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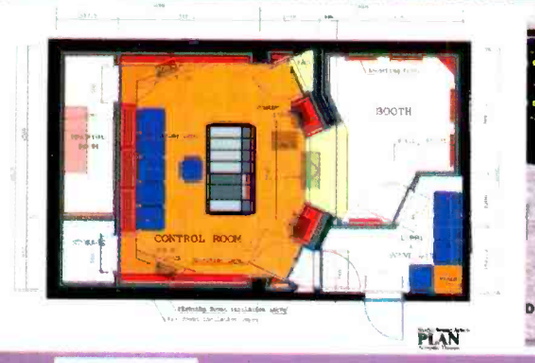

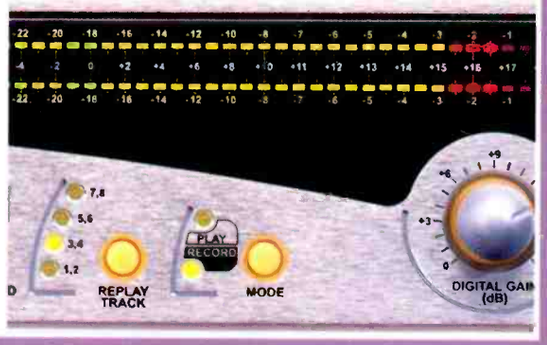

REVIEWS

- Drawmer Masterflow DC2496
- DAV Broadcast Gardens No. 1
- Empirical Labs EL7 Fatso Jnr
- HHb Portadisc
- Fostex D2424
- Dolby DM100
- Fairman TSC
- HHb BurnIT
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Putting a price on innovation

NAMM OFFERED ME what has now become an increasingly rare opportunity to take a peek at a manufacturer's 'secret' work in progress. Back in the heady days of fledgling digital it was a relatively common occurrence to be invited, in hushed tones, into a locked room at a convention or up to R&D offices and even to be asked to sign the occasional non disclosure agreement. The experience is thrilling and does wonders for the ego—I hasten to add that I was only one of many to go through the process at NAMM — but it is also surprisingly taxing.

You are watched intensely, they read your body language towards the new kit, note which bits you choose to touch, track where you eyes fall first and map and compile your questions and reactions. The performance is all about you and the manufacturer will only ask, perhaps, three or four questions. These seem almost inane in the context of the vast amount of information you are struggling to assimilate but they always reveal precisely what the manufacturer is really interested in or worried about.

At NAMM I was taken aback to be asked for the first time what I thought a new product should cost. I've commented on worksurfaces, degrees of assignability, I-O minimums, speed and feel, ergonomics, cosmetics, and compared and contrasted a new product for features and value for money against a competitor, but I've never been asked to put a price on something before.

What many would regard as the leading mass market edge of pro audio has become ferociously price conscious. While I won't pretend that cost was never a consideration with previous viewings of embryonic ground breaking products—they would tell me the price and expect a reaction—it was the life changing aid to productivity that a new product would bring that was the sell line.

Knowing that there could be a wide window of acceptable pricing cheapens the product and the time and effort that has gone in to its development, it also queers the wicket for what should ever follow it. Most importantly charging what it takes to market conquer demeans any intrinsic value that a user may place in a spot-on product and raises future expectations unrealistically.

If manufacturers charge what a genuinely innovative product is worth to a targeted user rather than what they can sell it for by the thousand, then they will still have a pro-audio industry market to sell to in five years time.

Zenon Schoepe, executive editor

Playing with fire

THE SETTING ISN'T NEW; not to me, anyway. But for the uninitiated, I passionately believe that the pooled listening resource most of us enjoy while at school and college plays a large part in the marketing, understanding and enjoyment of music. Few of us recognise it at the time, but diverging interests and growing responsibility soon challenge this golden age of listening leaving those who have not secured a career in audio struggling to keep their listening current. The situation is worsened by the cost of pre-recorded music; where cheap CDs would encourage impulse purchases and wider audiences, the record companies' pursuit of cash deters lone listeners from more speculative purchases.

It's been a kind of impasse for some considerable years now, with record collections stagnating and artists going unsigned while the Big Five count their cash and lament falling record sales. Could the Internet finally be offering a solution?

A traditional career as a songwriter or performer makes the Internet look decidedly apocalyptic—even on a good day. The case for artistic injustice and fading royalties is well put by Al Kooper in a recent issue of *FQ* magazine. I don't have an answer. But looking for a solution to music's present straits, the Internet, and even Napster starts to make some kind of sense.

A recent forum hosted by the Music Producer's Guild concluded that MP3 was a good marketing-promotion tool—and it might be more, if it helps bring the great unsigned to greater awareness and substitutes for those cumulative hours spent comparing notes on recent (and not so recent) releases in the playground. With a little faith, it might be possible to imagine Napster emulating the role of the (illicit) cassette recordings that circulate to the ultimate benefit rather than detriment of an artist. A kind of lost leader. Even Al concedes, 'If one were in their twenties and in an ambitious, nascent band, they would welcome Napster and their ilk...'.

If further proof is needed, we all know that when the 'money men' moved into music, the money started to move out, leaving behind an industry asset stripped by financial opportunists (The 'music business' proved to be more of an oxymoron than the jokes originally foretold). So if BMG is now pouring money into Napster, it's either another golden goose or the money men are about to make another killing.

Tim Goodyer, editor

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"I wish all our investments could be as successful as the SL 9000"

Pictured at Studio Davout is
Studio Manager, Olivier Kowalski.

Great Studios Of The World

"I wish all our investments could be as successful as the SL 9000.
It's solid, reliable and innovative – what more could we ask for?
E Series, G Series, J Series – we have them all and we are still celebrating!"

Olivier Kowalski, Studio Manager, Studio Davout.

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SL 9000

Solid State Logic

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India: Mumbai's Sound City, one of India's largest music recording studios, has taken a 40-channel Amek Rembrandt console as part of a major expansion. The programme, which will see four new rooms open during spring, finds the desk teamed with an Otari MTR90, and outboard including Amek System 9098 comp-limiters and EQ. Specialising in Indian films, and pop, Sound City attracts leading directors and music producers.
The latest project is for the film *Yadein*, produced and directed by Subash Ghai. Also in Mumbai, Spectral Harmony, a new multipurpose facility, has purchased the country's first AMS Neve Libra console for its Studio A where it will be used for music recording, film scoring and advertising jingles.
Sound City, India. Tel: +91 22 634 7676.
Spectral Harmony, India. +91 22 618 1496.
Amek, UK. Tel: +44 161 868 2400.

US: Nashville-based Cartee Day Entertainment, a new music production facility in the heart of the city, has installed a 72-channel AMS Neve VXS in Studio A following the appointment of Michael Cronin Acoustical Construction to renovate the facility's three studios. Studio A will now offer 5.1 surround capabilities.
Cartee Day Entertainment, US.
Tel: +1 615 341 0123.
AMS Neve, New York.
Tel: +1 212 965 1400.

US: LA live venue House of Blues' new studio is home to a 48-input Audient ASP8024 console for recording live shows 'on a nightly basis'. Part of the requirement was the the console should provide individual access to all 48 tracks of the facility's multitrack machine. The desk will also be used for recording direct to video for archiving performances at the venue.
Expotus, UK. Tel: +44 1923 252998.

Japan: Tokyo's Wink2 post house has placed a second DSP Media Studio in its Ginza facility. A new surround sound audio suite features a DSP Media Postation II, the second to be installed in Japan, while a second houses a Media Desktop System and AV

Surround 2001

US: LA recently hosted the second Surround 2001 conference, geared solely to practitioners of the surround sound industry. Despite a sad lack of attendees from the UK, it was gratifying to hear keynote speaker Alan Parsons open proceedings with some insightful tales of his own experiences in the world of surround. Other notable speakers included producers Ed Cherney, Al Schmitt and Chuck Ainley, film music mixers Shawn Murphy and Dennis Sands, mastering engineers Bob Ludwig and Paul West, and a panel of vehicle manufacturers explaining the future of surround in the car.

Exhibitors included tc, Lexicon, Euphonix, Martinsound, Genelec and Steinberg. Major presentations were given by Digidesign, dts, Dolby, THX and Studer, who were showing improvements to the VSP functions on the D950. Of particular interest was the new Sony digital mixer; priced at around £20,000 (UK) it neatly fills the chasm between Yamaha's 02R and Mackie's 8-bus on one hand, and Euphonix' System 5 and AMS Neve's Capricorn on the other.

The conference was full of practical workshops on various aspects of working in surround—at one point, audible gasps were heard as Tomlinson Holman revealed some of the bass management implications of DVD-Audio players in a home entertainment system.

Although still only a minority interest in the UK, surround is big in the US and rapidly getting bigger; over a thousand attendees and two dozen exhibitors showed up for the two-day event. As a conference specifically aimed at surround professionals, Surround 2001 was well focussed and a successful forum for the interchange of ideas. Oh, and there was even a people carrier parked out front with a 14.2 surround system on board.
www.surroundpro.com

New take on old film

US-UK: The BBC Worldwide Americas, Library Sales Group (BBCWA) is now using Minnesota-based WAM!NET Network Services to provide ready access to archive film.

'Having looked at a number of potential systems to deliver review and broadcast-quality digital clips quickly to our customers, WAM!NET Networking Services seemed to be the best solution to provide quick and seamless overnight service,' said Jill Hawkins, vice president of BBCWA Library Sales. 'Our news, television, film and advertising clients always need footage quickly, and therefore the ability to rapidly deliver footage is of utmost importance. By using WAM!NET, we are able to improve our turnaround time by as much as five days from traditional courier methods.'

WAM!NET allows BBCWA Library Sales customers to select archive footage from the BBC film and audio library in London and receive 'data-rich' footage overnight, improving delivery time significantly over traditional courier services. BBCWA connects its London headquarters to its three North American offices in New York City, Toronto and Los Angeles, using WAM!NET Direct! Service, a secure connection to WAM!NET's global network that interfaces with the BBC's own local area network. This provides BBCWA customers with access to the more than 350,000 hours of video, 500m feet of film and 500,000 audio recordings that comprise their 75-year-old media library.

'WAM!NET revolutionises the way companies produce and distribute digital content, enabling them to work collaboratively with their business partners in a fully digital global community,' commented Brent Bauer, vice president of global marketing at WAM!NET. 'WAM!NET is providing the BBCWA with a highly efficient way to distribute their vast archive of content to those media producers online. The result is improved turnaround time and significant savings in both time and money.'

The BBCWA Library Sales Group clients include high-profile film, television and advertising agency customers, such as Oprah, Sixty Minutes and VH-1's Behind the Music.

Beyond MP3

France: Digigram has licensed MPEG Advanced Audio Coding for integration into its suite of professional audio tools. AAC is part of the MPEG2 specification, a product of several organisations including AT&T, Dolby Laboratories, the Fraunhofer Institute for Integrated Circuits, and Sony Corporation. In order to streamline the licensing process, Dolby is to administer the AAC licensing program.

'We think AAC is the heir apparent to MP3 in the next generation of digital audio technology and we are committed to

Sting in a tale

PRISM SOUND HAS PERSONALLY DELIVERED its ADA-8 format convertors, featuring a newly developed workstation interface, to Sting's private studio in Wiltshire. The installation was part of a major Pro Tools upgrade for the ex-Policeman. Prism Sound sales director Graham Boswell spoke exclusively to Studio Sound:

Q: *A manufacturer doesn't always get so involved in a delivery—presumably it's a bit of a showcase?*

HHb actually supplied the convertors, but we sent someone down because it's the first time we've installed a Pro Tools system - and there were a lot of units because it's 64 channels. So Ian Dennis from engineering went down. M Corporation supplied the Pro Tools system.

Q: *What does the workstation interface add to the ADA-8?*

The standard ADA-8 package is a module for eight channels of A-D and eight channels of D-A, and an AES I-O card. There's also a stereo monitor selectable for either the A-D or the D-A path, which can be a mix of channels or a stereo pair. But there's a fourth slot in the ADA-8 frame which can be used for interfaces such as format converters and so on, and in addition to that you can put our workstation interface into it.

Q: *Weren't you going to do a Sonic Solutions interface at one stage?*

Yes, we announced that some time ago; it was for HD. But eventually we decided to do a Pro Tools interface first.

Q: *Does there have to be a different card for each workstation?*

Actually, we think the hardware is going to be pretty generic. It may have a different connector on it for Sonic Solutions but the electronics is the same. It's one of these reconfigurable array circuits.

Q: *How does it connect to Pro Tools?*

It plugs onto the end of the Pro Tools cable that normally goes from the computer to Digidesign's 888. You literally unplug the 888 and plug in a Prism box, and you've got a substantially improved converter system. It's 96kHz-capable, so went Pro Tools upgrades you'll be ready. But you can capture your recordings at that resolution now, if you want. In theory you can down-sample them later, although at the moment, in practice, we don't offer an 8-track down-sampler just yet. We will probably be offering that later on this year.

Q: *What was Sting's place like?*

He's got a very beautiful house down in Wiltshire, and away from the house there's a building that would have been part of the estate or the farm, which he's converted into a private studio. It's a small place, really designed for mixing or overdubs. With the SSL console, there's only room for two or three musicians. I think there's another room at the back, but there's no glass panel or anything like that. Everything's flightcased, though - including the [SSL] console. He can 'unclip' it and ship it out wherever he likes.

Q: *Has it been anywhere interesting recently?*

When we went down there for a photo- shoot it was in the middle of all that flooding, so it was very nearly shipped down the River Wye to another cowshed...

World: Reuters information, news and technology group, is to deliver news to mobile devices and web sites in audio format following an agreement with UK-based independent radio production company Somethin' Else. In a recent Reuters media customer survey in the UK, 94% ranked audio as the most important new medium for access across multiple platforms, and emphasised their interest in making an audio service available to their own customers in 2001. With the number of mobile devices world-wide set to rise substantially, Reuters regards the growth opportunity for mobile audio to be of huge potential. Newly recruited presenter-journalists from Somethin' Else (www.somethin-else.com) will edit six Reuters (www.about.reuters.com) Online Reports: World News, UK Top News, Sport, Business, Entertainment and Oddly Enough (a quirky news roundup) and turn them into broadcast-quality audio reports. The online Reports will be updated in real time by the editorial team and delivered to the Somethin' Else studios where each bulletin will be recorded and updated hourly. Reuters plans to roll out the audio in the first quarter of 2001; by going to their preferred web site or mobile portal, consumers will be able to select the news option of their choice. Sonita Alleyne, Commercial Director of Somethin' Else, said: 'This is exactly what the Mobile Internet has been waiting for. Why continue to scroll down text headlines when you've got audio news on demand? For the first time consumers can access audio news bulletins wherever and whenever they want. Reuters content combined with Somethin' Else's high-quality production values now gives mobile and PC-based Internet users a very attractive audio alternative.' Mark Trasenster, Managing Director of Reuters Media UK & Ireland, commented: 'The audio market is an exciting new opportunity for Reuters to position itself more firmly in the consumer marketplace. We are delighted to be working with Somethin' Else in this new venture, in which we have created a multi-access audio service to complement Reuters growing portfolio of mobile and broadband products.'

offering products at the forefront of digital audio research,' said president Philippe Girard-Buttoz. 'Compared to MP3 audio, AAC provides higher quality audio reproduction, yet it requires approximately 30% less data. As a leader in digital audio networking solutions, Digigram will move aggressively to incorporate this strategic technology to our development.'

Record companies including BMG, Universal, and Wamer Music have already begun to distribute music online in AAC format, with Digigram one of the first AAC licensees to target the professional tools market. 'We expect the availability of Digigram's upcoming products to provide important support for content owners, service providers, and broadcasters seeking next-generation hardware and software tools for preparing material for delivery in AAC format,' adds Girard-Buttoz.

New shape for Cube

Germany: New company Cube Technologies (Cube-Tec) has been launched to handle marketing and distribution of the AudioCube and related technologies on an exclusive, worldwide basis. The founding partners of Cube-Tec are Jörg Houpert, MD of Houpert Digital Audio (HDA); Siegfried Acker, MD of International Consulting & Marketing (ICM), and Curt Smith, President of Sascom. Acker and Smith will share Cube-Tec management responsibilities as Co-MDs, enabling Houpert to focus on product R&D, as Chief Technology Officer.

The launch of Cube-Tec is not expected to result in immediate changes within the distribution network of the AudioCube and Quadriga product lines. However, Cube-Tec is to play an active role in the sale of AudioCube and related technologies. Sales of AudioCube and Quadriga systems are claimed to be growing significantly around the world. The recent installations at Washinton's Smithsonian Institution and National Archive are an indication of the system's acceptance at high levels of the audio restoration industry, while Quadriga now has multiple installations at high-level facilities throughout Europe. The first North American Quadriga installation was completed at NY's Vidipax last year. Additionally, AudioCube is making inroads in film sound restoration, with recent installations at two major film restoration companies, Chace Productions and POP Sound in Hollywood.

Dutch double

The Netherlands: Leading Dutch radio production company, TopFormat, has been bought by Frank Kok and Lennard Groot from founder Ren Groot who retires from 30 years in audio with the sale. The new owners have both worked for the firm for years. The new owners will take on the management and day-to-day running of TopFormat with Kok in charge of sales and marketing and Groot in product development and publishing. Both will be involved in the Internet (www.topformat.nl) and e-commerce within TopFormat's current activities.

TopFormat produces jingles and commercials for radio as well as developing and distributing music libraries and sound effects for the audio-visual industry. Among other projects, TopFormat has recently developed jingle packages for Radio Regenbogen (South Germany), Radio Donna (Belgium) and Cadena 100 (Spain). TopFormat works for all the major radio stations in the Netherlands including Radio 3FM, Sky Radio and Radio 538.

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transfer station. The systems and AVtransfer, based on a Japanese version of Windows NT4.0, are connected via DSP's TEAM networking solution. Six nonlinear video suites and one CG suite are also linked to the network via AVtransfer. Another Japanese post facility, EXA, has recently purchased its first Soundtracs DPC-II digital console for installation in a 5.1 suite.
Wink2, Japan. Tel: +81 3 3545 3693.
EXA, Japan. Tel: +81 3 5421 0888.
DSP Media, US. Tel: +1 818 487 5656.
Soundtracs, UK. Tel: +44 1372 845600.

Italy: Milan's CX Studios has installed Italy's first TL Audio VTC console in its Studio B where it will run with a MotU hard-disk system and Digital Performer software. Complementing these is a selection of TL Audio outboard. CX Music is currently at the forefront of Italian international dance music production and will use the VTC on a forthcoming album by Sarina Paris.
CX Studios, Italy.
Net: cx.studioc@tiscalinet.it
TL Audio, UK. Tel: +44 1462-680888.

Germany: Munich's new Waters Edge Studios has opened two production and three recording rooms for work on at 5.1 recording, mixing and postproduction. Located on the west bank of the Ammersee, the studio has chosen custom DynaudioAcoustics monitors for its control rooms installed by Mega Audio in co-operation with ACM. Waters Edge also chose a tc electronic System 6000 multichannel processor with access from both control rooms.
Waters Edge, Germany.
Tel: +49 8192 933933.
tc electronic, Denmark.
Tel: +45 87 42 7000.

UK: Manchester-based 4:2:2 Studios has purchased a Pro Tools 24 MIXPlus system and AVoption XL, ProControl, 888/24 interface and Universal Slave Driver. The system includes assorted plug-ins and machine control software and has already been used on music videos, and audio post for Channel 4's Planet Pop. The company handles design, animation, interactive media and postproduction.
4:2:2: Studios, UK. Tel: +44 161 432 9000.
Digidesign, UK. Tel: +44 1753 653322.

Europe: Various European radio stations have installed Nicral's ARC AkCESS ISDN audio broadcast control system including Radio France, Merlin Communications, Red Dragon FM, the BBC, and Icelandic Radio. Danmarks Radio has installed a 180-channel Lawo

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mc2 82 recording console.
Radio France. Tel: +33 1 4230 3355.
Danmarks Radio. Denmark.
Tel: +45 3135 0647.
Nicral, UK. Tel: +44 1672 515727.
Lawo, Germany. Tel: +49 7222 1002-0.

US: Washington's Smithsonian Institution is to install 'the most comprehensive AudioCube 4-II system currently available' to meet restoration and mastering requirements. Loaded with 23 Virtual Precision Instruments, the system will be used to digitise and restore the Smithsonian archive and to re-master restored material for release on the Folkways Recordings label. The Smithsonian's move follows two AudioCube systems into the National Archive in Washington.
Sascom, US. Tel: +1 905 469 8080.

UK: BBC Maida Vale Music Studios has installed three CEDAR for Windows systems as part of a project to digitise

the BBC archive which includes Churchill's war speeches, war reports and radio heritage dating back to the start of the Corporation. The BBC Television Centre is to install an AMS Neve Libra Post console and AudioFile, and a second AudioFile SC will be installed in a digital tracklaying area. The Libra will work on drama, documentary

Free Spendor

UK: Soundtracs has sold it's Spendor loudspeaker business to Philip Swift, founder and principal of Audiolab (Cambridge Systems Technology Ltd) prior to its acquisition by the TAG McLaren Group in 1997. Swift is said to have the breadth and depth of experience in the audio electronics market to develop the Spendor business. Soundtracs sales and marketing director John Carrol, who had also been balancing a role as MD of Spendor said that Soundtracs had been 'looking for a good pair of hands to release its potential for some time'.

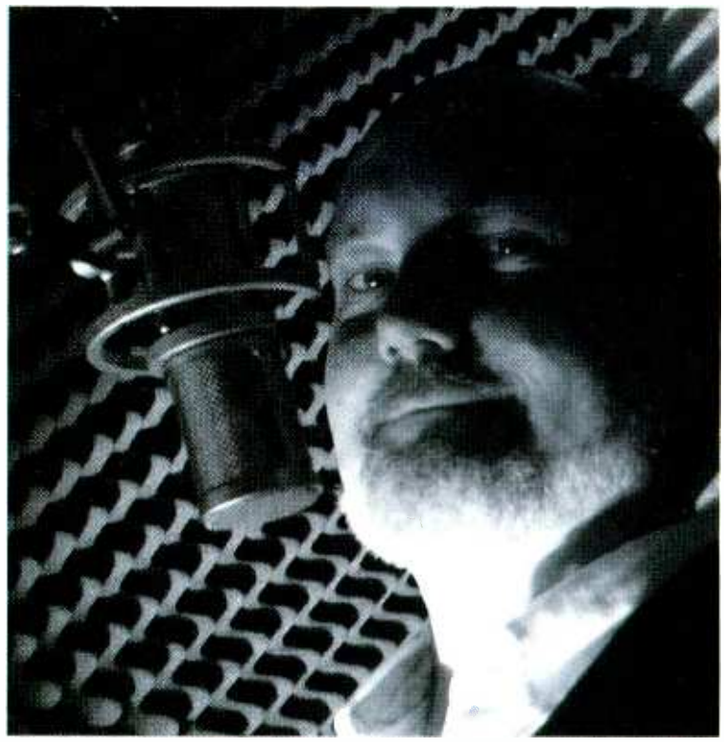
'Spendor is s capable of a lot more,' said Carrol. 'With our digital developments and changes in our distribution at Soundtracs we were beginning to drift apart. Spendor had become something of a spare limb, which was a shame because it has a lot going for it.'

Carrol added that Soundtracs had taken a great deal of care and time to find the right people to give Spendor a new home. The business will continue to trade as Spendor Audio Systems Ltd from the current Hailsham facility with the existing complement of staff.

NAMMin'

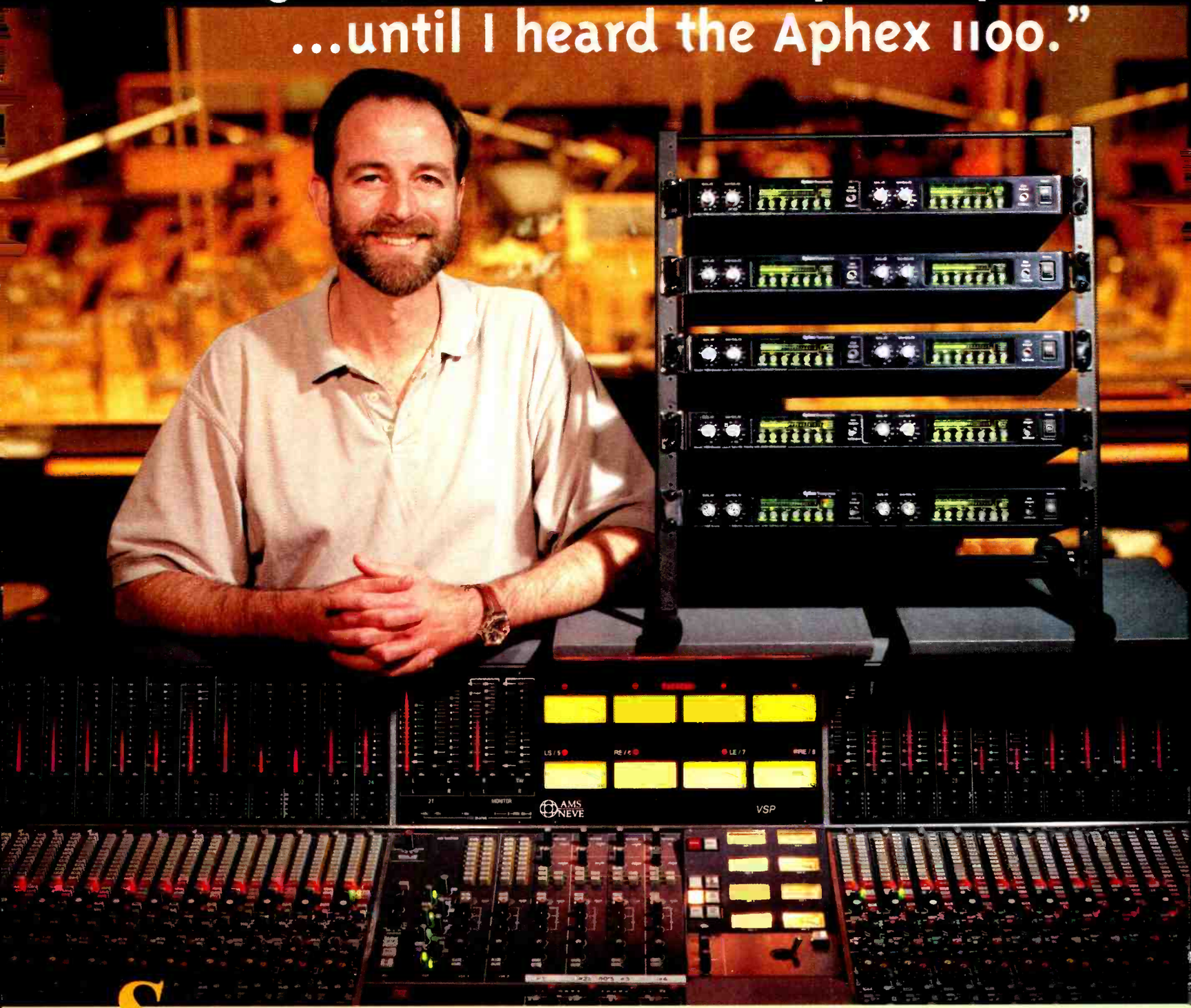
US: Moving back to Anaheim after reconstruction of its convention centre, NAMM celebrated its 100th outing with 65,372 official registrants (a 4.4% increase over the 62,596 that registered for the show last year) and buyer numbers up by 16%. This meant little to the thousands that dashed to Shure's stand for tickets to see Spinal Tap playing live as soon as the doors opened on the second day. And it certainly meant nothing to the punter who ushered casual spectators away from BC Rich's outrageous guitar designs with the line, 'You're all too old for these. Nothing for you here... Move along.'

The prospect of a joint press conference with rival companies Yamaha and Roland however, had the halls buzzing with talk of acquisitions but turned out to be the announcement of a collaboration to close the gap between diverging MIDI implementations. According to Roland president Katsuyoshi Dan and Yamaha MD Masatada Watchi, Roland's GS, Yamaha's XG and level 2 of the General MIDI (GM) format are set to offer dramatically improved compatibility. As speculation turned to the possibilities opened by future collaboration, Watchi-samma maintained that initial contact was a serendipitous coincidence of intent. Very Japanese. Mackie's intention to buy Belgian digital specialist Sydec, meanwhile, prompted British-based



US: The Texas-based television and radio studios that form Roy Williams $20m advertising empire has added a the Brauner Valvet microphone to its cabinet. Prompted by a recent project, Williams compared a selection of top-end mics and opted for the Valvet. Williams Marketing creates radio spots for more than 550 radio stations nationwide and clients in 38 US states.

"I thought I owned the best preamp...
...until I heard the Aphex 1100."



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

"I always had to choose either an intimate, detailed sound or a large image. The 1100 gave me *both* at the same time. It was so dramatically better than any other preamp I had to get the composer and other engineers to hear it for themselves. Everyone was blown away."

The Model 1100 is a 2 channel discrete Class A tube microphone preamplifier with 24-bit/96kHz A to D converters. Proprietary designs and highest quality components achieve the performance that has set a new standard for "the best preamp." Doesn't your music deserve the Model 1100?

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and magazine programmes while the AudioFiles will be used for conforming and tracklaying involving OMF transfer from Avid editors. BBC Regional *Broadcasting* sites in Leeds, London, Kent and Sheffield are undergoing 'redevelopment' involving the installation of 14 Calrex X-series consoles and three 24-channel C2 mixing consoles. Custom Consoles, meanwhile, is to supply four furniture suites for a new regional broadcasting centre in Tunbridge Wells. CEDAR Audio, UK. Tel: +44 1223 881771. AMS Neve, UK. Tel: +44 1282 457011. Calrec, UK. Tel: +44 1422 842159. Custom Consoles, UK. Tel: +44 1462 485444.

Sweden: Europe's first Euphonix System 5 digital console has been ordered by producer-songwriter Max Martin for a new studio in Stockholm, Sweden. Also the world's largest System 5, the 96-fader, 102-input desk will serve the writer of Britney Spears' 'Ooops I Did It Again' and The Backstreet Boys' 'I Want It That Way'. Euphonix, US. Tel: +1 650 855 0400.

US: LA's Skywalker Sound postproduction empire has purchased the first CEDAR DNS1000 Dynamic Noise Suppressor

Eire: Farm studios post facility has ordered two Soundtracs DS-3 consoles for imminent delivery. The Farm, Eire. Tel: +353 1 676 8812. Soundtracs, UK. Tel: +44 1372 845600.

Soundscape (partnered with Sydec over the Soundscape workstation systems) to draw attention to the likely benefits of a three-way collaboration. A more amicable atmosphere surrounded Hal Leonard Publishing's stand as it announced its intention to provide free interactive educational services to musicians and engineers. The site (www.artistpro.com) will include candid comment from the likes of producer Al Schmitt, mastering master Glenn Meadows and recording artist Bob Welch. The site also offers free access to Sourcebase, a database derived directly from *The Recording Industry Source Book*.

Plenty of technology cluttered the halls, from Keith Emerson's original 'Zoukra' Moog modular setup (still generating sequences from *Tarkus*) to the developments in control technology tendered by the Canadian Tactex Controls. Already picked up by Midiman in its Surface One virtual control surface, the surface 'fabric' is a direct descendent from the Canadian Space Agency and has allowed Midiman to present a new controller capable of driving everything from audio mixers, through musical instruments to graphics and animation. In contrast, Funk Logic's alternative panel blanks are capable of controlling nothing but your attention. From the established Algorhythmic Prosecutor to the new Palindrometer, these devices are decorated with dumb controls and dumber functions, brightening up the most sparsely populated studio racks. Uniquely Californian.

Digigram buys in to Innova-Son

France: Digital audio and remote management networking specialist Digigram has become a stockholder of Innova-Son, the French digital console manufacturer for live production in television, stage and theatre. As of January 16 Digigram controls 27% of the shares of Brittany-based Innova-Son and 33% of the shares of the Innova-Son holding company. Digigram financed the shares with cash and capital investment firm Epicea (Siparex group) will control 21% of Innova-Son. The

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

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and pressed it into service on Tom Hanks' new movie, *Cast Away* to isolate dialogue from sea and surf noise.
Skywalker Sound, US. Tel: +1 415 662 1000.
CEDAR Audio, US. Tel: +1 207 828 0024.

UK: Bristol-based postproduction facility Broadcast Film & Video has taken a number Dolby DP562, 569, 571 and 572 codecs for its new high-definition edit suite. Specialising in natural history, animation and long-form features, BFV produces a significant percentage of its work with Dolby-encoded audio and is the first postproduction facility in the UK to equip for HDTV.
BFV, UK. Tel: +44 117 923 7087.
HHb. Uk. Tel: +44 20 8962 5000.

France: The French Conservatoire de Paris has ordered two SSL Axiom-MT digital consoles and an SL4000 G+ analogue desk as part of the re-equipping of its audio-visual department. The first 32-fader, 64-channel MT forms part of a refurbishment including the installation of Genelec monitors. Tascam and Sony tape machines and tc electronic processors. Meanwhile, the St Quen-based Studio Zorrino has installed AMS Neve's Encore automation system for its 60-channel Neve V1 console. Studio Zorrino specialises in mixing film projects and French music.
Studio Zorrino, Italy. +33 1 4010 8715.
SSL, France. Tel: +33 1 3460 4666.
AMS Neve, UK. Tel: +44 1282 457011.

UK: British commercial radio group, GWR has signed a £1m deal with the Oxford Sound Company for its new Bristol Digital Broadcasting Centre. The contract is part of GWR's move to new premises early this year. One of the biggest UK radio contracts signed in 2000, the deal involves 23 on-air, production studios and technical areas for the GWR Group and represents a major investment for GWR-FM and Classic Gold in Bristol. GWR's nationwide programme production unit and GWR Digital.
GWR, UK. Tel: +44 1793 853222.
OSC, UK. Tel: +44 1608 659025.

US: New York City's VidiPax has become the first facility in North America to offer fully automated audio archival services through its installation of Quadriga software on the Spectral Design AudioCube platform. VidiPax is the world's largest magnetic media restoration company with clients ranging from museums to broadcasters, and has restored and remastered over 100,000 video and audio tapes.
VidiPax, US. Tel: +1 212 563 1999.
Spectral Design, Germany.
Tel: +49 421 22 1440.

France: Paris-based Ubi Sound Studio has chosen a 44-channel Amek Big, Pro Tools and Quested 5.1 monitoring system for a new mix room, designed and built by Audio Engineering's Sooch SanSouci. The monitoring system comprises five VS2108s, VS1115 sub and BSS Omnidrive FDS-355 processor. As part of the Ubi Soft Entertainment Group, the studio works for on its parent's animation series as well as with computer and video game producers. Recent work includes LucasArts Starfighter.
Ubi Sound, France. +33 1 48 57 25 75. Amek, UK. Tel: +44 161 868 2400. Quested, UK. Tel: +44 208 566 2488.

deal gives Digigram the rights to take full control of Innova-Son—during a period between the end of fiscal year 2001 and 30 September 2002—providing Innova-Son reaches a determined level of financial performance in 2001.

The investment bolsters Digigram's commitment to this area of the market, which it claims will account for a projected 25% of its revenue by 2002-3.

'Digigram and Innova-Son's strong technology, product offerings and sales channels compliment each other, and will enable Digigram to meet the growing demands of the public address market,' said Digigram president Philippe Girard-Buttoz who will take a place on the company's board alongside Innova-Son founders Christian and Philippe Royer who will continue to manage the company.

Founded in 1993, Innova-Son has a staff of 20 and reported sales of 1.5m Euros in 1999 with 82% of the business coming from outside of France and the majority of that US-based following the tying up of a distribution deal with Sennheiser US. Total revenue for 2000 is estimated at 2.3m Euros.

Innova-Son was the first manufacturer to introduce digital live production consoles to the market and from humble beginnings has made significant in-roads in to the sector despite considerable looming competition. Innova-Son president and CEO Christian Royer draws attention to his company's achievement at out running Yamaha, or 'Ahamay' as he says it reads in his rear view mirror. 'We can develop effective and high quality digital equipment for live performance for the same price as analogue solutions,' he says.

Customers include the BBC, CCETT, Rennes Opera house, Radio France, Sennheiser, SFP, Studer and many service providers for the live performance market. Innova-Son digital systems have been used for the MTV Awards, Notre-Dame de Paris musicals, Printemps de Bourges concert festival, Jean-Michel Jarre pyramid concert in Egypt (for Y2K the celebrations), soccer's World Cup music festival, and the Gypsy Kings tour.

Royer estimates that the pro-audio console world-wide market in 2001 will be worth 12bn Euros. 'We think the opportunity is very strong for Innova-Son to make a step forward in driving the emerging market of digital systems for live sound,' he said. 'The agreement with Digigram has given us more financial means to expand our sales and technical resources, particularly by appointing new people. You will see them as soon as we find the right men and women.'

Second showing for BCM

UK: Building on the success of the first Broadcast Content Management conference, *Studio Sound* sister title *TVBEurope* is bringing you the second annual BCM June 21-22 at the British Library in Central London. Broadcast Content Management 2001 promises an aggressive editorial programme in the period up to and including this year's NAB Convention.

Kevin Ivey, CNN's VP of R&D for Basic Technologies, will be one of several industry pioneers accorded a solo spot on the BCM 2001 stage. Another speaker booked to fly solo is Jane Marshall, chief executive of Carlton Active, who will discuss her company's production of the interactive services attached to ONdigital and ITV's coverage of the latter stages of the football Champions League.

Sessions will include Workflow Worries: Identifying Problems; Dare to Share: Moving Material Around; Addressing the Acronyms: Standards Issues Explored; New Media Case Studies; Management Across the Enterprise: Digital Asset Management: Winning Strategies; Facility House Efficiency: Bringing Back the Margins; and Making Material Fit for Repurposing.

The keynote sessions of last year have been replaced by frequent solo spots, the fourth confirmed being about the way that the library, no longer CAR, is the heart of every broadcaster.

For conference delegate registration or sponsorship information contact Sukhvir Hayre. Tel: +44 20 7940 8561. Email: SHayre@ubminternational.com

Natural move

UK: Studio construction company AVD has built new premises for audio postproduction specialist Natural Sound within Hammer House on London's Wardour Street, just yards from Natural Sound's former facility in what was once the famous Trident

SS & Digi: media partners

Europe: Following the successful US DigiWorld tour of LA, Nashville and New York, DigiWorld Europe will open in Paris with *Studio Sound* and sister magazine *Pro Sound News Europe* as its media partners.

Scheduled to hit nine European cities over a four-week period throughout February and March, each event is dedicated to users of Digidesign's Pro Tools and will feature demo stations focusing on various audio solutions, a main stage feature presentation of Digidesign's latest products and technology, as well as a Master Class and access to technical consultants.

DigiWorld will showcase advanced tools for audio production and offer attendees comprehensive access to the world of Pro Tools. The event will also feature celebrated American engineer Charles Dye conducting a Master Class along with a local engineer, producer or artist with something to offer Pro Tools users. The event is free and only advance registration for the Master Class is required—registration will be available online prior to the event. Interested parties may consult the Digidesign web site at www.digidesign. com The full schedule can be found in *Studio Sound*'s regular World Events listing (see page 74).

digital confidence

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In today's rapidly evolving media landscape, confidence in new technology has to be earned. With the abundance of equipment being introduced, can you depend on your supplier, the product reliability, the life-span? Can you know if you've allowed for all the possibilities of new mix formats, digital input/output configurations and new standards of automation which may appear without warning?

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In the USA, contact Fairlight USA, 844 N Seward Street, Hollywood CA 90038 Tel: +1 323 465 0070 Fax: +1 323 465 0080 Email: soundtracs@fairlightusa.com

APPOINTMENTS

Chameleon Audio has appointed Phil Chown as technical manager. He will support production and provide technical development facilities for the company's range of pro amplifiers, transformers and other product lines. Chown joins Chameleon with a telecommunications background and experience as a professional musician who designed, built and ran his own 8-track rehearsal and recording studio.

Harman International has announced Mark Terry as president of the Harman Pro Group Worldwide. Terry

has graduated from the North America pro group and will assume the responsibilities of the retiring Philip Hart.

Sennheiser Electronic Corporation has appointed Alan B Shirley to the position of vice president, export to direct sales, marketing, and distribution for all the Central and South American markets for Sennheiser and Neumann. Reporting directly to Sennheiser president John Falcone, Shirley comes from Telex Communications, where he was responsible for global marketing strategy for Telex and Electro-Voice.

Yamaha's new UK-based Commercial Audio department is now headed up by Mike Case following Alan Johnson's departure to Sony. Case has over 10 years experience in pro-audio having given sales and technical support to Amek, Garwood, Behringer and Sound Dept as well as having experience as a systems tech with Concert Systems PA Hire.

Audient has announced the appointment of Martyn Flood as Senior Design Engineer at its new Cambridge centre. Flood's responsibilities will encompass product development alongside sales and marketing partner Expotus, through to manufacturing release. He joins Audient from the Klark Teknik Group where he was responsible for Midas and DDA design projects. Audient expects the first Cambridge developed product to be launched in the first quarter 2001.

recording studios.

The move has been instigated by a merger with production company Tangent Television and video editing house Videola to form Cactus Media, an integrated media group aiming to maximise the synergy between its component parts.

Technical director Adrian Sutton comments, 'Natural Sound started life specifically as a music company,' he says. 'Primarily we are musicians who have been dragged kicking and screaming into the audio post business, like everyone else. But this company will be able to provide a lot more than simply a combination of video editing and audio postproduction.

'Even though we're doing an awful lot of audio post, all the engineers are musicians, and they bring their musical experience to bear directly in every session. There is no outsourcing which can delay and over-complicate the job.'

Natural Sound provides a range of audio services, including sound design, voiceover and Foley. Sutton's other responsibilities include IT. 'Computers feature heavily in our outfit,' he says, 'not just in terms of Pro Tools rigs but also in the way audio gets delivered around the facility. We're completely tapeless; the only time DAT gets used is when material is sent out to clients. All the audio within the building is on a network system which I devised.'

Pro Tools is being installed to handle all the audio post and some music projects. However, the studio's Otari RADAR units will stay. 'There's nothing to beat them for speed and recording quality,' says Sutton. Most music and sound origination is done in Emagic's Logic Audio and Sonic Foundry's Sound Forge, while the main mixing platform is Otari Status. Like its new partners, Natural Sound is retaining its title within the umbrella of Cactus Media.

Natural Sound, Tel: +44 20 7437 4860.

Brähler founder dies

Germany: Helmut Brähler, boss and founder of Brähler ICS Konferenztechnik, has died aged 67 after long and serious illness.

Brähler laid the foundations of his business in Bonn in 1958. A chemistry student at the time, he was repairing electronic equipment for the University of Bonn and built the institution's first simultaneous translation facility two years later. In 1973 his fledgling firm moved to Konigswinter-Vinxel from where Brähler ICS became recognised market leader in conference technology helping serve every Olympic Games, the Environment Summit in Rio and more than half of all the World Economic Summits among over 90,000 contracts. The Digivote voting and consulting equipment system appeared in 1994 taking the company into new areas of business and further expanding the operation. Rejecting numerous take-over offers, Brähler built an international business with production based in Konigswinter, Ireland and Hong Kong before handing over control to his son, Michael, in 1998. He remained active, however, offering support and advice until his death.

Helmut Brähler leaves behind wife Erika and sons Michael, Stefan and Uli.

Master stroke

UK: The Focusrite Forté 001 that once graced Master Rock studios has come home to The Who's Pete Townshend for use in his private studio. Having been snapped up by Funky Junk MD Mark Thompson (who variously describes it as 'the most beautiful desk ever made' and 'the most stunning mixer' he has ever seen), when Master Rock studios closed late last year, the Forté underwent a complete overhaul at Funky Junk's Boffin Island service department before its sale.

The console, generally regarded as one of the 1980s most expensive, was last used by singer Robbie Williams and producer Steve Power at Master Rock and attracted potential buyers in New Zealand, Texas and Scandinavia as well as from Townshend during its overhaul. 'The Forté is an historic desk so it's fantastic that the eventual buyer has had such a close personal connection with its history', comments Thompson. 'I'd had my eye on the console since 1991 when Master Rock was put on the market,' he explains. 'When the opportunity to buy it arose I didn't hesitate but, sadly, I couldn't keep this 16-foot monster in my bedroom so it was advertised for sale.'

Accepting the full five-figure asking price, Thompson resisted the temptation to allow the sale to become a bidding war. 'Equally, we were not prepared to consider lower offers,' he adds. The Forté will now be modified to meet Townshend's requirements before installation.

Cracking the Net

THUNDERCRACK IS A NEW UK-based online media delivery specialist. Founded by mastering engineers from the music industry, it's a small independent aiming to slot into the plans of record companies, broadcasters, corporate marketing concerns and others preparing for content delivery over the Internet.

But instead of simply providing an encoding service for audio and video, Thundercrack offers data management tools designed to improve control and monitoring of content use dramatically.

As of 2nd January it is officially working in conjunction with Intel, which enables the Soho-based start-up to offer its services through Intel's well established network optimised for entertainment media. CEO Barry Grint, founder of Alchemy Mastering, spoke to *Studio Sound*.

Q: *You say Intel is a key relationship. Why is that network so important?*

Intel has a streaming network which works in Real and Windows, an 'edge' delivery system—instead of a server-client relationship, for every piece of content streamed there are servers located at Points of Presence (POPs). The clip is placed on a central server, and as it gets requested, it gets drawn out to the edge of the network - which means you get a better level of service because you're calling it in from the nearest server to you all the time.

Q: *Where does Thundercrack come in?*

What we're doing is adding a level of control and management over the top of the network. Intel represents the lorries that do the delivery, and we represent which rooms you go into, what you're carrying, and whether the person ordering is entitled to have it. We also control any pay-per-view or subscription management that's involved with any clips.

Q: *What exactly happens when your clients stream through you?*

We enter into a dialogue with the client's database when a clip is requested, checking whether the person has registered, what they want and so on. When all criteria are satisfied, the content is streamed. But while doing this we can also provide other information, such as the fact that the person is in Germany, so they require the German-language version, for example.

Q: *Is the Internet ready for this?*

Intel are going to have the capacity to be able to do web TV. They have created their own streaming network outside the Internet, in order to get data around quickly and efficiently. Of course, you're talking about big bursts of data for streaming...

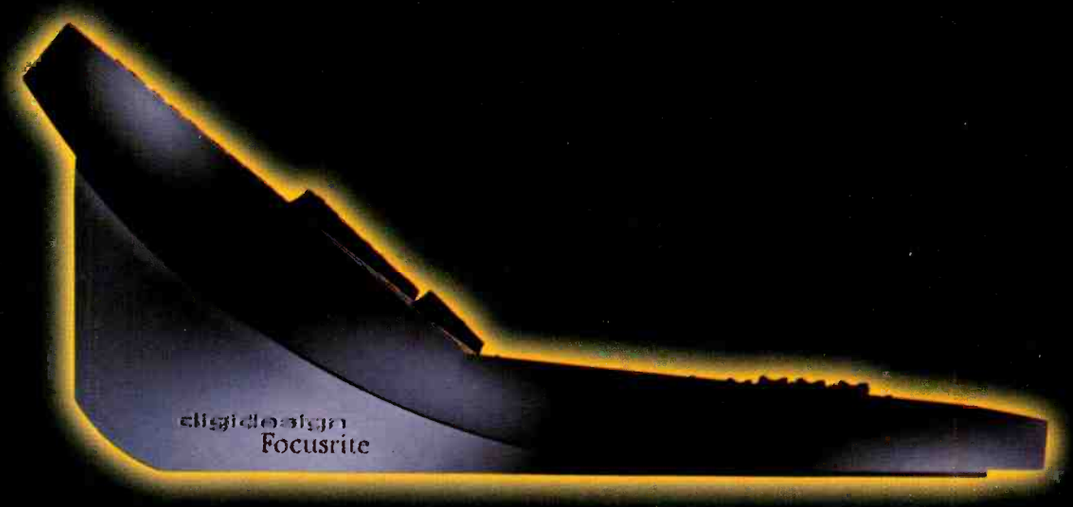
Q: *But doesn't this sort of thing only work for downloading?*

The same principles apply to either live or download applications—that is, webcasting or video-on-demand. In the last year we've seen a great advance in webcasting: just compare Paul McCartney's cast from The Cavern a year ago with Madonna's recent show in Brixton. The whole system is coming together now. We're working on real-time server control which will enable advertising to respond to demographics immediately...

Q: *Good grief. Whatever happened to mastering?*

We are still mastering, because the network sits there and we put the stuff on the servers in the first place.

Thundercrack. Tel: +44 20 7631 1000. Fax: +44 20 7631 1002. Web: www.thundercrack.com



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Joppy Gutierrez, FBS Radio Network general Manager

MELLOW TOUCH

Moving from pure music to more varied programming saw Manila's Mellow Touch make the first of an ongoing series of leaps in evolution. **Martyn Green** visits spin city

MELLOW TOUCH IS ONE of about 25 FM radio stations currently operating in Manila, alongside a similar number of AM stations. Owned by FBS Radio Network, it serves Manila's 9m population and reaches as far afield as Baguio City, six hours drive to the north. It operates an FM studio, news department, recording studio and commercial dubbing room from its base in Mandaluyong, the highest point in Metro Manila. The station also operates an AM studio, like most broadcasting companies in Manila, although this represents a Public Service Broadcasting service. In total, the network comprises five provincial stations—one in the north, the remainder in the Visayas in the centre of the Philippines and the southern island of Mindanao. These operate independently and their programme format is optimised for the local audience.

Mellow Touch studios occupy space on the 44th floor of a tower containing four stations and three antennas. Typically, not only are the broadcast studios and the recording studio not soundproofed, none of them have a sound lock as space is too limited to accommodate both outer and inner doors.

Mellow Touch started broadcasting in 1973, and over the course of some 27 years the station has seen many changes to its playlist. In 1980 it only played love songs, which ensured its success for the next 10 years but by the early nineties, growing competition compelled it to revise its programming. For a long time, apart from the ads, it broadcast only pre-recorded time checks between records because it was felt that its listeners preferred to hear music. But in 1996, much like the changeover from the movies' silent era to the talkies, a decision was made to switch from voiceless music programming to incorporating an on-air presence. Suddenly 'voices' had to be found to present the station's image. Unlike the Talkies, which ended the career of many silent stars, the station's 'spinners' continued to select and play the music, while a separate announcer talked about the records. Nowadays two-man teams work in the Mellow Touch studio, rather just than a single DJ, taking care of the technical operation as well.

FBS Radio Network general manager, Jose 'Joppy' Gutierrez, takes up the story: 'When I started in radio in the seventies there were only four or five FM stations here in Manila, and at that time being number one wasn't a big deal, but now you have to be really different. Things started changing in the early nineties. By then, there was so much more competition starting up because the people who owned the franchise to the radio frequencies suddenly had to do something with them. Before, they owned the frequencies but didn't use them because they could get a franchise for a frequency and not have to use it for a long time. Now, when you are awarded a franchise, you have to start construction and go on the air within six months otherwise they take it away from you and give it to someone else. And just to show how valuable a radio station is in Metro Manila, the last one, purchased in 1997, I think, went for about 140m pesos. [US$3.15m at today's rates—making it considerably more in 1997.]'

When Gutierrez joined Mellow Touch in 1986, it was only just beginning to move away from pre-recorded time checks and towards projects such as concerts and movies.

'We needed to make people more aware of us and to give the station a different image,' he explains. 'Previously we were playing elevator music—love songs—and once had a big following. But over the years, because other stations were re-formatting and changing direction, we were losing listeners. We decided we wanted to stay with the kind of music that the spinners chose but the problem was, they couldn't talk! So, in 1996, we hired some new talent, our "voices".

'Our operation is a little different from other stations, since now we have a team working in the studio, rather just than a single DJ who takes care of the board work as well. We have a spinner who selects and plays the music, and then we have an announcer, who is our voice. All he does is research

and talk. And so we made this shift to a more live-sounding broadcast.'

These days the name Mellow Touch is perhaps a little misleading. 'We chose to keep it for sentimental reasons, I suppose,' Gutierrez comments. 'We've made some adjustments to the music and the overall sound in response to the changing market, as a lot of our listeners are younger now. So we prefer to call the sound Young Adult Contemporary. It hasn't been easy changing perceptions without changing the name, but we're already seeing a positive change in our listenership.'

As a result of the redirection, Mellow Touch is performing well once again, relying on the spinners ('the backbone of this operation') to give it its identity.

'On average, these guys have been working with us for about 12 years, while the head spinner has been with us almost from the beginning—24 years—so they know the music well,' Gutierrez says. 'They know what became a hit in Manila in 1976, for instance, they know exactly how it starts, how it ends, what the song is about, and what kind of instruments they use in the beginning... And the spinner gives that sort of information to the announcer. Of course, we have a computer hooked up to the Internet, so the announcer can do his own research, too.'

Bringing in announcers wasn't the only change made in 1996. The establishment of a news department, albeit primarily a CNN monitor, also helped develop Mellow Touch's new identity. Also on the monitor list are other Manila stations like ABS-CBN, or GMA, who have fleets of field reporters. Any breaking news is re-written by the station's two news writers and broadcast.

'Our writers are actually students who just report what they hear on the radio and TV in their own words,' Gutierrez explains. 'And if you think that is pretty unsophisticated, when I was starting out in radio in the seventies, I used to read the news straight from the newspaper!'

The kind of equipment in use has also progressed since those days but the Mellow Touch recording studio still has a Tascam 348 ¼-inch machine sitting alongside a 'generic' 166MHz PC with 32Mb of RAM and a 5Gb hard disk running a sound recording and editing program called SAW Plus—Software Audio Workshop. There are also Mackie CR1604-VLZ and 12-channel Harris consoles, four Denon and Audiometrics CD players, two Sony MD players and cartridge players hanging on from the change of premises in June 1999.

'We record straight from the microphone to the hard disk through the Mackie mixer, Gutierrez begins. 'And we do all our editing on the computer. There are many editing programs we could use, but we found SAW Plus suits us best—it runs on Windows 95, and it can handle 16 tracks, and costs about US$500. I believe you can even buy pirated versions here in Manila, but the pirated version doesn't give you all of the track processors.

'Nowadays, as I say, we work mostly from the computer but five years ago we used to do a lot of editing from the reel—we had two-open reel players—and we just dubbed across from one to the other machine. With the computer programme, it is the same principle, but it is so much faster.

'Whenever we finish a production we master it onto an MD, or whatever format is required. Sometimes we put commercials on CDs, because for distribution they are better, as CD players are widely available everywhere in the Philippines.'

The increased speed of production is an added benefit but wasn't the main reason for moving into computer-based working.

'What we really wanted was a cleaner, more consistent sound for our commercials and our productions,' Gutierrez explains. 'I remember doing production on an open-reel recorder—every time they made a slight change in the tag line of a commercial, the quality was different. I mean, you'd forget how far you were from the microphone and then every time you rewound the tape you'd lose a little bit of the sound. With a hard disk it is so much neater and more accurate. And it's a lot faster—a helluva lot faster. We can do a 30s commercial in five minutes.'

Mellow Touch's news department

Skline star: the Seoul TV tower

It did take a while for the entire production team to learn the software, however. 'Actually it was very easy to learn,' Gutierrez says. 'If you're used to a computer, and to Windows, then it's easy. In less than a couple of hours, you can put together your own production. What you have to spend time on later is learning the short cuts.

'We use the cart machines for commercials because the spinners are more familiar with them and have difficulty changing their habits,' Gutierrez continues. 'Clearly though, it is better to use MiniDisc because you get uniform quality, and you can program every cut in a commercial break, and it will play out by itself. But some of the guys are scared and with a cart machine they feel they have more control. It is not that they don't want to change over—they're afraid of relying on the new technology which can do everything for you.'

Manila is a little more advanced than stations in the provinces and is aware of the pressures to move to digital working, regarding working directly to the computer system's hard disk as a step in this direction. 'But,' as Gutierrez notes, 'when we go to digital, we will have to completely replace everything, and that is expensive.'

A further deterrent exists in the fact that the transmitter is only four or five years old and will probably delay the move by three to five years. Yet another inhibiting factor is Manila's broadcasters' general lack of familiarity with digital equipment...

'We are not very familiar with how it operates or how it is serviced,' Gutierrez admits, 'so if we have a breakdown, we could be off the air. When you are not familiar with something, you tend to be a bit afraid of it. I remember the first time I got a computer, a technician came and set it up in my office, and then said, "Okay—there you are. It's all set." But I didn't like to make a fool of myself in front of him, so I said, "Okay—go!" I wanted to learn it by myself—and make my mistakes in private.'

In fact, some stations in Manila—like Joey Radio, 92.3FM DWFM are already broadcasting direct from a computer-based system using a scheduling program from RCS. 'But with those kind of systems, you also need to have a backup that is always ready to go,' Gutierrez asserts. 'All their music is already on hard disk, everything that is broadcast is there and every time a commercial comes up, a record of the event automatically gets sent to the traffic department, with a time on it and gets printed out as a CP—a Certificate of Performance for the advertiser—so you don't even need a log anymore. It's certainly nice, but it's pretty expensive. Anyway, the programming at our station depends on the choices of the spinners and there's a limit to what you can do with a program that chooses music for you. You can put in all the parameters but then you don't have a feel for the music. We like to think we preserve the feel of live radio.

'At the same time, we'd like to reach out to a wider audience so we are starting to get involved with streaming audio over the Internet. We have made some moves, but we have been told that, although it is technically feasible from Manila, the hardware is a problem. We don't have much broadband here, so the sound comes out choppy. We need to wait for PLDT [Philippines Long Distance Telephone Company] to upgrade their system. But audio streaming will surely come—and probably faster than we think.'

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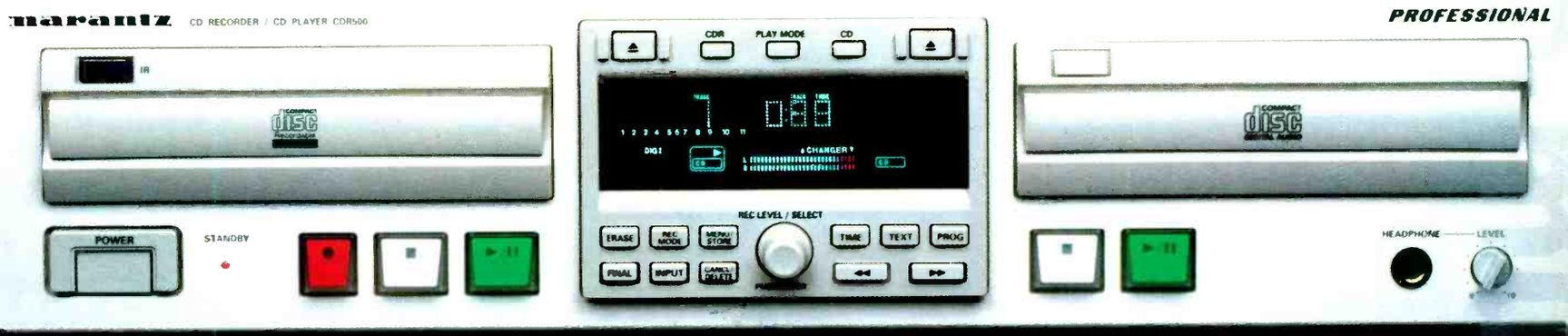

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HHb MDP500 PortaDisc

While most format wars are conducted in the full glare of publicity, minor skirmishes go unreported and sometimes even unnoticed. **Neil Hillman** reports from the trenches location digital recorder frontline

THE NEWS THAT this autumn HHb would be ceasing the manufacture of its PortaDAT portable DAT recorder after eight successful years was greeted with some considerable discussion and speculation. For many in the sound recordist fraternity HHb's machine had become the *de-facto* over-the-shoulder time code DAT recorder. But quite where the company's product profile would be taking it was unclear: hard disk, flash disk... The options were there but the agenda remained unset.

The resulting choice of MiniDisc has raised questions, expectations and not least of all, eyebrows in equal measure. I have in the past expressed my support for this medium as a form of acquisition; within certain constraints including the necessary requirement of careful operation, suitability for the job and caution with the duplication of source material. But as someone who both records and dubs location programme material, it is the flexibility and ease of use of MiniDisc that approaches a love that dare not speak its name: for few recordist's can publicly admit to more than a passing nod for MiniDisc, fearful of being thought of as somewhere between technically promiscuous (rather exciting, actually) or simply inept (bad for self-esteem and chances of awards). But as a device for recording wild tracks when operating tethered to a camcorder, or creating a safety back-up on a drama recordist's trolley, MiniDisc comes into its own. If only it carried time code. Sadly, madly and badly, the Sony protocol that prevents the utilisation of time code will also prevent MiniDisc from fully fulfilling its potential to be the most versatile work-horse medium since magnetic audio tape. But again, with the additional feature of a USB port that enables streaming audio to and from computer-based programmes such as Cool Edit Pro, the PortaDisc avails itself even more unashamedly to other areas of location sound recording, especially speech-radio production.

First seen in public in prototype form at the Las Vegas NAB show early last year, Los Angeles became the location for the official launch of UK digital-audio specialist HHb's latest offering: the MDP500 PortaDisc MiniDisc recorder. Promising a shipping date of November 2000, HHb has been true to its word and production has commenced on time to satisfy the healthy pre-launch order book for what the boys at HHb boldly predict 'is set to become the standard issue audio acquisition recorder for music recording, film, radio and TV applications'. That, by any stretch of the imagination, is a tall order to set for the sibling product of a domestic format; and the not inconsiderable associated sonic-snobbery surrounding the professional use of MiniDisc. However, over the eight years that HHb has been synonymous with the failed domestic platform DAT, it (and HHb) has gained an enviable name within the location recording fraternity through the production of the PortaDAT. HHb will need to draw on this too, as the PortaDisc will be going head-to-head with the highly competent Marantz PMD650 MiniDisc recorder, launched almost exactly one year earlier.

First impressions are of the PortaDisc's robust feel. The chassis is hewn from 1.2mm steel, beefing-up the device and requiring that weight-saving measures had to be introduced elsewhere. Although this is not obviously apparent to the detriment of the design, the weight with batteries has been trimmed to 2kg. The Fisher-Price purple colour scheme—in keeping with the corporate HHb motif—takes a little getting used to, but does in fact lend a rather regal tone to the machine. The top face carries a raised and moulded, smooth, rubber quadrant that actually feels like a motorcycle tyre inner-tube; but I guess the design team would prefer to refer to this as a 'swoosh'—in any case it acts as means of allowing the transport and edit function keys to operate in a recessed environment and prevents inadvertent key-strokes whilst the device is in operation in its carry-case. Reassuringly, it is the HHb logo and machine title, rather than 'Dunlop', that are nicely embossed into the rubber, giving a very pleasing and tactile finish overall; although it struck me that its handling and cornering in the wet could be questionable.

This top face is home to the grille of the in-built 250mW speaker and internal microphone, located top right, while to the front of the swoosh quadrant are the small-ish push-buttons for KEYHOLD (disabling all keys except itself), OPEN (to eject the disc), and EDIT (pressed to access Name, Erase, Divide, Combine or Move functions). Alongside are the two AMS keys, used to increase the track number and also used in the editing and naming process, and finally the four familiar transport keys of REW, PLAY, FF and STOP.

The left-hand side houses the 12V-14V DC co-axial power socket and the shuttered disc slot. Power-assisted insertion and ejection means that the machine has to be powered-up to load or reclaim a disc; this

MX-2424 Profile:
Steve Levine, ManMade Soul Studios

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

Producer Steve Levine likes recording at home, that's why he has a brand new purpose-built studio in the grounds of his west London house.

Steve Levine also likes recording with tape, that's why he bought two TASCAM MX-2424 24-track, 24-bit hard disk recorders for the new studio.

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Steve Levine: Culture Club, Honeyz, Denice Williams, The Beach Boys, West World, 911, Ziggy Marley, Gary Moore, Beckley-Lamm-Wilson, The Creatures and Quarterflash.

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small irritation of an extra few seconds to complete this most basic task could perhaps be eliminated by the provision of a residual power feed to the eject mechanism. However, both the load and unload cycles provide an insight into the delightful precision of the MD drive itself; clearly this is not just a badged consumer device.

The right-hand side of the machine carries all the *inputs and outputs, be they* analogue or digital. The two balanced female XLR mic-line input sockets can be fed with 48V, 7mA phantom power—selected through a simple step in the setup menu—while SPDIF digital inputs and outputs are catered for by means of In and Out RCA co-axial sockets, In and Out optical sockets and a version-1 USB type-B connector. Analogue unbalanced line-level outputs are available on a pair of RCA phono-type sockets and an 8-pin remote connector offers parallel control. The ¼-inch jack headphone socket is nearest to the operator, providing a 15mW output into a 32Ω impedance.

The front face then is the engine room, where good ergonomics and an uncluttered control surface inspires immediate confidence. The POWER button is bottom left, with the headphones-speaker volume control above. The speaker is defeated during record, or when the headphones are inserted and its level may be fixed by means of its retractable push-to-lock knob. The 19-segment LCD panel can be viewed from a range of angles and also has switchable illumination; it shows level metering through a twin bargraph arrangement, configurable to provide peak hold and margin indication, and it also displays information prompted by the use of the three Function keys (F1- F3) located centrally below the glass and the six system keys to the right of the display window. The top two, LIGHT and MARK, are the most straightforward; the back-illumination is provided momentarily if the LIGHT button is dabbed, or remains on if the button is held for 3s or longer while the MARK button manually writes the track number. The middle two are DISPLAY and SYSTEM where the former changes the display menu between Disc Time, Level Margin, Time and Date, and the latter changes system settings in conjunction with the bottom two buttons, INPUT and SET UP, and those adjustment keys F1, F2 and F3. The SYSTEM button adjusts Record mode (between mono and stereo), Track Increment (between manual or auto), Threshold Level (for auto track incrementation and adjustable between -30dB and -60dB in 10dB steps), Auto Start/Cut (from the preset threshold), Auto pause (similarly), Pre-record (from a 6s buffer), Headphone Monitor (stereo, mono-L, mono-R or both), Repeat mode (selectable between off, all, one or A-B), Digital Output (on or off), and Auto Power Down (an option after 10 minutes in Stop mode).

The INPUT button is used to select and set the source

(between mic, line, digital, internal mic or off), mic attenuation (adjustable between 0dB, -15dB and -30dB), bass roll-off (off, 75Hz or 150Hz), limiter (off, ganged, AGC or on), phantom power (on or off), and digital input (co-axial, optical or USB).

The last of the six menu buttons is SET UP, used to set peak hold (either off, 1s or on), clock and date, and date format. Up to five user setups can be configured and stored on the PortaDisc and an in-built sample rate convertor accepts both 32kHz and 48kHz signals in to the host's 44.1kHz clock rate.

As well as allowing the basic functions of disc and track naming, The PortaDisc enables some basic editing; it is possible to go to a particular point in a track, combine two tracks to make one, divide one track into two, or move and erase tracks. The use of the Universal Serial Bus interface complements these basic editing functions by allowing direct audio-access to a suitable Windows-based PC or Macintosh driven programme.

To the right of the menu buttons is the large, concentric rotary record level knob for adjusting the analogue record levels, and this may be locked at a particular level by means of a mechanical slider set below it. A column of three LED's—red, green and yellow—indicate recording, battery charging and pause mode respectively, alongside the last two control buttons: the red RECORD slider switch and the yellow PAUSE button.

Power other than by the external DC feed is via eight 1.5V AA batteries housed in a cartridge that sits along the full width of the bottom face. The machine is supplied with rechargeable cells and a spare cartridge for quick replacement, which if the given figures are accurate, means a useful life of 2.5 hours for recording or three hours in playback between changes.

Perhaps as a victim of its own success, for HHb the DAT location recorder market approached saturation point and new sectors needed to be explored. Arguably, HHb is in a better position than most to gauge the mood of those people most able to condemn or crown the PortaDisc. It is however, up against a fine product with the Marantz PMD650 MiniDisc recorder. The rival models are comparably priced and they both aim at the same slice of the professional market—but if you need it, the PC compatible USB port will certainly tip the balance. If you don't, you can still feel secure with a stated frequency response of 10Hz-20kHz, a dynamic range of 96dB, the ATRAC 4.5 recording algorithm, a 40s memory buffer and the knowledge that the proven HHb rugged build quality continues through to the PortaDAT's heir apparent, the MDP500 PortaDisc.

In fact, I rather suspect that the usual cappuccino's, lattes and mocchas consumed in that certain audio manufacturer's North London office, may soon be supplemented by fresh ciabatta and the crowning glory of all sandwich fillings, Coronation Chicken; consumed to the reverberant cry from massed recordists gathered outside in the car park—'The King is dead! Long Live the King'. □

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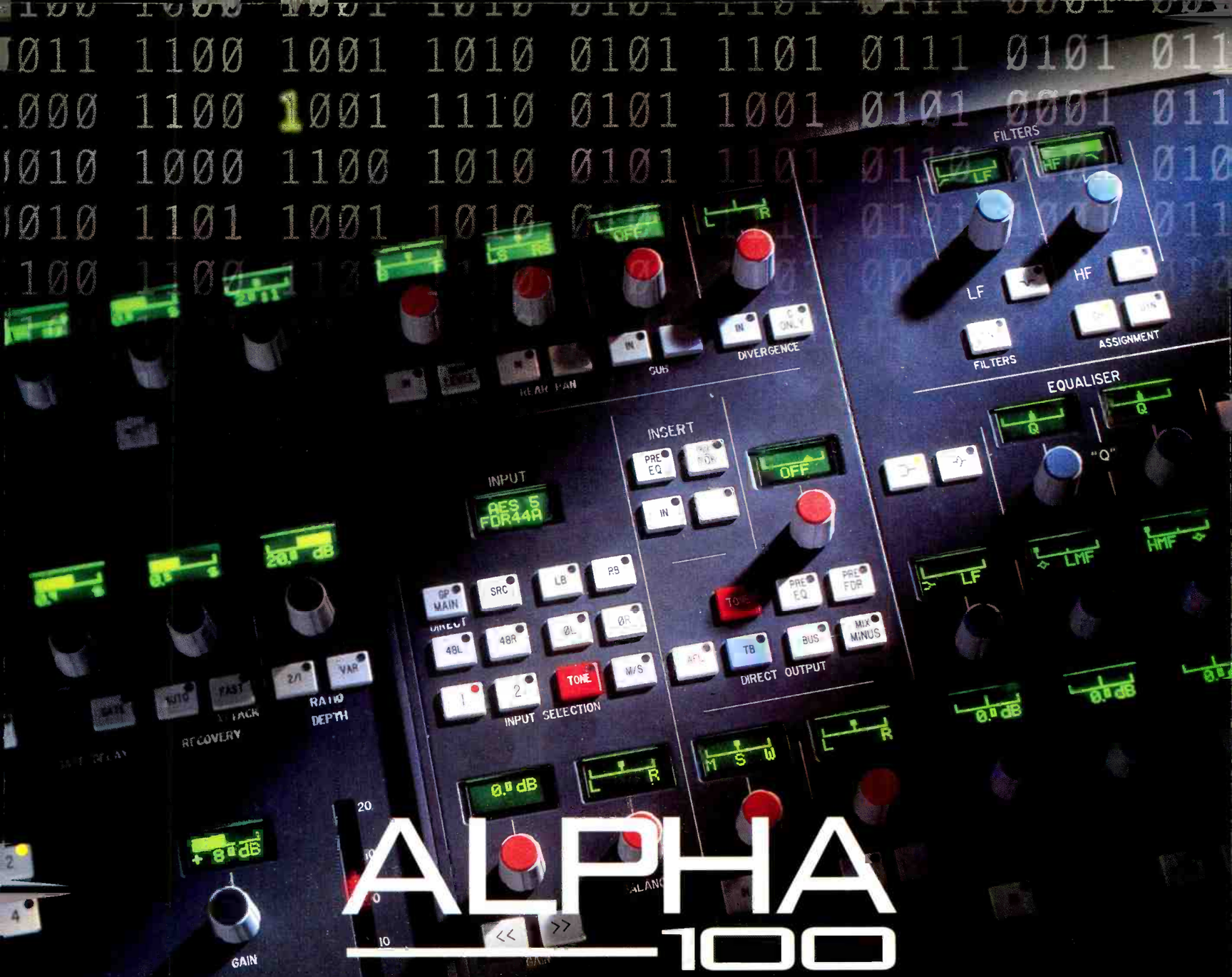

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Fostex D2424

Following the arrival of Tascam's MX-2424 digital recorder comes Fostex' offering. With Mackie's machine waiting in the wings and news of Alesis joining the fray, **Rob James** explores the D2424

THE LATEST IN A LONG LINE, the D2424's lineage clearly lies in Fostex' D1624, D160 family. This timely introduction extends the formula and format to a full 24 tracks record and playback at 44.1kHz or 48kHz sampling rates in 16- or 24-bit depth. Eight tracks of 96kHz 24 bit recording are the bonus alternative.

The physical packaging of the D2424 is almost identical to its predecessors but with one major change—Fostex' house colours have been replaced by a charcoal grey finish with charcoal grey keys and white legends. Although attractive, I found this less clear than the 'traditional' scheme, especially in subdued lighting. The control panel is removable and, using the optional extension cable, can be sited up to 10m away. This is a good idea since the D2424, like all current machines in this class, is far from silent.

Using the latest incarnation of Fostex' FDMS3 (Fostex Disk Management System 3), tracks can now be named. Ninety-nine Program files are allowed per disk, each with a combined total of 56 real and virtual tracks at all sample rates and bit depths. Thus a 96kHz Program will have eight real and 48 alternatives, while at 44.1kHz or 48kHz the 24 real tracks drops the number of alternatives to 32.

Recordings are made anywhere in a circular 24-hour 'window' up to the maximum capacity of the disk. Complete 'real' tracks may be swapped with alternative tracks individually, as stereo pairs or in 8-track banks. Individual files are recorded for each audio 'event' with each silence counting as an event. Each edit point splits existing events, further increasing the number. This may become a significant limitation since the maximum number of events per track is 512. However, since there is no 'hidden' audio where events overlap, multiple events can often be merged into one without seriously reducing future editing options. Although file transfer between a PC and the D2424 is somewhat restricted and cumbersome, it is at least possible. This is compensated by a comprehensive array of back up options for normal sampling rate projects.

IDE and SCSI drives are both supported with ADAT and DAT also catered for. An Ethernet card is under development. However, 96kHz projects are less well served. I think for most purposes by far the best option for moving projects (Programs) to a computer for editing is to transfer them digitally to something like an RME Hammerfall card.

The digital 24-track market has been completely transformed by the arrival (or imminent arrival) of three contenders. Tascam, first to market with the MX-2424 is joined by Fostex with the D2424 and the still awaited Mackie HDR 24/96. The good news for users is just how different these machines are. All have unique virtues and-or vices depending on the application. The areas which most obviously separate the contenders are; connectivity, punch-in-out performance, editing and display.

One definition of professional audio kit is that you pay more for less. This apparent contradiction is simply explained. Manufacturers of pro-sumer kit and most especially computer software seem to believe a gargantuan feature list will make their products more desirable. Professionals know it is often worth paying more for equipment which does a narrowly defined job quickly and efficiently without unnecessary baggage. With the D2424 and its siblings, Fostex proves you don't always have to pay more to achieve this happy result.

For those who really must have AES-EBU I-O, this machine is not ideal since the maximum option is eight (mono) channels. But if you need 24 decent D–A convertors, the D2424 is attractive since these can be an expensive option on other machines. The provision of a full 24 tracks of ADAT I-O is equally welcome. Fostex offers further external A–D convertors as an option. In contrast to the audio I-O, standard sync options are limited to word clock and MIDI. If you want to work

with LTC or video sync, you will need the option board which also adds 9-pin control. MIDI support is strong with tempo and time signature maps, MTC and MMC.

Punch-in recording can be performed either automatically or manually across any number of tracks from the control panel or optional foot switch. Rehearse mode operates in a similar manner to edit rehearse on a video machine, instantly switching the monitoring from replay to source at the -in point and back at the punch-out. In Record there is a delay before the monitor switches back on punch-out which does not inspire confidence although the recording is fine. Whether punch-in and punch-out are manual or automatic the transport must be stopped before further recording is possible. When you stop there is a 'housekeeping' delay before you can do anything else.

Editing is adequate rather than impressive. There is no insert editing as such—edits move all subsequent audio down automatically. To insert, you first have to open up a gap by manually shifting the rest of the track by the required amount. The minimum event length, audio or silence, is 740ms which can be restrictive. Tape recorder style editing and track swapping works well enough, but how much detail editing does anyone seriously want to do these days without some sort of track display? For some purposes the lack of track display options will be a deciding factor though not necessarily in a negative sense. Track sheets are still a good discipline. For acquisition in particular, security is more of an issue than display and for field recordings a screen is an additional burden. For multichannel playback work such as installations, the Program chaining functions are more useful than a track display.

The D2424 offers a great deal for the money. Particularly noteworthy is the amount of I-O included as standard and the removable front panel which provides total remote control with decent metering at no extra cost.

The application should dictate the choice of solution. The D2424 is not a comprehensive editor, nor is it a 'digital dubber', but as a straight substitute for analogue or modular digital multitrack tape recorders it has a lot going for it. Compared to obvious rivals the headline cost is low and factors such as the built in I-O and remote control consolidate this advantage. □

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Operation and interconnection

THE D2424 IS a 3U-high rackmounting box. The main unit front panel is sparsely populated with the power switch, a deeply recessed 15-pin D-connector for the control panel, and four steel mushrooms to attach the control panel. When mounted, this hides two half-height 5.25-inch disk slots. One EIDE 3.5-inch drive caddy and a 15Gb drive are fitted as standard. The second slot takes either a second EIDE caddy or optional DVD RAM drive for back up or file transfer purposes. External SCSI drives may also be used. Fostex list suitable E-IDE drives on their web site. Caddies are not 'hot swap' capable so inserting or removing a drive requires a complete power down. For file exchange drives must first be formatted as FAT16 on a PC. Another restriction, is file names. Six characters maximum plus 2-digit track number and .WAV extension.

Drives used for recording must be formatted on the D2424 to suit the bit depth and sampling rate required. Bit depths and sampling rates cannot be mixed on the same drive even in separate projects. Another key choice is Multiple Undo. If selected, all recordings and edits are retained using up disk space, without it, only the last recording or edit is kept—there is one level of undo-redo.

The large, bright display shows 24 bargraphs. Beside these are status and mode indicators. Alphanumeric characters across the top display messages and time information.

Record Track select buttons are arranged in two banks of four. A TRACK SHIFT key allows access to all 24 tracks. Below the Track Select keys, three LEDs indicate disk access and whether the Record Ready keys are addressing tracks 9-16 or 17-24.

The main transport controls still use the quirky Fostex arrangement; RECORD STOP PLAY REWIND F.FWD. The rest of the keys and layout follow the familiar Fostex pattern. Keys have adjacent indicator LEDs where appropriate and white legends.

The SHIFT key is used to access key functions shown in boxes. Once some familiarity has been achieved it is mostly obvious and things fall quickly to hand.

SETUP accesses three groups of parameters; Changing the Initial Settings, Check for checking the number of events in a Program or current disk status and Execution for editing Program titles, saving, optimising a disk and potentially destructive options such as Disk formatting and erasing Programs. The jog wheel scrolls through the circular list.

Time can be displayed as absolute (based on each new program starting at zero hours and continuing to a maximum of 24 hours), as MTC which is an offset added to ABS or MIDI bar, beat, clock which corresponds to the MIDI Clock-Song Position Pointer. Adding the optional time code board allows the machine to chase and generate LTC and adds 9-pin slave abilities.

AUTO PLAY plays from a locate point and in combination with AUTO RETURN, loops. Used together with AUTO PUNCH Rehearse, a punch-in can be repeatedly rehearsed and in and out points separately auditioned and trimmed on the fly before committing to a recording.

Outputs are manually switched from play to source by arming a track or tracks for recording and pressing REC. Alternatively, pressing TRACK SHIFT and SHIFT together switches all tracks to input monitor. For editing, Copy & Paste makes a copy of the data and pastes it to another location via the clipboard, even between Programs. Move & Paste does almost the same thing but erases the source data including the clipboard. With Copy & Paste, multiple copies can be pasted. There are two methods of using erase, either from a specified point to end of Program on a track or tracks, or erasing between two specified points. All edits have a fixed ramp of 10ms or 5ms at 96kHz.

TRS jacks connect eight inputs and 24 outputs of balanced analogue. Each input feeds three tracks, 1, 9 & 17. 2, 10 & 18 and so on. All convertors are 24-bit sigma-delta 128x oversampling types. A menu selects the reference level of the analogue I-O and balanced or unbalanced working. Six TOSlink optical connectors enable all 24 tracks of I-O at 44.1kHz or 48kHz sampling rates and are also used when backing up to ADAT or DAT. Optical input 1-8 doubles as SPDIF input to tracks one and two only and the optical outputs may be switched to output the first six tracks in SPDIF. Operation at 96kHz is currently only possible via the analogue I-O or the optional AES-EBU card.

Word clock I-O is BNC with a termination switch. MIDI In, Out and Thru are on DINs. Two RS-422 serial 9-pin sub-Ds carry either Sony P2 protocol or Fostex System Exclusive data. A 100Ω termination switch on the input allows for terminating the last machine in a chain. SCSI connection is half-pitch 50-pin.

The Model 8350 AES-EBU board and-or the Model 8345 time code and sync board add video sync and time code capabilities via XLRs for time code I-O and BNCs for Video In and Thru plus a termination switch. A ¼-inch jack on the front panel connects a punch-in-punch-out footswitch.

HHb BurnIT

Still courting the seemingly insatiable appetite for recordable CD in professional circles, the purple box manufacturer has weighed in lower than it has before. **Zenon Schoepe** trys not to burn his fingers

HHB'S LATEST FORAY IN TO CD-R recorders is by far and away its most mass market and accessible. Known as BurnIT, the smaller legending reveals a model number of CDR-830 which puts it in to the context of the company's previous offerings in this area, such as the CDR-880 and still current CDR-850 and CDR-850 Plus.

Connector-wise we're down to the bare minimum here with phono analogue I-Os and digital I-Os presented in coax and optical flavours. As an aside the original BurnIT brochure shows a back panel drawing that includes a 'remote' section that has connectors for 'text' which perhaps would accommodate connection of a computer keyboard for entering text info. However, this is not present on production models.

The front panel if far busier with clusters of buttons, most of which are dedicated in their operation. The left most cluster concerns itself with scrolling text messages—BurnIT distinguishes itself together with the Marantz CDR631 in presenting CD Text as a feature—plus traditional display mode switching, a switch that clicks between the disc, artist and track text info, and a MONITOR button for following the input selected from a switch that rolls through the three available varieties. Dedicated switches are also provided for erasing CD-RW tracks or discs, finalising, and selecting auto or manual track incrementing, the latter activated by pressing the RECORD key.

Transport related keys are PLAY/PAUSE, STOP, RECORD and RECORD PAUSE (around 4s). A MENU key accesses deeper functions such as up to 12s of fade in-out, copy protection (permit, once and inhibit), setting the threshold level for auto track incrementing plus the balance level of the input in analogue or digital. The analogue input has its own pot but digital levels can also be adjusted by selecting the parameter from the menu and adjusting it with a dial which has push to confirm. The same dial is used for adjusting all the other aforementioned parameters in a similar fashion. There's also the useful inclusion of automatic track incrementing for those long drum solos in which markers can be inserted at 1-, 3- or 5-minute intervals.

The tone of the manual is distinctly biased towards the format beginner with its reiteration of points and explanation of rudimentary CD-R principles. Not a bad thing, most of the very earliest CD-R machine manuals presupposed a level of knowledge that at the time was more likely to be found only within CD plants. However, its handling of the variety of Synchro options available may overwhelm the beginner when it is perhaps adequate to state that the machine can achieve synchronised recording from a variety of sources as single track, all tracks and all tracks followed by finalisation.

As is so often the case now, BurnIT comes with an elaborate infra-red remote which accesses the machines role as a player, such as programmed playback and activating and setting skip IDs, but also duplicates all the front panel controls. Most importantly the remote is employed to enter text info in a slightly less cumbersome method to that offered by using the previously mentioned front panel dial. To quote from the literature, each title can be up to 120 characters long including spaces and you can store three unfinalised discs' worth of characters (up to 2,000) in the machine's memory at the same time. We'll have to take the manufacturer's word for this as I was not about to embark on a test of the limits of the text capacity even though the remote's key arrangement is largely similar to that used on mobile phones for text messages and therefore more comfortable than using the front panel dial. I've now got around to liking the idea of CD Text but, ladies and gentlemen, there has got to be an easier way of getting the words on to the platter than the methods used on BurnIT and Marantz' CDR631. We have been spoiled by the freedom in which we can connect up a PC keyboard on top-flight MD machines after all.

That said, I do like this remote as it's well laid out and sectioned off and the switch response, while short in travel, is extremely positive so entering text is less painful than it could have been.

Treated as a sum the operation is clear and simple and sonic performance is well up there. The SRC is bypassable, display is clear, the metering good and the response of the switch gear is fast, something that couldn't be said of the very early CD-Rs which were rather sluggish in this respect.

Appraisal of the current wave of more affordable CD-R machines must be tempered with a pinch of realism. With the exception of a few key new features the new machines offer little that the last generation of boxes are able to achieve. In the context of HHb's range of recorders there is no real reason for anyone who already has such a machine to dump it and invest in the BurnIT. I would still say that the CDR850 Plus has a lot of stuff going for it.

If there has been an increase in performance then it is imperceptible, however, what is blatant is that the money required to buy in to this technology has dropped dramatically against even only a few years ago. CD-R remains an illustration of how technology progresses and prices come down, the newer machines do not replace the good machines from the last generation they just make getting in to the format that much more accessible for first timers and less financially challenging for the inevitable repeat business.

As such BurnIT is a a worthy contender. Build wise it seems more mass-produced and 'streamlined' than previous HHb recorders and it's also physically more lightweight, even though I'd be rash to suggest that it is anything but robust enough for heavy duty work. Perhaps predictably, the operational aspects are more defined and distilled in a manner that was a stumbling block for earlier CD-Rs. Accessibility and the time taken to burn the first disc has undoubtedly been reduced for novices to the format (there must surely still be many) and there are swages of buttons and control functions presented on the top. There's nothing hidden or secretive here just solid performance with the sorts of bells and whistles that you would expect if you are a careful follower of the spec sheets. The downside is undoubtedly connectivity and particularly balanced analogue although if you are running to the CD-R digitally and will not be needing it for playback duties then this will be of very little consequence.

The bottom line is that used in certain types of application BurnIT will fulfil all your requirements and then some. We've never had it so good. Highly recommended. □

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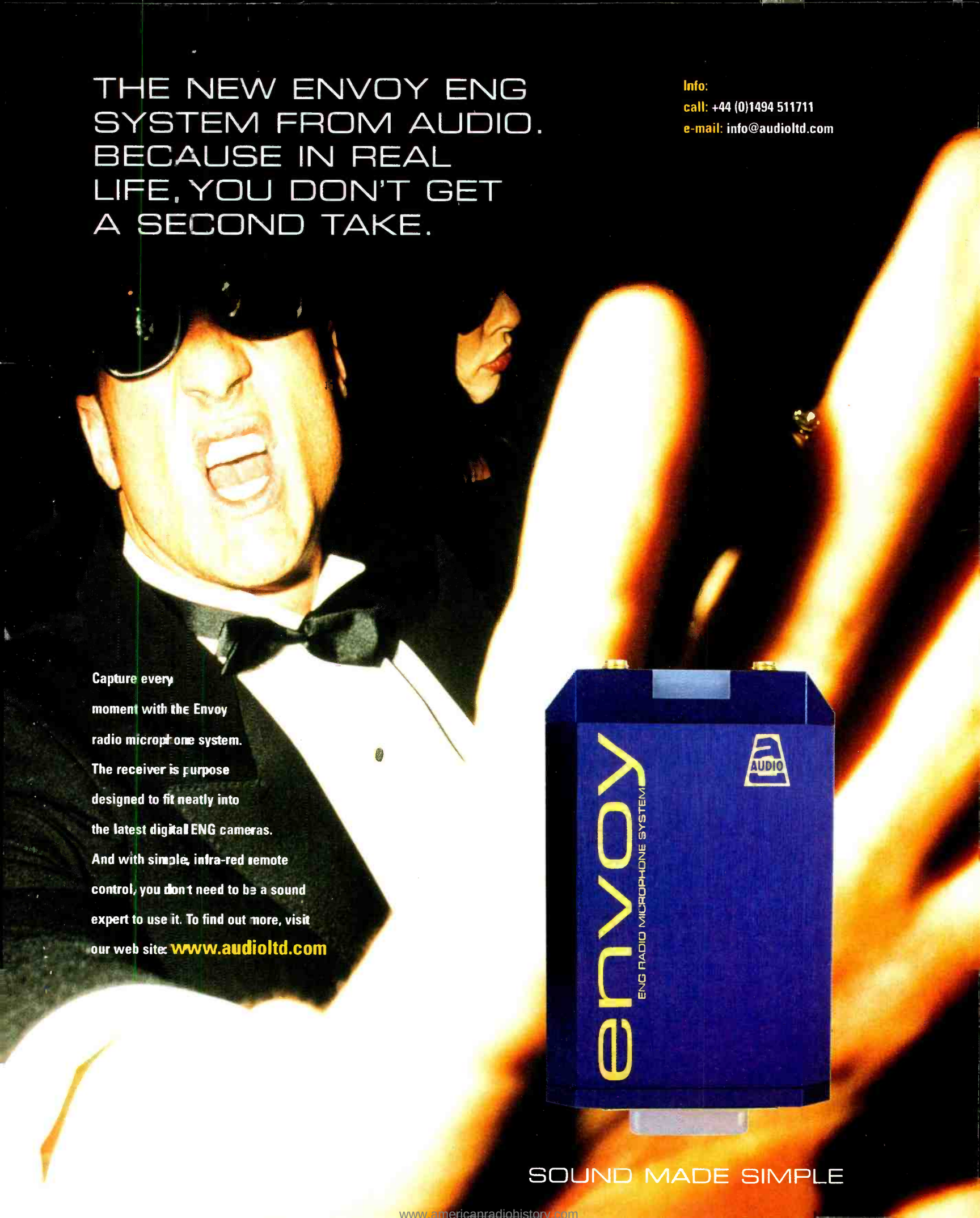

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SOUND MADE SIMPLE

ATC T16 Active

Studio Sound's 'bench test' loudspeaker reviews continue with the ATC T16 Active. **Keith Holland** reports

THE ATC T16 ACTIVE IS a 2-way active loudspeaker comprising a 165mm bass driver, a 25mm fabric dome tweeter and built-in crossover and power amplifier electronics. The cabinet is of cast aluminium construction and is a ported design with side-walls that curve round to give a plan view similar in shape to a manicured fingernail. The rear panel has a large cast heatsink for the electronics, an IEC type mains socket, an

XLR type input socket and switch, and controls for input sensitivity and bass boost, which can give +6dB at 50Hz. The measurements for this review were carried out with the bass boost control set to 0dB. The cabinet has external dimensions of 450mm high by 270mm wide by 330mm deep and weighs 17.5kg, which is considerably less than the similar-looking SCM20A (*Studio Sound*, June 1999). ATC specify a 200W rms power amplifier for the bass driver and 50W for the tweeter giving a maximum continuous output of 108dB SPL at a distance of 1m.

Fig. 1 shows the on-axis frequency response and harmonic distortion for the T16. The response is seen to lie within ±3dB from 70Hz to 18kHz with the -10dB point at about 50Hz. The low-frequency roll-off is approximately 5th order suggesting the use of an electronic high-pass protection filter. The low-frequency harmonic distortion performance is fine for a loudspeaker of this size with the 2nd harmonic peaking at about -35dB (1.7%) at 50Hz but the mid-frequency performance is slightly higher than expected peaking to -35dB at 750Hz. The off-axis response is shown in Figs. 5 and 6 for the horizontal and vertical performance respectively. The horizontal directivity is well controlled with little evidence of mid-range narrowing or lobing, and the vertical plots show a crossover dip at 30° above and below the axis which is characteristic of most non-concentric driver arrangements.

The step response (Fig.3) demonstrates good driver time-alignment with the high frequency peak occurring only about 150µs earlier than the main response and the power cepstrum (Fig.4) shows little evidence of cabinet edge diffraction problems except for a minor echo after about 400µs. The waterfall plot (Fig.7) shows that, despite the 5th-order roll-off, the low-frequencies decay fairly rapidly except for some minor overhang at about 60Hz. There is little evidence of ringing in the mid-frequency range. The high-order roll-off does affect the acoustic source position however (Fig.2), which is seen to peak at about 3m behind the loudspeaker at low frequencies.

Overall, the ATC T16 Active is a fine loudspeaker demonstrating good performance on all measurements. ATC has succeeded in producing a loudspeaker with most of the qualities of the SCM20A (*Studio Sound*, June 1999), but without the enormous weight of the earlier unit. Perhaps the biggest difference between this and the SCM20A is the low-frequency alignment; ATC has opted for a ported design with a protection filter which should mean that this loudspeaker will survive more low-frequency punishment than the earlier model at the expense of low-frequency transient accuracy. □

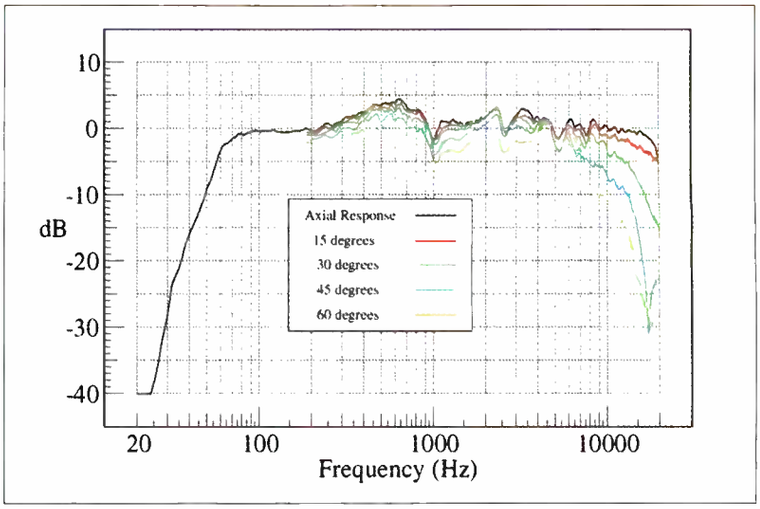

Fig.5: Horizontal Directivity

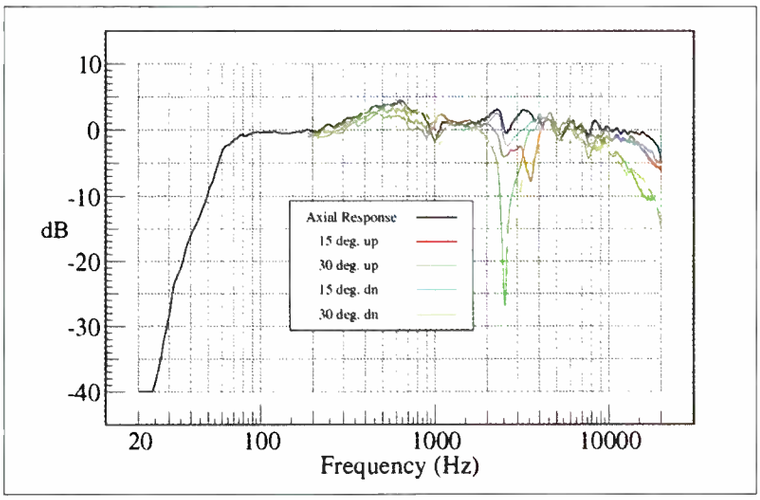

Fig.6: Vertical Directivity

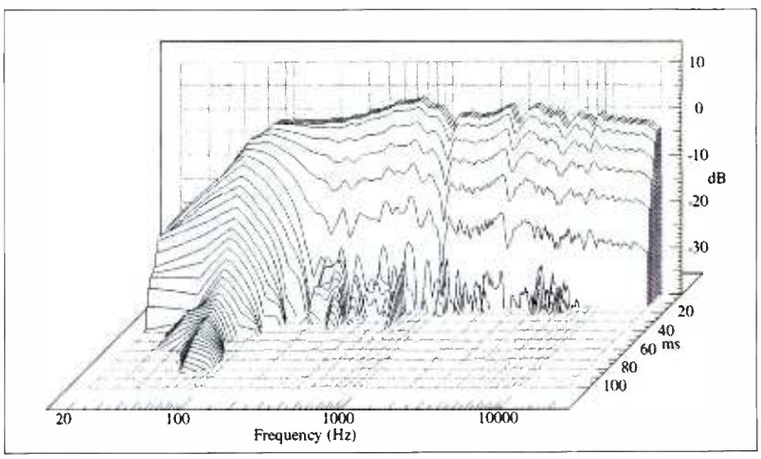

Fig.7: Waterfall

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Methodology

Studio Sound, April, page 14
Net: www.prostudio.com/studiosound/aprl98/r-tannoy.html

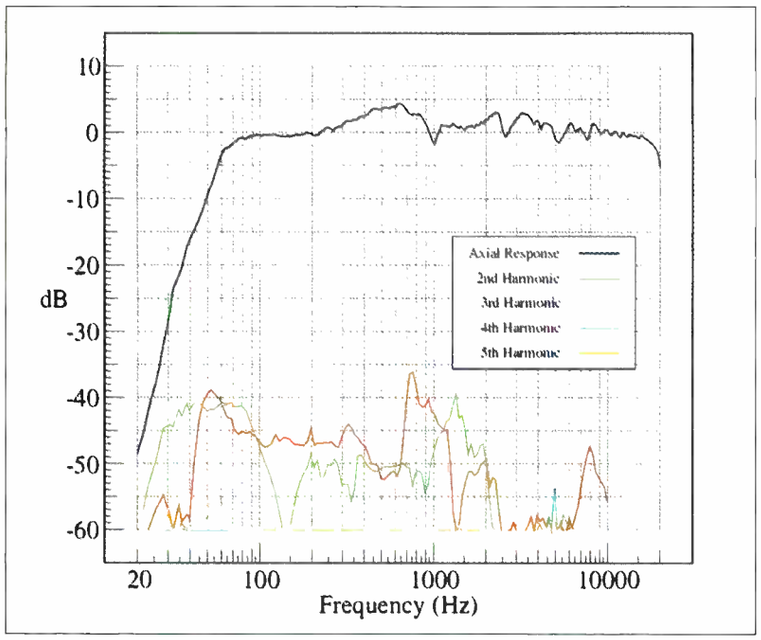


Fig.1: On-axis Frequency Response and Distortion

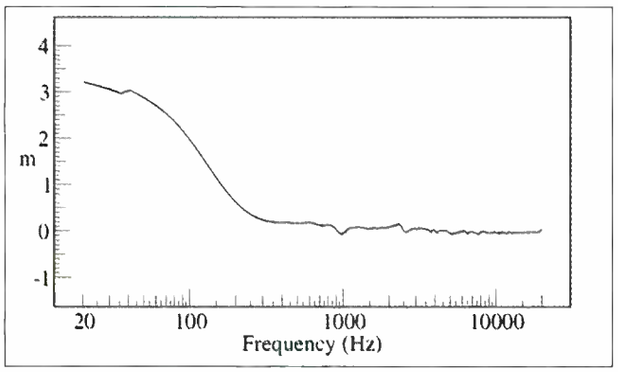


Fig.2: Acoustic Source

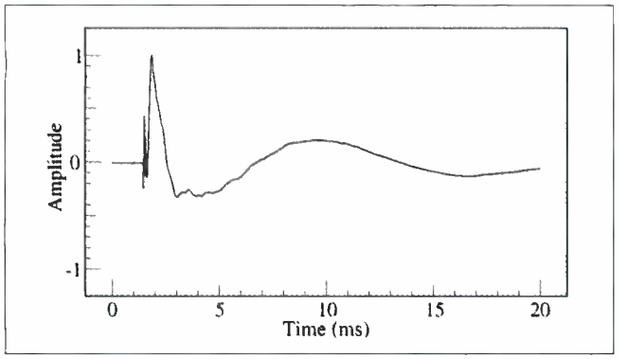


Fig.3: Step Response

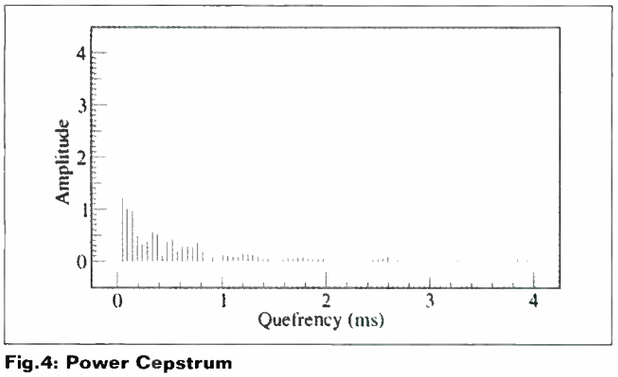
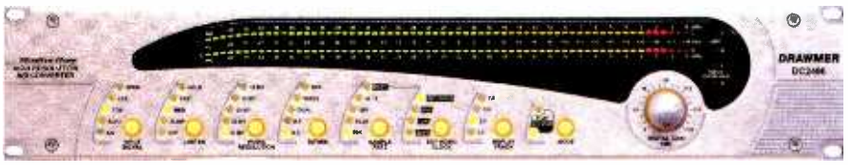


Fig.4: Power Cepstrum

Drawmer Masterflow DC2496

Raising the stakes in its Masterflow range, Drawmer offers a 24-96 convertor with some enticing applications. **Dave Foister** finds form and function

DRAWMER'S TRANSITION FROM Kings of analogue-only dynamics to digitmeisters became complete with the MasterFlow series, where the digital domain became the focus rather than an adjunct to the analogue processes. We had already seen the 1962 tube mic preamp with sophisticated 24-96 digital output, including a bitsplitting feature for spreading high-resolution digits across the tracks of low-resolution MDMs; now with MasterFlow all the processing's digital, and we have Buck Rogers styling to prove it. The DC2496 is big brother to the DC2476 in more than just size; it uses dual convertors working together on the high-resolution conversion, giving it a quoted dynamic range of 130dB.



Although in a sense the 2496 does little more than convert analogue to digital, it manages to fill a 2U-high box, partly because it has the biggest meters you're ever likely to see—rows of 64 LEDs (I counted them, how sad's that?) that take up most of the length of the panel and dip at the bottom end to follow the contour of the fancy black window. This in turn is set into a thick sculpted silver aluminium panel that's about as far from Drawmer's traditional functional black foursquare presentation as it could be. The curvy theme is developed further by the sets of LEDs showing the status of the various functions, all of which lie along deeply grooved arcs.

Of course, any convertor will have a number of parameters to adjust for the job in hand, but the Drawmer seems to have more than its fair share, indicating that it's a little more than a basic convertor. Obviously there is the usual choice of sample rates and bit depths, and for less than the full 24 bits there is a selection of dither types—HF, MF, white noise, and a Dual mode claiming the lowest distortion with a better perceived noise characteristic than straight white noise—with a brief outline of the relative merits in the manual. As expected, there is also a choice of word clock sources, and the range on offer here shows right away what else the unit can do, as the possibilities include ADAT and TDIF.

The DC2496 has an amazingly densely populated rear panel, among which can be found a pair of ADAT lightpipe connectors and a standard TDIF 25-pin D. Part of the point of these is still the bit-splitting technique introduced with the 1962, allowing 24-bit standard-rate audio to be recorded across three tracks and now 96kHz 24-bit across six tracks, even on original 16-bit machines. The advent of Tascam's DA-98HR gives a simpler and more elegant way of doing this, but for the many owners of other MDMs who have no other need to upgrade, the Drawmer approach is an attractive alternative. It also now allows Tracks 7 and 8 on the recorder to carry a 16-bit 48-44.1kHz backup recording, and this basic signal is also available on an auxiliary stereo output. This means reference copies can be run live on to DAT or MD alongside the high-resolution master. Navigation of this forest of connectors is made easier by LEDs showing which are active at any one time, and the clear photographic maps in the manual.

The 2496 is required for playback of the high-resolution MDM tapes, and in fact can play any adjacent odd-even pair of conventional ADAT or DTRS tracks as well as its own format signals. It automatically detects the type of source and sets itself accordingly; sample rate conversion and dither are then available to produce the desired finished product, along with reference analogue outputs from a high-quality internal D–A. If using the special MDM modes it's important to remember that switching between them can produce unpleasant effects, as the extra tracks containing the bottom eight bits of two channels make a nasty noise by themselves. Those who have used the 1962 for bit-split recordings can play their tapes back through the 2496 as the process is the same. Note as well that the unit will handle complete 8-track transfers between ADAT and DTRS formats without signal modification, as well as transfers of bit-split high-resolution multitracks via the processing.

Gain can be applied to the whole signal in the digital domain up to a maximum of 18dB, and in case this pushes the peaks above zero a limiter can be switched in with a choice of time characteristics from slow to fast. There's also a Hold mode, which can be used to normalise the gain to the maximum possible; play the track through the unit with the gain at full, and the system adjusts its gain so that the peaks hit zero without any limiting. Alignment of the whole system is helped by a built-in oscillator, accessible only from the rear panel, with choices of level and frequency.

As a straightforward stereo convertor the DC2496 is a powerful and comprehensive package, with an excellent neutral sound that will complement any recorder. Add the bit-splitting, bringing top-end specs to anyone with a bog-standard old DA-88 or black ADAT, and the facility to patch and copy between so many formats, and it's an attractive multipurpose tool providing a lot of useful functions at very high quality. □

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NEW TECHNOLOGIES

Controll24

Digidesign and Focusrite have co-operated on the development of the Controll24 mixing control surface with built-in analogue preamplification for Pro Tools. Said to offer a cost-effective solution to Pro Tools MIX/MIXplus

owners the control surface offers 24 touch-sensitive moving faders, dedicated EQ and dynamics switches on every channel, and illuminated switching for mute, solo, record arm, channel selects and automation modes. High-resolution LEDs display transport location, each channel strip offers dual-channel metering, and 26 scribble strips provide system feedback for channel names and plug-in parameters. Designed to control Pro Tools' recording, editing and mixing automation, Controll24 connects to Pro Tools via 10BaseT ethernet and is said to offer hands-on control of nearly every recording, routeing, mixing, and editing function in Pro Tools. The worksurface includes 16 Focusrite Class A mic-line preamps and two DI inputs on the first two channels for directly plugging in instrument-level devices. Pro Tools 5.1 surround mixing features are addressed by Controll24's surround monitoring section and also included are talkback capabilities and an integrated submixer section with eight stereo inputs. Digidesign, UK: +44 1753 658496.

Alesis HDR

Alesis has announced the ADAT HD24 24-track hard disk recorder which uses a proprietary method of writing to hard disk, said to dramatically reduces fragmentation of data, to provide 24 tracks of 24-bit audio on low-cost IDE hard drives, and offers drop-in compatibility with over 150,000 ADAT systems world wide. With an estimated

street price of $1999 (US) and shipping expected in the Spring, the ADAT HD24's drives are hot-swappable through two front-panel bays and the machine offers the digital audio and synchronisation connections of the existing ADAT. The rear panel includes 24 channels of 24-bit analogue I-O, 24 channels of ADAT optical I-O and ADAT synchronisation I-O for sample-accurate sync with other ADATs, a BRC remote controller, and products from other manufacturers. When connected to a BRC, it 'looks-like' three ADATs and multiple units can be synchronised. The HD24 provides 24 tracks of high-resolution 24-bit recording at standard sample rates of 44.1kHz, 48kHz, or at 88.2kHz and 96kHz with a forthcoming 96kHz I-O option. External word clock input is provided and the machine can cut, copy, paste, insert and move tracks and segments of audio with undo from the front panel or optional remote control. Rear panel Ethernet connection

dbx 376

Bringing its own character to the channel strip concept, dbx offers us the Tube Channel Strip. **Dave Foister** enjoys a refreshing change

DBX HAS LONG BROADENED its scope beyond dynamic processing and noise reduction, bringing us its takes on the valve mic amp, the mastering processor, digital conversion and many other things. The surprise is that it's taken this long to produce a full channel strip, the showcase of many other manufacturers. The 376 allows dbx to bring us several aspects of its expertise simultaneously, from microphone input to digital output with several useful treatments along the way. In style it resembles the 386 mic preamps we saw recently, its silver panel perforated with a grille showing the tube within, and a good sprinkling of multicoloured illuminated buttons.

The signal path is entirely analogue until it hits the convertors at the end, and has the usual three inputs

for microphone, line and front-panel instrument jack. All necessary preamp functions are there for phantom, 75Hz low cut, and a 20dB pad, and the variable gain is controlling the drive to the tube amplification stage that is the only tube element in this hybrid path. Obviously this high-quality preamp can be used as it stands straight through to digital, although unlike some such strips the other stuff can't be completely switched out of circuit, only set to zero.

In the processing that follows, the emphasis is, unsurprisingly, on dynamic treatment but starts with simple 3-band EQ (hopefully described in the manual as parametric although it clearly doesn't qualify). This gentle circuit has smooth adjustment for bass and treble, and a swept mid-band with a fixed broad boost and cut bandwidth. With 15dB of boost and cut on all bands it's capable of major changes but always remains sweet and subtle. In case you should be tempted to overdo it, there's an LED just to show when the EQ is clipping.

The EQ stage is followed by a classic dbx compressor, whose small control complement belies its capabilities. Two knobs and two buttons are all dbx needs to give a powerful palette of compression characteristics; Threshold and Ratio adjustments control the basic process while Slow provides the only variation on the program-dependent time behaviour. The other button switches in dbx' proprietary Overeasy soft-knee feature, one of the best circuits around for simple unobtrusive compression. LEDs show where the signal is in relation to the threshold, staying green below and going red above, and with Overeasy selected a central yellow one lights to show when the signal is in the soft transition from unity to compression.

Many will be familiar with the character of the Overeasy knee but for those who aren't, it makes for a remarkably forgiving compressor that always seems able to come up with what's required with the minimum of twiddling. Push it hard, and it squeezes without complaining, but it does the subtle stuff as well. Old hands may find it hard to trust something that looks like Compression for Dummies, but it works. Taking it out of circuit is done by setting the ratio control to Off, making AB comparison tricky, and there's no gain makeup control other than the final output level knob, but otherwise it's got everything you're likely to need.

After the compressor is a simple de-esser, with knobs for FREQUENCY and AMOUNT, and this, like the compressor, does its job capably with minimal fuss. It got the sibilance out of a vocal for me with no effort at all, and the only way you'd know was the flashing lights and the lack of esses.

The output of all this goes both to the convertor and the analogue output, and either can be metered on a small row of LEDs. The analogue to digital convertor itself is no me-too add-on, but once again incorporates dbx' proprietary ideas as to getting the most out of a 'standard' digital signal. This involves the trademarked Type IV conversion system that puts gentle soft-knee compression into the top segment of the dynamic range, allowing considerably more subjective level without the risk of overs or noticeable side-effects, as nothing happens unless the signal is right up near the limits. There's more to it than that, as outlined in the White Paper that takes up a good proportion of the manual of any dbx product that includes it, but the nub is that it does what it says it will. It also offers two dither types and two noise shapes for use when dropping to 20 or 16 bits; of course by default conversion is 24-96. All these selections are made with the lit buttons, whose colour shows which option is active; until you learn them, you have to read the tiny writing to work out what's happening, but it's still a good way of squeezing this much functionality into 1U.

The success of any 'channel strip' is going to depend on whether you like the way the manufacturer does the various bits. dbx has a proven track record in the dynamics, the preamp and the A–D, with the EQ being perhaps the less-known quantity. As this is simple and effective, the whole package becomes the Simple and Effective channel strip, with a tolerance in its dynamics and conversion you'll be hard pressed to beat, coupled with a fine clean sound and surprising control. Much more than a me-too. □

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Arbiter Group, UK.
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NEW TECHNOLOGIES

makes HD24 files accessible to computers in AIFF format while the HD24's 24-bit ADAT optical I-O allow simultaneous transfer of 24-track material in real-time. Control of transport, track arming and editing functions will be possible via an optional full-function remote control which will ship this summer for less than $600 (US).

The CLX-440 is a professional, full-featured compressor-limiter-expander that combines separate compression and expansion sections for each of its two stereo channels, with look-ahead capability, side-chain and key functions,

continuously-variable soft-hard knee and peak-RMS controls. Two sets of meter follow input, output, compression and expansion activity. The CLX-440 also features a side chain I-O.

The PEQ-450 is a dual-stereo 5-band, fully parametric equaliser with 20Hz to 20kHz control, ±18dB boost controls, continuously-variable Q, high and low shelving, high- and low-pass filters and input-output metering. A chain mode allows all 10 bands of EQ to be used in tandem to process two stereo signals simultaneously. Connectors are balanced 1/4-inch TRS jacks. Both units have a suggested retail price of $399(US) and will ship in the Spring.

The ProLinear 820 DSP-enhanced studio monitor is a bi-amplified, 2-way studio monitor with a DSP module that is applied to each speaker on the production line to correct for small variations in drivers. Four-band parametric EQ with front-panel controls allows the alteration of speaker response to taste and the user can recall standard EQ curves stored in factory presets, modify them and store them in user memory. The rear panel of the ProLinear 820 includes a 9-pin serial interface, allowing the ProLinear 820 to be connected to other ProLinear monitors or to a computer for multichannel configuration and voicing. The ProLinear 820 features a custom 8-inch polypropylene woofer and 1-inch silk dome tweeter driven by 100W and 50W amplifiers respectively. Nominal output is said to be 90dB @1m and maximum output 105dB @1m. They will ship in spring for $1299(US) a pair.

Listing at $649(US) per pair, the M1 Active Mk2 maintains the competitive price of the original M1 Active monitor but features newly-designed dual amplifiers, a redesigned 1-inch silk tweeter and an internally-mounted phasing plug. The crossover point has been moved to 2kHz.

Alesis has also extended its RA range of studio amplifiers with a new series of affordable amps in three distinct power ratings: RA150 ($259); RA300 ($359); and RA500 ($459). Incorporating a convection cooling system, the amps feature DC coupled, fully complementary discrete amp topology, dual differential input stages, wide bandwidth, detented front panel level controls, overload-protect

STUDER

Picture been originated by Pablo Picasso and Studer

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DAV Electronics Broadhurst Gardens No. 1

With the audio industry finally old enough to see its experts finding new alliances and opportunities, DAV's mic preamp draws **Dave Foister** back to the heyday of Decca

DECCA'S LOSSES ARE AUDIO'S GAINS—in some areas, at least. It's certainly no secret that the closing of Decca's R&D department brought us the Genex M-O disc recorders, the first fruit of an in house Decca project. On a smaller scale, ex-Decca maintenance-design engineer Mick Hinton is behind the launch of a new range of outboards under the DAV banner. First off the production line is a microphone preamplifier known, in honour of the location of the old Decca studios where he began in 1969, as the Broadhurst Gardens No. 1. During his time at Decca's Belsize Road complex, Hinton designed 4-channel microphone preamps which are still in use by ex-Decca engineers at Classic Sound, and the new range is based on Decca circuits from around 1977.

In appearance, the No. 1 closely resembles the Canford Audio (*Studio Sound*, February 2000) mainly because it is built in the same style of off-the-shelf extruded black case. One end carries the output and mains connectors while the other carries the inputs and controls, and the most obvious difference is that the DAV is considerably longer and a good bit higher. The resulting impression is of a piece of equipment whose function is far more important than its appearance, being just a notch or two up from good home-brew. The facilities are also remarkably similar to those of the Canford, although this appears to be no more than coincidence.

DAV places its emphasis heavily on the quality of the electronics inside, and its lack of cosmetic pretension and fairly basic set of controls mean that it can also be made more affordable than its quality would suggest. Each channel has only one knob, for switched setting of the gain (26dB–59dB in 12 steps), and a few small push-button switches with indicator LEDs where appropriate. The labelling for the controls is silk-screened in blue and red on a black panel and is not easy to read.

Each channel has a fairly hefty pad (-26dB) and two switches for low-cut filters, giving a choice of three cut-off frequencies. The lowest is usefully low at 40Hz. In line with the consideration that quality comes first, there is no attempt to reduce the audible effect of operating these switches, and consequently they thump quite a lot. I

NEW TECHNOLOGIES

indicators, bridged mono operation, balanced 1/4-inch and RCA connectors, heavy duty, dual binding post output connectors, and a relay-controlled turn on-off system all in heavy-duty steel chassis. The RA300 and RA500 also offer XLR input connectors and bargraph metering. Alesis, US: +1 310 255 3400.

CreamWare Luna II card

CreamWare's Luna II audio adapter for Windows and Macintosh computers has a set of ultra-low latency drivers combined with mastering quality analogue and digital I-Os. Boasting three on-board SHARCs, the Luna II PCI card has stereo analogue and SPDIF I-Os and 24-96 capability. The Luna 2496 convertor box can be added for eight additional 24-96 analogue I-Os and a 16-

NEW TECHNOLOGIES

channel ADAT interface is available.The on-board DSP can serve as a 16-channel mixer for the creation of 5.1 surround mixes with EQ and compression and access to the plug-in library for CreamWare's Pulsar-SCOPE platform. Creamware, Germany: +49 2241 59580.

Emagic releases

Emagic and Mackie have joined forces to produce a family of hardware controllers. The first project will be the Logic Control control surface for Emagic's Logic Audio software which will be modular, competitively priced for the entry level, and have eight motorised touch-sensitive faders, one touch sensitive master fader, eight mutes, eight solos, 8 rotary encoders, tape style transport, two mic preamps, a data wheel, and an Alps control pad. It will be shipped by the middle of the year. Emagic has also announced the EMI 216 mobile USB multichannel audio interface which delivers six playback and two recording channels at 24-bit with plug-and-play functionality. The computer automatically

don't have a problem with this, as it's not hard to mute the following chain before making changes, and it means that the only capacitors in the signal path are the carefully chosen phantom power decoupling capacitors.

Phantom power is not individually switchable for the two channels, indicating that the unit, despite its excellent crosstalk figures, is perhaps primarily intended for use with a straight stereo pair. This might also be suggested by the fact that only Channel 1 has a phase reverse switch, which is fine if a stereo pair through here is all you're using although it doesn't allow absolute phase to be corrected on both channels for those who feel this is important.

The final feature, also curiously found on the Canford model, is a switch for routeing Channel 1's input to both outputs, allowing the preamp to be used as a simple distribution amplifier. There is very basic metering in the form of two LEDs on each channel, a green one lighting at -3 and a red marked Over. The specs reveal the levels indicated by these to be +18dBu and +21dBu, with a clipping level of +29 giving plenty of headroom even with the lights flashing. The small difference between their indicated levels means that the greens are rarely on, making them less useful than they might be.

The emphasis in the specs is on low noise and low distortion, with a frequency response quoted as 10Hz to 70kHz (no tolerance given). This character is very much in evidence in practice, showing that the guts of this ordinary-looking box are on a par with far more fancy-looking devices at far more fancy-looking prices. It's a full, open sound, clean and quiet, doing the deceptively simple job of neutral amplification very well indeed. It handled a particularly problem microphone I use without difficulty; many preamps go unstable with it

as there's some problem with its output impedance, but the DAV was perfectly comfortable with it.

The Broadhurst Gardens No. 1 is uncompromisingly a tool to do a job; no client is going to take any interest in it whatsoever and it does nothing for the aesthetics of your control room. Yet it's an excellent tool that will fit comfortably into many situations at a remarkably low price. DAV promise three more units, all from the same era of Decca design: a mic-line amp with EQ and filtering, a stereo limiter-compressor, and a stereo mastering unit whose facilities remain a mystery for now. If the No. 1 is representative of what is to come, we should all be looking forward to them with great interest. □

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Empirical Labs EL7 Fatso Jnr

A compressor with more than a hint of distortion and 'spank' at its disposal makes an intriguing proposition. **George Shilling** accepts

IT'S FUNNY HOW tastes change. In the eighties and nineties everyone was trying to generate extra high-frequency harmonics with Aphex, Vitalisers, Scintilators and Sonic Maximisers. Now, here is a device that is somewhat the opposite, removing unwanted nasty high frequencies, and more...

Fatso is an acronym for Full Analogue Tape Simulator and Optimiser, but even this description does not tell half the story. The aim of the Empirical designers was to create a box that emulates the pleasing qualities of tape saturation, without the unpleasant ones—smooth clipping up to 20%THD without noise.

However, they ended up taking the concept much further, introducing a number of features and functions. The Fatso emulates the 'musical nonlinearities' of not only magnetic tape, but also transformers, and older valve and class-A circuits. And as a bonus, several different flavours of compression are available. This stereo unit has completely separate controls for each channel, which comprise large Distressor-style Input and Output Gain knobs with detailed legending for easy fine-tuning, and only three pushbuttons. However, numerous LEDs of different colours crowd the front panel.

By turning up the input level, you can drive the Fatso to introduce second and third harmonic distortion. The 0vu light indicates 1% THD, and a red 'Pinned' LED indicates 5% THD or more. This seemed to behave like over-recording on my first ever Hitachi cassette recorder. Ah, memories... Unfortunately, it seems that introducing compression precludes this particular distortion. There are four preset types of compression, which are stepped through with the COMPRESSOR button. All have preset attack and release times. These include a Tracking Compressor, which is set up as an 1176 approximation with fairly quick attack and release, and a gentle knee. The General Purpose mode is slower and relatively invisible, more like an optical unit, although not as close an emulation as the Distressor's Opto mode. The Buss Compressor setting has slow attack and fast release, with only a 2:1 ratio, and a 15dB knee. The fourth type, Spank, can be selected on its own or in combination with any of the other types, so cycling through all seven modes and off takes eight button pushes. Spank mode has a subtle knee followed by very fast hard limiting which absolutely whacks the dynamic range. This is the most fun, with remarkable squashing achievable without any unpleasantness. All compression is indicated by spaced LED gain reduction meters along the bottom of each channel, which are extremely clear.

The Warm section emulates high-frequency saturation, and consists of seven increasingly 'warm' settings (and Off), which can be nudged through with the Warm buttons. This introduces a fast acting compressor that acts only on the high-frequency content of the signal. This function therefore warrants its own gain reduction meters, the top rows of LEDs, which indicate attenuation at 20kHz, although the actual corner frequency moves as attenuation occurs. This function can be used in all sorts of situations. Recommendations include taming brittle sounding percussion, acoustic guitars, but I also found it useful for greatly reducing some crackles and distortion when remastering an old recording. On bassy sounds, you find sometimes that there is not enough high-frequency content for this circuit to touch the signal unless the input is cranked considerably, but most signals can be warmed effectively.

The third button toggles a relay switched Bypass, and also cycles through Tranny mode. After years of effort by designers to invent transformerless circuits, Empirical Labs has come to the realisation that a transformer can actually do useful things to a signal, especially to the low frequencies, where they become nonlinear. The Fatso's Tranny circuit introduces a subtle distortion, which enriches low and mid frequencies, making extreme lows more audible on tiny speakers. This generally adds vibrancy, although I decided against using it on bass guitar due to audible artefacts.

Stereo linking of audio and controls is possible and the whole unit is very user-friendly. This is remarkable considering the small number of controls. EL made a conscious decision to pack the whole thing into a 1U-high box without an LCD screen, and I think this was definitely the right way to go.

The gently humourous and expertly written manual is full of suggestions for uses in different circumstances, but really, anything goes and the overall sound and feel of this unit encourages you to experiment. The different sections all interact, and just a level change at the sidechain insert will alter the processor thresholds of the Fatso. The only danger is getting carried away with the Warmth section, leading to a slightly dull overall sound. I guess at that point it's time to revert to an exciter.

Interestingly, the rear panel includes phono connectors in addition to jacks and XLRs, in the hope of attracting hi-fi users wanting to soften up the sound of their CDs. However, in the near future it will be possible to replace these with a linking connection to enable multiple units to be ganged for multi-channel surround work. Whatever, it's a joy to use in the studio—and much more use than an exciter. □

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NEW TECHNOLOGIES

recognises the unit and power is supplied via the USB port. Approximately the size of a VHS cassette and extremely lightweight, the EMI 2I6 is said to be an ideal audio interface solution for laptops. The incorporated headphone amplifier provides mobile monitoring and the box has SPDIF and will be delivered with EASI and ASIO drivers for MacOS 9.0.4 and up plus EASI, ASIO, MME and DirectSound-compatible drivers for Windows Millennium.
Emagic, Germany: +49 4101 495 320.

Manley ELOP II

Manley has announced ELOP II, 'The Limiter' which keeps the original opto circuit included in its previous designs but adds a switchable high pass filter into the side chain so that it is useable for mixes and other tracks. A fast FET-based brick wall limiter spans the range of clean predictable limiting to grunge while a FET release control adds colour. Mic preamps have been added on both channels with switchable phantom power and phase reverse and a rear panel slot accepts A–D and D–A convertors.
Manley, US: +1 909 627 4256.

New compact Soundcraft

Soundcraft's Spirit M Series affordable compact mixing consoles are available in M4, M8 and M12 versions offering four, eight and 12 mono inputs respectively. All have four stereo inputs, 100mm faders, an SPDIF output and peak and signal LEDs plus a high resolution stereo output meter. Mic preamps are from the Ghost desk while EQ is 3-band with swept mids plus a high pass filter. There are four auxes split equally between pre and post status while each mono

channel additionally has a switchable direct output. Channels also get PFL and 2-track playback inputs are provided with level control, PFL and a mix replacement function.
Soundcraft, UK: +44 1707 665000.

New Rolls

New from Rolls is the ADi6 active direct interface with two 1/4-inch inputs that may be mixed or tied together and sent to an electronically balanced XLR output. The unit may be phantom or battery powered and has variable attenuation and ground lift. An addition to the company's series of personal monitor devices, the PM55 line monitor amplifier has a 1/4-inch TRS stereo monitor input which may be mixed with a 1/4-inch unbalanced instrument or line level input. The mixed result is sent to a standard or mini jack headphones output. The CL151 GLC is a single channel compressor-limiter with a noise gate and mic preamp that is driven by balanced XLR or unbalanced jack inputs with a TRS jack side chain and 1/4-inch jack output. Soft knee compression circuitry has variable threshold and ratio controls followed by

STING'S NEW PRODUCTION TOOLS...

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Simon Osborne – Engineer/Mixer

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ONE TO ONE
The International Media Manufacturing Magazine

Dolby DM100

Following the proven invaluability of cable and MIDI test boxes, Dolby's hand-held bitstream analyser is set to be a must. **Rob James** holds hands

FORGET PRADA AND GUCCI, this year's 'must have' accessory comes from an equally famous if surprising source. The embroidered logo on this neat, black, tote bag positively screams exclusivity. Even by Bond Street standards the price is stratospheric but unlike its better-known cousins, this one comes complete with seriously useful contents. Lurking within is Dolby Laboratories' DM100—a handheld bitstream analyser-generator for Dolby Digital, Dolby E and PCM streams at all rates up to 48kHz.

Gone are the days when checking a signal path was a simple matter of jacking into a 'listen'. Two-wire and three-wire circuits now carry a bewildering array of data—I say data because digital formats often include a lot of non audio information. Dolby Digital and Dolby E are both particularly rich in metadata. The DM100 redresses the balance somewhat by enabling the operator to identify and check digital signals of unknown parentage. The outputs may be set to simply pass the input stream through unchanged or AES3 output bits can be set to alternative values.

Incoming bitstream type and channel format are displayed and, where appropriate, bit depth and sample rate. From this top-level status display, the UP and DOWN keys step through the Status menus. ENTER brings up the detail under each heading, scrolled with the UP and DOWN keys. ESC cancels a function or moves up one level in the menu hierarchy. Channels are menu selected for monitoring and Dolby Digital dynamic range control may be applied—useful in noisy environments. The displays are, as far as possible, consistent with other Dolby products so owners and users of DD and E encoders and decoders will be quickly at home.

If the monitor functions don't quite do it for you, the generator functions should decide the issue. Apart from sine, sweep and pink or white noise signals further bitstreams may be uploaded via the RS232 port. A Windows PC application will be supplied to do this together with a number of other bitstreams. The total memory for audio storage is small so the samples are looped. It will be possible to have, for example, a noise sample sequentially switched on each channel in a stream in turn, so you would have noise rotating through the channels to aid in line up. Data logging may be achieved using any standard terminal program.

As a simple test I connected the digital output of a domestic DVD player to the co-axial input. The Dolby Digital bitstream was immediately recognised with access to all the metadata parameters. The one which made me really think was the original mix monitoring level -105dB! I also successfully experimented with the generator functions, feeding into a domestic Dolby Digital decoder.

I do not propose to list all the metadata parameters covered by the DM100. These have been well covered before and in any case, anyone who needs this unit will know the detail. Suffice to say it packs a vast amount into a compact unit. In fact, the only things I didn't like were the slightly awkward battery compartment cover and the belt clip cum desk stand. The latter flew across the room more than once during the review period but at least it didn't break.

The DM100 is a potent weapon in any engineer's armoury. These days there are a variety of digital audio streams flying around even moderately sized installations. Identifying what format they are is only part of the problem. There are ever more ways for signals to be apparently lost or unacceptable. Broadcasters, post houses, DVD duplicators, indeed, anywhere operating a mixed economy of AES, Dolby Digital and or Dolby E will find the DM100 an essential tool. □

In the bag

XLR, BNC and TOSlink optical connectors cover the bases for bitstream I-O. XLR and BNC outputs are always active. TOSlink output and the inputs are menu selected. In Autodetect mode inputs are scanned for a valid AES3 signal. A small internal speaker and 3.5mm stereo headphone jack are used to monitor decoded audio signals.

Video reference input is an RCA (phono) jack. A mini-DIN socket provides RS232 connectivity for test bitstream uploads, data logging and firmware upgrades.

BNC to phono and mini-DIN to 9-pin sub-D adaptors are included.

Beneath the small LCD are six indicator LEDs. Since there is a lot of data many of the indications are pretty cryptic but will rapidly become familiar in use.

The top six keys' primary functions are; POWER, STATUS, MON, SHIFT, SETUP and GEN. SHIFT and POWER toggles the backlights and SHIFT followed by one of the remaining keys selects one of the four user presets.

Cruciform ESC, ENTER and UP and DOWN keys deal with data entry and menu navigation. Audio monitor output is adjusted with the volume keys.

Internal powering is by four AA cells. Good backlighting of keys and LCD aids operation in the stygian gloom prevailing in many studios. Permanently on, backlighting would quickly flatten the internal batteries. To avoid this, Dolby has provided sensible power management options and the alternative of mains powering via a 6V DC socket.

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NEW TECHNOLOGIES

gate threshold and release time variables. LEDs meter gain reduction. CL151 GLCs can be mounted side by side on a rack tray and are the first units in a new series from the company that will include a mic preamp, EQ, crossover, sonic exciter and a low wattage amp.
Rolls, US: +1 801 263 9053.

Latest Roland workstation

The Roland VS2480 24-track workstation offers 24-bit recording with on-board effects processing and CD recording, a 64-channel digital mixer, 17 motor faders, VGA monitor output and mouse and keyboard inputs. The system achieves 16-track simultaneous recording with 24-track playback plus 384 V-Tracks. Editing is drag and drop with the mouse and the desk is fully automated. Two stereo effects processors are expandable to eight and include COSM mic, speaker and guitar amp modelling plus a mastering tool kit. There are 24-voice phrase pads for triggering and arranging phrases directly from disk plus WAV file import and export. Dual R-Bus ports allow expandable I-O in analogue and digital formats and the package includes SMPTE and Word Clock.
Roland, Japan: +81 6 6345 9800.

Sonifex logger

Sonifex's Net-Log audio logger is designed to be operated and controlled by PCs on a network and combines the reliability of a dedicated hardware recorder with the flexibility of editing and playout over a network. It can record four mono, or two stereo, audio streams for playback using TCP-IP. Audio is encoded in MPEG layer 2 format and written to a 30Gb internal EIDE hard disk drive. Audio can be recorded at a different bit-rate for each stereo pair, allowing for regulatory low-quality recording of several days duration and high-quality re-broadcast recording on one machine. New additions to the Redbox range include three stereo unbalanced to balanced convertors—single, dual and quad; a single microphone amplifier; a single stereo to mono convertor; and a silence detection unit. The CO-ISDN version of the Courier includes a built-in codec that can be

used for live reporting or data transfer. On-board editing facilities and compatibility with the majority of in-house editing and playout systems provides seamless audio transfer. A new portable telephone balance unit enables live commentary for the standard Courier or where ISDN is not available. Enhancements planned include G.722 and dial-in ISDN access to the Courier.
Sonifex, UK: +44 1933 650700.

Compact ribbon

Described as a compact mono ribbon mic, the SF-1 from Royer claims a flat frequency response and panoramic soundfield. Transient response is aided by an ultra low mass 1.8 micron ribbon assembly. Off-axis colouration is said to be negligible. Heart of the system is a proprietary cross-field motor assembly made up of four powerful Neodymium magnets and Permendur iron pole pieces. The design is said to assure the shortest front to rear ribbon path length for 'best' high frequency response. The case is fashioned from ingot iron and forms the magnetic return circuit which accounts for a relatively high sensitivity.
Royer, US: +1 818 760 8472.

Fairman TSC

Stepping down weight in the outboard ring, Fairman's new valve-based stereo compressor makes a clean sweep. **George Shilling** acts as second

HAVING NOTED the perceived importance of the mass of any piece of outboard gear in our review of the heavyweight Fairman Tube Master Compressor (a Fairchild-influenced design from Denmark), it comes as a mild surprise to find that Swiss-born designer (and accomplished recording engineer) Werner Scherrer has managed to cram his know-how into a more normal sized 2U-high box for the Tube Stereo Compressor. And it comes at a far more reasonable price than previous products.

All Fairman products to date have been huge boxes, such as the Klein & Hummel UE100-based TMEQ model—a 6U-high box containing 22 valves. Their previous designs have all been derivative of discontinued classic models. However, this unit has a less obvious pedigree, with an LED-based optical circuit featuring valve circuitry. It is still extremely heavy, weighed down by some hefty-looking transformers. Scherrer obviously understands not only tube technology, but also the importance of transformer design.

The mains transformer is located in the increasingly popular position of outside the case on the rear panel (like the Manley Massive-Passive). Alongside this are the usual XLR and IEC sockets. The front panel is finished anodised black, and indeed the whole case has a smart black finish, with top venting. The front panel sports a central pair of illuminated 57 x 57mm SIFAM Vintage vu meters, with controls for each channel split left and right. In between these is a slightly confusing LINK switch: in the down position (marked Stereo) the channels are actually separate. I have to concede that it represents the true meaning of the word, but it caught me out initially—they are linked when the switch is up. When linked, all controls remain active, and for proper stereo operation it takes patience to set the channels' undamped knobs similarly. In this mode the inputs to both channels are apparently merged and sent as a sidechain driver to both channels' compression circuits. With no sidechain inputs, this at least allows use of the unit as a mono compressor with external sidechain, by using one channel as driver.

All knobs are high-quality conductive plastic, stereo matched potentiometers. Input and Output Gain knobs (separate for each channel) have a range of [±]6dB despite their legended scale of 0-10. The THRESHOLD knob is similarly vaguely marked (see below). There are also knobs for ATTACK, RELEASE and a continuously variable COMPRESS/LIMIT knob on each channel. None of these have any meaningful markings. A FAST/NORMAL mode toggle switch which opens up further possibilities. In Fast mode, the fastest Attack of 1ms and Release of 2.5ms makes this pretty quick for an optical device, although it never stops sounding like an opto-compressor. Each channel has a separate BYPASS toggle switch, which activates a hard-wire relay bypass, while the meters continue to indicate 'would-be' compression.

The blurb on the Fairman web site describes the optical circuit as employing an LED illuminated high-speed resistor. This resistor is an electronically controlled potentiometer rather then a VCA. The result is the absence of any distortion at any compression-limiter level at all, and this was borne out in use, and the published figure of better than 0.05%THD. There is certainly no high-frequency 'squashing'. The COMPRESS/LIMIT knob is the key to setting this unit up properly: it ranges from approximately 1:1.5 to 1:12 in the Limit position, which can provide some very audible pumping. Higher ratios can be used to great effect—the lack of distortion is a great bonus. However, for general use I generally had this knob set about two-thirds of the way towards Limit.

One immediate 'characteristic' I noticed is that it is quite hard to make this compressor do much compressing. Even with maximum input gain and threshold, you are often just lightly tickling the signal. Apparently, Scherrer is aware of this and working on a change to the design to bring the THRESHOLD knob into a more useful range. But by inputting a hotter than normal signal I was able to get things moving.

Personally I was disappointed by the (no-longer available) TRC, as I was expecting a Fairchild sound-alike, whereas it was a far cleaner-sounding unit, despite sharing similar compression characteristics. Unsurprisingly, the TSC is also very clean sounding, boasting remarkable figures for a valve device—S/N of over 98dB and a frequency response from 10Hz to 46kHz. It was much like I remember the Millennia Media Twincom, another spotlessly clean and true sounding optical unit, although the Fairman has the capability of much faster settings. I recorded a number of acoustic instruments through the TSC, and the main thing I noticed was that it just 'compressed'—it added no grunge or frequency response changes. Across a mix the sheer range of settings afforded by the Fast and Normal modes means that an appropriate setting is always achievable. Previous Fairman models have been popular with mastering engineers, and I suspect the TSC will be no exception. Fortunately, Fairman have predicted this demand and offer a version with ELMA 04 gold plated switches for such users.

Once the Threshold range is sorted out, this unit becomes a serious proposition, seemingly built to last and carefully put together for the connoisseur of clean compression. □

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NEW TECHNOLOGIES

Small Summits

Summit has introduced the first in a new line of affordable products. The TD100 tube direct box and instrument amplifier uses a loading control to match the input impedance to the incoming device while the output gain pot creates drive from the valves. Headphones can be connected for practice purposes in this half rack size module with its discrete transistor output. Said to 'recapture the magic' of the TLA100A tube levelling amplifier, the half rack TLA50 has XLR and 1/4-inch jack balanced I-Os. side chain access and linking capability for stereo use with another TLA50. The device will take -10 or +4dB inputs and output in the same and even when bypassed the audio still passes through the 12AX7A/ECC83. Three position attack and release switches are provided along with VU metering of output and gain reduction and continuously variable gain and gain reduction controls.
Summit Audio, US: +1 831 728 1302.

Audix clips and minis

Audix has introduced the ADX-20i miniature professional condenser microphone with integral gooseneck clip. The high tension, spring clamp fitted allows the mic to be used

for saxophone, trombone, trumpet and other brass instruments. It comes in a wired format operating on phantom power with the provided preamp module (APS-910), this microphone can also be used in battery mode with an optional power supply (APS-911). With a low profile and a 'unique' mounting system, the D-Vice drum microphone clip will attach to the rim of most drums and rimmed percussion. The low profile mount can be attached using only one hand and can accommodate any 5/8-inch microphone clip. The first in the Mini-D series of professional instrument microphones, the MD-10 has an extremely low profile mounting system using a flexible gooseneck. Frequency response is claimed to be 70Hz-15kHz on a hypercardioid pattern while an XLR at the end of the gooseneck allows for easy connection and placement of the microphone cable.
Audix, US: +1 800 966 8261.

Two new Rodes

Rode has introduced two new mics to its expanding product range. The NT1000 features a large capsule with gold-plated membrane, ultra low-noise transformerless circuitry, cardioid polar pattern, heavy-duty cast metal satin nickel body, high-strength welded and heat-treated mesh head, internal capsule shock-mounting, true condenser (externally biased) operation and a full frequency response. The NTK cardioid features class A valve circuitry with a hand-selected and graded twin-triode valve and dedicated power Supply. It has a large capsule with gold-plated membrane and claims ultra low noise and wide dynamic range.
Rode, Australia: + 61 2 8765 9333.

re·verb (rĭ-vûrb) 1. Lexicon

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THE FEATURE RACE

With experience of working film on both sides of the Atlantic, Dean Humphries is better placed than most to assess the sound for picture business. **Rob James** listens in

AT SEVEN DEAN HUMPHRIES wrote, 'I want to be a dubbin mixer like my father'. His teacher thought he meant to work with horses. Today, his name and title may be unfamiliar unless you make a habit of staying to the end of film credits but within the tight-knit film sound world Humphries is better known. He has moved around more than most including a spell in Hollywood. After a successful year he is back in London at Videosonics.

'I'd been friendly with Dennis (Weinreich) for some years,' he explains. 'He was out visiting his mum and called me up. He asked would I like to come and work for him. At first I said, "Well, not really", but he didn't want me to come and do doccos and TV, he wanted to move Videosonics out of low-end feature films and into the high-end. I've always been a big fan of Dennis. It's his company and he puts his money where his mouth is. You can make money quickly in this business but you have to keep re-investing or you go bust. I admire that ethos of, "Look guys, let's keep trying to do something different". I just said, "Sold!".

Now 42, Humphries' credits include classic TV comedy series *Only Fools And Horses*, the liberating *Shirley Valentine*, big budget Hollywood pictures such as *Interview With The Vampire* and *Someone To Watch Over Me*, and a few more contemplative films like *Tea With Mussolini* and *Dancing At Lugnasa*. Not forgetting Bertolucci's *Hamlet* and four films for Roman Polanski.

His career began after a slightly acrimonious departure from Surbiton Grammar, when Gerry (Dean's father), took him on, unpaid, at Twickenham studios. 'Three nights a week, I stacked shelves in Waitrose,' he laments. 'In the studio I swept the floor, made tea and fetched the newspapers. In downtime I was forever in the theatre playing with things and badgering people with endless questions. Eventually I made it into the theatre, I had to polish the console—literally, clean out all the little indentations in the knobs with a razor blade. All that was character building.

'The first fader I ever had was on, *The Great Train Robbery*. A helicopter shot pulls up into the sky. At the top Michael Crichton wanted a skylark or something. I had to fade in, tweet, tweet, then the next cut was right up close to the train. At the end of the reel he said, "Guys, that was fantastic. Everything was absolutely perfect. The only thing I'd like to check... was that bird loop a bit too loud?". I wanted to die.'

Humphries moved to Worldwide Studios in Soho to see how the other half lived. 'The first two weeks I was really struggling,' he recalls. 'Ten tracks would arrive, no automation, two hours left on the clock and not even half way through it. It was fraught but essential and I'm desperately glad I did it.'

After a detour to Advision, he arrived at Tony Palmer's dubbing theatre under the garden, Ladbroke Films, with ex-BBC mixer Alan Dykes. 'For a while we had half the faders upside down. You could do a crossfade pushing two faders the same way. Apart from TV work we were able to pick up smaller B films, I did *Lace 2* among others. I was there for three years, there were some marvellous times and some which were so terrible they were brilliant. I have never before or since witnessed anything like it.

'One editor, Teddy Mason, told Gerry I was doing all right and I think he took notice. When he asked me back to open a new theatre I said, "Absolutely". The second or third film we mixed was *Cry Freedom* which won a BAFTA award, so for the first few years, we were on a major roll there. We did *A Fish Called Wanda*, *Event Horizon* and many others.

'Gerry had mixed a couple of films for Roman Polanski and did a remix on *Tess*. Polanski wanted him to mix *Pirates*. Gerry said no, but asked if Polanski was interested in me. So at the age of 27, when I should really have been in the back room lacing up machines, I went off to Paris. To be honest I would have swum there.

'It was my first time with an automated console, and watching the faders moving up and down was witchcraft to me. I mixed for two days, came in on the third and the French guys were looking all concerned. It had all gone—two days work... Like a complete moron, I'd mixed for two days on automation without committing anything to tape. That was a huge lesson for me.

'In *Death And The Maiden* there's a really complicated scene with music crossfading and all sorts. I just couldn't get it right. After about six goes, in desperation, aware everyone was looking at me, I put my head under the console and started swearing at myself. The next thing I'm aware of, Polanski is down there, looking at me—"I bring you all the way

over from England to fuck my film up? Maybe I should have a go". When we surfaced there were six or seven French people looking at us, wondering if we were crazy.'

Do films get to you?

I cry, I weep buckets. If I see *Cinema Paridiso* or anything with a nice slushy ending I can't see the screen. I'd be pretentious if I said I tried to create that but I know when something will grab the audience. When you push those faders up and it goes zhoop and does exactly what you want it to do with the picture, you just think, if it gets the audience like it's just got me, then we're in.

There's a night scene, in *Frantic*, a boat going up the Seine with a Morricone score. If I see that scene now I can tell you where I was, what time we were mixing, all the problems, who was on the film, everything. Bam! It transports you back like a snapshot of who you were, where you were.

Why did you leave Twickenham for the second time?

Two guys from Disney came over to see me. Out of the blue, they asked if I would be interested in a job in LA. I flew out to have a look and decided it really wasn't for me. Four months later Chris Jenkins at Todd-AO called, asking if I'd like to come and work for them and I decided I really wanted to give it a try.

What brought you back just a year later?

LA was great and I had an interesting and wonderful year. I did *Bless The Child* and *Town And Country* and loads of other stuff. I enjoyed it, but Todd was undergoing, and still is, a huge metamorphosis after being bought by Liberty Media. Loads of people, mixers, were leaving. They're worried that the balance of power is going to shift from the guy with the huge six million input Harrison or DFC because of plug-ins and Pro Tools and all that stuff. I think Liberty Media buying Todd-AO and Soundeluxe is saying the days of the big mixer and the big money are going to be eroded. The market will be more high-end TV. Quicker turnover, bigger profit than high-end feature films.

Does digital make life easier?

Ninety per cent of the changes are a huge leap forward but some things were better 10 years ago. There is no ambiguity, no room for debate. From DAWs we've gained immediacy. That strength is also the weakness. As workstations proliferate on the mixing stage so does potential for fiddling. If the director is single-minded and assured the workstation is a wonderful tool to aid and abet you. In the wrong hands, with the wrong people, I find it a hindrance and you can start to lose the continuity and

flow of the mix.

The big disadvantage is machines which won't play in reverse. The film I've just done, we were playing the dialogues and ADR off Pro Tools. Two reels in I just said, 'Stop! and had all the audio put on to Akai (DD8s) because I can get a flow and continuity listening in reverse. People argue all you have to do is whizz back, five seconds in advance and run forwards again. But I can do 40% of my work listening in reverse and you get a timing thing out of it. Next time, it's there. Otherwise, to hear a bit of audio twice, I have to run forwards twice and it's interminable bearing in mind the lock-up time.

What does multichannel change?

You need more real estate. It's impossible to mix on a manual console. At Todd the console had something like 520 inputs. On a simple movie by the time I'd got all the pre-dubs into the console and the workstations on-line I'd be running at over 300 inputs. In 1988 the new Mitsubishi at Twickenham had 48 inputs. For the first four years even if we went mad we only used three-quarters of the faders and that with Dolby Stereo films.

So where has it all changed chaps? You have complete flexibility, the option of not having to tie two things together. I don't have to lock in that bird tweet with that door close. Technically, soundtracks are a whole lot better for it, emotionally I'm not so sure. But it's more labour intensive. One mono sound effect, a spaceship, by the time you've panned it round in 7.1, it's eight tracks on a pre-dub. I usually get minimum of left, centre right on music tracks. The last film, *Monkey King* came in 16-track.

It's the same with location recording, although it can take more time, my feeling is, if it gives you another bite at the cherry, bring on more tracks.

Do you use a lot of LFE?

Generally in America they leave the boom (LFE channel) on from frame one because it's part of the big Hollywood kaboom. There's no right and wrong but I've heard people put it on a simple door-close, and you think, chaps, in real life a door close isn't down at DC, come on. I don't like the artifice of it sometimes, you're saying to the audience, look at that, that's big and throbbing and huge, wow!

How much is experience or experiment?

I'm re-inventing in every film, but subtly. For nine years I used compression on dialogue all the time. When it gets a bit frisky and somebody screams, a compressor catches it. But you can always hear it working. I watch films and think that worked and that was a disaster. I deliberately haven't used a compressor on any dialogues in four years unless it's something really extreme.

I was doing some work on *The Exorcist* at Todd-AO and I talked to Buzz Newton. I said, 'I heard this rumour you never compressed?' He said 'No'. I said, 'You must have' and he said, 'No Dean, I used my fingers.'

Compressors are a lazy man's way, a catch-all thing. Dynamic range is reduced and so are the top and bottom frequencies.

I also asked him where he put his dialogue filters. He said 6kHz and when I expressed surprise he just said, 'Kinda worked for me Dean.' He's the one with the Oscars....

On this last film, I took 20dB at 1kHz out of the Foleys because I've got this theory, probably completely flawed, that Foley people in this country whack their foot down so hard it sounds too strident, and it's always around that frequency. I've often used de-essers on Foley to try to tame that spiky attack and I've put a quick compressor on as well just to catch the leading edge. I picked that one up from Mike Minkler who uses one all the time on Foley. If you get one that's a bit spiky it just softens it slightly.

What's your favourite toy?

I couldn't live without the BSS de-esser (DPR 402). I'm obsessional about it, I can't stand esses. Without

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a shadow of a doubt the AMS-Neve DFC, as a console which produces audio, is fantastic. Whether you're talking about the compressors, the gates and especially the EQ and the high- and low-pass filters, there is nothing to touch it. It is superlative. Having gone through Quad Eights, Mitsubishis, SSLs and the Harrisons, the audio side on the DFC and the EQ is just the best I've ever heard. You can get down to a single cycle, once every three weeks you want to get out something at 12kHz or 72Hz and you can do it. The precision of it is wonderful and there is no noticeable colouration.

But in some areas the ergonomics are a disaster for me. On the compressor, THRESHOLD and LEVEL are the two furthest buttons away with four blank windows at the bottom. So you think, if you carry on this analogy, why don't you move the fader half way up the desk?

In the end, if somebody said, 'Which console would you buy?' We're in the world of audio and I probably would go for a DFC but it's more physically demanding.

One beauty with the DFC is you can put a brickwall high-pass and low-pass filter across everything. I hear all this stuff whizzing around at 10, 11, 12kHz. Chaps, for goodness sakes cut the thing off. 'Simple Simon' in film sound comes at you like a laser. On the last film in LA I brick-walled everything in the dialogue at 8.3kHz. Don't ask how I came up with that figure, just one of those random things, and at 70Hz. People may say it's too dull, but when you listen in real life...

Another advantage when you have a hi-fi cymbal or whatever, you've got the emotional dynamic thing of, wow we haven't been up there for a while and it comes through.

How is the process changing?

In America, they're moving towards editing-pre-dub rooms, it's starting to happen, certainly with Todd-AO and 4-MC. The sooner we move into cutting rooms which can monitor and edit 5.1 the better. People over here will tell you they already do this, but in America they now have proper 5.1 rooms. What they take on the stage is a lot closer than we have at the moment.

Dennis has his foot in both the film and TV camps and it's interesting to embrace thinking which has largely come out of TV. Ten years ago people in the film industry would have choked on the idea, now it's slowly coming around to what you lot were doing in the BBC years ago. You were way ahead of us.

What is the fate of the re-recording mixer?

Someone who gives a papal blessing. It'll be easier and slightly more rewarding. Scrabbling around making the tracks work and sorting out the EQ will all be done in the cutting room.

I'd tell my kids to get into sound editorial. Mixing is great, it's fun, but they're going to do so much more in editorial over the next 10 or 15 years and it will erode the power base of re-recording mixers.

What changes would you like to see?

If I could change one thing it would be to make UK Foley and ADR better.

I'd also like to move into the next dimension—height, Ambisonics and so on.

I also want a black box which can play and record any number of tracks and doesn't care about sampling rates, frame rates and so on. The beauty of mag was you could take a piece of it anywhere and it would play. We've lost that.

I don't think it's going to happen in the next ten years but I'd be delighted to be proved wrong. □

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FIRST WE LISTEN

MAKING LOVE

Producer-keyboardsman Mitchell Froom and engineer John Paterno tell **Dave Goggin** about the making of Joan Osborne's new *Righteous Love* album

COMPOSER, PRODUCER, ARRANGER, and keyboardist Mitchell Froom recently produced, with Joan Osborne, her engaging album *Righteous Love*, which was recorded by John Paterno and mixed by Bob Clearmountain in LA. The songs were tracked briskly with a working band known around Los Angeles as Jack Shit. Saxophone was provided by Steve Berlin of Los Lobos, with keyboards by Froom. The sessions took place at a studio very familiar to Froom and engineer John Paterno—The Sound Factory. In the past, the versatile Froom has produced such artists and groups as Los Lobos, Crowded House, Elvis Costello, Richard Thompson, Suzanne Vega, Ron Sexsmith, Bonnie Raitt, The Corrs, and Sheryl Crow.

It's such a solid album, that it would be unkind to overlook the musicians who contributed.

'Pete Thomas was in the original Attractions with Elvis Costello' Froom opens. 'He's probably worked on 16 or 17 records with me, on Los Lobos' Colossal Head and Kiko, and many others. The three guys—Pete, and Davey Faragher on bass, Val McCallum on guitar—have worked together in different ways with different people. They've all worked with Sheryl Crow and now are working with Vonda Shepard on stage and on the Ally McBeal TV show. Because they're all living in LA, they decided to put together a group. They're fantastic—somebody ought to sign them.

'On this record, for the first time, I felt that the sound was much bigger than the sound of the individual musicians. Between Davey and Pete, particularly, they developed their own science of how to play together. They really know how to make a noise that sounds like a band, a very attractive sound—it doesn't sound like studio musicians.

'They are also very aware of their sounds,' Paterno offers. 'The sound of Pete's drums is important to him. He'll go out of his way to get what he feels is right for the song, both by his drum choices and tuning choices. Davey, Val, and Mitchell are the same way. They are not afraid. It almost always sounds good in the room before I even move a fader. It's also a big help that I've worked with these guys before—it feels like a team effort when we work together.'

The album was recorded song-by-song, with each taking two to three days. Once a rough mix was agreed, the team moved on to the next track, revisiting everything once the main body of the recording was complete. Overall, the basic sessions seem to have been fairly brisk involving, perhaps surprisingly, the use of some loops.

'On quite a few songs we worked with loops,' Froom confirms, 'but basically, all the time, everyone was playing the song and Joan was singing live.

'We recorded in Studio A which has a main room, a piano iso, a live iso area and a machine room that can also be used for iso,' Paterno continues. 'The console was an old 36-input API, and I used Neve 1073 modules for the drums. Drums and bass were set up in the main room. Drum mics included an AKG D112 and U47 FET for kick, a 57 and 452 for snare, 414s for toms, and 452s for OHs and hat. Toms were recorded into the OH tracks to conserve space on the tape. There were several room and close kit mics, including an Altec 633, U87s, and a 441. The bass was a Little Labs DI and a Sans Amp acoustic DI. Guitars were done in the live iso with a Shure 57 and KM86. Mitchell's keys were done through various pedals and DI'd into the console. Joan's vocal used Mitchell's Telefunken 251 through a Hardy M1 mic pre, and an ADL 1000 compressor right to tape. The tape was BASF 911, 15ips, with Dolby SR. We stayed on one machine, except for the strings.

'The main thing about working with this group of players is that they are extremely fast. The plan is to be prepared for anything, because you never know what will make it's way to the final version. My assistant, Joe Zook, did a great job keeping up with me. What basically happens is they sit in a group, learn the tune, and work out an initial arrangement. If there's a loop involved we'll work that up in Pro Tools, to be played live and printed to a few tracks while the musicians are doing the take. Then they all go out to their instruments at the same time and start playing. It's a bit of chaos at first, because we're working out sounds and parts at the same time. But it all seems to fall together quickly most of the time. I usually at least get a basic drum thing going with Pete each morning, although half the time the approach changes dramatically once we've heard the song.'

The amount of overdubbing was determined on a song-by-song basis, some tracks requiring more work than others.

'We tried to figure out how to make the sound pretty much on the spot,' Froom explains, 'whether we were playing along with a loop or not. We wanted to have the feeling that when we came in to listen, it would sound like a record.

'My goal on a tracking date is just that,' says Paterno, 'to have the players come in and have it sound like a record. I work hard to try and make everyone happy with their sounds, so they can concentrate on the per-

forming part of it, and not the sonic part. Plus, Mitchell's focus in the studio is like a laser beam. He knows how to put things together in texturally, rhythmically and harmonically interesting ways. He's really great at walking that line between hearing a direction in his head, and letting the musicians and myself find our ways into the song. He is a master of getting the most out of the least number of parts. And he commits—there is rarely any track that is kept that is not intended to be used in the final mix.'

Froom maintains that the basic concept of the album was to make a 'modern' record, that was suitable for Joan's voice and her music. His reference points were recent work from Macy Gray and Sheryl Crow ('they make very modern records that remind you in some way of what you loved about older records, without sounding retro').

'That was the agenda for us', he confirms. 'When we were originally talking with the band, we wanted it to be an outgoing record. The thing about Joan is that the band can play with tremendous energy and not overpower her in any way because she's so dynamic. That's a freedom for musicians. On a lot of the records I do, the singer isn't that commanding. They are powerful in their own way, but you have to hold back in order for the singer to be able to dominate the music.

'I talked to the band like this: "We're the young Rolling Stones, we're the young Beatles. We want people to really like us. We're not setting out to be too clever, or too arty, but we love what we're doing and we want other people to like it, too". Which is quite different from calculating a Hit. I was mainly talking about enthusiasm and the attitude. It was outgoing—interested in pulling people in. I didn't want them to say, "Hmm, that's an interesting record", and never put it on again. This is more of a party record, really.'

'The way that it happened was Jack Shit was playing Tuesday nights at The Mint,' says Froom, 'and after cutting the first tracks Joan just loved the band so she started going down and sitting in with them. The first night she sang 'Just My Imagination', then a Hank Williams song, whatever, and that led to an open environment in the studio. They'd just be goofing around with songs. We had talked about doing a cover song, even though it isn't normally my favourite thing to do. You shouldn't do it unless you can reinvent the song in some way. Otherwise, it's a bit gratuitous.

There is—inevitably—a single drawn from the sessions: a reworking of Gary Wright's 'My Love is Alive'.

'I think it was pretty big, following 'Dreamweaver',' Froom says. 'And it's got a great riff. Originally we were thinking of a more obscure song, but just before we started to record, they were playing this one and Joan really liked it. And she sounded great—so we tried it out.

'First we recorded it in a fairly conventional way and it sounded terrible, very boring, and I thought, "Why are you doing this?". She was singing it well, but it became clear that the record had to be much more extreme. We felt that the drums had to sound completely different. John Paterno started messing around with a Moog pedal, I think it's called a Mooger-Fooger—the phaser. We put that on the drums, and we gated 'em, and did just about anything to make a tripped-out sound.

'I think I ended up using one of the overhead mics and sent it to the Mooger phaser and a couple of different room mic setups, compressed with Spectrasonic 610s and 1176s,' Paterno adds.

'Then we decided to make the guitar as aggressive as possible, so we went direct and used a fuzz tone on it, so it was very much in your face....

'It was a Zvex Fuzz Factory,' Paterno reveals. 'I don't think you can get more fuzzy than that thing.

'The Minimoog part was something we wanted to do that was truly stupid, and that was about as stupid as possible. It reminded me of an early disco song. It was real fun to do. And I hope that we successfully reinvented a record which was good to begin with. When it was decided to make it a single, we added a few things to make it even more of a party record.

'Mitchell held the note and I changed the delay time on a Memory Man we had hooked up to it,' adds Paterno. 'Like he said, stupid as possible. For the single version, we added some more percussion and a keyboard part or two.

'For me, the concept became a cross between The Beastie Boys and early Tina Turner,' Froom states. 'That's where it wanted to live. The rawness of the way the Beastie Boys tend to do stuff, where it's just that dead simple, with almost nothing ever happening. But it's very aggressive. After that, the song came along quickly. After taking a long time getting the sound just right, we ended up cutting the track on the spot. That vocal is a one-take vocal—everything. She did the harmonies in two passes, and then a few overdubs. We were done.

'When Joan hits it, it's a great thing to see in the studio—she has a way of projecting her voice in a charismatic way. It's coming from such a deep place, it's all in her placement of notes and where she lives. The way she describes it is that when everything is going right, it's almost like a way of breathing for her and she feels it all over. It's almost a transcendental experience, and you can tell when it happens.' □

LITTLE WONDER

If small is beautiful, it is rarely easy. **Philip Newell** examines the considerations and difficulties of small control room design

IN HIS 1950S REFERENCE, *Loudspeakers*, Gilbert Briggs likened them to boxers, saying 'In general, a good big one will always beat a good little one'. The same can be said of control rooms as when the size comes down, several things conspire against a neutral-sounding room.

Reflections come back from wall surfaces earlier than in a larger room, because they have travelled less distance. This also means that they reflect more often, and produce a higher reflection density than larger rooms. The reflections are also higher in level than from similar wall surfaces in larger rooms, again because they have travelled less far. This gives them a greater ability to interfere with the direct signal. There is less space in a small room to site absorbent or diffusive materials or structures, so the room effects tend to be less manageable than in larger rooms. The resonant room modes (standing waves) begin to separate at frequencies higher in smaller rooms, so the reduced ability to absorb or damp the room effects are exacerbated by the greater intrusion of the irregular response range into the low-frequency range of the audible spectrum (see Fig.1). Finally, it is difficult to work at a suitable distance from wide range, extended low-frequency monitor loudspeakers, sufficient to avoid geometrical near-field effects where the multiple loudspeaker drive units fail to gel into one integrated source. Highs can be heard coming from the tweeters, and small movements of the head cause changes in the perceived responses. While there are, therefore, good reasons for preferring large control rooms, economics and practical considerations see the majority of recordings undertaken in studios with relatively small control rooms—24 to 40m² being typical.

Addressing the first two problems together, we find that specular reflections are the worst offenders, so they must be dealt with by means of either diffusion or absorption. In my own opinion, absorption is the only solution, for while diffusion may well maintain the stereo imaging over a larger 'sweet' area, it nonetheless returns considerable energy to the listening position. Diffusers statistically diffuse, which means that when area-averaged, they equally diffuse at all frequencies within their design range. However, this does not mean that at any given point there will never exist hot spots at certain frequencies. Angus[1] showed that the situation can, at times, be such that reflected energy from diffusers can be even more concentrated than from a flat reflective surface.

Much is also spoken about the Haas Effect when discussing the use of reflectors and diffusers. It is often implied that the reflected energy arriving 1ms-30ms after the direct signal only adds to the loudness, and that the reflections need to be twice as loud as the original signal (10dB higher) in order for them to be heard as separate events. This is absolutely *not* what Haas states. He wrote that they would need to be 10dB higher in order to be heard equally as loud as the direct signal. They can be perceived at much lower levels, and hence have the ability to colour the sound, even in cases where they do not harm the stereo imaging. One way of dealing with this problem is through the use of adequate absorption, which, even if it

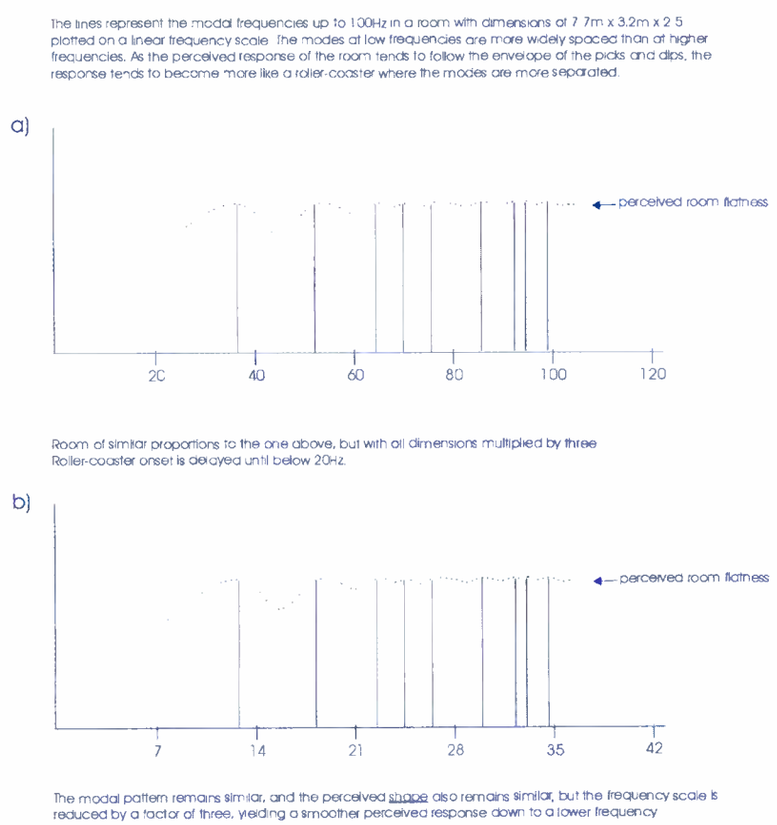


Fig.1: Perceived responses in rooms with significant modal activity

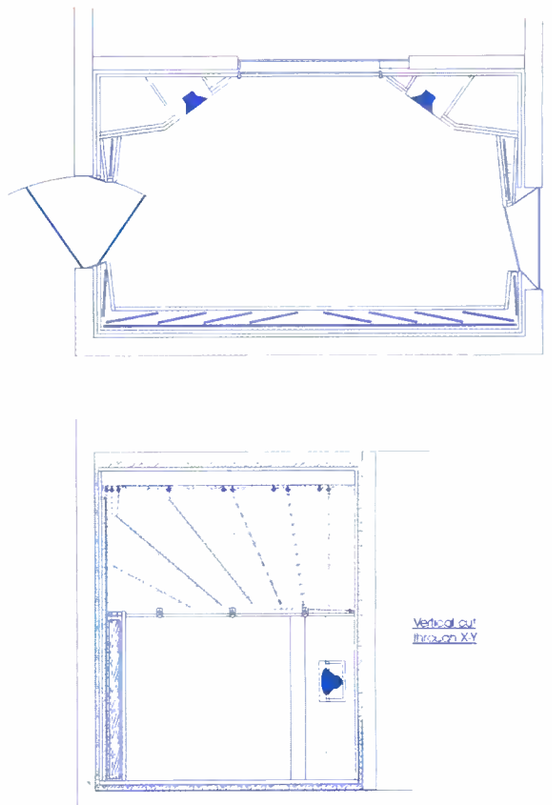
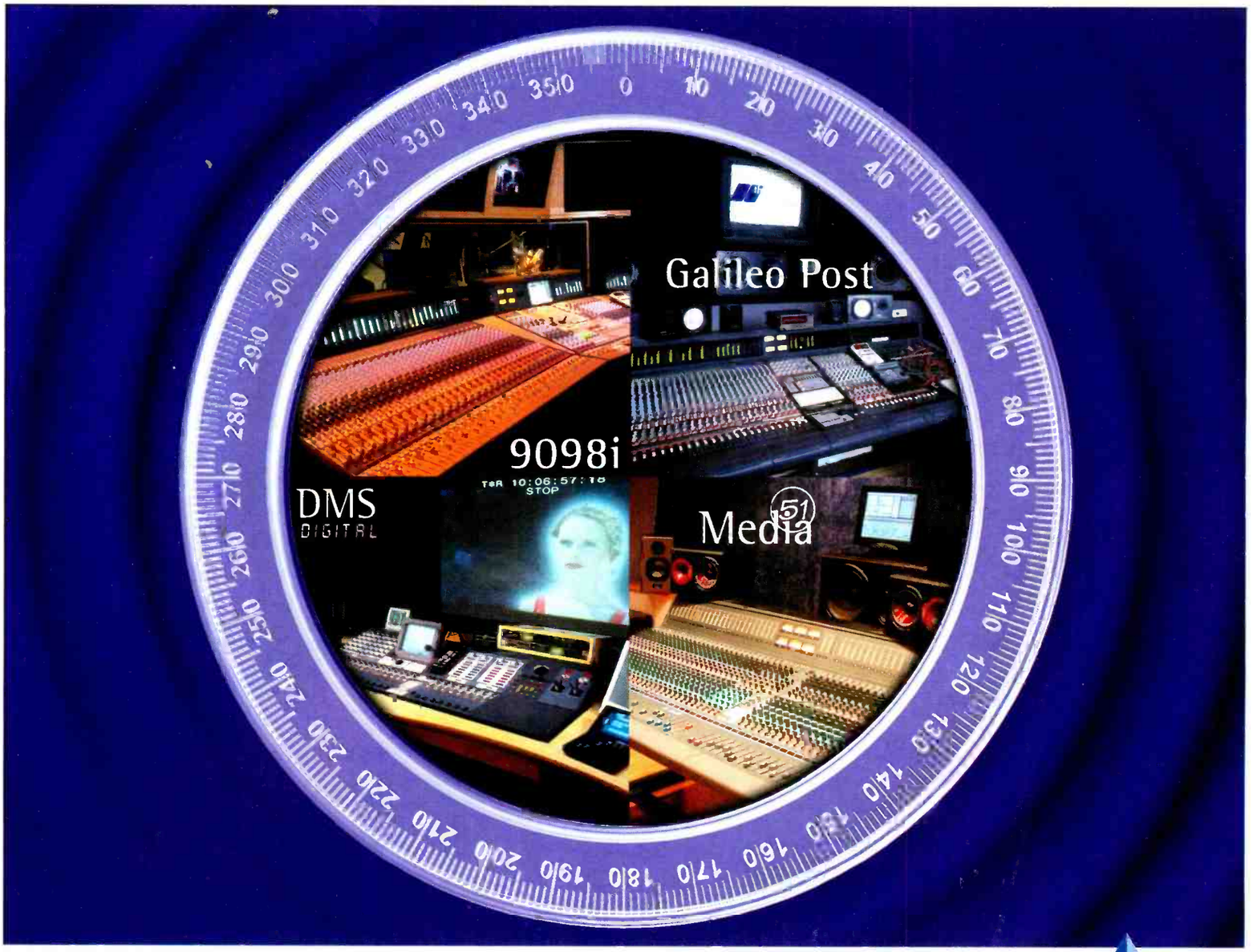


Fig. 2: The Non-Environment Concept. In brief, the Non-Environment concept of control room design seeks to allow the recording personnel to monitor as closely as possible what is on tape. The room is taken out of the monitor response to the greatest degree possible without making the room too dead to be comfortable. Essentially, the ceiling, rear wall and side walls are all made to be as absorbent as possible. Furniture and equipment is placed in the rooms in such positions as to cause first reflections to be directed into the absorbers. The front walls are hard, as are (normally) the floors.The rooms have no single, representative decay times, as the source position changes the decay time. The main monitors are fixed in positions from which the decay time is minimal, and the recording personnel work in a position with a pleasant decay time for speech. Similar concepts are used by designers such as Tom Hidley, and variations by Sam Toyoshima, Shozo Kinoshita, David Hawkins (Eastlake Audio), Francis Daniel and others, all of whom favour highly absorbent rear walls and hard front walls. Opinions vary as to how to, and to what degree to, add life for the upper frequencies, both for the music and for the general ambience of the room. Experience has led me to the conclusions that this type of room is the most effective solution to the problem of room-to-room monitoring consistency in small control rooms

0-360 in 5.1



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does not remove all the reflected energy, will at least heavily damp the modes, making them broader in their frequency spread and lower in level, both of which tend towards producing less colouration.

The third problem is that smaller rooms offer less space to install acoustic control contrivances and absorber and diffuser sizes cannot be scaled with the size of the room. These depths are fixed by the wavelengths of the frequencies (if 1m is needed to be effective to 70Hz in a large room, then 1m is still needed in a small room). Many studio owners balk at 1m depth of absorber on a rear wall if the room is only 4m from front to back. Nevertheless, physics dictates this, not the designer, so a studio owner resisting the loss of floor space will trade poorer response flatness in the room.

Point four relates to the scaling problem for absorbers and diffusers. Fig.1 clearly shows matching modal patterns for two identically shaped rooms but with one having dimensions three times larger than the other. The modal patterns are a function of the relative room dimensions, the shape, and very little can be done to change this state of affairs. The perceived room response generally tends to follow the envelope of the modes and the spaces between them, so where the modes are closely spaced, a generally smooth response will be perceived. When the separation begins in the audible low frequency range, the individual frequencies, which coincide with the modes, will be heard to ring on in the room, giving it a 'boomy' character.

It is relatively futile to try to change modal frequencies by angling the walls. A small angle helps to reduce flutter echoes but even angling one wall by 1.5m in a room 10m² has almost no effect on the pressure distribution at 70Hz (Fig.2). One viable solution is to damp the modes by using the maximum practicable quantity of absorption on the sidewalls, the rear wall and the ceiling.

The final problem is the geometric near-field consideration, relating to the (usually) spatial separation of the various drive units in a typical monitor loudspeaker. One answer is flush-mounting the loudspeakers in the walls of the room. This puts them at points of maximum distance from the listening position, and also avoids the low-frequency response irregularities caused by the rear radiating waves reflecting from the front wall.

A ceiling height of at least 4m is highly desirable, as floors are highly reflective to low frequencies and should therefore be opposed by a ceiling capable of dealing with floor-ceiling modal activity. Somewhat like the floor-ceiling problem, rear walls face front walls that almost all tend to be reflective at low frequencies. The front walls must be solid in order to provide an effective baffle extension to the loudspeakers at low frequencies; otherwise they cause response irregularities akin to the problems encountered by freestanding loudspeakers.

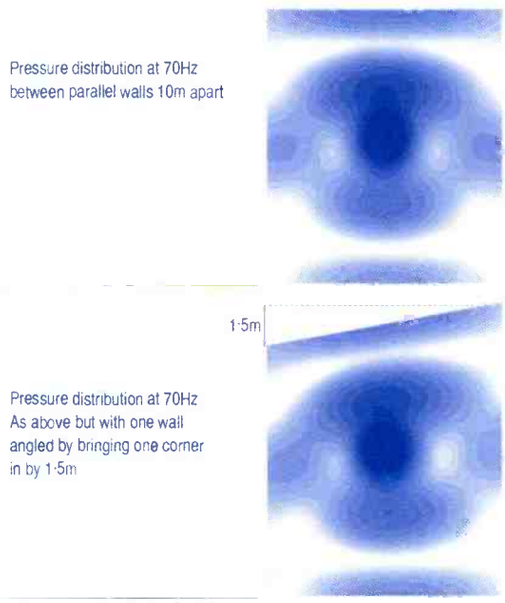

Fig.3: Magnitude of Pressure Field due to Point Source in Two Different Rooms

The subject of small room acoustics is huge, but hopefully some of the things discussed in this short article will help to lift the lid off what many people see to be a black art. The mystery which many people seem to think surrounds room acoustics is partly because it is a very complex subject, but also due to the way that many things in acoustics tend to be counter-intuitive. As James Moir pointed out so aptly about 40 years ago, 'What one rapidly learns about acoustics is that anything which seems to be obvious is probably incorrect'. □

REFERENCE

[1] *James Angus, The Effects of Specular versus Diffuse Reflections on the Frequency Response at the Listener. Preprint No 4938. Presented at the 106th AES Convention, Munich, (1999).*

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CHANGING ROOMS

Four international studio designers were offered an identical brief to create a small 5.1 postproduction mix room to Dolby commercial TV license standards. The brief called for the mix room, three-person voice-over booth, machine area, and sound locked lobby. The results are enlightening

David Bell, Whitemark

IN LAYING OUT the space for TV work within the Dolby Commercial License, consideration needs to be given to the issues of monitoring, projection, acoustic design and ergonomics.

Monitoring is, perhaps, the most important area of the studio where client and engineer input is vital. The choice of monitor system is fundamental to the way any engineer works and the individual concerned should have a significant influence on the decisions made.

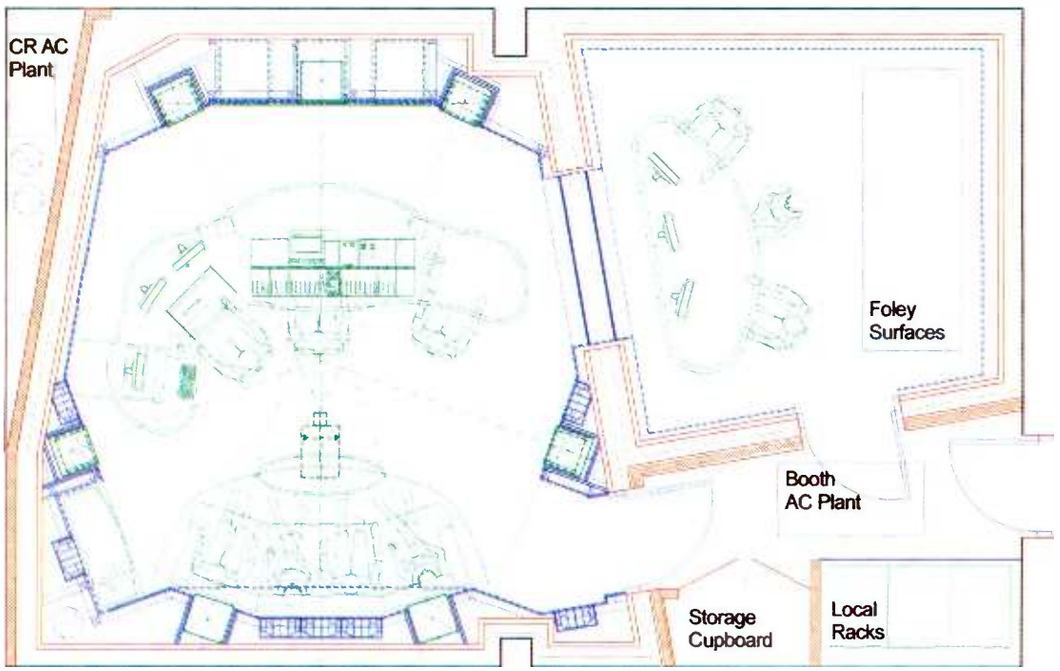
The front three monitors are high-pass filtered by the Dolby Cinema Processor at 120Hz and thereafter must produce 105dB peak at the principal engineer's monitor position. The low-frequency sub-bass unit(s) chosen should be capable of producing 115dB peak at the same position whilst the rear channels should be capable of 102dB. The Dolby standard requests that all three front monitors are placed within the area of the projection screen. In rooms of the proposed size, however, the projector geometry tends to limit the width of the screen (in the illustrated example it is 2.1m). This in turn limits the physical separation of the LR monitors, that would tend to result in 'over panning'. It has been our experience that positioning the monitors on the outside edges of the screen produces the best results once material is monitored outside the studio and gives a more representative panning monitoring environment.

The projection system is best coupled with a woven type screen due to its acoustic transparency when compared to perforated (or micro-perforated) types. The basic loudspeaker system can suffer badly from headroom difficulties and performance deterioration if the equalisation curves needed to compensate for the screen's performance are applied. The choice of projector should be such that the geometry demanded by the particular unit and lens set can be accommodated. Modern units with digital masking and keystone correction can help significantly with this problem, allowing the distance from the top of the screen to the plane of mounting to be maximised while accommodating differing screen formats without the need for motorised tabs. Finally the projector should be housed in a cooled enclosure so that the noise floor of the control room can be met.

Controls rooms should meet the NC20 noise criteria, while we specify NC15 for isolation booths and Foley areas. The construction required to do this can vary but Soho (the principal home of European postproduction) is littered with buildings so weak as to require careful acoustic and structural design to achieve the required standard. In the headroom given, and assuming a reasonably strong floor with normal building environmental noise levels, the illustrated layout represents laminate wall and ceiling structure mounted on a floated 100mm concrete floor. The floor could be replaced with a laminate structure with some loss of low frequency isolation. Great care is taken to isolate the monitors from the studio structure and to achieve resonant frequencies below those that would adversely affect the monitor's performance (typically 5Hz-8Hz).

The acoustic design illustrated will cope with the requirements of most surround sound standards but is designed to allow Dolby EX compatibility. The distance to the engineer is approximately equal from all sources, minimising the time delay correction required and equalising the direct-reverberant energy ratio from each loudspeaker. The room should have an even decay time with frequency; this is achieved with use of broad-band absorption in the ceiling and walls. Early reflection suppression is achieved by the geometry of the walls and the distribution of absorptive and diffuse surfaces within them. It has been White Mark's experience that diffuse materials distributed through the rear of the room produce better subjective results than large arrays.

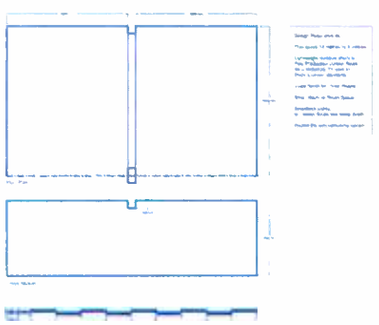
The room is laid out to give the engineer as good a working environment as possible. Seating at the rear



CAD layout offered by White Mark

The brief

Each designer received an identical brief containing a floor plan and section of a room measuring 10m x 6m with further restrictions for structural beams, and the requirement that the room should have:
A 5.1 control room conforming to Dolby License Standards for TV postproduction work
A voice-over booth for three people
Small machine room space
Soundlock lobby to control room and voice booth
Ducted DX airconditioning system



Right: Watch this space...

allows good stereo monitoring and as good a feel for the surround as possible. It also allows good visual aspects to both the screen and the booth (from the left-hand end of the seating). Thus the client can see the process of tracklaying and be involved with the voice-over artist's performance, see the process of mix-down and monitor the end result to a reasonably accurate extent.

Some engineers prefer to have clients in front of them but this is not truly successful in rooms of the size specified, in our experience. The workstation position is set centrally so that a client-producer can be accommodated alongside a central engineering position and a separate editing station. The rear client area is furnished with telephones, data connections and power points.

The layout has been furnished with a larger than minimum booth space in which some Foley surfaces can be installed. This is definitely an issue that needs discussion with the client as some facilities decry the use of non-dedicated Foley rooms while others regard them as essential.

The final components of the layout are the three racks for local mounting of external equipment. In a larger facility these would be mounted in a central machine area but this brief specified a 'small machine room space'. Access should always be given to the rear of racks so that the technical installation and maintenance is easy. Storage is a particular need in studios with a measure of Foley work and a cupboard for each studio should also be included.

The air conditioning plant for the control room is mounted to the front left of the space where distribution can be arranged without passing under the down stand beam. The booth would be controlled from plant mounted in the lobby ceiling space. Distribution to the control room will be simplified by this arrangement allowing the preferred airflow in the room to be achieved. This, in White Mark's experience, is a symmetrical supply at high level at the front of the room and a symmetrical low level extract to the rear. The machine space can be cooled by a ceiling mounted unit over the racks with care being taken to ensure even air flow over the equipment mounted therein.

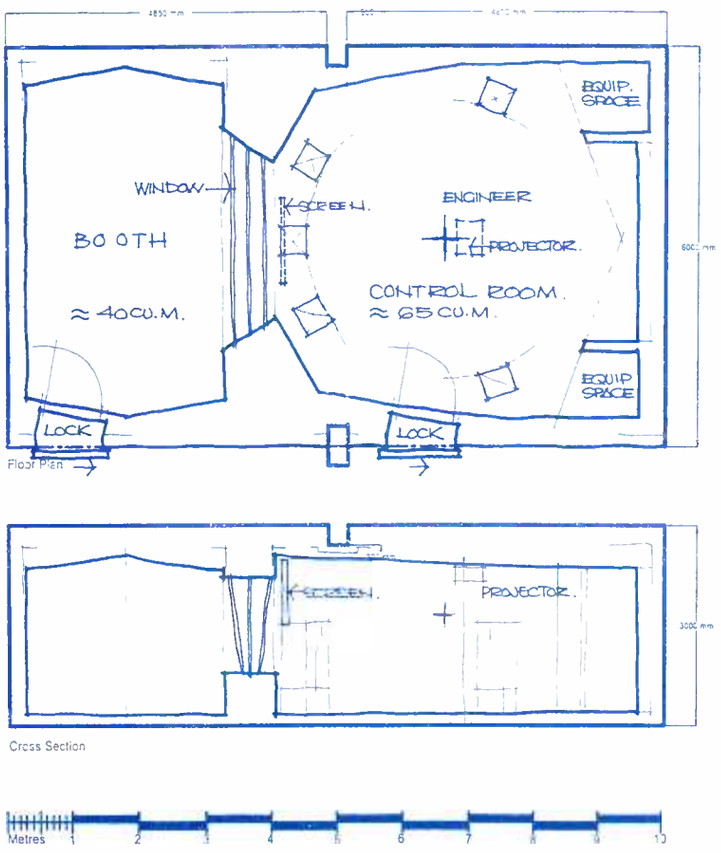
Finally the room, once built and equipped, will need alignment. White Mark frequently suggest Matt Dobson align the monitor systems and check the performance of the rooms prior to the checks performed by Dolby. This introduction of a specialist external to the company serves to minimise the time spent by Dolby in the alignment and seeks to give the client an extra level of confirmation that the system performs as it should.

The illustrated room has the following equipment complement for illustration only: Genelec 1037 with Genelec 1094 sub bass units, Amek digital console, DAR editor and Barco 6300 projector.

David Hawkins, Eastlake Audio

INTEREST IN mixing surround-encoded material has been focused by the greatly expanded potential of DVD-A audio format and in any case is being driven by factors including the ever-expanding computer games market, the increasing number of surround-encoded outside event broadcasts and the development of in-car audio entertainment. With any mix room, ignoring surround capability may mean exclusion from an increasing number of future bookings. Unfortunately however, the criteria for appropriate monitoring within smaller scale surround mix environments are confusing and sometimes, apparently contradictory.

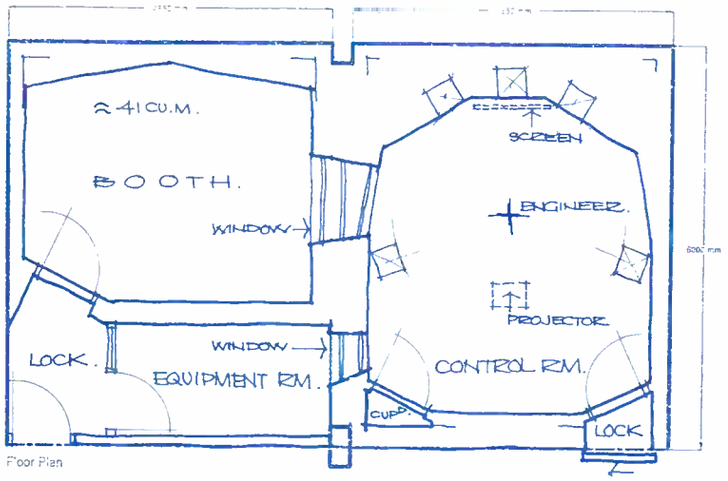
Dolby recommendations for feature film are clear, technically sound and unambiguous. Dolby recommendations exist also for smaller 5.1 mix environments but there are also many other opinions and the framework is therefore less clearly defined. A relatively lightweight building shell of (just) adequate dimensions requires important, though not necessarily fatal, compromises: the



Discarded Eastlake design offers limited equipment space and more space for engineers

building has a limited capacity for carrying heavyweight isolation systems; limited internal height precludes making the control room and booth LF performance better than the rooms' footprints alone might indicate. Additionally, the height limit makes the installation of suitable air-conditioning a real challenge. After configuring the shell to allow construction of the required spaces, there is limited room for 'massaging' the ratios of the room-dimensions to acoustically optimise those relationships.

Eastlake's starting point is to create simple, one-line 'conceptual' designs to show the possibilities that exist for arranging the space. These simple, preliminary images with basic 'non-sexy' geometry applied to the spaces are usually generated at 1:50 scale by old fashioned drafting-pen before loading the chosen scheme onto CAD.



The 'preferred' Eastlake design

In this case we identified three immediate layouts. One (3) was rejected as the control room proportions were unsuitable (too wide and shallow). Of the remaining two, (2) was preferred because it gave a more dedicated technical equipment area and better space behind the engineer for a secondary table surface.

'Complete' isolation of adjacent facilities is an impossibility where the space and floor loading are restricted. Realisable and affordable isolation values are a different matter. The relatively small window panel sizes between control room and booth coupled with below -90dB monitoring levels used in postproduction give no cause for concern. The required isolation values from building to control room and booth (and vice versa) are more critical considerations. A site-survey of noise levels within the designated space indicated that room isolation systems providing an averaged value of 50dB+ within 100Hz-3,150Hz range would exclude all but exceptional external events from the control room and—more importantly—the booth. This is achieved (comfortably within the added weight loads permitted by the structure) with relatively lightweight but acoustically effective, resiliently mounted floor and gypsum-based wall systems capped with an independent ceiling. Air spaces are left between structural walls and ceilings, and isolation system walls and ceilings and the only physical connection between the new rooms and the host structure is via the resilient decouplers. The isolation systems reduce the net internal length and width dimensions of control room and booth by 400mm and the height in the booth by more than 300mm.

With design parameters sufficiently settled, 1:20 scale working drawings are produced with development of detailed electrical lighting and power schemes, and the air-conditioning arrangements. From the 1:20 plans and sections and the equipment details, computer graphics visuals of the 'finished' facility are generated. These allow choices of the acoustically transparent fabrics, carpets, hardwood and granite flooring details to be decided upon.

LF RT60 times achievable in the control room and booth spaces are for the most part volume-dependent while MF-HF times can be influenced more by the cosmetic and subcosmetic-line materials and the design reflects this. The booth—though a relatively small space—has sufficient volume that it does not have the 'signature' of a very small space. If a booth is of inadequate cubic volume for recording, low-frequency information cannot develop smoothly and—regardless of the amount of artificial reverberation used by the sound mixer-recorded voices will always have an audibly lumpy LF response.

The short distance between the air-conditioning supply and return grilles and microphones use in the booth demand quite low noise rating (NR) performance of between NR15 and NR20 from the air-con system. A relaxed NR value of up to NR25 is tolerable for the control room owing to the higher ambient noise from loudspeakers and other peripheral equipment.

An even more relaxed NR figure is acceptable within the machine area as this has a high level of acoustical isolation from the control room and booth. A low-cost split could be employed. The challenge within the control room and booth air-conditioning design is to provide appropriate cooling and the required number of air-changes; the correct refreshment proportion of fresh air within each air-cycle; ductwork which does not cause turbulence and subsequently noisy, air delivery-extraction; and grille placements capable of ensuring diffuse temperature distribution in the served areas without uncomfortable, localised draughts.

Video is displayed on the front wall screen from one of the new generation high-intensity 2,000 Lumen DLP Projectors mounted semi-recessed into the ceiling. These halide-lamped units allow a bright visual image even when reasonable working light levels are employed within the control room. (As an alternative, a flat screen plasma display could have been used but with less impressive off-axis performance).

Genelec 1037 or similar-sized speakers from another manufacturer are appropriate to the control room size and—by music recording standards—the modest SPL requirements of the post process. Reservation is made for a powered subwoofer at the front of the room. Surround speakers (mounted on substantially weighty plinths) of the same type as the (also plinth mounted) front speakers are specified bringing all HF drivers to the same minimum height clearing the acoustical obstacles in the path of the front loudspeaker HF drivers. The general layout of the LR speakers, each 150° off-axis from the C speaker is per the ITU recommendation and is generally non-contentious. The ITU 1100 off-C-axis positions for the surrounds is a good starting reference but some mixing personnel prefer to increase the surround angles (though maintaining the surround speaker in the same arc relative to the listening position). Casting the surround speaker positions in stone in a still-evolving technology may be a mistake. Finally, within relatively small, heavily damped monitoring environment, we hold closely matched HF-source localisation all round to be highly desirable.

Andy Munro, Munro Associates

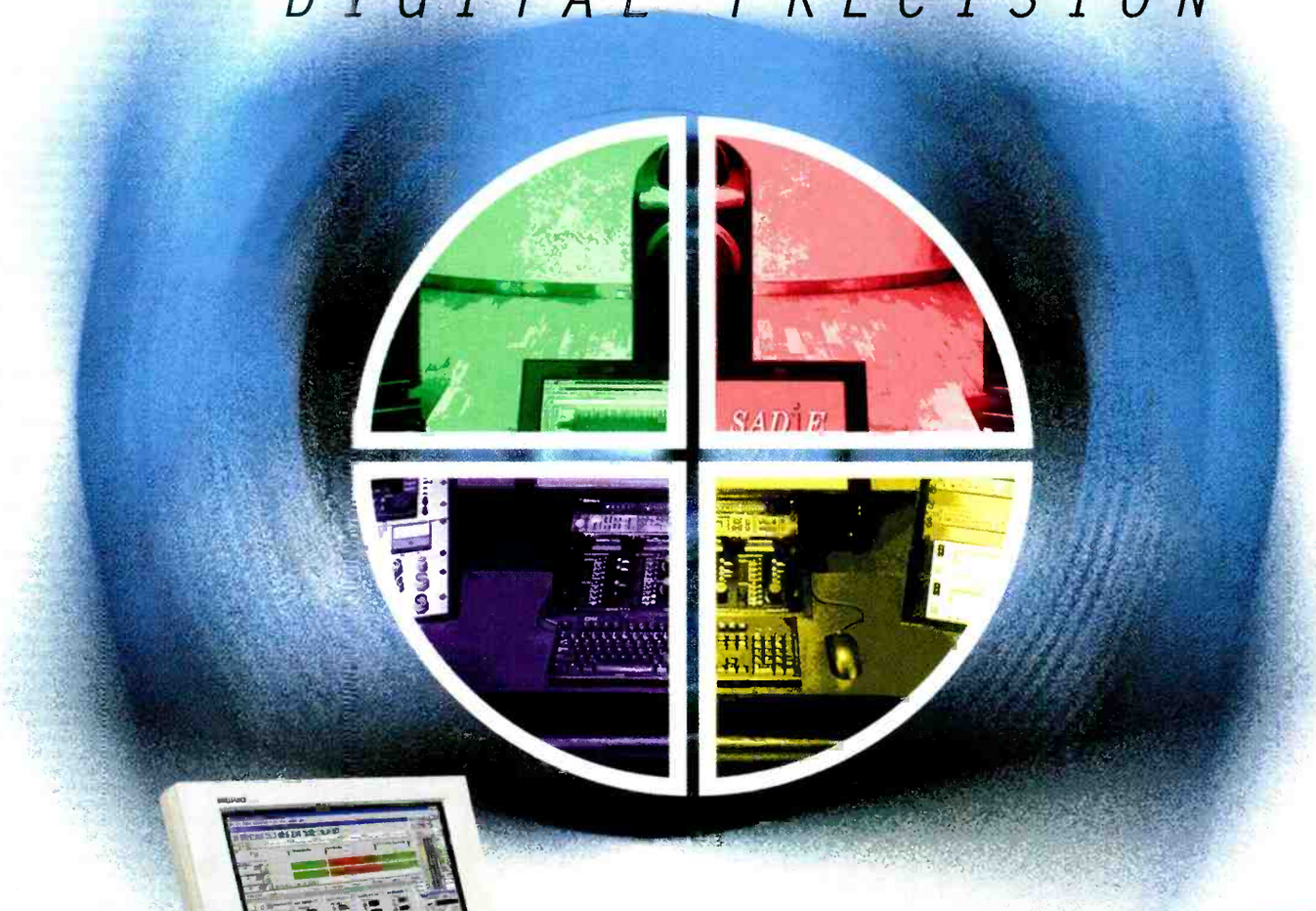
THE FIRST and probably most distinguishing feature of a sound for video room is its picture aspect ratio. When working with film formats, the widest standard ratio will be 2.35:1 but as this room will be using only video projection this limits the format to something less than that. In order to show the widest picture possible it is essential to push the mixing position back to at least 5m from the screen speakers, which enables a screen width of up to 4.5m, while maintaining sufficient vertical clearance and line of sight for the projector.

Although the brief for the room requires a Dolby license and suitability for general television work it is desirable to make the acoustic design according to the more demanding criterion of film dubbing facilities as this will translate well to the small screen but not vice versa.

Good sound isolation is a prerequisite for dubbing theatres as subtle effects and illusions would be lost in noise breaking in from the outside. NR25 is an acceptable maximum but only just and THX recommends

THE WHOLE PICTURE

DIGITAL PRECISION



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NC20 in its PM3 Specification. Ventilation systems must also be designed to an even lower figure if the combined noise is to be unobtrusive. A detailed noise and vibration survey is always to be advised at the start of any project as often train or metro noise can be masked by general airborne noise.

The acoustics of the room itself must be considered in the context of cinematic sound. Nearly all movies are mixed in larger theatres of at least 150m³ and the mix position is 10m-15m from the screen speakers. This is well beyond the critical distance (the point where the direct sound level Ld is equal to the reverberant room sound energy level Lr) and so the combined sound level Lp is significantly higher in a reverberant space than in a very dry room of the same size. For this reason the speakers are invariably horns and high efficiency compression drivers which are directional enough to provide good imaging in the presence of a reverberant soundfield.

In a smaller room it is desirable to maintain the same kind of balance between direct and reverberant energy and so the speakers should be less directional and the room slightly more lively than a traditional television dubbing room.

For many years I have been working with film mixers to come up with the best combination of the attributes of a speaker system most suited to smaller theatres. The result is the M3F system which combines five, controlled directivity, direct radiating drivers in a 3-way, digitally managed cabinet. By taking advantage of the free energy available in the room that must be turned into diffused sound in order to be useful it is possible to provide a smooth and constant spectrum over a relatively wide area of the room. The digital control unit also allows precise matching of the centre and outer speakers, which are inevitably different because of asymmetrical loading of the outer units and the opposite effect on the centre unit. It is also possible to delay each speaker to correct for flat screens or even insufficient frame sync offset due to the lack of film projector.

Much has been said about ideal conditions for the rear surround channels. Whereas in a presentation theatre there can only be one solution, a fully diffused soundfield, so everyone hears something with approximately the same front to rear balance, there is an argument for phase coherent rear channels when mixing. This is precisely so the engineer can hear when something is too focused and then do something to mess it up again. If it sounds diffused it is diffused.

As for the ITU-R proponents who believe in sitting, rooted to a single, phase coherent, hotspot I say 'get a life'. Seriously there is a place for such systems, in DVD mastering suites, where phase and time delays must be 'analysed' but for whom?

The most difficult aspect of a small theatre sound is the very low frequency performance. Even with a close-field speaker, over 99.9% of the bass comes from the room. At a distance of 5m the direct energy is insignificant. As far more of the mid and high energy is beamed to the mix position and more reflected energy is absorbed there is a temptation to roll off the bass and boost the high frequencies to make the spectrum look flat. Not so! The speaker system should be equalised so that if measured close up it looks flat and when measured at the mix position it has a gentle roll off which in effect is allowing for the excess bass energy and the ability of the ear to pick out the direct sound. Add the irritation of screen deflections and air absorption and we have a real dilemma as to how to set a universal 'X Curve'. The truth is there is no one curve that is always correct. Touring sound engineers have known this for years and they have learned how to deal with different venues. Fortunately our rooms are fixed and all we need is patience, and a good analyser.

The brief called for a booth and a machine room and after optimising the main room we decided to use the little space left for a sound lock and a small 'tent' as it is curiously named in German dubbing theatres. To obtain the best sound mix the main room must be geometrically correct and that said what is left must be used as well as possible.

The interior design must reflect the need for diffusion and therefore we use more wood than wool, so to speak. That said, the front of the room is quite dry and therefore can be used of ADR and even Foley work. The final room will require outboard racks and more seating but that is a matter for the client to specify and then the whole entity is finally tested and adjusted for satisfactory performance.

All of our rooms are designed in accordance with both Dolby and THX requirements as this is simply good engineering practice. The final sound and vision run through, for shaking light fittings and buzzing panels, is usually done to the delight of the building crew without whom almost anything is possible.

Sam Toyoshima, ADG

THERE ARE, of course, design factors relating specifically to surround-sound control rooms—especially concerning the placement of the speakers—but the principals of acoustic design and treatment are not fundamentally different from those that apply to a conventional two-channel room. The sound engineer in the control room perceives reverberation as a 'convolution' of the applied reverberation programme and the impulse response of the control room. And the consumer will hear the reproduced reverberation sound in the same manner, although the room impulse response will necessarily be different. It is therefore advisable for the engineer in the surround control room, to have the same acoustic as the conventional control room, in order for the consumer to enjoy the surround sound in a given listening environment.

'My basic concept for the design of 2-channel control rooms, is that the front wall should be hard, and the rear wall soft. The hard front wall provides a good baffle effect at low frequency, and an adequate spread of the sound image.

'A soft front wall has the effect of reducing low end, and of localising the sound image specifically at the engineer's position.

'The soft rear wall prevents the occurence of standing waves at low frequency, which would cause pronounced peaks and dips in the room response.

'A surround control room should be similarly treated, but with the addition of some surfaces around the rear speakers, which provide HF reflection, and produce a good spread of rear sound.'

Room proportions remain a primary consideration, and round-number relationships between the height, width and depth are to be avoided since they will be most likely to give rise to standing waves—a condition referred to as 'shrinking'. The dimensional ratios of the room should therefore not be integral, or alternatively there must be adequate low-frequency absorption within the room. Particular considerations relating to the design of rooms for surround sound include the following :

The room geometry should not result in reflected rear sound at the engineer's position, from surfaces

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such as the observation window glass, doors and so on.

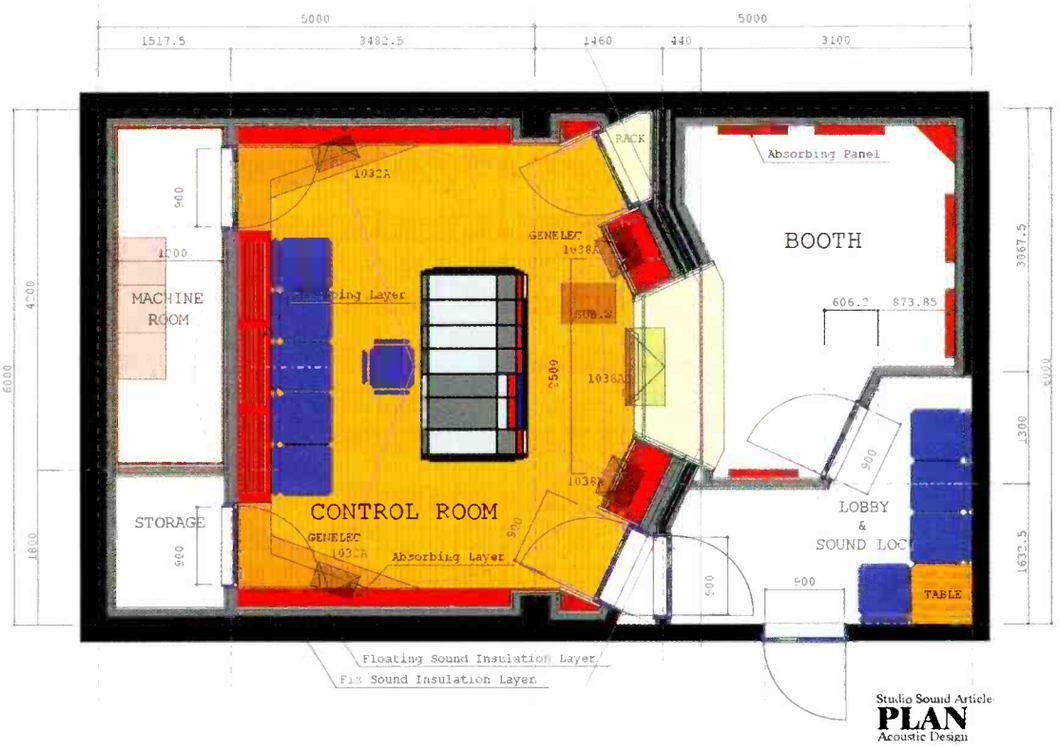
The preferred situation for the rear speakers to match the front LR speakers, and be positioned at the same height. But physical or budgetary constraints frequently mitigate against this and it is satisfactory to use smaller rear speakers, possibly mounted at a different height.

In a paper presented to the 95th AES Convention in New York, I and my colleague Bike Suzuki—who is chairman of the WG-4, DVD Forum Audio Working Group—presented our findings concerning the positioning of rear speakers. We had concluded that they are best placed at more than 1.2m above floor level.

The centre speaker should be placed in accordance with ITU recommendations, namely on the circumference of a circle which passes through the LR and rear speaker positions, and with its centre at the engineer's position. But in cases where existing stereo rooms are to be converted to surround format, the room dimensions may not always allow this.

In my experience, the tolerable variation for the position of the centre speaker relative to the LR speakers is ±10%. In theory, a misalignment of, say, 34cm in the radial dimension to the centre speaker, where the LR speakers are at 3.4m, would result in a comb-filter effect due to cancellations at 0.5kHz, 1.5kHz, 2.5kHz and so on. But this would only occur if the level and program (to each channel) are identical. I would consider the allowable variation in height between the centre and the LR speakers as also being ±10% of the ITU circle radius.

Although it is said that the human ear is limited in the accuracy with which it can locate the height of a sound source, it is preferable to match the height of the front speakers as nearly as possible. □



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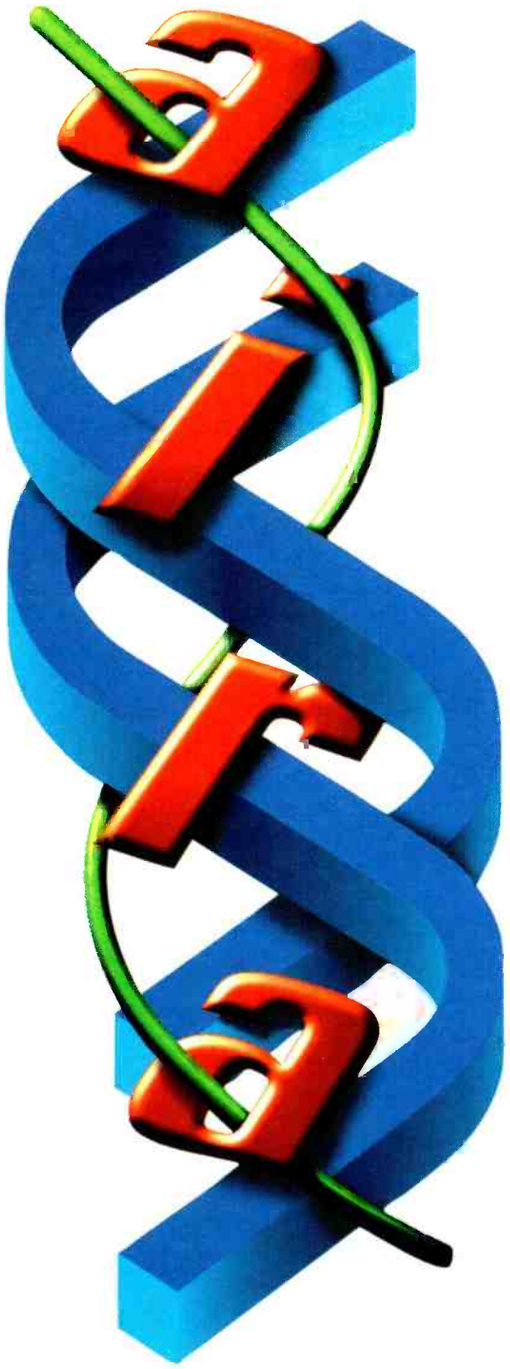


NOMINATE!

Fax: +44 20 7407 7102.
Email: SSAIRAs@ubminternational.com

THE FOURTH SSAIRAs—the *Studio Sound* Audio Industry Recognition Awards—follows the outstanding success of the last three years' awards in which the readers of *Studio Sound* voted for their preferred products in assorted categories. However, we first need to gather the nominations from which the winners will be selected which is where you come in.

Anyone can nominate a product for a suitable award category, but only fully qualified readers of *Studio Sound*, not manufacturers or related personnel, will be permitted to vote.

To nominate a product simply fill in the form or send your nominations via email by listing the category number followed by the product. To be eligible, a product should have started shipping since the Paris AES Convention (held in February 2000) and obviously needs to conform to the description of a particular category.

The resulting nominations selection will be published in future issues of *Studio Sound* for postal voting and for interactive voting from the *Studio Sound* web site.

With regard to the categories, it should be noted that, in the case of outboard equipment, this is described by function rather than product description—hence a 'voice channel' may legitimately be entered as an EQ if you feel it excels in this area.

There is also a special category in which you are invited to nominate equipment, people, initiatives or anything else that falls outside the other categories yet warrants acknowledgement. Nominate only in the categories you feel comfortable with. Do it now!

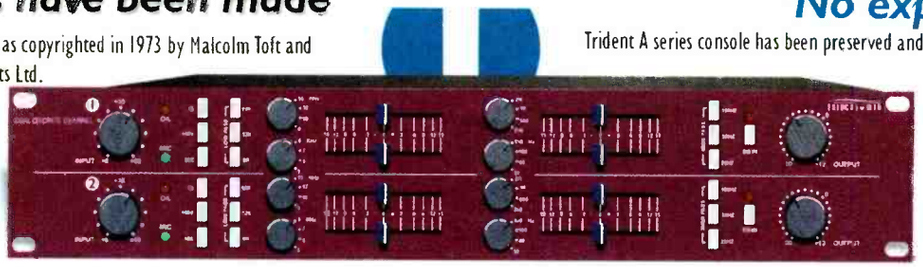
Nominations can be made by photocopying this page, filling it in and returning it to: SSAIRAs Nominations, *Studio Sound*, 8 Montague Close, London Bridge, London SE1 9UR, UK. Fax: +44 20 7407 7102. Alternatively, you can email the category numbers and your nominations to SSAIRAs@ubminternational.com

Nominations:

1. Large scale console
2. Medium to small scale console
3. Outboard dynamics
   A 'by-function' category covering any outboard featuring dynamic processing.
4. Outboard preamp
   A 'by-function' choice from outboard including microphone preamps.
5. Outboard equaliser
   A 'by-function' choice from outboard including EQ.
6. Outboard Reverb
   The final 'by function' category addresses reverb processing.
7. Combined outboard device
   Some units thrive on the combination of their processes.
8. Monitor
9. Microphone
10. Audio editor
11. Audio recorder
12. Location-portable equipment
    Gear for guys on the move.
13. Plug-in
14. Special category
    Your opportunity to recognise anything or anyone that has benefited pro-audio. Think carefully and laterally.

'No exceptions have been made'

...This is the ORIGINAL 'A' series design, as copyrighted in 1973 by Malcolm Toft and his company, Trident Audio Developments Ltd.



From the original blueprints of the Trident A series, comes the dual A series channel. This is **real inductive** EQ, identical in design and sound to the world famous original. By blending the best modern analogue recording technology with the classic module from the world famous Trident Audio Developments Company, the memorable design and sound of the original

'No expenses spared'

Trident A series console has been preserved and authentically recreated. The new Trident MT-A series Dual Discrete Channel presents the most revered design of the Trident Audio Developments company in a package that will compliment any modern professional studio. Luxury EQ in the making.

*"It's not **like** the original - it **IS** the original"*

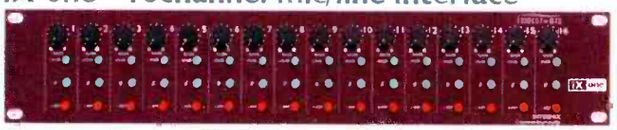
Signature-one

Mic pre, high/low pass variable filters, classic 4 band parametric EQ. The Signature one offers Trident-MTA console channel quality and sound in a small rack package.

Signature-two

Dual mic pre and classic 4 band sweep EQs. Compact, quality stereo/dual mono mic pre/EQ tracking solution.

iX-one - 16channel mic/line interface



16 quality mic/line pre amplifier channels to handle all studio sound sources into digital systems. A fantastic solution.

Super Tube

Multi pattern-ultra presence TB-47 Meekrophone

The new JOEMEEK TB-47 ultra presence tube Meekrophone

"The sheer presence and drive of recordings is astonishing, vocal tracks cut through the mix in the nicest possible way. There is no need to create a 'hole' for the voice: I find my EQ section getting dusty." T.Carey, producer

TRIDENT MTA

www.trident-mta.com

www.joemeek.net Fletcher Electroacoustics Ltd. St Mary's. Barton Road, Torquay. TQ1 4DP. England. tel ~ +44 1803 321921 fax ~ +44 1803 321922

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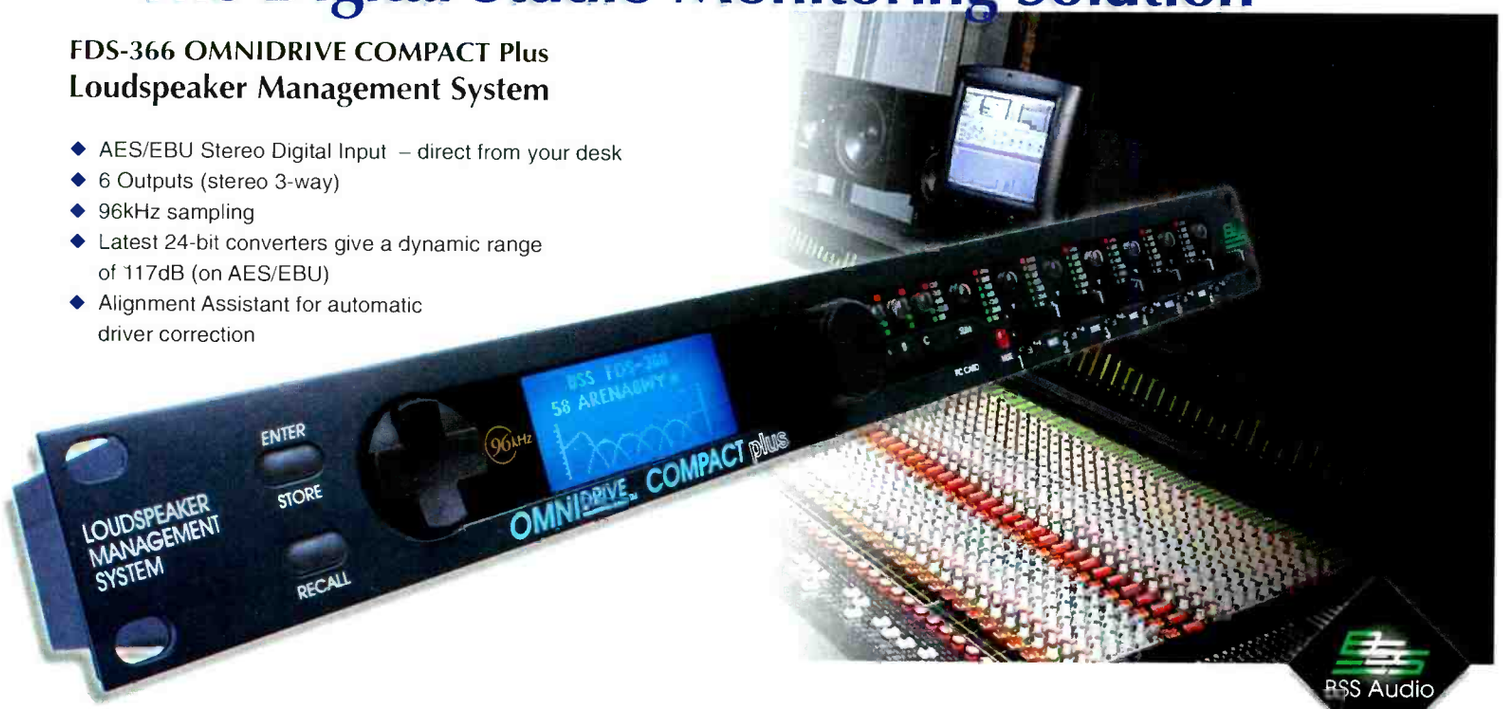

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False starts and fine ideas

If multichannel audio is one of the current hot topics, it remained cool for decades before it found a suitable home, writes **Barry Fox**

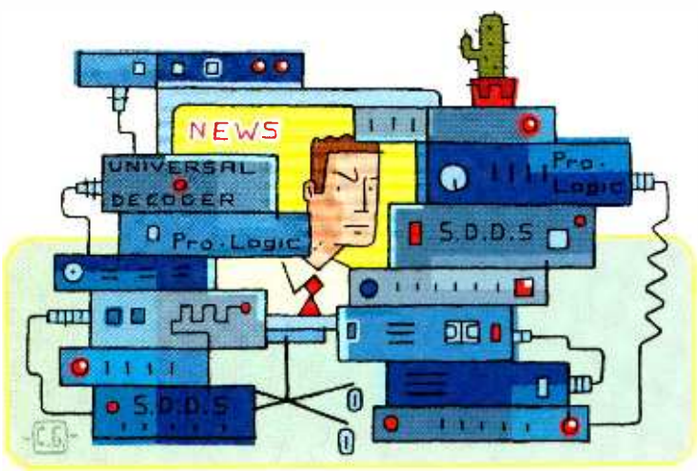
YOU HAVE TO HAND IT to DTS. People who buy DVD players and surround sound amplifiers now expect them to have DTS capability, even though there are next to no Region 2 discs with DTS tracks. The hi-fi fraternity unofficially imports Region 1 discs and talks about chalk and cheese differences between DTS and Dolby Digital surround, with DTS the cheese and Dolby the chalk.

Now that DTS has made encoders available for purchase, Dolby has bought three and done comparative tests with Dolby encoders and studio engineer listeners in London and Los Angeles, using 'coder-killer' music to expose compression artefacts. The tests were done at the DTS full-data and half-data rates (1509kbps and 754kbps) and Dolby Digital at 448kbps and 384kbps. Dolby has also analysed the encoders and compared DTS and Dolby versions of the same music and video material. This is a contentious issue so I pass on what Dolby says, without comment.

Although movie discs should sound equally loud through both systems, some sound slightly louder in DTS than Dolby and this makes casual comparison difficult. One reason, says Dolby, is that even when the encoders are level-matched using a 1kHz tone, early DTS encoders added 0.6dB gain across the whole audio spectrum. This difference is not enough to sound obviously louder but adds subjective 'punch' to the DTS versions of movies such as *Twister* and *Interview With The Vampire*.

Dolby also claims that some programme material has been remixed, with different sweetening or equalisation, prior to DTS encoding. So Steely Dan's *Two Against Nature*, Dave Grusin's *West Side Story* and *The Haunting*, sound different on DTS releases.

'Now that DTS encoders are available, anyone with proper equipment in the audio industry can repeat these tests, and is encouraged to do so,' says Dolby.



There is no doubt that some of the appeal of DTS comes from general unease over any company which becomes too dominant. It's the IBM and Microsoft syndrome. Until DTS came along, with Steven Spielberg's backing, Dolby was the only game in town. dbx is history (revived in memory only by the SA-CD reissue of *Tubular Bells* which Mike Oldfield overdubbed with dbx) and Sony's SDDS cinema system looks increasingly like a figment of corporate pride.

So how did it happen? For one thing, by admitting mistakes, which is something the Japanese never do. Ray Dolby, who still owns 100% of the company, is refreshingly frank about his failures. The Dolby FM radio noise reduction system never made it because the broadcast industry just was not interested. I still have an FM receiver with never-used Dolby switch.

At one stage Ray Dolby was planning a video noise reduction system. This was a logical move because, before starting his own company, Dolby had been part of the team at Ampex which unveiled the first 2-inch Quad VTR in 1956.

'But I killed the project in 1980. We couldn't do everything', he says.

In the 1960s, the record companies wanted to improve the sound of prerecorded cassettes by reducing the noise from the master tape. So Ray Dolby came up with a noise reduction system that worked on all four tracks of the master simultaneously. 'As two of the tracks were running backwards we had to work with reverse time constants', he recalls. 'It was difficult but we finally made it work. Then I pulled the plug on the project because along the way we had seen that the better way was to use B-type noise reduction on the master tape and on the cassette.

'I gave the first talk about noise reduction to the movie studios, at Elstree in the UK, in 1966. And I got quite a shock. The movie industry was just not ready to think about sound quality. I did the standard engineer's test of jangling my keys in front of a microphone and all hell broke loose on the soundtrack. There was high frequency distortion and intermodulation.

'We waited until 1970, when Ioan Allen and David Robinson came on board, and I told them to go out and look at the sound systems in movie studios and theatres. They came back and said the frequency range of movie sound systems in most cinemas was so bad they were doubtful we could ever do anything useful with optical soundtracks. We realised that we had to get the cinemas to improve their entire sound systems. But they started.

'By the mid-seventies, the movie industry had started asking for 4-channel sound, stereo with centre channel dialogue and surround. They wanted it from 35mm optical, because 70mm film with magnetic surround cost 10 times as much.

'I said they were asking the impossible. And anyway quadraphonic sound had failed as an idea for home hi-fi, and left a bad taste for the public. People just didn't trust the idea of surround.

'But it turned out the instinct of the producers was right...'

Beating around the Bush

The controversy surrounding the recent US presidential election may hold better metaphors for the recording business than we realise, writes **Dan Daley**

BEFORE GEORGE W BUSH'S appointment as US president, I was drawn to consider how a Bush presidency might impact on our industry. Initially I wasn't sure how the occupant of the White House had any effect on the pro-audio business and at the time, it was far from certain that he would be using 1600 Pennsylvania Avenue as a return address for the next four years.

But waiting nearly a month to find out gave me chance to reflect on a few things, and make some new connections between our domain and that of the larger world. It helped that I would spend part of that time in Europe and in Hong Kong, because the perspectives brought to bear on this mess of an election by non-US citizens helped clear some of the noisesome fog generated by the barking dogs of American cable television. (It also helped that I now have a residence in South Florida; in Broward County, to be exact, the focal point of the maelstrom of dimpled chads and the noisy disenfranchised. Somehow, when you tell people you live there, they automatically assume that you were involved in voter fraud, and that you have some secret knowledge of events that has escaped media scrutiny. Truth be told, I live on the 25th floor and could barely hear the screaming.)

Observation 1: Welcome to the Era of Mediocrity Empowered. It's daunting to know that the Free World will be led for the next four years by someone who looks so much like Alfred E Newman but who lacks the same IQ level. But neither Bush nor Gore was worth the effort. They were creations of partisan politics and media wrangling. But if people get the government they deserve, then the quality of both simply reflect the culture that spawned them.

That lack of quality is reflected elsewhere. Relative to music, few people in our business argue that the quality of music has dwindled in recent years, both because of technology, which puts relatively tinny-sounding downloads ascendant over the kinds of audio efforts we've historically striven for, and marketing, which has put an emphasis on youthful telegenics over talent. I've always been a free-marketer, and I've staunchly maintained that, in such a subjective business as music or any other art, it's the consumer who determines good and bad with their purchases. Britney Spears sells records; Tom Waits doesn't. I like Tom Waits much better but as they say, 50m Frenchmen can't be wrong.

I've always been a bit put off when I hear studio owners tell me that they opened their facilities because they love music. As often as not, I'm writing their economic obituaries a year or two down the road because their passion overruled basic business sense and, terminally addicted to gear, they overdose, usually on credit cards. And even the more economically adroit among us, while they may rail against the likes of Spears aesthetically, would not kick her out of bed or out of the studio. Artists like Spears have, by virtue of sales, given a legitimacy to the ambitions of engineers and producers who at least

subliminally realise that celebrity gets you more peer recognition than plodding talent.

But even I've had to backtrack a bit from that stance lately. I think, in the Era of Mediocrity Empowered, those poor (literally), passionate souls will serve as a beacon and an anchor for the way music can sound, a bulwark against, to use Jean Sheppard's term, the 'creeping meatballism' of corporately sponsored arts. Their passion has transformed the studio business, and not necessarily to everyone's liking. And it has also clogged the pipes with more music than the world has ever heard or needed. But their zeal remains vital, for without the passion, music becomes just another marketing vehicle for The Gap. So, in the coming months, I resolve to be more compassionate to those who think recording studios are funded by miraculous interventions as opposed to actual business plans. We're gonna need their unique madness.

Observation 2: The Post-Nuclear Winter Landscape of The Music Business. The dominance of the media wranglers in the election underscores the fact that the manipulation of media has become America's biggest growth industry. And nothing illustrates that better than the recent wholesale conglomerations of media corporations. Time Warner-AOL, Universal-Vivendi, Bertelsmann-EMI, Yahoo-Disney (the last two still speculative but good bets). These are formidable combinations of the way the entertainment industry used to be and the way it will be. The trouble is, the money it takes to run these massive engines leaves little to fund the development of new talent, upon which the studio business depends. I expect these new entities to turn to their low-overhead catalogues to generate revenues and no longer to speculative new artist development.

However, this opens many more doors of opportunity to those who record music. Like mice at a Sumo wrestlers' convention, the chance, beneath the corporate Sturm-und-Drang, to create micro-markets and develop artists and music that can turn profits on 40,000 units instead of bankrup[illegible]fter 40m (remember MC Hammer?) will be as ripe as [illegible]n the days of Sam Phillips and Ahmet Ertegun. Only better, because the portals will be there to move this music around. This idea excites me like nothing else: the ability to apply our collective technical and aesthetic talents without the constraints of the Old Scheme of the music business.

So the election is simply metaphor. It was the Belgians and the Italians and the Chinese who asked me all the hard questions, like are we pulling out of Bosnia or the status of WTO membership. Americans are more concerned that whomever occupies the White House keeps Fed chairman Alan Greenspan a long, long leash, so our mutual funds keep growing. But I did have fun explaining who Alfred E Newman was.

Free to air

If any enlightened state recognises the relationship between information and democracy, it is put to the test by its broadcasting legislation, writes **Kevin Hilton**

IT IS COMMON PRACTICE among politicians, administrators and business figures to take a famous quote, phrase or idea and paraphrase it to make it relevant to their purpose. Sometimes this is a worthwhile exercise, on other occasions (regrettably more common) it is merely a way to give some credence and authority to a bunch of second-rate, secondhand ramblings.

The real pity is that the spirit of the original quote does not inspire any leap in thinking. Last year an executive of the Radio Authority, which regulates and licenses commercial radio in the UK, took the motto quoted by Henry David Thoreau in his seminal essay Civil Disobedience, 'That government is best which governs least' and paraphrased it as 'That regulator is best which regulates least.'

Thoreau took his starting point further: 'That government is best which governs not at all'. The fast changing face of broadcasting and telecommunications is now demanding a new approach to regulation, only 10 years after a supposedly lighter touch system was introduced by the 1990 Broadcasting Act, the brainchild of the Conservative prime minister at that time, Margaret Thatcher.

Back then it was the stated aim of the UK government to break down the perceived 'last bastion of restrictive practices' that ITV represented. While the 1990 Act indulged capitalists led to the creation of massive media groups, there was still enough regulation to prevent one or two completely taking over an entire sector. In some respects there was more regulation: the old IBA dealt with both radio and TV but the responsibilities were split between the Independent Television Commission and the Radio Authority.

It was the stated aim of the re-born Labour Party to introduce a new regulatory structure for broadcasting when elected. At the end of last year the now Labour government published its Communications White Paper, a statement of intent and a discussion document that will begin its progress through parliament during the second term that Prime Minister Tony Blair is guaranteed, unless something goes horribly wrong.

Henry David Thoreau also said that, 'Government is at best but an expedient; but most governments are usually, and all governments are sometimes, inexpedient'. This statement can be applied even more readily to the business of regulation. Which is why there has been such an embracing of the White Paper by both of its authors—the Department of Culture, Media and Sport and the Department of Trade and Industry—and some regulators.

The Radio Authority itself called the document 'a sound basis for the future regulation of radio within the framework of a changing technological environment'. The Authority has also coined a useful phrase to describe the government's intentions, joined up regulation.

The thrust of the White Paper is not just to join up the disparate threads of media regulation but to prepare for the changes that new technology is bringing. The core of the proposals is the creation of a new regulator, the Office of Communications (Ofcom); this would combine the responsibilities of the ITC, Radio Authority, the Broadcasting Standards Commission, telecoms regulator Oftel and the Radiocommunications Agency, which manages spectrum.

Just when you think the government is at least unconsciously following Thoreau and advocating minimal regulation, almost contradictory statements arise. In pointing out that there are currently variations, with radio having a 'lighter touch' regulation than terrestrial commercial TV and stating that the new structure must be 'sufficiently flexible', the question arises, 'How different is this to what happens now?' In typical governmental style, this is answered earlier in the document: '[The] inherited system of separate regulators has made an important contribution to quality, choice and competition... but it is tackling an industry which is converging... Reform to bring together the existing regulators more closely would be a second-best response.'

It is well known that new technologies are bringing about massive change and opportunities. Sure, there has to be caution and direction, otherwise all that will be created will be a mish-mash of channels and outlets, pumping out material of dubious value. To this end there remains a call for supervision of content, although the government states that whether the style is formal, self or co-regulation, it 'must be kept at the minimum necessary level to deliver our goals for consumers and society.'

At the end of Civil Disobedience, Thoreau stated: 'There will never be a really free and enlightened State, until the State comes to recognise the individual as a higher and independent power, from which all its own power and authority are derived, and treats him accordingly.' The White Paper comes close to this: 'If information is power, power can now be within the grasp of everyone. No government can now rely on the ignorance of its population to sustain it. We are richer as citizens thanks to the expansion of modern media.'

It has been described as a broadcasting and communications revolution. If another acronym leads to this kind of freedom and self-determination, the White Paper should be welcomed. We will have to see how much makes it through the parliamentary mincing machine...

BUILDING PRO TOOLS

Looking to get into Pro Tools but want to know more before venturing into the unknown? Digidesign specialist **Dan Muchmore** talks basic requirements, expansion possibilities and configuration tips

CHOSING THE RIGHT Pro Tools system depends on your present requirements and what you see yourself needing from the system further down the line. Pro Tools is modular and therefore expandable and can be split into a number of components: 'core' systems, I-O interfaces and peripheral extras such as sync devices, controllers, and plug-ins.

The first things you'll need to think about are track count, DSP requirements and I-O. The core system is split into three product groups, each one varying on track count, DSP performance and I-O connectivity. 'Core' describes the set of cards that make up the system, the required cabling for these cards and the Pro Tools software and manuals.

Pro Tools|24 is the first of the TDM core systems and is made up of two cards—you need to know this to know how many PCI slots are required, especially when using any of the new Macs. It is capable of 32 simultaneous tracks, moderate DSP power, which is easily expanded by adding more DSP cards, and 24-bit, 16-bit resolution at 44.1kHz and 48kHz. Pro Tools|24 Mix and its expanded version, Pro Tools|24 Mix Plus are designed for serious mixing and processing. It is worth mentioning that a few of the more power hungry plug-ins (for example Access Virus and Reverb One) will only run on Mix-based core systems. It is the first of the two new generation core systems that include the new Motorola Onyx DSP chips that allow greater track count, DSP mixing and plug-in count. This core system has one card capable of 64 simultaneous tracks (a trade-off with processing DSP), moderate to high DSP (depending on the track count up to three times more DSP than Pro Tools|24 and expandable by adding more Mix Farm or DSP Farm cards), and 24-bit and 16-bit resolution at 44.1kHz and 48kHz.

Mix Plus is essentially the same card that ships with Mix with an additional Mix Farm card, and used in audio production and postproduction environments. It is a two-card system capable of 64 simultaneous tracks, maximum DSP power available in a core (up to seven times the DSP audio provided by Pro Tools|24 and expandable as above) and 24-bit and 16-bit resolution at 44.1kHz and 48kHz.

In addition to each core system you need to run at least one Digidesign interface, which will connect to the core card of the system covering the majority of sound formats.

All Pro Tools systems require one core system (Pro Tools|24, Pro Tools|24 Mix or Pro Tools|24 MixPlus) and at least one Digidesign audio interface. Each D24, Mix Core or Mix Farm can support 16 channels of I-O and each DSP Farm card supports eight channels of I-O. When specifying a system, an important consideration is whether an 8-channel or 16-channel interface is being run. If you choose to hook two 8-channel interfaces together and wish to mount them on the one card you will require the Digidesign 16-channel Peripheral Cable. With the correct additional Mix Farm-DSP Farms installed you can have up to 72 I-Os installed, made up of any configuration you wish.

You now need to decide whether you need synchronisation, MIDI, tracks and storage, and VTR control—we will look at these in more depth next month. However, you will need to find out how to authorise your software.

Copy Protection is a minefield with each software company having its own method of copy protection. But there are three main methods used: Challenge Response (or Unique Serial Numbers), dongle based and floppy disk based.

In the first case, the serial number is usually included with the manuals or software and you need to enter the number on the first run of the program. If it is 'Challenge Response' then when you first run the program it will give you a unique code that you need to give to the manufacturer, who in turn will give you the response.

Dongle-based systems are used by companies such

Core system components

Pro Tools|24

A D24 Audio Card: Provides track count and connects to your Digidesign audio interface(s) including up to 16 channels of I-O and a serial port for optional connection of a Digidesign USD or machine control-support device.

One DSP Farm: Provides mixing and DSP power to run TDM plug-ins; plus up to eight channels of I-O.

Digirack plug-ins: These are a special selection of TDM and file base Audiosuite plug-ins.

Latest version of Pro Tools software.

Pro Tools|24 Mix

A Mix Core Card: Provides track count and connects to your Digidesign Audio Interface(s) including up to 16 channels of I-O and a serial port for optional connection of a Digidesign USD or machine control-support device.

Digirack Plug ins.

Latest version of Pro Tools software.

Pro Tools|24 Mix Plus

A Mix Core Card: Provides track count and connects to your Digidesign audio interface(s) including up to 16 channels of I-O and a serial port for optional connection of a Digidesign USD or machine control-support device.

Mix Farm Card provides additional mixing channels and-or real time processing, plus up to 16 channels of I-O. Digirack plug-ins.

Latest version of Pro Tools software.

as Waves who include a dongle with the software. This comes as either an ADB (old style Macs) or more recently a USB adaptor that you plug in to the relevant ports and the software takes its authorisation from there. With both of these methods the protection comes with the software. However, the third method, floppy disk based copy protection, requires you to have a floppy drive. This is fine for Macs that are Blue and White G3s and Windows NT systems but with B&W G3s and G4s you will need a qualified external USB drive. Only a small number of these units work with copy protection and it's worth referring to the Digidesign 'compatibility pages, to find out which drives are currently supported. (http://www.digidesign.com/compato/)

What you will require in terms of storage depends—predictably—on what you wish to do with a system, but for a 'standard' audio system one or more Digidesign 'qualified' drives are needed. Either a couple of IDE or Ultra Wide SCSI drives can be used. A full track count with Pro Tools|24 Mix Plus requires an approved UW SCSI accelerator. If video playback is requires as part of the Avoption or Avoption XL then a number of other UW drives need to be mounted on a separate bus of an approved SCSI accelerator.

Digidesign has qualified the use of the Atto Express single or dual SCSI Accelerators, and also suggests formatting the drives with the Atto control panel Express Pro Tools for maximum performance. A full drive compatibility chart is available at http://www.digidesign.com/compato/.

USB and serial MIDI interfaces will work with

Interfaces

888|24

8 Channels of 24-bit A-D and D-A conversion
8 Channels of digital I-O (AES-EBU),up to 24-bit resolution
Balanced analogue XLR connectors
Switchable +4dBu and -10dBv operation plus external input-output level trims
High-resolution LED metering
Standalone A–D and D–A convertor

882|20

8 Channels of 20-bit A-D and D-A conversion
SPDIF connectors (phono) for two channels of digital I-O
Balanced or unbalanced operation via ¼-inch TRS jacks
Switchable +4 dBu/-10dBv operation
Signal presence metering

1622

High quality, low price I-O for instruments and effects gear
Sixteen 20-bit analogue inputs and two 20-bit analogue outputs
Two channels of 24-bit SPDIF I-O
Software controllable gain on all inputs, outputs switchable between +4dBu and -10dBv
Greater than 100dB dynamic range (at +4dB)
Support for balanced and unbalanced connectors ¼-inch TRS jacks
LEDs for input and output metering

ADAT Bridge

16 Discrete Channels of ADAT Optical I-O
Separate AES-EBU and SPDIF ports for mastering to DAT
20-bit D-A convertor pair for high quality monitoring

If you need to transfer TDIF then you can do this by using the only third party interface Digidesign supports. This is the Apogee AD8000, which will convert many formats and interface directly with Pro Tools.

Pro Tools, and Digidesign recommends using a serial MIDI interface as these offer the tightest possible MIDI timing. From a technical perspective, we've found that USB interfaces aren't adequate for LTC-MTC sync and also heavy MIDI data traffic, such as controller data. When using a USB Mac, a serial-based MIDI interface is recommended. This is connected to the Mac by removing the modem from the G3-G4 and adding a serial adaptor that will achieve much tighter and more reliable MIDI timing. Digidesign currently supports the GeeThree Stealth Port and Griffin gPort II installed in the modem port thereby not using a PCI slot.

Next month we will examine the additional generic hardware that adapts Pro Tools for use in music, postproduction and broadcast applications. □

Ad Index

COLOUR TELEVISION

Colorimetry, human perception, the engineering requirements of cameras, transmission techniques and displays... **John Watkinson** takes a global view of colour

AS MIGHT BE EXPECTED, colour must begin with an understanding of what the eye can see. Fig.1a shows the range of wavelengths visible to an average human in good lighting. However, as the light fails, the visibility curve shifts as shown in Fig.1b. Under certain conditions, late in the day, both mechanisms may be working simultaneously, leading to a particularly vivid sensation.

The sensors in the retina are discrete, not unlike the pixels in a CCD camera. Fig.2a shows that if all of the sensors were the same, we would be colour blind but have very sharp vision. Fig.2b shows a hypothetical case in which the eye has seven different types of sensor responding to different wavelengths and giving good colour discrimination. However, the effective size of each sensor to brightness is now about three times the size of a single sensor, so the sharpness of vision would fall unacceptably. Fig.2c shows that in human vision there are only three types of sensor. This limits the colour discrimination but the effective sensor size to brightness is now only twice the size of a single sensor. However, the loss of resolution is still unacceptable and evolution has achieved a further compromise.

In fact, the range of wavelengths to which each sensor responds is broad and there is considerable overlap. The result is that in most natural scenes all three sensors are excited. The outputs from the individual sensors are used regardless of colour sensitivity to create a sharp image in the brightness domain and the differences between triads of sensors is used to create the sense we call colour. As three sensors are needed to distinguish the colour, the sharpness of colour vision is poor at about one quarter that of luminance. Furthermore, the overlap of the sensor response mean that our colour vision gives a highly simplified representation of the true spectrum. These two characteristics are probably just as well as otherwise colour television would be much more complicated and expensive than it is.

It can probably never be known why we perceive colours the way we do because colour perception is entirely subjective. In the real physical world there are no colours: there are only spectra. Colour is the human sensation produced by a given spectrum. As it is subjective, we cannot know how another person perceives colour. People's ability to discern colour varies widely. A significant number of males have difficulty distinguishing red from orange, whereas women have better colour discrimination than men.

In casual speech we describe objects as having a certain colour but this is incorrect. The perceived colour of an object is a function of the spectrum of the illumination as well as its own reflective characteristics.

White light has a uniform spectrum and the spectrum produced by an object will then be the same as its reflectivity function. White light is also elusive because the atmosphere acts like a filter, scattering blue light more strongly than longer wavelengths. Fig.3a shows the sun at midday shining through a thin layer of the atmosphere has a near-uniform spectrum. Late in the day the light passes obliquely through a longer air path Fig.3b and the heavy scattering of blue (hence the colour of the sky) leaves the red light dominant, hence the red colour of the sun as it sets.

An object reflecting a white spectrum at midday will have a strongly red spectrum at sunset. The human visual system compensates for this because the colours we see are to an extent the colours we expect, not the actual spectrum. The human visual system performs automatic colour balancing as the spectrum of ambient lighting changes. Midday daylight is near white, whereas tungsten light is yellowish and fluorescent light is red deficient.

The approximate nature of colour vision means that different physical spectra can give rise to the same impression of colour. Different spectra which give the same sensation are called metamers. One metamer may have a spectrum which is continuous and smooth and another which gives the same sensation may contain sharp peaks with little energy between.

Fig.4 shows that human colour vision has reduced all possible spectra to just two components which are sensed in addition to brightness. In Fig.4a in the case of a flat or white spectrum both of these components are zero. In Fig.4b one wavelength is dominant and the light will be perceived as tinted to one of the rainbow or spectral colours. The degree of dominance—the departure from flat—is called the saturation. To give an example, pillar-box red is a saturated colour whereas pink is a desaturated red, or a white spectrum with a bump in the red region.

Saturation is one of the components mentioned. In fact, as Fig.4c shows, the spectrum may also contain a dip or a deficient wavelength. This results in so-called non-spectral colours that are the response of the human visual system to a mixture of short and long wavelength.

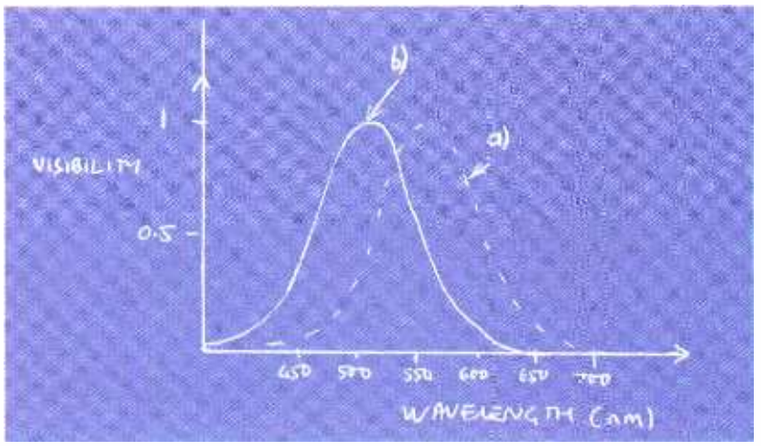


Fig.1: Wavelengths visible to us in varying lighting

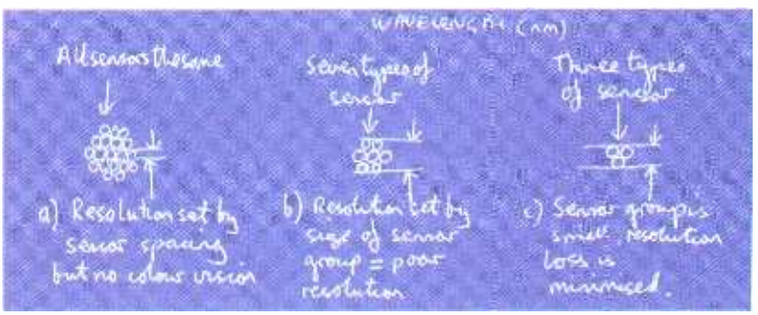


Fig.2: There is a compromise between colour activity and resolution

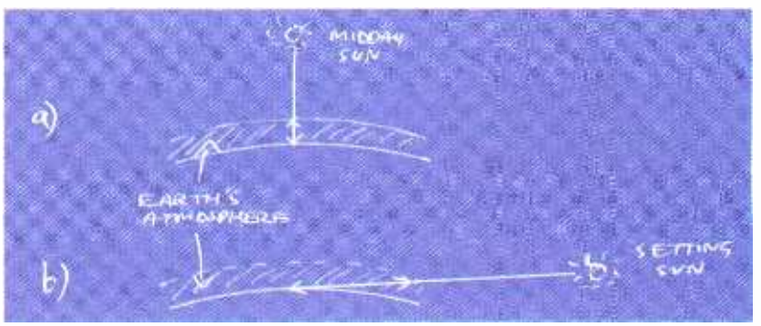


Fig.3: Noon and sunset visual effects

Purple is a non-spectral colour which is the sum of red and blue light. It can be thought of as white that is green deficient.

The position of the dominant wavelength determines the colour in spectral colours and the position of the deficiency determines the colour in non-spectral colours. This position determines a parameter called the hue. All perceived colours can be described by various combinations of hue and saturation.

Fig.4d shows that if white is considered to be the neutral point, the hue represents a direction away from white and the saturation represents a distance. Direction and distance—this sounds dangerously like a vector.

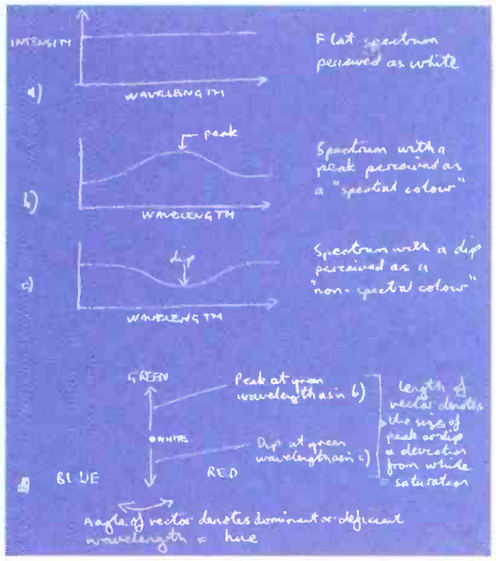


Fig.4: Hue and saturation

Going upwards, for example, the vector finds green. Turning the vector clockwise heads towards red, whereas anticlockwise heads towards blue. Going downwards finds purple.

All of this is in addition to the brightness or luma information. Consequently if we can find a way of sending this vector for each point of the screen along with the brightness, colour television transmission is possible. The traditional analogue method of broadcasting a vector, as used in NTSC and PAL, is to modulate a subcarrier in phase and amplitude to produce a signal called chroma. The phase determines the direction and the amplitude the saturation. The limited resolution of human colour vision means that the bandwidth of the chroma signal can be much less than that of luma. When the luma signal, Y, and the chroma signal, C, are kept separate, the result is known as a Y-C system.

If the chroma is linearly added to the luma signal the result is known as composite video. Composite video has the advantage that only a single signal results making it easy to broadcast on a conventional analogue transmitter. In NTSC the frequency of the subcarrier is chosen so that there is exactly an odd number of cycles in two line period. As a result, the subcarrier inverts from one line to the next. On an odd line, a positive half cycle of subcarrier may make the picture too bright by adding to the luma signal. But on the next line the subcarrier will have a negative half cycle making the picture too dark. The two effects cancel out in the eye of the viewer.

This can also be considered in the frequency domain. At a frame rate of 60Hz, with 525 lines in the picture, the line rate of monochrome US TV was 15,750Hz. The luma spectrum is dominated by integer multiples of this frequency as in Fig.5a. The subcarrier frequency is 227.5 x line rate (3.58MHz) so that the chroma spectrum interleaves with the luma spectrum as in Fig.5b.

Accurate Y-C separation requires a complex comb filter and the technical requirements are rarely met in consumer equipment. Consequently keeping the two signals separate as is done in the Y-C system will give better results. A number of consumer TV sets and VCRs can operate in Y-C mode.

Chroma is produced by a process called quadrature modulation. Fig.5c shows that a sine wave and a cosine wave are amplitude modulated by two different signals called components and added. The result is a signal that is both amplitude and phase modulated. The signal is demodulated by sampling 4 x per cycle of subcarrier in just the right phase. When the sine wave is passing through zero, the voltage of the waveform must be due to the cosine wave amplitude only and vice versa. The reference phase in which to sample is carried from encoder to decoder by a burst of subcarrier which is added to the video signal during blanking just after the sync pulse.

The component signals which operate the quadrature modulator must be derived from a practical camera. How this is done will be considered next month. □

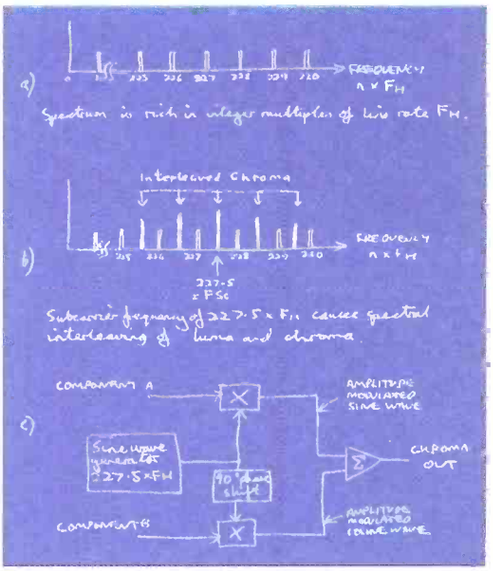


Fig.5: Chroma interleaving and quadrative modulation

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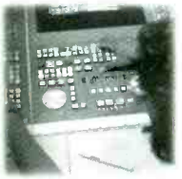

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Ruby delight

HERE IS NEWS of a Ruby piece of audio gear that I received for your 40th anniversary (an age I also reached a month ago). It was a shock to see my name in the winners, but to get a custom edition of a processor already much characterised in itself made me the happiest of them.

The Joe Meek VC1 remains popular as it is switched on in almost every session, feeding either an MTR90/II or a 24Mix+. On the photograph you can see its next owner (or his brother) practising an output gain make up.

Thank you again; thank you too for the pleasure I have to read you each month.

Luc Hurand

Christmas hit

DIDN'T WE HAVE a lovely time, watching TV at Christmas? Along with the British diet of game shows and Bond films was the unavoidable pop programming that stretched well in the New Year. Not much to report here, then—unless you caught a few rare feet of English pop trivia showing Fiddler's Dram performing their unforgettable (and only) hit, 'Day Trip to Bangor'. Still not much to report?

Maybe not, unless you recognised the keyboard player (Wurlitzer EP200 if I'm not mistaken) as a youthful Dave Foister, now veteran *Studio Sound* equipment reviewer putting in a spirited performance for the cameras.

Thanks, Dave, for bringing a smile to the lips of so many serious people this Christmas.

Name and address withheld

Lipps service

IN THE DECEMBER 2000 edition of *Studio Sound* magazine, you mention in the David Z article that he was the producer of 'Funkytown' by Lipps Inc. Actually, the producer of the record was Steven Greenberg not David Z. Where did you get that info? David was, however, the recording engineer on the track... Please make this correction so as not to misrepresent the 'actual' producer of 'Funkytown', Steven Greenberg. Also, please forward this to the magazine article writer, Dan Daley.

JR Fields, Minneapolis, MN

David Z replies:

Steven was the actual credited producer. I was the engineer, though sonically I feel that I had considerable artistic input into the production. I didn't mean to mislead the writer or the reader, and regret if that's was how it was perceived.

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8–10
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28–1
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THE WISH LIST

< Continued from page 78

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Fairlight MFX3 48-track, with Media Link; Kyma, Sound Design Workstation. ('The Dream Machine')
'The MFX3 is probably the fastest DAW on the planet thanks to its tactile interface. Most commands are at the touch of a button. There are 48 tracks on one drive, grouping and global manipulation, plus networking for when you get to build a second room.

'For those who seriously want to play around with sound, the Kyma box does the lot. In fact, it's the only DSP engine that gives you really unheard sounds, including sound morphing, re-synthesis, echoes, delays, time stretching, re-pitching, vocoding, live processing, compressors, filters and noise gates, to name but a few. You can build your own processor using all of the aforementioned, and many more in any order you like. It really is a dream tool and the only creative get-to-bits tool available in one box.'

Mastering:
Sony PCM 7040 DAT; Tascam DA-98HR
'Strange that you get four times as many tracks for half the price of a 2-track machine.'

Computer:
Apple Mac G4 733MHz or the new Super Drive
'It has it's own DVD writer and authoring software, so at the end of a session you can burn a DVD, including picture, for client approval, staying digital all the way without an analogue machine in sight.'

Microphones:
'The Neumann U87Ai is my particular choice for voice, but it's such a personal thing... Take your pick.'

Outboard:
tc electronic DB Max; tc electronic M5000; Lexicon 960L; Sony DRE-S777
'I have only heard about the Sony not tried it, but apart from the normal presets you can apparently record your own rooms and apply the desired acoustics to anything you like.' □

THE BALANCE SHEET

Total expenditure: <£500,000

Coming in at somewhere between £405,000 and £465,000, Lloyd has room to manoeuvre. 'I'd invest in carpets, fixtures and fittings. Perhaps even a Jacuzzi. As for equipment, there would be some samplers: a Synclavier keyboard with Cubase integration as well as an Akai S3000 or E-mu's new E4 platinum. Other than that, I'd like the Cubase VST 5 - loads of plug-ins, with MotU 2048 and the 308 input-output interface. Not forgetting the Micro Scalectrix, the PlayStation, and a bowl of chocolates to keep the clients happy.'

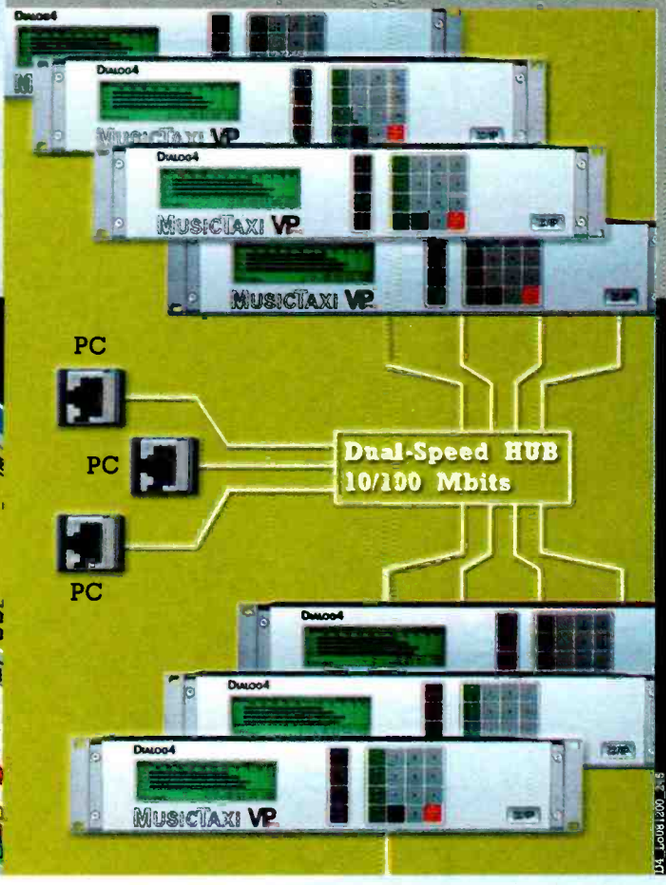
REFRESHMENT TOP 10

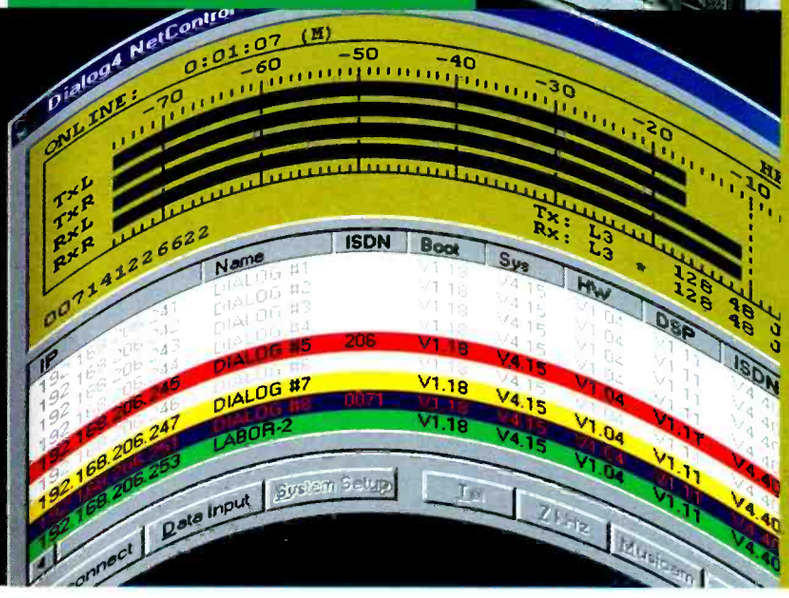
1	Gin Genie	6	I'm in with the Gin Crowd
2	Alehouse Rock	7	Needles and Pimms
3	Born to be Mild	8	Slurp John B
4	Beer: There and Everywhere	9	Wishing on a Staropramen
5	All Along the Scotchtower	10	You Bitter, You Bitter, You Bet

AUDIO OVER IP

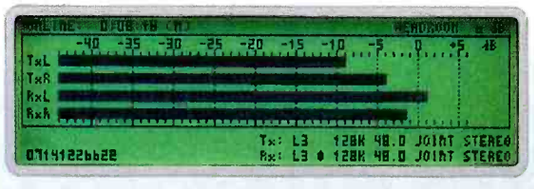
Join the Codec Connection and work with MusicTAXI VP-PRO TCP/UDP/IP - the first full duplex audio codec with ethernet access!

10 JAHRE DIALOG4





DIALOG4



MUSICTAXI VP PRO

TCP UDP/IP

Featuring:

- 10Base-T Ethernet interface for remote control and audio transmission over data networks
- TCP for point-to-point connections
- UDP for broadcast and multicast mode
- ISDN for backup
- NETControl remote software to control all MusicTAXIs via multiple PC access

DIALOG4
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THE WISH LIST

LLOYD BILLING'S POST HAVEN

Following this month's preoccupation with post studio design, **Richard Buskin** challenges Lloyd Billling to fit out his ideal working environment in our specified studio space

AFTER THREE MONTHS spent lugging film cans around Soho as part of his work for Columbia Pictures' Dispatch Department, Lloyd Billing advanced to tea-boy at Advision Music Studios in the early seventies. Over the course of four years, he made tea for artists such as Yes and ELP, before moving on to Leeward Sound Studios as a junior engineer. After another four years mixing commercials, one of Billing's clients suggested opening their own studio, and the result was The Tape Gallery, which opened on April Fools' Day, 1981.

Initially the facility comprised one transfer bay, one studio and an office, but has evolved into six audio rooms, an edit suite, three transfer bays and numerous offices, and five anciliary companies have also been established—Tape Gallery Productions, The Music Gallery, The SFX Gallery, Tape Gallery Multimedia and The Voice Gallery.

Every now and again, Lloyd still makes the tea, yet he took time out to come up with the ideal post room along with Simon Capes, and did so while factoring in the cost of hiring the best people to help accomplish this.

'The general rule of thumb in the audio postproduction world is that if you take the price of the console, multiply it by 1.5-2 and add it to the console price, you'll get a realistic figure of what the overall budget should be. The theory behind this is the larger the console, the more ins and outs, monitoring, wiring, and auxiliary gear you need. I have put it to the test on my dream studio and previous studios, and spookily it's not far off.

'To build a dream studio you first have to build a dream team. Quite often, because of monetary constraints, you are inclined to go for the cheapest quote but in my experience this is a false economy and only leads to an extended completion date, poor workmanship and a large legal bill. Stick with people who specialise in this area and who do it on a regular basis. I am constantly being asked for recommendations, so I have included the odd name or two.'

Project manager & builder:

'You first need a project manager who deals with contractors, schedules and logistics. You don't want your state-of-the-art mixing console to be delivered when the builders are still kicking up sawdust. We use a company called Advance Studio Sound Systems—Robin Cannell has a great technical knowledge, and he has co-ordinated numerous projects for us.

'We use builders like Oakwoods, who have done it before. Jerry has built numerous rooms around the world, so he won't make silly comments like, "What do you mean, you want skirting boards and soundproofed rooms? They weren't budgeted for, mate, so that'll be an extra".'

Design & furniture:

'Custom-made is the only option, and design and redesign—and, dare I say, re-re-design—the only way. AKA specialises in this, and although having 3D drawings is expensive and time consuming, it's well worthwhile, giving perspective and a feel of the final look. You can also foresee errors regarding sight-lines to actors, engineers, listening positions and so on.'

Air conditioning:

'This is an often under-budgeted and vital part of the equipment list—and I say equipment list as opposed to a client comfort preference, because what's the point in spending all that money on a studio that overheats and breaks down all the time? It's an art measuring heat output from various bits of kit, to the amount of people the room can accommodate. You must have enough air circulating to cool everything, and it needs to be silent, especially in the vocal booth.'

Wiring, installation & electrics:

'Again, as per the builders, The Wiring Company has done numerous installations. Most of the patch bays and aux equipment can be pre-wired off-site, therefore reducing the completion time. Liasing with the project manager is a must for cable traps, runs and so on.

'The most common electrics faults are site placement of outlets, lights shining on the screens or in you eyes, and casting shadows that make reading difficult. You should also allow for a master contact switch that will power the whole studio down in one hit. At the same time, don't forget the cleaner. Kelvins costs.'

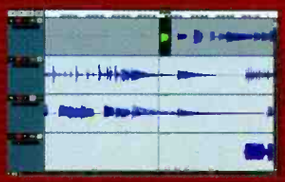
Console:

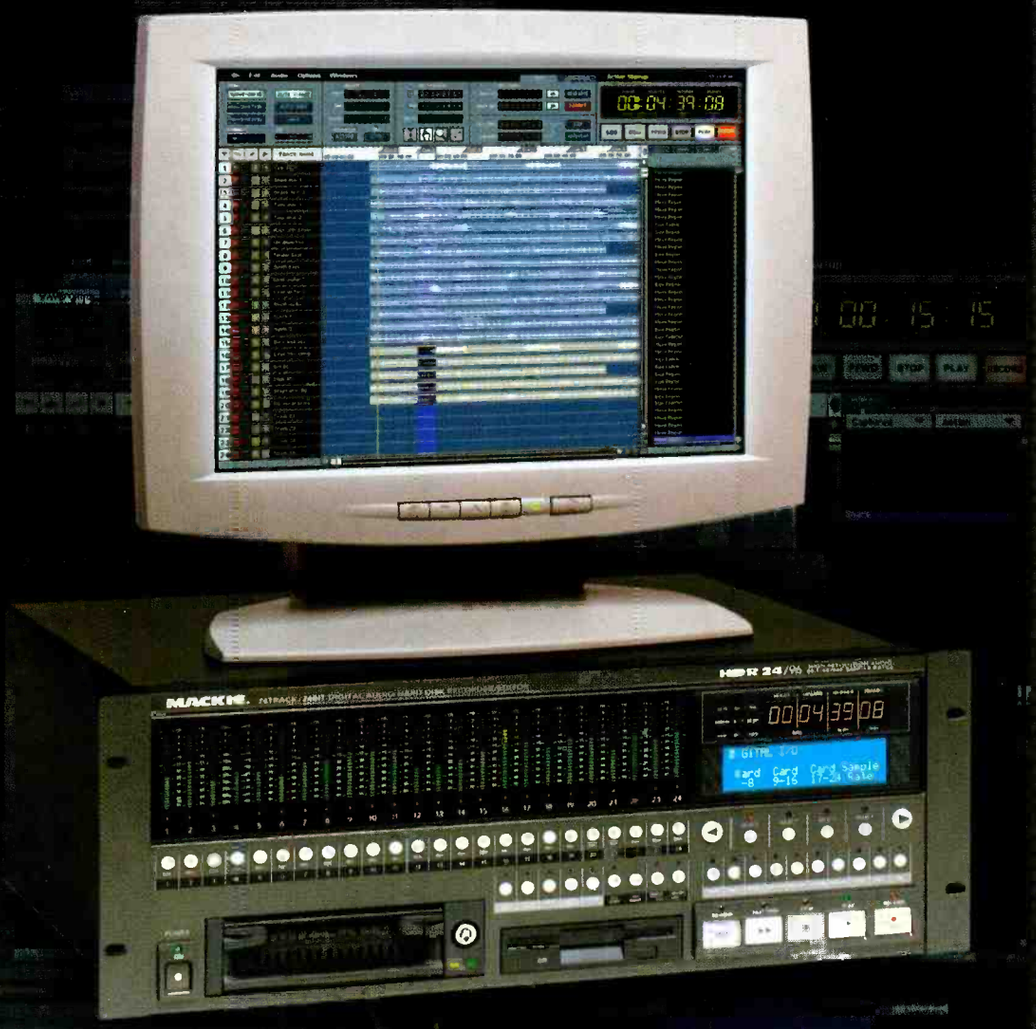
'The mixing console is the heart of any studio, and for me it has to be the 96-fader version of the Soundtracs DPC-II. It is so well thought-out that when we went to see it there wasn't one response of, "That's planned in our next software release", or "I promise it will be included by the time yours is delivered". It was a revelation to discover that every aspect of this console had been seriously considered, and that if it couldn't do something there was no bullshit, just a sensible answer as to why. There are no hidden submenus several layers down, and it's very user-friendly. In fact, it was almost self-explanatory. Obviously, the other thing to look for when buying a desk is service and backup.

'The DPC II has a work surface with a centre 19-inch rack, and 160 channels with full DSP on each, including EQ, dynamics, auxes and inserts which are all available as standard. In fact, unlike some manufacturers, they have even included talkback FOC.

Continued on page 76 >

HDR24/96. MACKIE'S NEW 24 TRACK RECORDER. WORKS WITH ANY MIXER. NO EXTRA COMPUTER OR SOFTWARE NEEDED.





- **24 tracks...24-bits**
- **Built-in full-feature digital workstation editing**
- **Affordable pull-out media**
- **Built-in SVGA, mouse & keyboard ports**
- **Built-in 100BaseT Ethernet**

New hard disk recorders were all over the place at this fall's AES convention.

Our new HDR24/96 was the only recorder with built-in nondestructive graphic waveform editing. Just plug in a mouse, keyboard and SVGA monitor to view all recorder parameters on screen in real time. Enjoy complete editing control with unlimited levels of undo, drag-and-drop crossfades with 9 preset combinations plus fade/crossfade editor. And look forward to DSP time compression/expansion, pitch shift and lots more!

The HDR24/96 was the only recorder that uses pull out Ultra-DMA hard drives, so affordable that you can keep one for each project—over 90 minutes of 24-track recording time costs less than a reel of 2-inch tape!

Call or visit our website for preliminary info on the new HDR24/96. Shipping soon from Mackie Digital Systems.

HDR24/96 editing features include 8 takes per track with nondestructive comping, nondestructive cut/copy/paste of tracks, regions or super-regions, drag-and-drop fades & crossfades, 1x/2x/4x/8x/24x waveform views, true waveform editing with pencil tool, bidirectional cursor scrub and unlimited locators and loops... with unlimited undos — but without requiring an external computer! Coming soon: DSP time compression/expansion, invert, pitch shift, normalize and much, much more.

Use the HDR24/96 with any analog or digital mixer ...or link it up to our Digital 8•Bus desk.

- Built-in 20-gig Ultra-DMA hard disk plus front panel bay for additional easily available pullout drives
- Intuitive analog tape deck interface and monitoring
- Syncs to SMPTE, MIDI, Black Burst, PAL & NTSC without extra cards
- Unlimited HDR24/96 linking! Sync 48, 72, 96, 128 or more tracks sample accurately
- 96kHz recording via software & new PDI•96 I/O
- Uses Digital 8•Bus I/O cards — mix and match!
- 3.5-inch disk drive for software upgrades & tempo map importing
- Fast Ethernet port built-in
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