is cheap, small, and when used to transport digital audio data, offers many significant advantages over conventional analogue copper, including these five:

Much less copper cable is needed (one Cat 5 cable typically replaces a 16-way audio multicore).

It is ridiculously cheap compared with multiway audio cable.

It is easy to install, as it is smaller, and could even be temporarily run without getting in the way too much. As Cat 5 and the associated RJ-45 connectors are a computing industry standard, many third-party contractors are conversant with the rules concerning its installation.

There is no signal degradation over distance—as the audio is digital, it is not subject to the same impedance and capacitance effects that affects analogue signals.

You'll probably see UTP and STP (or SCTP) in cable specs. UTP is Unshielded Twisted Pair, while STP denotes Shielded Twisted Pair. Strange to think that an audio person's natural reaction would be to go straight for the shielded variety, but in reality it adds



Cable considerations

WHEN SELECTING CABLES for microphone use, consider a range that offers a wide choice of colours. A rainbow selection of cable colours does help when trying to trace a specific cable through a pile of leads.

While multicore cables are ideal for when there are large numbers of signals to be carried, they may not be the best option for every installation situation. If every pair in the multicore is to be terminated into a plug, in wiring terms it may be simpler to use discrete cables as they are generally quicker to wire into XLRs and jacks. Also the thinner diameter of multicore pairs, means that sleeving will probably need to be added to each so that the cable clamp of the plug will be able to grip it.

Another disadvantage of installed multicores is that, in the event of losing a few pairs through mechanical damage or rodent teeth, replacing a section is very difficult. It is wise to have a few redundant

pairs available for such emergencies. Discrete cables have the advantage that damaged lines can be replaced one at a time, or in more difficult situations, sections can be cut out and joined.

Cable is heavy. The only time that this is really obvious is when it is delivered on drums. There is actually quite a variation in weight between different cable types and this should be considered if cable runs are to be suspended at any point.

It is increasingly common to find regulations that affect where cables can be installed in public venues. As with most other materials used in public buildings, there may be further restrictions about cable construction and the toxicity of fumes should they suffer in a fire. Cable manufacturers should be able to advise about the performance of their cable but it is unlikely that they will necessarily know the regulations in every territory.

Costing your wiring

AS WITH MOST ASPECTS of installation, wiring costs have to be watched with reference to budget. However, the unknown factor on an installation project is time. Whether time is important because the wiring crew is on an hourly rate, or because an installation needs to be completed quickly to hit deadlines, time can always be referenced directly back to money.

When selecting a cable, a plug, a socket, or a patchbay there is a need to consider whether the combination of components can be wired together easily. For example, some constructions of multicore cable need each pair to be heat-shrink sleeved on termination to prevent the shield and shield insulation unwrapping when broken out from the external sheath. On a 32-pair or 48-pair cable this presents a significant time-cost burden. This cable type may have been selected for budgetary reasons

but it will not be so cost-effective after the time factor has been added. It is also important to remember that a piece of cable has two ends and the multicore type chosen because of the termination type at one end may be less well suited to the termination at the other end.

In many installations, labour costs are greater than material costs so it may be wise to consult the wiring team who frequently have a totally different perspective on what cable types work in a specific installation situation.

Less experienced installers may consider some of the features that cable manufacturers are now including as being worthwhile—the colour coding of multicore pairs, length markers and numbering of cable sleeves. While they may add to the cost of the product they make the installation simpler and reduce the opportunities to make a wiring error that has to be sorted out later with more time-cost.

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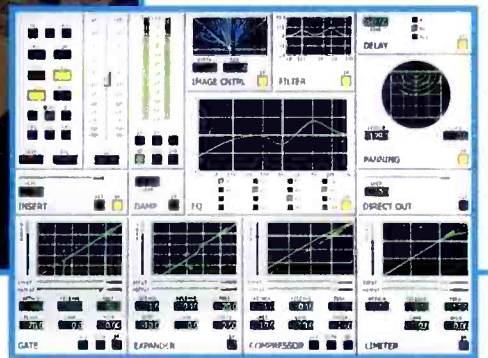
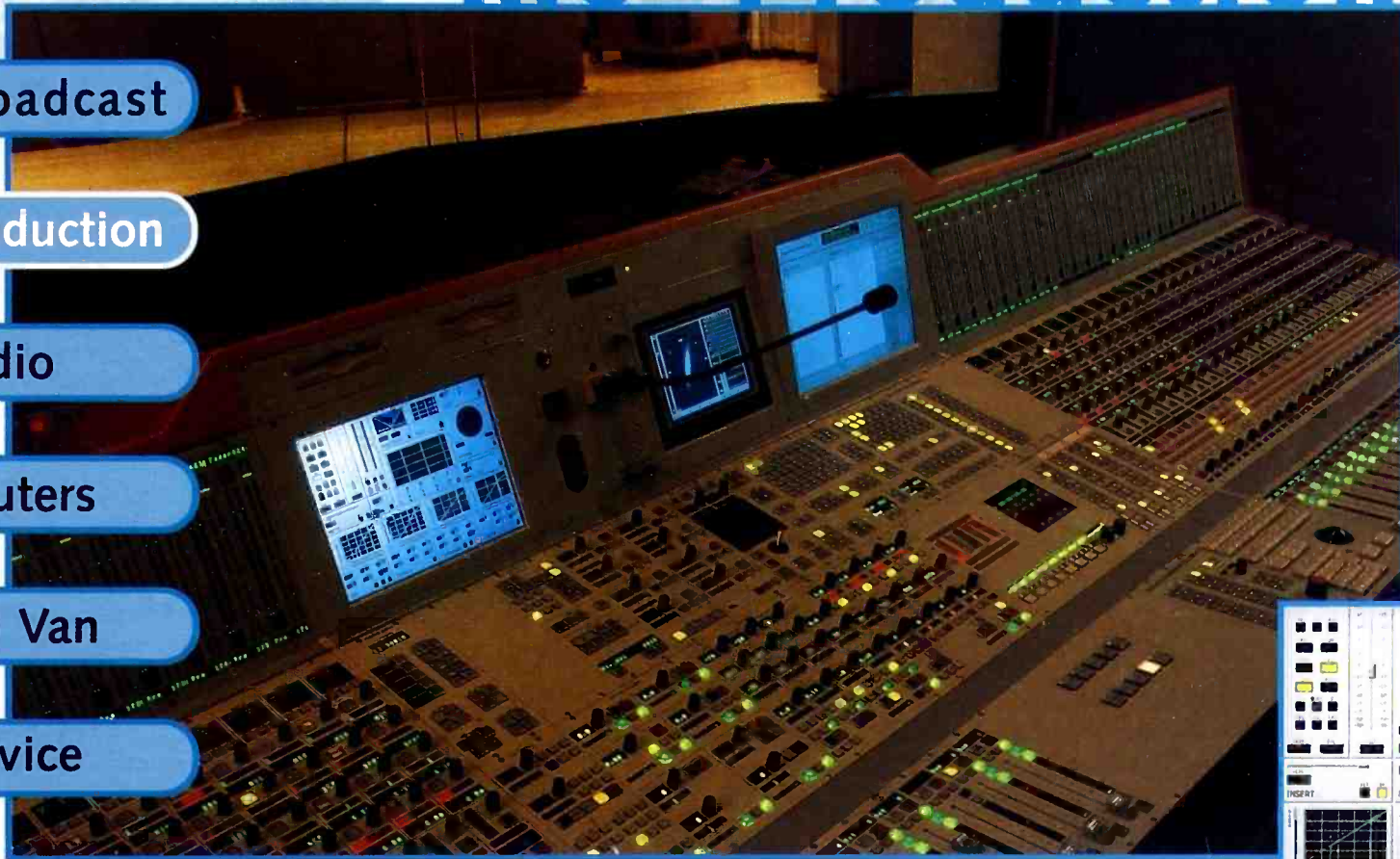
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virtually nothing to the performance of the system (unless you're working in an extreme environment with really high external interference or machinery) and will add significantly to the costs.

Termination is usually on RJ-45 connectors—a simple plastic 8-way plug and socket that you can find on your PC's network card. This too helps bring down installation costs as you can buy a crimping tool that takes all the hard work out of putting these slim wires into a small receptacle, saving on soldering time and connector cost when compared with the familiar XLR-style of connector.

What should you watch out for with Cat 5 cable? Just because it is 'computer cable' does not mean you can just rush out to the nearest PC superstore and buy any cable for your installation.

Beware of 'patch cables'. These are intended only for short distances, and more often use stranded wire rather than solid core wire, and may not be true Cat 5 compliant. While they will be adequate over a short distance, the performance (bandwidth and impedance) on long cable runs will introduce errors in the network performance. The stranded cores do make for a more flexible and resilient cable, but solid-core cable should be actually less expensive and give better performance.

Secondly, that RJ-45 connector looks simple to install, and using a crimping tool it is mechanically fairly straightforward. It is the twisting of the pairs, however, that brings Cat 5 cable its performance, and so it is necessary to keep those pairs twisted as close to the termination point as possible (within 1/2-inch maximum).

Don't be fooled into thinking that network cable is indestructible. Cat 5 cable suffers as much if not more from bad handling, over-flexing and general abuse than multiway audio cable. As a general rule of thumb,

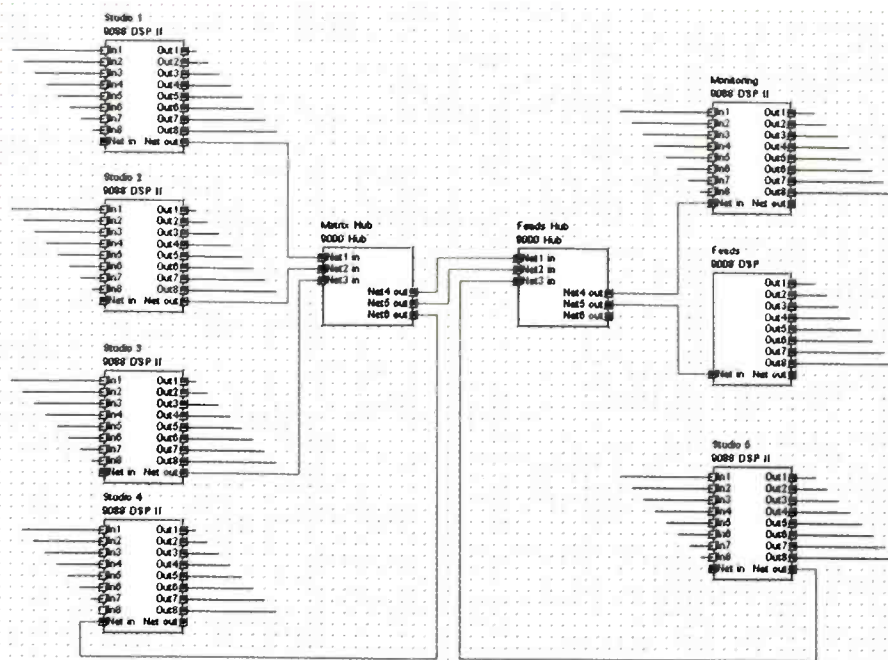
it is recommended that you do not bend Cat 5 solid cable into a radius smaller than four times the diameter of the cable (for a 4-pair cable, around 2.5cm, or an inch), therefore kinks should be avoided or the range may be reduced.

Remember that the RJ-45 connector can also be fragile, although there are now emerging some very robust connectors that integrate with metal shells based on XLR type connectors.

Check the wiring standard that the system you are using employs. The two main ones are EIA/TIA-568-A and EIA/TIA-568-B, which use the pairs in different ways. Wire up to the A standard where you need B and again, you'll have networking problems.

If you are going to be installing Cat 5 cable, it is worth investing in a good Cat 5 cable tester (no, a battery and a light bulb are not considered sufficient). While the wiring and termination may look okay, a good tester will report any bandwidth transmission and attenuation problems before you start running up the network, and will save you enormous amounts of time and wasted effort trying to locate a system problem.

There are full specifications published that Cat 5



Typical application of Cat 5 network in studio complex

cables have to meet, including return loss, equal level far-end crosstalk, delay skew and attenuation to crosstalk ratio. Essentially, these are performance specifications that indicate how well cables should propagate data, but obviously are IT-related rather than audio.

We've already mentioned that Cat 5 is a transport means for audio networking. Several companies now offer systems, some based on standard computer Ethernet networking techniques (such as Peak Audio's CobraNet), while others, such as BSS Audio's Soundweb system, use proprietary networking solutions. Each may have its advantages and disadvantages.

There are a number of compromises that have to be borne in mind. The bandwidth required increases with the number of channels transmitted. To achieve a high bandwidth, you need to use a higher data rate. The higher the data rate, the shorter the distance the data can travel without attenuation or degradation. For example, a standard Ethernet-based system runs at 100Mb/s, and can run data for 100m, while a system using a 12.5Mb/s data rate will be stable up to 300m. Longer distances generally require a more expensive fibre-optic solution.

Typically, these systems will deploy at least eight



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Supplier's own

WHILE THE EMPHASIS is often given to cable products from major manufacturers that are generally internationally available, there are other sources also worth checking out.

The catalogues of the larger pro-audio suppliers frequently have their own brand cables among all the major name products and, and some of these can provide usefully unique features. The majority of customers purchase their cables through dealers who quickly become aware of the specific needs of their clientele, particularly those in more specialised areas who sometimes find standard products lacking. Armed with this knowledge they are able to approach cable manufacturers for a custom product that, due to its niche nature, may not be viable for the manufacturer to make and market as part of their standard lines.

Generally these cables are customised solely in their construction, using a different combination of materials and techniques to improving parameters such as increased flexibility, improved screening, construction optimised for a specific type of termination, or even external sleeve colour to identify a specific cable in a multicable situation.

Examples of these supplier-specific cables are

numerous. I used a specific own-brand installation cable for years because it was well screened, easy to strip and terminate, remained flexible yet lay flat in trunking, as many other types did, but it's external dimension and sleeve was the perfect balance for compact patchfield or multiway connector termination as well still being held firmly within my preferred brand of XLR-type connector. Unfortunately it is not available any more—which brings us to what I see as the principle drawback of own-brand cables—the longevity of supply is probably not as assured as with manufacturer's own.

There are some interesting examples available. UK pro-audio supplier Studiospares has an interesting variation on a balanced multicore cable that uses double foil wrapping of each pair (with their own drain) to produce a comparatively more compact multicore than other construction. Most multicores of this type use a cellophane wrap around each pair's foil screen and can turn wiring such cables into a lengthy business. This cable, made for Studiospares by NEK, has an insulating coating on the outside of the foil itself making it easier to use.

Keith Spencer Allen

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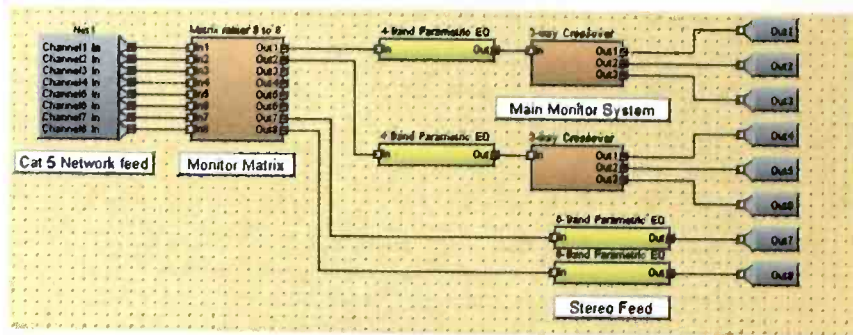
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48kHz 20-bit resolution digital audio signals on a single Cat 5 cable, and in some cases bi-directionally, so 8-in and 8-out from a point. Depending on how the system deploys its network, this could lead to an 8-channel bus ring, or if some kind of hub is used, larger matrices can be formed to provide routing to several areas of a building.

The audio networking systems on the market today vary in complexity, too. Some are designed purely for signal transportation; others also use the network to carry control data for the system. Most will have distributed processing by default. That is, the unit used to convert the network audio into an analogue or AES-EBU signal at the extremes of the network will also include some DSP power which can be used to locally process, mix or route the signals. As an exam-

ple, the local hardware could be used to take any signal feed, and then EQ it, and feed it to a crossover to studio monitors, all in the digital domain. Some systems have AES-EBU inputs and outputs, which means that the number of A-D and D-A conversions is minimised, keeping as much signal integrity as possible.

There are many areas that are really benefiting from audio networking over Cat 5. Obviously, routing large numbers of digital audio channels over long distances suits distribution of qual-



Layout of DSP in BSS Audio's Soundweb

ity signals around studios and broadcast facilities. If the system being used to transport those channels incorporates some processing and matrixing, you then have the possibility of choosing where you send which signal. Broadcast facilities have used large matrix routers for years, but digital audio networking using Cat 5 can dramatically reduce the cabling and hardware costs. In such a system, it would be possible to easily re-route audio signals from a central PC, while maintaining signal quality at the delivery points and giving the ability to monitor any signal at the that control point.

Additional processing (such as equalisation, mixing and crossovers) may well exist in the hardware as described earlier that can be used on the terminations of these signals at studio monitoring systems, mixer inputs and so on.

In the fixed installation sector of the audio industry (like conference centres, hotels, retail stores, visitor attractions and so on), the goal is similar—route audio quickly, efficiently and cost-effectively to as many areas as possible. All benefit from the cost reductions and performance enhancements of Cat 5.

As a major example of this distributed audio networking, the BSS Soundweb system installed in the Millennium Dome used some 4000 channels of audio throughout the themed Zones, broadcast suites, Millennium Show and Skyscape areas. A central high-way bus was used to create a distribution network, and local zone audio networks were linked in either directly onto the network or through an analogue bridge. Each zone had its own network, used for playback, and a centralised broadcast suite could pick up any signal from any part of the Dome, all under PC control. Voice evacuation and paging could be easily integrated as the infrastructure was there already.

To implement this using traditional analogue equipment would almost certainly have been impossible—consider the patching requirements alone.

Already, more manufacturers are entering the field of digital audio networking, and people are looking at larger systems with greater channel capacity. Routing flexibility is in high demand, as often there is no exact idea of the routing requirements at the initial project specification stage.

The IT industry is looking at faster systems, where Cat 6 and Cat 7 specs are now being finalised and implemented. Cat 6 is specified up to 250MHz, and Cat 7, which will probably involve new connection hardware, a specified data rate up to 600MHz. Gigabit Ethernet, running at 1Gb/s, as its name suggests, is a reality, and this spec calls for Cat 5E cable. Category 5E cable (enhanced) is made to more stringent standards, and is now officially part of the 568A standard.

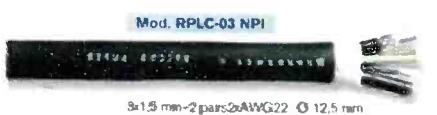
Somewhat sobering to think that all this has stemmed from telephony, the first application that transmitted sound over a piece of wire from one place to another... maybe audio has a place in computer history. □



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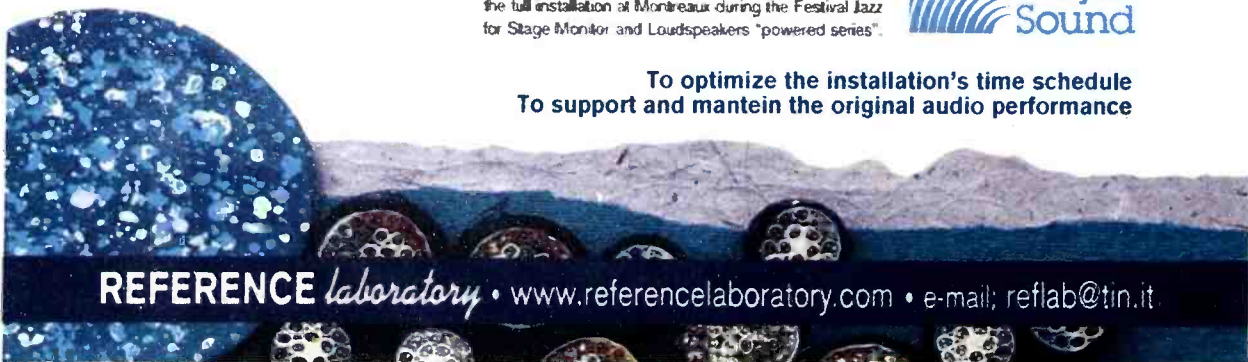
- For Live application is build under Flame resistant CEI 20-20 IEC332.1
- For Fixed installation is build under Fire Resistance (NPI not spread the fire) CEI 20-22 III IEC332.3
- LSZH (Low Smoke Zero Halogen) Mod. RPLC05 ZH CEI 20-22 #1 IEC 332.3 CEI 2037



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Simon says...

If anti-copy systems are intended to prevent illegal copying of CDs, they do nothing to discourage their designers from repeating each others' mistakes in their testing, writes **Barry Fox**

WEB SITES ARE posting hacks that defeat the SafeAudio CD anti-copy system on offer from Macrovision. Meanwhile, Macrovision continues its patronising red-rag-to-a-bull pronouncements that its system of adding noise errors to CDs must be all right because un-named golden ears could not find anything wrong during unquantified tests. Now we have at least two more players playing the same clumsy game. By the time you read this there will doubtless be more.

Sony has been secretly testing Cactus Data Shield, developed by Israeli company Midbar and tested in Germany last year with disastrous results—but supposedly now improved. Once again the company refuses to say how its system works but patents reveal details. 'We can stop all kinds of copying, even on domestic recorders,' claims Eyal Shavit of Midbar. Macrovision has already admitted that SafeAudio can be defeated by using a consumer CD copier instead of a PC.

Midbar's patents remind that all music CDs store bursts of music code and control information. The music is marked with 0 flags which tell the player to decode and send it to the loudspeakers; the control information is flagged with 1s and not decoded. Midbar replaces some of the music with false data and labels it as control information, so the CD player does not decode it. This creates a gap in the music which the player disguises by bridging the gap. So the original disc should play satisfactorily. 'There is little or no net difference in audio quality,' claims Midbar. But the company will not identify the 'golden-eared listeners' whom it says have tested the system.

If the CD is copied, the copier is tricked into wrongly labelling the false data as music. So when the copy disc is played there are bursts of distortion as the player tries in vain to decode garbage. The effect, says Midbar's patent, not only sounds bad but is 'potentially damaging' to the player circuitry if the added noise is suitably shaped. Playing square wave pulses through a hi-fi does it no good at all. A spokesman for Midbar says it would be 'unacceptable' to damage consumer equipment. But he will not discuss how the technology does or does not work—only that there are multiple

lines of defence possible.

Sony secretly tested Cactus by treating several thousand CDs sold recently in the Czech Republic and Slovakia, but the process was not set to cause damage. 'We have had no problems with loudspeakers,' assures



Shavit. He acknowledges that it would seem 'unacceptable' to harm consumers' equipment deliberately but adds the rider 'we have not abandoned the idea; we can add extra lines of defence as people use new attacks'.

A recent British patent filed claims yet another anti-copy system. But this one is special. It comes for Richard Gooch of the Recording Industry Trading Company. Who they? I could not find the number listed in the phone book, but finally established that the RITC is actually part of the IFPI, world trade body for the record industry. And Richard Gooch was recently named Senior Technical Advisor. So now we have the record companies' own trade body inventing a music-corruption system and hoping to earn money from it.

The Gooch patent tells how 'producing CD-Audio discs which do not adhere to the *Red Book* standard... may be used to produce a copy-protected audio CD'. But this not only blocks CD copying, it prevents 'legitimate usage such as the importation of data into portable players developed under the SDMI' and the 'legitimate extraction of digital audio data for rendering through high-quality systems such as the Meridian 800 Reference DVD-CD player'. So the IFPI has been looking for a system which allows copying for 'specific legitimate applications'.

The IFPI solution is to deliberately corrupt the timing signal of the laser beam cutter during mastering. The final pressed disc, says the IFPI, will 'play normally in the majority of audio CD players'. But if a CD-ROM drive is used to copy the time-corrupted CD to a blank disc, data extraction is 'disrupted' and the copy is spoilt. This would also prevent what the IFPI regards as 'legitimate' copying, such as SDMI dubbing. So data-repair data is recorded on the disc, either as a separate music programme or as MP3 or MLP compressed data in a subcode channel.

The corruption is intermittent so the repair data need only be stored in bursts. SDMI software accesses the repair bursts and creates an error-free file that copies onto a portable memory player. The repair data can be on a separate disc, memory card or web site, and encrypted so that the music can only be copied with permission or on payment of a fee.

It's all very clever, but a disc that plays normally on the 'majority' of CD players will by definition not play on a minority. So how big is the minority? The patent offers no hard facts.

So on the one hand we have the record industry promoting the new super hi-fi formats DVD-Audio and Super Audio CD, while on the other hand we have major record companies like Sony, and the industry's own trade body, experimenting with schemes which deliberately degrade the quality of ordinary CD sound and even make discs unplayable on some players, on a completely hit-and-miss, suck-it-and-see, trial-and-error basis.

Philips is now evaluating these CD-corruption systems to see whether they contravene the *Red Book* license by robbing music CDs and players of the safety margins built into the CD system to cope with naturally occurring errors, such as dirt, dust and scratches.

As correspondents on an Internet pro-mastering forum ask, can these discs fairly be labelled CDs, what will happen if deliberately corrupt masters are provided without the replicator being made aware and how will the system cope if deliberately introduced errors clash with accidental errors?

Still standing

If the terrorist attack on America has damaged its infrastructure, it has strengthened its resolve. It may only be music, but the studios of America are not giving up, writes **Dan Daley**

ON 11th SEPTEMBER, at around 9am, New York City and the rest of America lost whatever of its innocence was left. Two of four airliners hijacked that morning were flown as bombs into the two towers of the World Trade Center in downtown Manhattan. Within 30 minutes of the second homicidal collision, and within 20 minutes of each other, the two towers gave way and collapsed in on themselves. The death toll was in the many thousands.

Most of America, like the rest of the world, watched this transpire on television. And what struck me first about this was the unrealness of the scene as it unfolded on television. The sky was a bright, vivid blue, and was cloudless. The explosion when the second airliner hit the South Tower was a brilliant ball of orange and yellow, billowing in a way that seemed strangely familiar. In fact, we had seen this many times before. Watching on television, disconnected from reality, the events looked as though they had been meticulously prepared on a matte background in postproduction. It looked like something that had been laboured over for weeks at Industrial Light & Magic. It didn't look like Pearl Harbour, the event that was repeatedly invoked rhetorically; it looked like *Pearl Harbour*, the movie. Even the images that appeared a few hours later, of burning debris and soot-covered people fleeing the scene, looked like what we've become used to on the History Channel: like archival footage of the aftermath of Coventry or Dresden.

But in New York City, on the ground, it was, as my brother who was in the Wall Street area that day on the way to work on Ellis Island said, 'hell on earth'. Television and the movies, America's last major export product, has permeated every aspect of our lives since birth, acting as a buffer between us and reality. That is how it worked on that September morning. To the millions of people who actually saw it take place in front of them the unreality of the events were an understandable psychological barrier. 'This can't be happening', is what your brain says, even as your retina records each brutal image.

The towers, built in 1972, are part not only of life in New York, but of entertainment reality and lore. Ean Sugarman, a recording engineer and DJ, had worked at The Greatest Bar On Earth, the disco on the 107th floor of the North Tower owned by WTC top-floor restaurant Windows On The World, had an unobstructed view of the demise of the building. 'I got woken up at about 9am by my neighbour. I hung my head out the window to hear him tell me, "Ean, your business is over, have a look"'. I don't think anyone realised immediately that the buildings were going to collapse. I could see where I worked on the 107th floor and figured that maybe tower one would be out of action for a few months. When the North Tower collapsed, we could hear it three miles [away].'

Most of the major studios are in the Midtown area, around Times Square, such as Quad and Right Track, or on the West Side, like Sony Music and The Hit Factory. Quad owner Lou Gonzales closed the studio as the smoke

This year's model

Making money out of the Internet is quickly becoming the Holy Grail of modern media management, writes **Kevin Hilton**

SOME OF THE PHRASES most frequently used when talking about the Internet—aside from ‘sleeping giant’ and ‘dotcom collapse’—is ‘business model’. It is usually part of a sentence like ‘We must get the business model right’, although, until recently, quite what this means, or how it can be done, has not been fully explained. It is only now that a business model that has been around pretty much since the beginning of e-commerce is now being aggressively implemented. Subscription is arguably one of the more obvious ways of generating revenue but the general online commercial community has shied away from it.

An even more obvious way to make money from entertainment ‘content’ is to pay for it as you need it: in real terms, the cyber equivalent of pay-per-view television. Artists of a certain stature—cult figures, industry mavericks, those whose careers are not what they once were, or a combination of all these—have been dabbling with both subscriptions and pay-per-view for the last few years. But it was generally considered that music downloading in general, and live streaming in particular, would not be widely accepted until big name performers and record labels adopted it.

As befits her reputation, Madonna took the risk with her vaguely controversial Brixton Academy live show and webcast. Elton John went further than Madge in July when he played an exclusive gig from Ephesus in Turkey. This was hosted by MSN, which hailed the event as the world’s first global pay-per-view webcast.

This show was also being a purely broadband presentation. Tracy Blacher, MSN UK’s consumer marketing manager, identifies the Madonna show as an ‘exercise in quantity rather than quality’, a reference to it being available over existing connections. ‘The Madonna concert was never going to be of superior quality,’ she says, ‘and although not many people have broadband connections at the moment, this [the Elton John webcast] is a way of driving the technology.’

MSN has not released any audience figures for the webcast, saying it is ‘commercially sensitive information’. Blacher says that MSN will host both PPV and free webcasts in the future, depending on the artists concerned and audience interest. Perhaps overstating the importance of the Elton John webcast, Blacher observes that it could do for pay-per-view and broadband what the Coronation of Elizabeth II and the Moon Landing did for television.

To be fair, the parallels are there. The online entertainment field does have a desire to experiment with the form and make the same impact as TV has done. The twin barriers of cost and technology are currently in the way. Alex Boyeson, production manager for Capital Interactive, which webcast the triumphant homecoming to Oxford of Radiohead (also during July), comments that content is no longer an issue, it is transmission quality. ‘It is still flaky and the whole peer-to-peer relationship with ISPs costs so much money,’ he says.

There is also the question whether this way of working will become fully viable and if there are enough

rose over Manhattan. Two producers who were scheduled to work there had their planes diverted. The next day, Gonzales says in an email (most phone service was still out), ‘We have three sessions going and bookings coming in. Not quite business as usual, but close. It seems people still want to go on with few or no interruptions.’

How possible that could be remains to be seen. For virtually all commercial studios in Manhattan, the three days after the terrorist attack were quiet. Studios below 14th Street, such as Electric Lady, Theatre 99 and Chung King, were in the exclusionary zone for several days, unable to operate. Yet, underscoring the chronically Balkanised nature of New York itself—where it sometimes seems more reasonable to fly to LA than to go from Grammercy Park to the Upper West Side—by Friday studios in Times Square were doing a limited number of sessions. ‘It was almost normal by Friday,’ reports Sound on Sound owner Dave Amlen. ‘Times Square looked like any other day. To see it, you’d never have known something horrific had taken place a 10-minute subway ride away.’

Amlen also pointed out that New York’s studio community is largely self-sufficient due to the city’s status as the capital of rap and hip-hop music. ‘Many of the studios have engineers and producers who use them because they’re around the corner from where they live,’ he says.

But the long-term prognosis is unclear. Lou Gonzales wonders whether producers and artists will want to come to Manhattan in the same numbers in the future. And several studios have made significant new capital investments in themselves in the past few months: Amlen bought new SSL 9000k and Sony Oxford consoles, a \$1m combination, plus the build-outs the rooms required. Then there’s the massive and multi-million-dollar new orchestral recording studio which Right Track Recording had just finished on the West Side, near the Javits Centre.

The studios of New York had been on the upward side of the business cycle, with steady Urban music work forming a reliable core upon which to base enough economic optimism to risk new capital investments. The sale of music on physical media—disc and tape—had been declining all year, down about 5% by mid-year. That didn’t necessarily mean, however, that there would be less music, and many studios had been adding Internet-orientated services to stay on top of a shifting market.

Cyclical fluctuations in the music market, even those caused by technological advances, are nothing new. But the dramatic uncertainty of the 11th September event was. Will music producers and artists and other entertainment clients become reluctant to come to a city that has been so blatantly marked as the symbol of American success? The only event that even approaches the catastrophe of 11th September is the double-whammy, in 1994, of a major earthquake and racial rioting in Los Angeles. Bill Dooley, director of recording at Extasy Studios in LA, and one of the city’s studio veterans, recalls that music recording there took a nosedive that took six months to recover from. ‘But that was without everyone being afraid to fly,’ he adds. ‘That compounds it, and means this will affect studios in all major US markets.’

But life goes on, and New Yorkers have proven this. Todd Whitelock and Steve Epstein, two remote recording specialists for Sony Music Studios in Manhattan, were on different planes on 11th September heading to LA. Epstein ended up stranded in Kansas City; Whitelock in Detroit. Both then drove for two days, arriving within an hour of each other, three hours before the Wynton Marsalis session they had intended to record was to start at Todd-AO in Hollywood. ‘They didn’t give up,’ says Brian McKenna, Sony Music Studio’s senior director, who relayed the story. ‘And neither has New York.’

people who want to see such events in this way. Earlier this year, the president and chief strategy officer of BowieNet said the trick was to make ‘streaming video a winner’, while not excluding slower networks.

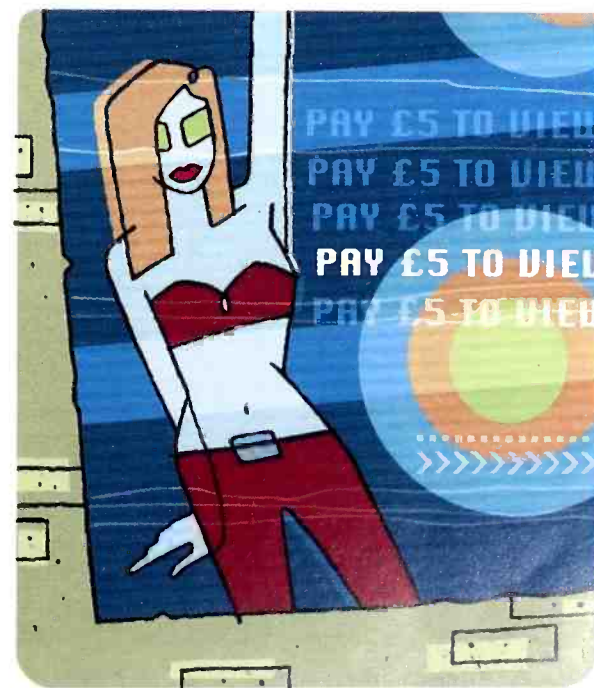
The business model that the wider record industry considers to be the most valid—paying a subscription for the privilege of downloading material that is changed on a regular basis—has finally been put into operation. On the face of it, WOMAD Digital Channel is a venture from yet another specialist, non-mass-market label. For a monthly subscription of £5, consumers get 40 tracks a month from the Real World catalogue; these are playable only on the subscriber’s PC, although there is a mechanism that enables the customer to buy a permanent download copy of a track.

OD2 (On Demand Distribution), co-founded by Real World-WOMAD figurehead Peter Gabriel, has developed the technology that drives the service. It has also signed deals with the Association of Independent Music and Telstar Records, building up the number of European music retailers on the WebAudioNet platform.

Other online entrepreneurs are now asking their consumers to directly pay for content: even some newspapers are considering charging for such things as horoscopes and crosswords. But a recent report casts doubt on the money-making capability of Internet entertainment. *Interactive Consumer Broadband: Sex, Sport and Shopping?*, produced by research organisation Analysis, suggests that digital TV will be the preferred source of interactive and exclusive pay-per-view programming.

A co-author of the report, Margaret Hopkins, underlined the findings of the report by saying, ‘It is difficult to see the attraction of services such as video on demand (VoD)—once seen as a shining light for the future of Internet services—when intelligent devices such as the personal video recorder will enable a do-it-yourself VoD.’

Paying for online content is not necessarily the saviour of the Internet, nor is it a potential stiffer. Providers should continue to experiment and push the boundaries but they should always remember that the Internet is but one outlet for the ever increasing number of people trying to sell us something.



DIGITAL VIDEO RECORDERS

Digital video production equipment is now as commonplace as digital audio, and for much the same reasons. **John Watkinson** looks at digital VTRs

ALTHOUGH PROCESSES such as mixing are adequately performed in the analogue domain for both audio and video, there has always been a difficulty with analogue recording. Tape noise may be acceptable on a single generation in either application, but it builds up over the number of generations needed for production. In the analogue domain, the only solution is to use wide tape tracks. This is why production recorders need to use bigger reels or cassettes than consumer devices such as VHS which only need to work for one generation.

In the digital domain, high-density video recording can be used because the effect of noise from the narrow tracks is random bit errors and we can fix those using error correction. That error correction system can also fix errors due to tape dropout. Buffer memory in the replay section removes timebase error, just as in digital audio equipment. In fact it is difficult to see much difference in principle between an audio DAT machine and a digital VTR. They really differ only in the bit rate.

Bit rate is an important parameter because it affects the economics. Component 4:2:2 digital video on the serial digital interface (SDI) has a bit rate of 270Mbits/s, although once all of the repetitive stuff is removed the meaningful picture needs just over 210Mbits/s. This is quite a high rate to sustain and although technically feasible, it will require a high tape speed. The D-1 format worked in this way. This was the first DVTR to be commercially available and it used $\frac{3}{4}$ -inch tape. The high tape consumption meant that it was never widely adopted by broadcasters. As tape formulation improved, higher energy tape based on metal particles was developed. This allowed enough

energy to store one-bit to be available in a smaller area of tape and the result was an increase in density, which also improves the economics. The D-5 format uses $\frac{1}{2}$ -inch metal particle tape to record 4:2:2.

As most broadcasters used composite video—PAL or NTSC—many analogue formats were developed to support composite signals. For a time, manufacturers supplied composite digital formats which used convertors on input and output so that they were plug compatible with analogue machines. The D-2 and D-3 formats were in this category. As production moved away from composite to component, these formats became obsolete.

As an alternative, it is possible to use compression, so that the recorded bit rate falls. Video compression techniques will have to wait for a future article, but in essence compression looks for similarities between adjacent pixels, such as in large areas of sky, and for similarities between pictures. The latter is fine for broadcasting, but not so good for recorders that have to edit. It's no use recording only the differences between the previous picture and the next if the previous picture is replaced in an edit. As a result digital VTRs tend to use compression systems that operate within the picture only.

Digital Betacam uses this type of compression, called intra-coding or spatial coding. DB is a 4:2:2 system and compresses by just over 2:1 to help keep the compression losses minor. JVC's Digital-S format (now called D-9) also uses 4:2:2 coding and achieves very nearly the same performance as DB but at lower cost. However, the digital production VTR is a dying breed. Competition from editors based on computers and disk drives has destroyed the market for

high-grade VTRs. The only sphere in which the DVTR can compete is in portable applications such as location production and ENG (electronic news gathering) and in consumer devices where extreme miniaturisation is popular.

In the case of DVC, the compression factor is higher in order to achieve a miniature mechanism. The input bit rate is reduced prior to compression by down-sampling the colour data to 4:1:1 or 4:2:0. This reduces the colour bandwidth, but is not visible to the naked eye, although it might reduce the quality of any subsequent chroma keying. As DVC and DVCPRO are intended as consumer and ENG formats, this is hardly an issue.

In contrast, Sony's SX format tries to retain a professional feel by retaining 4:2:2 coding. However, the bit rate on tape is marginal for 4:2:2 and the losses are consequently greater.

All VTRs need audio channels as well as picture. Production-grade DVTRs usually have four audio channels, and generally these are uncompressed. Smaller formats may only support two audio channels. Since digital audio is just data, it is quite feasible to record the audio on the same tracks as the video. Fig. 1 shows that this requires a process called time compression. If the blocks of audio and video samples are stored in memory and read out at a higher clock rate than they went in, the result will be that the blocks come out in less time. The audio samples are squeezed heavily in time so that they fit into the gaps in the video. The blocks are all uniquely numbered on the tape, so that when the track is played back, the replay circuitry knows which data are which. Spaces are left between the audio and video blocks so that they can

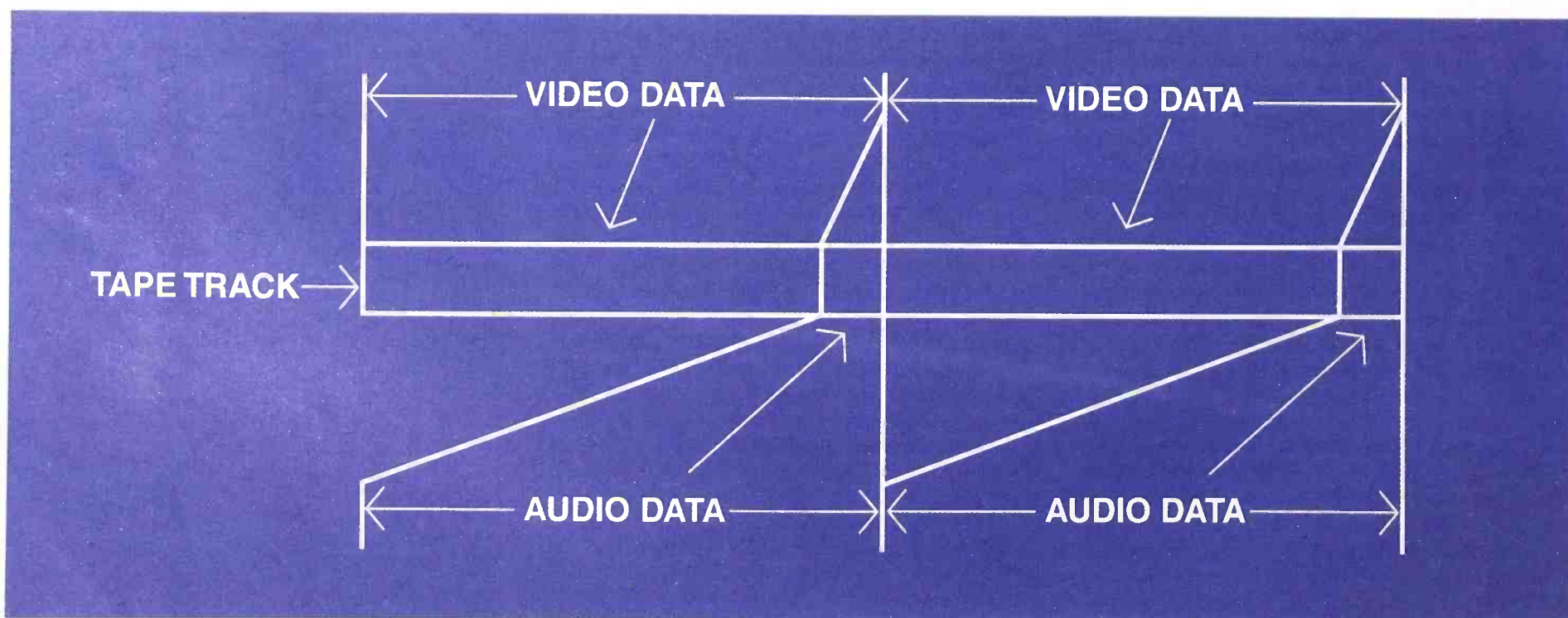


Fig. 1: Time compression allows audio and video data on the same track

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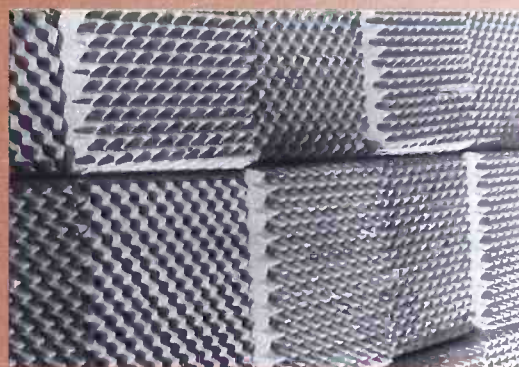


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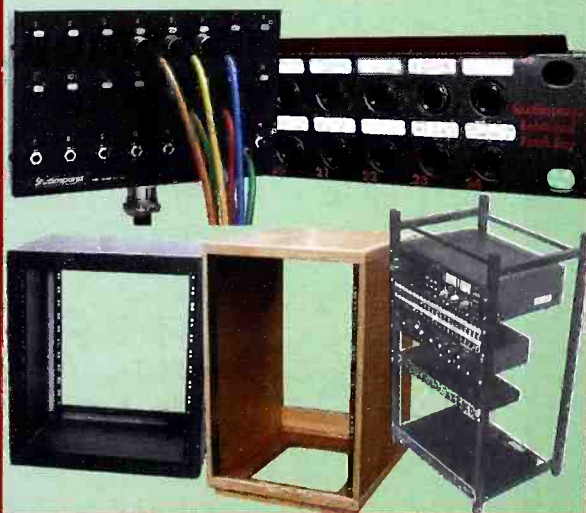
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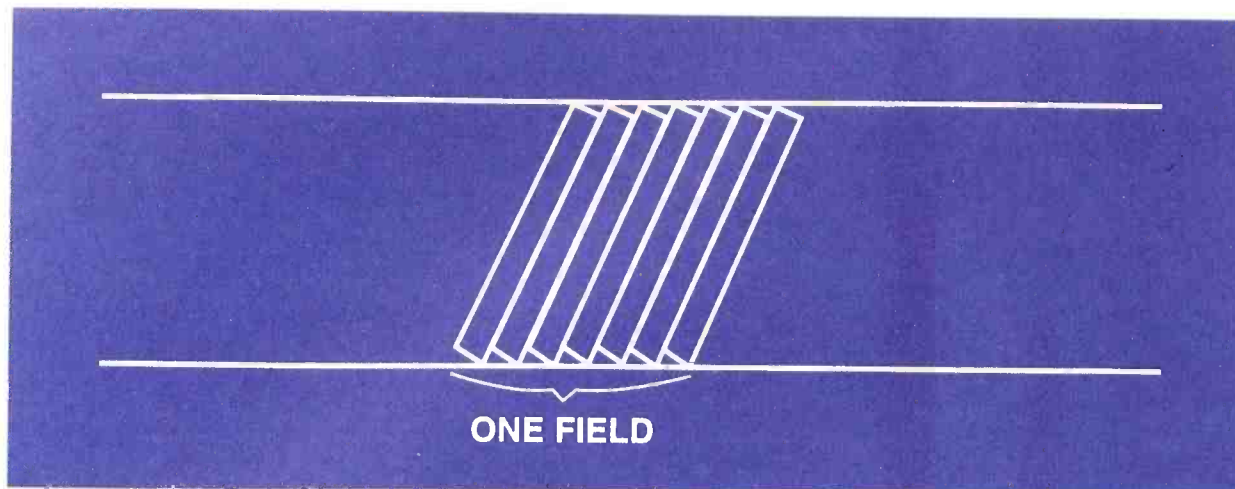


Fig.2: Many DVTRs use segmentation: the field is split over several tracks

independently be edited. In order to edit one audio channel, the transport goes into record just for the duration of the appropriate audio block in each track. The unique block addressing mechanism helps the record electronics to anticipate the correct point to enter record as each track is traversed.

The high bit rate of digital video means that often it is impossible to get all of the data for one field in a single tape track. Fig.2 shows that the answer is segmentation: each field is broken into strips and recorded over several tape tracks. There is another advantage to segmentation; it allows dual-standard hardware. If a segment rate of, say, 300Hz is chosen, then a 50Hz format records using six segments per field whereas a 60Hz format records using five segments per field. As the 50Hz formats have more lines, this works out well.

Machines that don't employ compression have to record a high bit rate. This can be reduced by using

more than one head working in parallel. There is a further advantage here which is that if one head gets dirty, only half of the data are lost. Using a scheme called distribution, the pixels can be shared between tracks. This makes concealment of errors due to head clogging much easier.

Tape-based machines cannot format and verify their media like hard drives, and so they must be able to deal with uncorrectable errors where the loss of data is so great that the error correction cannot operate. In the uncompressed domain, concealment is easy because interpolation can be used between good pixels to estimate the values of missing pixels. However, if a whole block of data are lost, this would result in a rectangular area of picture in which the resolution was obviously reduced. A process called shuffling is used to overcome the problem. Prior to recording, the pixels are moved around the screen in a pseudo

random fashion. After replay, this process is mathematically reversed. The result is that the pixels come back to the correct place, but concealments are scattered over the whole screen in a random pattern, rather than being concentrated in one place. This makes the concealments much harder to see.

In machines which use compression, pixel-based concealment is impractical because compression schemes work on picture blocks or tiles and an uncorrectable error can cause the loss of a whole block. In general compressed machines use more powerful error correction to reduce the number of occasions where concealment becomes necessary. If a block is lost, it may be possible to copy a block from an earlier picture to fill the gap. This is generally much more visible than pixel-based concealment. Shuffling the pixels before compression is not an option as the shuffle will destroy the redundancy in the picture, although it is possible to shuffle the compression blocks to avoid adjacent blocks being corrupted on the screen.

It is generally required to see some kind of picture even when the tape is being shuttled. Under these conditions the tracking breaks down and complete tracks cannot be recovered. However, individual blocks can be recovered, and as they all have unique addresses, any block that is successfully read can be used to update a frame store. This frame store does not contain a single frame, but is a composite of pixels from many different frames, but it is still recognisable as a picture and adequate for locating a point of interest in a recording.

The shuffle designed to aid concealment also helps in shuttle as the recovered pixels are widely spread over the screen. This technique cannot be used in compressed formats which can only recover picture blocks. These blocks become very visible in shuttle. □

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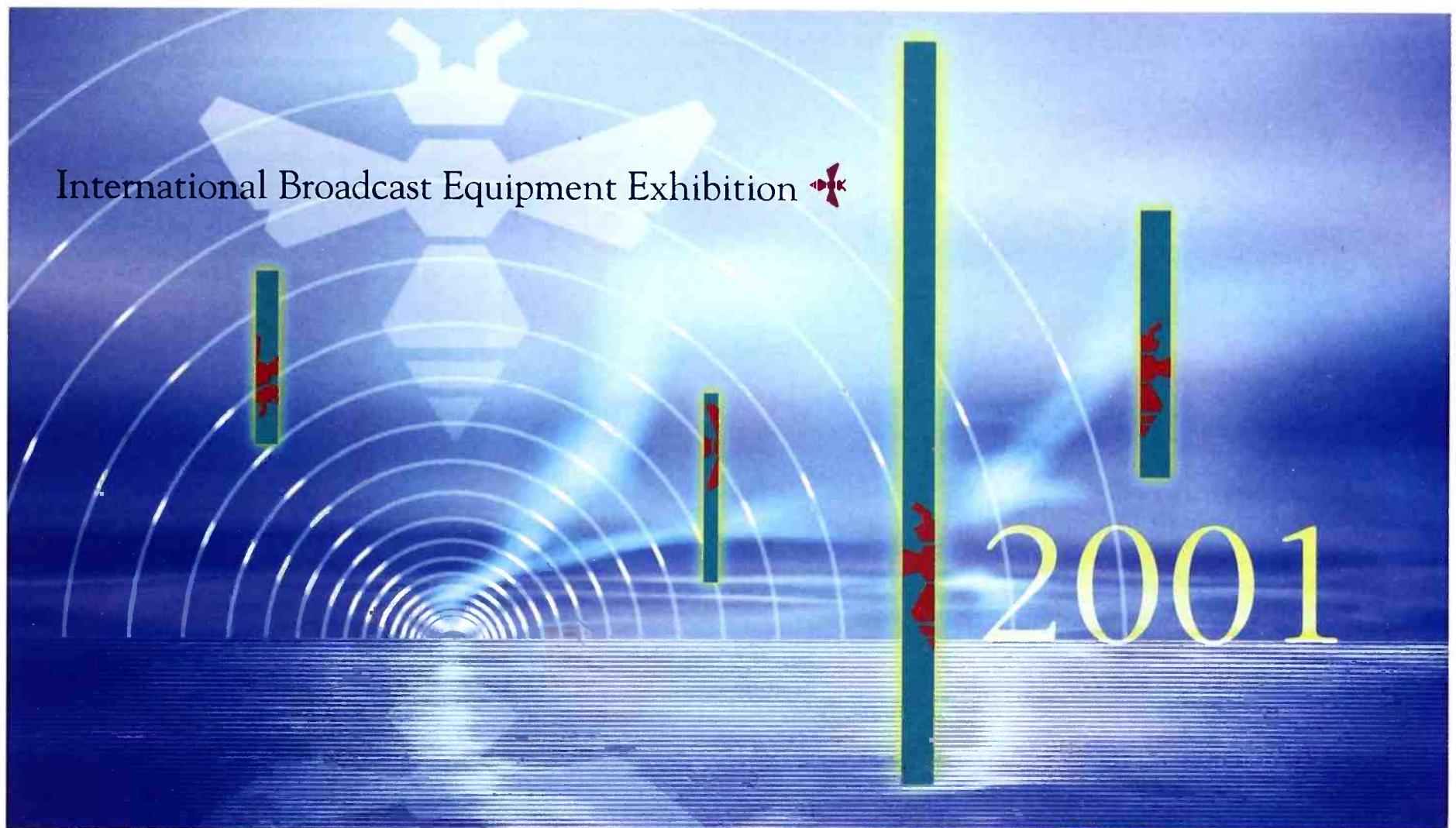
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MIC MECHANICS

For the purist, the subject of classic mics extends beyond tarnished condensers to include carbon, crystal, dynamic and ribbon microphones. **Ashley Styles** studies early microphone designs

LET'S BEGIN AT THE VERY BEGINNING. I am sure that there are still many examples of carbon microphones in various collections around the world. One of the very first models—designed for broadcasting use—was the famous Resitz made by Eugen Resitz, one of Neumann's former employees. Out of interest, the Resitz microphone had a 'smooth' response from 50Hz–1kHz, being some -15dB down at 10kHz.

Those early carbon microphones were physically quite large and often of interesting design—for example, the octagonal shaped model from The Trix Electrical Company Ltd, England. The suspension lugs are used to suspend the microphone within a cradle, with a suitable elastic-rubber cord arrangement; the cradle is then attached to the microphone stand. Electrical (signal) connection to many of these microphones is by means of brass terminal posts with knurled finger tightening securing nuts with some models, such as the Trix, using a connector similar to the European standard 2-pin mains plug-socket. The associated wiring consists of a simple twisted pair, which was more often than not un-screened cable.

The transducer, much like a small cylinder, is partially filled with carbon granules. One end of the cylinder, the flexible end, is fixed to a diaphragm which also serves as the electrode, while the other end of the cylinder has a fixed electrode. A DC 'bias' voltage is required, as the carbon granules generate no electrical signal themselves. As the carbon granules vibrate in sympathy with the sound waves moving the diaphragm, so the resistance of the carbon granules changes. From the resulting AC produced across the transducer, the audio signal is extracted via a capacitor or transformer-coupled circuit.

The quality of reproduction from this type of microphone is fairly poor. For example, those of us who can remember the old-fashioned telephones used until the early seventies—most of which used carbon microphone technology—remember the problems and poor sound quality. I appreciate that the transmission capabilities in telegraphy were limited to a 300Hz–3kHz frequency range and that the microphone and receiver, earpiece, were hardly designed for anything other than the reproduction of speech,

however the problems associated with carbon microphones were blatantly obvious.

The related output level versus the sound pressure level could be quite high, depending upon the bias voltage. If the bias is too low, then the output level will be below the self noise of the carbon granules used within the capsule assembly. Equally, if the bias voltage is too high, then flash-over and arcing can occur, which causes the carbon granules to stick together, causing increased problems with self noise that render the microphone useless. Unfortunately, because of the principle of operation, the self noise is very high in the first case—more a case of 'noise-to-signal' than

What can we say about these devices? The electrical output is derived from the vibration of the diaphragm causing bending of the attached 'shim' of Rochelle salt crystal. This is called the 'piezo-electric effect', whereby an electrical signal is generated across opposite surfaces of the crystal when it is twisted or flexed. Much like carbon microphones, the physical mass-compliance of the diaphragm and electrical 'element', determine the sound quality obtainable from these units.

The mainstay for production of crystal microphones, was the domestic tape recorder market of the fifties and sixties, with only a few sales of crystal

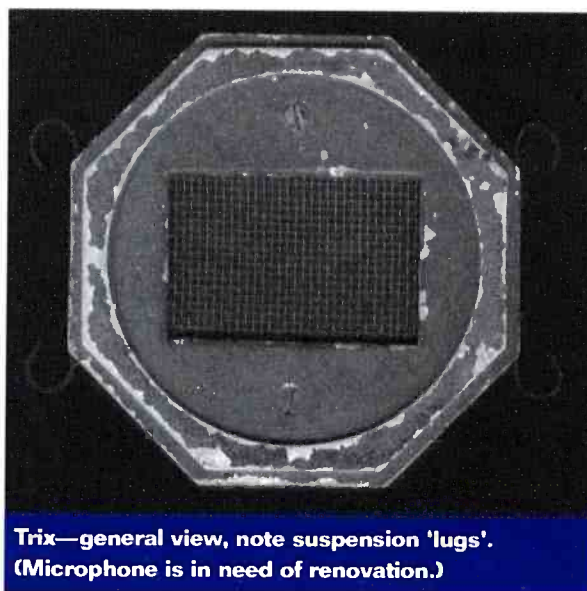
microphones for PA purposes. I recall one manufacture of crystal microphones—Acos-Cosmocord Ltd based in Waltham Cross, again a British company—whose microphones were used by domestic tape recorder manufacturers. Acos-Cosmocord, is also remembered for the manufacture of crystal and ceramic cartridges and pickups, for record reproduction.

The crystal of Rochelle salt used in this type of microphone, has a very high internal impedance and the microphone requires to work into a low capacitance cable-load, together with a load of no less than about 1MΩ, higher if possible.

If the loading is less than 1MΩ, the low-frequency response becomes more attenuated as the resistance of the load is decreased. The microphone lead has to be kept reasonably short and constructed from low-capacitance cable, anything above 100pF causes a drop in high-frequency performance. It also follows that the high-frequency-response continues to be attenuated as the load capacitance is increased, so while valves were being used in domestic tape recorders, the crystal microphone still had a future—high input impedance together with low input capacitance. Alas, semiconductors were soon to revolutionise the electronics world. The input impedance on most domestic tape machines and PA amplifiers, due to the properties of the transistors available at that time, were then less than ideal for crystal microphones. The 'high' impedance in the FET-based electronics that we are now so familiar with, were unavailable in the early days of transistor technology. So sadly, or not, the introduction of the transistor was to be the end of the line for the crystal microphone.



AKG-D36 with its remote adjustable polar pattern



Trix—general view, note suspension 'lugs'. (Microphone is in need of renovation.)



AKG-D2224 'dual' capsule dynamic microphone



American—No it's not a cylinder head, it's a ribbon microphone

I recall (I was in my mid teens at the time) a popular publication called *Practical Electronics*. With the advent of FETs, during the late sixties, *Practical Electronics* printed an article about constructing a 'high-quality' crystal microphone. I remember the article well as I built a pair of these microphones. The microphone was designed around the ever popular 2N3819 FET, field effect transistor, which presented quite a high input impedance, many M Ω , to the associated crystal-ceramic 'cartridge'. The cartridge, type Acos 39/1, being quite small, about 0.75-inch in diameter, gave quite a respectable high-frequency performance and together with a high input impedance, offered an equally respectable low-frequency response. The insert came with strict instructions about the risk of damage to the crystal element through soldering directly onto the terminal pin(s)—only plug on connectors must be used. From what I can remember, the units performed surprisingly well, I still have one in my collection; the only problem I ever had was trying to track down the associated 22.5V battery. This, however, was all back in the days when people of all ages had hobbies.

A dynamic (moving coil) mic is actually a loudspeaker in reverse. Consisting of a coil of fine wire, attached to a diaphragm which vibrates in sympathy with the audible source, 'vibrating air', and moving through a strong magnetic field, thereby generating an electrical signal from the applied sound pressure waves. The strength of the magnetic field damps the free movement of the coil-diaphragm due to the eddy currents that are produced within the electrical circuit of the microphone and the preamp input loading. The vibrating air causes the coil-diaphragm to move in one direction, and the eddy current generated (not the electrical signal) attempts to move the coil-diaphragm in the opposite direction. The same also applies to ribbon microphones. Carbon and capacitor microphones suffer from the same problem, alas in a different way—as the working electrical charge across the carbon granules or the capacitor plates is increased, by design, so the damping effect will also increase. As the dampening effect increases, so the microphone becomes increasingly 'deaf' at high frequencies and the device will also exhibit a greater nonlinear transfer of electrical output for a given sound pressure level. With all types of microphone, it is a balance between sensitivity and sound quality. This is one of the reasons why matching of microphones to preamps is so important, especially with moving coil and ribbon type microphones.

Maybe this is why some microphones appear to give a 'drier' or 'tighter' sound, when the microphone impedance is set lower, at, say 50 Ω rather than 200 Ω , when the damping factor would have increased by four times.

The dynamic microphone has been with us for many decades with early models, for example ST&C models, using screw terminals, much like that of the early carbon models. Together with equally elaborate suspension systems, to reduce any structurally transmitted vibration, that might be picked up from the microphone stand. Alas the early microphone stands were so solid in construction, the chance of any mechanical vibration would be slight and limited to LF rumble.

Perhaps the range of quality and manufacturers of moving coil microphones is the greatest of all microphone types available. From the low-budget models supplied with domestic tape recorders of the fifties and sixties through to the top-of-the-range professional models available today.

There have been many different designs from many different manufacturers. Most microphones using a single capsule element within a simple housing. Through the use of short pipes or tubes, the back pressure of the capsule unit, can be fine-tuned. This enables the designer to obtain either omni or cardioid-hypercardioid polar pattern. The cardioid response obtained from a 'basic' moving coil microphone, by virtue of its fundamental design principles, is somewhat inconsistent with frequency response. This can restrict the use of such microphones. One way to obtain a better frequency independent, cardioid-hypercardioid response from a moving coil microphone, is by using two capsules, mounted one in front of the other. Each capsule is designed to have a smooth cardioid response within its designed working frequency range. Any irregularities in polar response, outside of the working frequency range, is lost by the crossover network that is required to

combine the signals from the two capsules. The high-frequency unit being mounted in front of the low-frequency (LF) unit helps to reduce any acoustic shadows that might otherwise upset the directional characteristics of the microphone. The signals from the two capsules are then feed to the associated crossover network, which includes some form of switchable EQ. An example of this principle, was that of the fragile AKG D224, which is sadly no longer in production.

An interesting design, and I believe one that it is unique in the world of dynamic microphones, is that of AKG's D36 model. Looking like a tall D12, the unit incorporates two capsule elements mounted one above the other, the upper capsule being mounted above and facing the opposite direction to the lower capsule. The two signals are then added and-or subtracted from each other, within a remote pattern box, to obtain the desired polar pattern required—adding them together for an omni pattern or subtracting them for a fig-8 pattern (much in the same way as the Lomo 19A10

valve microphone, see the September 2001 issue of *Studio Sound*).

A few manufacturers have produced hybrid models, one that comes to mind being the STC 4033. This microphone uses both a dynamic moving coil unit together with a ribbon. Again like the AKG D36, through the use of adding and-or subtracting the outputs from each of the two units, the desired output signal can be obtained. The STC 4033 microphone has three modes of working, selected by a switch built into the microphone body. The patterns are as follows, P (pressure) which gives an omni signal using the moving coil unit, R (ribbon) allowing fig-8 working from the ribbon unit, and finally C (cardioid) which is derived by mixing the signals from both units together. Some additional EQ is used within the microphone to obtain the correct directional characteristics.



Acos-MC2 mic



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RCA77DX showing the 'Cam' used to adjust the polar pattern

placement, making it ideal for such applications.

Using a ribbon of metal foil, suspended within a very strong magnetic field, there are no other moving parts. The ribbon, which is also the diaphragm, vibrates within the magnetic field, generating a sympathetic voltage across it. Because of the relatively low mass of the ribbon and the simplicity of design, the quality obtained can be very good indeed with the fig-8 pattern maintained at all frequencies—something that very few, if any, other microphone types can offer. The output signal from a ribbon will be approaching a linear transfer of the sound pressure applied, something that many other microphone principles cannot accurately obtain.

Stepping aside from ribbon microphones for a moment, it is an interesting thought, whether or not the output from a capacitor type microphone, working in omni or cardioid mode, is capable of giving a linear transfer of the applied sound pressure versus the relevant output voltage. The capsule of a capacitor microphone is basically a capacitor, hence the name given to that type of microphone, with one plate being a fixed rigid electrode, and the other plate being the flexible diaphragm. If we look at the theory behind capacitors we see that the capacitance between two parallel plates (our capsule) in a static situation changes in a linear fashion as the distance between the plates alters. In operation, only one plate of our capsule remains flat, the other plate flexes becoming more convex or concave with variations in sound pressure. It can be seen, therefore, that the capsule is a nonlinear transfer device. The only way to overcome this problem is to have a diaphragm sandwiched between two outer plates, attempting to cancel out the errors generated by the effect within the single back-plate type of capsule. These plates would need to be acoustically transparent, therefore making it almost impossible to construct such a capsule. Of course, the nonlinear transfer of a capacitor capsule together with the nonlinear transfer of a valve, if the combination cancels out the nonlinearities, could be one of the reasons why some valve microphones have that certain 'something'.

Back to the aspect of ribbon microphones. Because the resistance of the ribbon (metal foil) is very low at a fraction of an Ω , there is normally a need for an impedance step-up transformer. The output signal from most ribbon microphones, even after the signal has passed through the impedance

Originally designed for use in film studios for the early talkies—where the mechanical noise, generated by the gate of the cine camera, needed to be kept to an almost inaudible level—the natural fig-8 polar response of a ribbon microphone meant that any unwanted noise could be nulled through careful microphone

matching transformer, is still very low, requiring a considerable amount of extra gain at the microphone preamp. Therefore, to achieve the very best results from a ribbon microphone, in terms of picking up the quietest of sounds, only the best of preamps should be used. Thus allowing the microphone to 'breathe'.

A microphone manufactured by Fostex used quite a novel technique to obtain a higher output signal, together with a higher internal impedance. The basic ribbon being non-conductive, was coated with a very thin layer of conductive material, a coil was then etched onto the surface of the ribbon, similar to the principle used with flexible wiring looms in many modern electronic devices. This now meant that there were many turns of conductor on a single ribbon passing through the magnetic field, the internal resistance was also higher—a combination that allowed a higher output signal to be generated as compared to a conventional ribbon microphone, for a given sound pressure level. How effective this was in practice, I have no idea. It would be interesting to have seen the resultant sales figures for

this microphone.

There have been many ribbon microphones manufactured; names such as Reslo and Gramman come to mind and these models can still be found in regular use. It would appear that there is a comeback in using these older ribbon microphones for recording,



Acos-soc showing the 'reslo' type connector used on the MC2

the main area being that of capturing the particular sound from an electric guitar-amplifier-speaker combination.

There are still many ribbon microphones in current production, such as the classic 4038 from Coles, formally known as ST&C and of course the new arrivals such as models from Royer, with their R-121, which is based around an old design from Bang & Olufsen, that of the Fentone model.

Most ribbon mics, by virtue of their basic design, are pressure-gradient types, working in fig-8 mode. There are some models that have other polar patterns; indeed, some models have adjustable polar patterns. Normally limited, again by basic design principles, to fig-8 through to cardioid, much like moving coil microphones, any change in polar pattern, is obtained by mechanical methods—like shielding the ribbon, in the direction of the unwanted sound source. A fine example, that uses this technique, is the RCA 77 series of microphones. □

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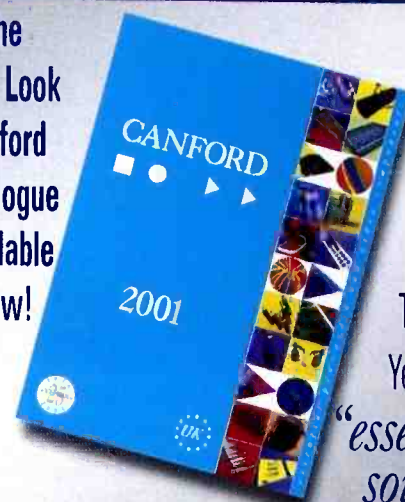
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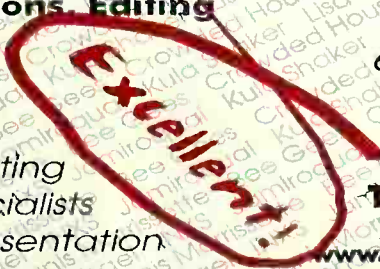
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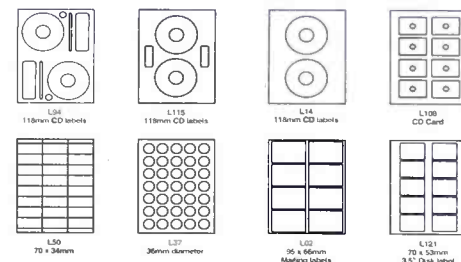
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LETTER OF THE MONTH

Online & in line

I HAVE THOROUGHLY ENJOYED *Studio Sound* for quite a while now and leave it lying around for my clients to peruse during session down time. Incidentally, I love the new format.

Today I got the new issue and included was a renewal form for my 'usual' complimentary subscription. It instructed me to fax the form back. Which brings me to the subject at hand. Is there a way to renew online? I simply do not have a fax machine here in the studio (I use eFax instead) and am 10 miles away from the nearest office supply business which offers fax services.

If not, no problem. I'll just wait until the next trip to town. I know most of the 'other' publications offer online renewals but could not find a place on your (excellent) site to renew. BTW—I have taken the liberty of

adding your URL to my link page dedicated to online mags. Hope you don't mind.

Keep up the good work! Magazines like *Studio Sound* keep people like me (out here in the Arkansas hinterland) up to date with the latest in the industry.

Bob Ketchum, Cedar Crest Studio, Arkansas

Tim Goodyer replies

It's overdue but it's finally here, Bob. You can now re-register on the *Studio Sound* web site (www.studio-sound.com) in line with the 'other' magazines on your coffee table.

Thanks for your support.

This month's letter of the month wins a free copy of PC Audio Editing: From Broadcasting to Home CD from the Focal Press range

Never...

GREAT TO SEE the NS-10 story. I love the things myself but I am beginning to suspect that the reason they always sound good is that they are always positioned away from the walls. Drag those 12-inch and 15-inch jobs out from the wall and it's always an improvement.

Ed Matzenik, Maitland Australia

Tim Goodyer replies

Your loudspeaker design book will tell you what's going on here, Ed. Proximity to a wall increases the perceived bass response of a free-standing speaker. Higher up the frequency spectrum, reflections from nearby surfaces—including walls and the surface of a mixing console—blur the stereo image, and it is probably this aspect of the performance you're identifying.

Obviously, optimum positioning of a speaker will give better and more useful results, but there's something more to the NS-10. Hopefully we'll get some idea of what that is when Keith Holland has done a little more lab work.

...ending...

WHAT I LIKE about working on NS-10s is that they make the mid-range very clear and prominent. This is normally where many instruments are fighting for the same space.

The NS-10s allow me to concentrate on getting the mid-range finely balanced and once that is done, the basis of a mix is

usually well established. I wouldn't record on them though, and I certainly wouldn't want them at home, but for mixing they are a great help.

Michael Klein, Heartbeat Sound, London UK

...story

AFTER READING JOHN ANDREWS' letter on the NS-10 (*Studio Sound*, September 2001), I must say that I basically agree with him. However—there has to be a 'however'—on the first point regarding the Neve consoles, they were very readily modifiable, and in those days the number of maintenance engineers in a studio often outnumbered the balance engineers, so modifications were not hard to come by. Certainly on the Neves at Pye Records, in London in 1970, we could put programme through the desk loudspeakers, but they really were awful.

On the second point, regarding the aims of loudspeaker design, an incredible number of intelligent and knowledgeable people have been trying to create 'the ultimate reference monitor' for the past 75 years or so. The fact that none exist suggests that the problem is not trivial. Every position in every room can change the actual radiated output from a loudspeaker. So if any given loudspeaker is going to sound different depending where you put it, where is right?

Another problem is that of a reference signal source. Any given position in any

27–30

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30–3 December

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December

6–8

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6–8

BCS & Comms India
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7–8

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February 2002

3–6

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4–6

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13–17

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4–7

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4–8

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15–16

DVD Update 2001
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16–19

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28–30

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1–3

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4–11

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8–12

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15–17

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16–18

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23–25

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LETTERS

given room can change the sound of an instrument, and can also change the sound picked up by a microphone. Perhaps we could take as a reference an anechoic recording via a flat measuring microphone, but few instruments have ever been designed to sound 'right' in an anechoic chamber, so this type of reference would not be correct, either.

Personally, for many years, I have been trying to design the most neutral control rooms and monitoring systems that I can achieve, and the monitoring is semi-anechoic that is true, yet George Massenberg said to me that, as a producer, he is sometimes forced into recording in studios where the musicians are most happy, whether sonically neutral or not.

I can't argue with him on that point, because it all starts with the musicians getting their job right. This is a huge subject, and not simply one for the letters page. In brief, though, one of the major problems is soundfield distortions. The true soundfield of an instrument cannot either be captured by a microphone nor re-created by a loud-

speaker, and our ears are very sensitive to soundfield changes. Michael Jemson was pretty hot on the topic.

It is a coincidence, I promise, but Focal press, who sponsor this letters page, also publish a book which I wrote in the late eighties-early nineties (*Studio Monitoring Design*) containing about 150,000 words in 22 chapters, basically about why we have not been able to produce what John Andrews is asking for.

Philip Newell, Vigo, Spain

Okay, TC

READING YOUR AES Europe show report in the June issue I realised, that we might not have made our show strategy clear. For those of your readers that did not take the opportunity to visit Amsterdam, we shared a booth between all the TC companies—tc electronic, TC Works, TC Helicon and Dynaudio Acoustics. As you emphasised in your piece, there were no brochures on the booth for people to pick up. Instead we had a rather big central

reception area where visitors could pick up all kinds brochures and demo CDs, and a staff of product specialists circulating ready to help visitors out with personal answers and advice—not to mention our demo-sessions run by product specialists from all the brands.

You made the point that this technique was not proven to be efficient... and, well, you might be right. But one could also ask if it has been proven that loads of brochures really serve the purpose in a better way. We all know that only a small percentage of these brochures will avoid being dropped somewhere during the show. Instead we have chosen to offer to send requested material to visitors' home addresses within five days of the end of the show. Our intention is to move a step further, and ask ourselves how we get people the information they need beyond the

content of a brochure.

At TC we firmly believe that if we are passionate about what we do, we should be able to interact with people who share this same passion. Therefore at AES, we assessed carefully the need of each visitor on the booth and offered them what we could to answer their most precise questions. The AES attendees are not numerous and we believe that such a strategy fits this type of environment. Instead of just doing 'business as usual' we are constantly trying to evaluate and improve our performance. Just like we do with our products.

I hope that I have spread a little light on this issue, and brought about a better understanding of our intentions and motives.

Stephan Israel, International Marketing Manager, TC Group

BOOK REVIEW

Inside the Hits: The Seduction of a Rock and Roll Generation

Wayne Wadhams, Berklee Press

ISBN 0-634-01430-7

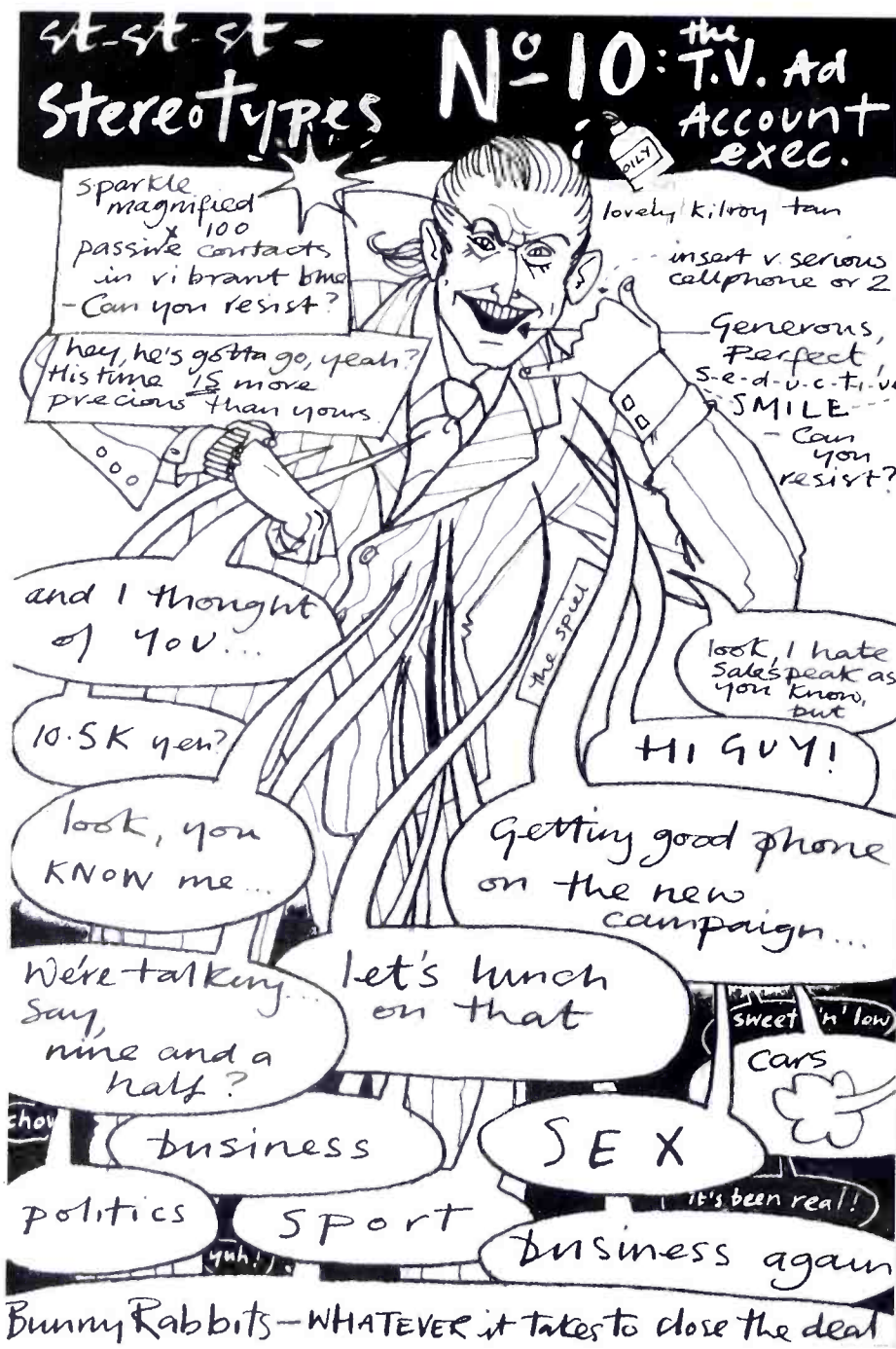
For a transient art form, pop and rock music has prompted an incredible volume of analysis and comment in both musical and social themes. Maybe it's not so surprising if taken in the context of oral traditions and generic folk musics, but for those inspired by music and ultimately driven to write about the soundtrack to their collective youth, it's quite a transition.

Wayne Wadhams would qualify as one of the 'driven'. Not simply because of his evident love of music, nor of his present position as professor of music production and engineering at the prestigious Berklee College of Music, but because of his book, *Inside the Hits: The Seduction of a Rock and Roll Generation*. In some 565 pages, Wadhams exhaustively studies 60 classic rock-pop songs in terms ranging from the practicalities of melodic structure and arrangement, lyrics and production, through a short study the artist behind the recording to its social placement. The jewels in the book's crown come in the form of supporting inter-

views with artists and producers (some drawn from *Studio Sound's* archive) giving a unique insight into each song. As such, *Inside the Hits* makes intriguing, if sometimes intense reading.

After an extensive and informative introduction that assumes only rudimentary musical expertise and broaches the social history of the 30-year span of the book's coverage, each entry discusses a particular song title in some depth. The titles have been carefully chosen to provide a breadth of styles and significance—The Doors, The Byrds, Aretha Franklin, Stevie Wonder, Tina Turner, The Police, Michael Jackson, Steely Dan... and a whole section devoted to the Beatles.

A curious mix of musical education, studio documentary, cultural analysis and intrigue, *Inside the Hits: The Seduction of a Rock and Roll Generation* is required reading for every popular music addict, studio engineer, and trivia obsessive.



STAR WARS TOP 10

- | | | | | | |
|---|---|---------|----|---------------------------------|---------|
| 1 | The Luke of Love | ♫ † † ↑ | 6 | Darth Side of the Moon | ♫ † ↑ |
| 2 | Anakin Stand the Rain | ♫ ♫ ♫ ← | 7 | Death Star, I Can Boogie | † † ↑ |
| 3 | Blame it on the Wookie | ♫ † ↓ | 8 | Don't Stop the Ewok | ♫ ← |
| 4 | I Wanna Hold Your Han | ♫ ♫ ♫ ↑ | 9 | Hoth Love | ♫ ♫ ♫ ← |
| 5 | Yoda'n't Have to Say You Love Me | ♫ ← | 10 | Jamba Leia | ♫ ♫ † ↓ |

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JOE BULL

SADiE mentor and MD Joe Bull fields an eclectic selection of questions spanning next-generation technology and rotten tomatoes from *Studio Sound's* editorial desks

JOE BULL is managing director of Studio Audio and Video Limited, better known as SADiE, which concentrates its efforts on the design and manufacture of digital audio workstations. Joe quit university to learn the art of audio engineering as an assistant to Mike Kemp and Gary Lucas at Spaceward Studios—a small independent recording studio in Cambridge, UK. Joe's early projects included overseeing the conversion of the Old School in Stretham (SADiE's current headquarters) into a fully-operational 24-track studio. After about seven years engineering and producing records and demos for numerous artists, the company diversified into audio-visual work for the corporate market and this exposed an early need for reasonable cost computer graphics machines for the broadcast industry. Spaceward Microsystems was thus formed with Joe as one of the founding directors and grew over the next five years to employ 95 staff and a turnover of about £6m. There followed a major patent action in the high courts where Quantel accused Spaceward of infringing some patents and after losing this battle the company was wound up. Soon afterwards, Mike Kemp, Joe and a few colleagues decided to form another company to put some of the knowledge acquired back into the audio industry where they had both come from. Thus SADiE (the company) was born in 1991.

SADiE: a bit of a girl's name for a company?

Absolutely—I wouldn't have it any other way. The female of the species is so much more adept at doing 10 things simultaneously than most men that it also neatly sums up one of SADiE's great strengths. The original reason for the name SADiE was the Studio Audio Disk Editor and it seemed like a nice acronym that was easily memorable. It was also my paternal grandmother's name so as time went by it gained even more poignancy for me personally.

Would digital audio have been in better shape without the pursuit of more bits and higher sampling rates?

On the contrary, I've always felt that the pursuit of better quality of representation is vital in any of the arts. Human beings need to strive for better realism in any reproduced format, be they visual arts, audible arts, fine arts or whatever. The better the reproduction the more involved the audience becomes which validates the reason for creating the art in the first place. If anything, from an industry perspective, it would have been preferable if the original spec for CD had been set at 32k and 14-bit—at 44.1k and 16-bit it's acceptable for most of the listening public and it is unclear as yet whether the average consumer is going to be prepared to fork out for higher quality. This would be a pity and I would equate it to the world saying that Caxton's printing press was 'good enough'



and the wealth of visual information that we have now would have been denied us.

What are the best and worst aspects of computer-based workstations?

The best thing is the speed at which an audio professional can now work. The ability of an operator to create very high-quality audio output from the source material available has been radically increased since the advent of digital audio workstations. I can remember hours spent trying to fly-in backing vocals in synch from a 2-track machine onto a multitrack and always having to accept the compromise that it was just about good enough. With a workstation this has become a thing of the past and the productivity it provides has benefited everyone who works in our industry.

If the question was to compare computer-based systems with dedicated hardware workstations, then the issues are more on the technical development side. By using a 'standard' computer platform you get the advantage that the major computer and software manufacturers are assisting your developments by adding to the base-line machines. The downside to this is when you have to rewrite large portions of your software to fit in with the latest initiative, from Bill Gates or whoever, that provides not a single jot of benefit to the users. You just have to take the rough with the smooth.

What will The Next Big Thing in DAWs bring?

A happy and comfortable retirement for me... Technically, I'd like to see an integrated tea-making plug-in. The role of the tea-boy (of either sex) was always a vital component of any recording studio (I served my time) and it's probably one of the last stu-

dio functions (other than substance abuse) that has yet to be incorporated into the workstation.

Have you forgiven Quantel?

What's to forgive? It was a business decision on their behalf and those sorts of decisions are often ruthless. They were trying to protect their marketplace from a smaller competitor and used the courts as a way of achieving that aim. I did allow myself a smirk when they failed in their attempts to prevent Adobe infringing the same patents five years later but by then it was ancient history.

Is there still a role for analogue equipment?

Of course there is. I have never understood people who form camps lobbing grenades onto the alternative technologies. There are some things that you can only do effectively in the digital domain and other things that are still just too expensive to perform there when analogue provides the perfect solution. At the end of the day, if it sounds good and accurately represents the sound that the engineer-artist-producer is trying to create, use it. Some of the best fun I ever had in the Studio was recording—found items—especially to add quirky percussion to a track. Coffee tins, baths, cardboard boxes, whatever sounded good in context. It should be the same with audio equipment providing it allows you the chance to experiment with interesting sounds, then great! Inevitably, all audio nowadays is digitised at some stage for delivery—arguably this is best done earlier in the production chain to enable the engineer to retain full control of the audio product.

What piece of kit made the biggest impact during your time as a recording engineer?

For me it was the AMS RMX16 digital reverb. This was the first bit of really nice sounding digital outboard gear that I came across and it led the way for the digital revolution. It was suddenly possible to create the most realistic reverbs digitally and in a repeatable manner, which was a revelation.

You have the trade show calendar and three tomatoes...

Three is not enough! I am torn between squelching the numerous 'major' shows which are constantly adding more 'areas of interest' to maintain their attendance figures and thus keep their prices up, and the small 'targeted' shows that don't attract enough customers to justify the exhibitors attending and still charge outrageous prices. I also get very hot under the collar when two shows coincide. The bottom line is that there are too many exhibitions—it's almost as though the organisers expect the industry to come to a halt every other week. Most people would prefer to watch paint dry! □

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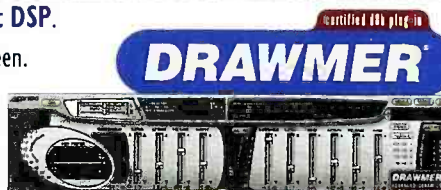


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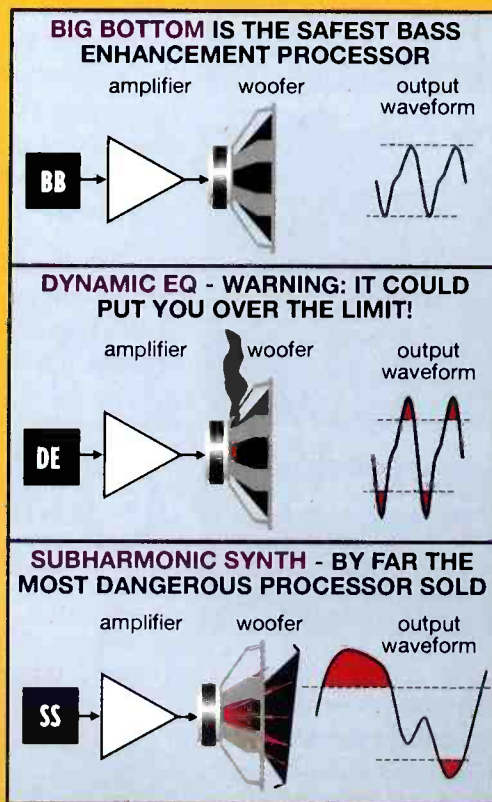
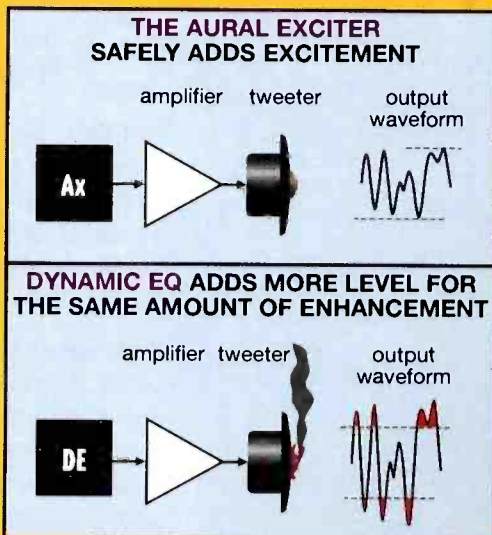
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