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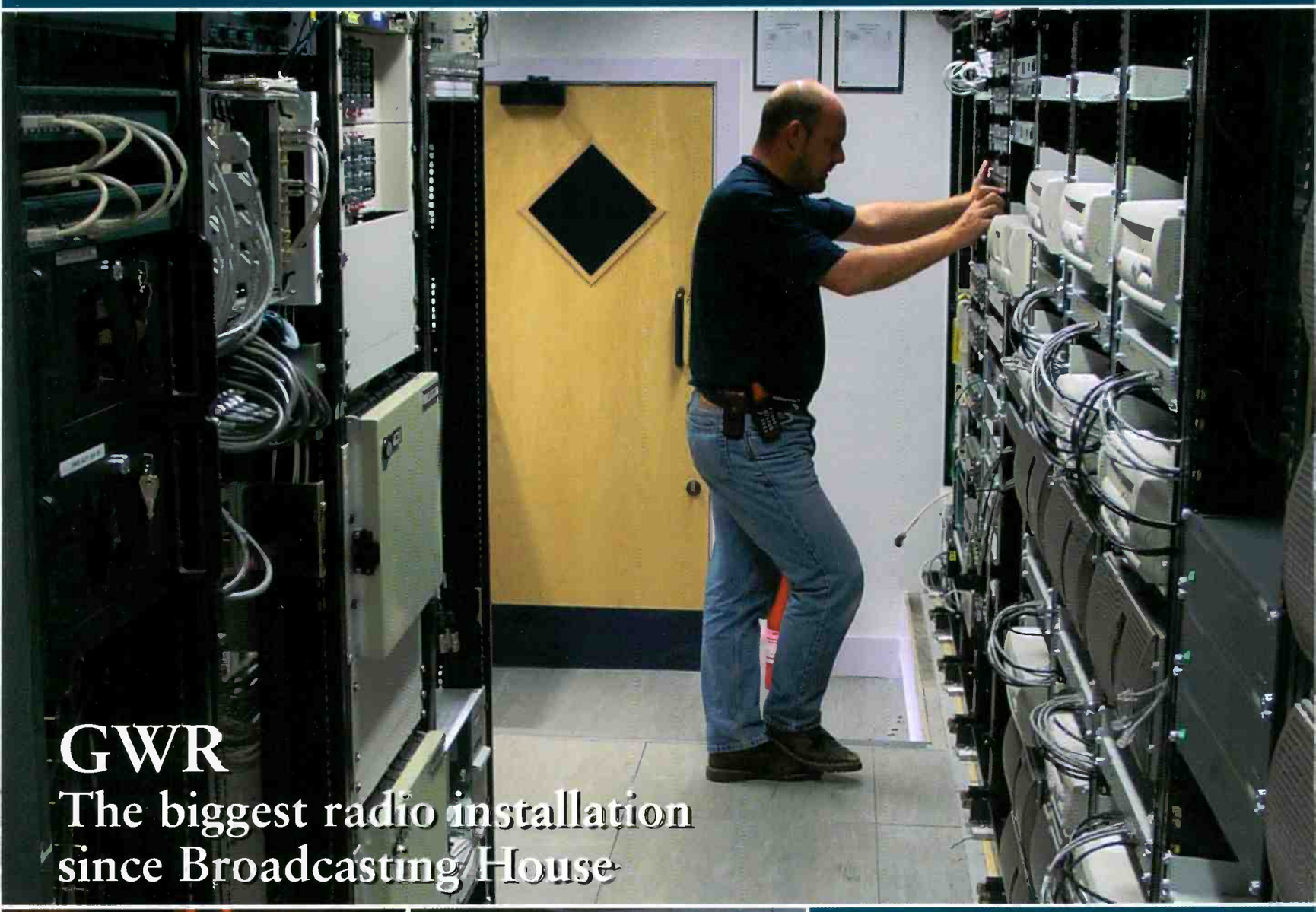

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REVIEWS

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

Dindae Sheena, Oasis Studios, Beijing

SL 9000 J SuperAnalogue™ Console

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

Studio One at Oasis

OASIS STUDIOS

Great Studios Of The World

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

Oasis Studio, YYYD Productions Co. Ltd.
No. 16 Dong San Huan Beilu, Chaoyang District, Beijing, 1000024

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SL 9000

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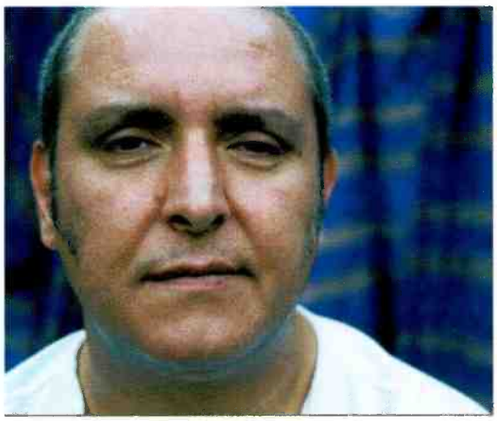
A need to know

IF WE ALL HAVE ONE secret weakness then it is the desire to know what is to befall us. Aside from the obvious 'business applications' of being able to see into the future, humans are obsessed by a need to know what is to come because they need to know that there is place for them, a role for them, and that there is in fact a future for them.

Our look at the home of the future in this issue throws up some interesting insights in what (probably) will or (probably) won't happen to the domestic environment of a decade hence and how, by extrapolation, it is likely to impact on the professional audio work sector. However, at least as many questions are generated as answers.

If a common thread emerges in looking at previous past experience it is that things rarely change as dramatically as we think they will and what emerges is inevitably always a modification and adjustment of what came before with the enduring presence of technologies that have not disappeared despite everything pointing to this inevitability. The continuation of the record player and stylus, and the recommissioning of cutting machines into this millennium, in whatever lowly role, flies in the face of all the reliable indicators just as valve outboard and mics seemed doomed a good decade earlier.



It would seem that despite the best efforts of the domestic electronics giants to funnel the audience down an ordered and convenient narrow route, the technology that they bring in tow sheds splinters of options and possibilities. Some of these may be short-lived and ultimately dead-end but someone will earn a crust in all these escapades. The audio skills you have are transferable and updatable in a way that much of the delivery technology in question is not. Looked at in this light the future looks very good.

Zenon Schoepe, executive editor

Hi Angel

JUST A NOTE to say that we're moving office again. Having left the extravagant surroundings of the *Daily Express* building for the more earthy setting of London Bridge less than five years ago, the powers that be have dictated that we now return. We moaned about leaving and now we're moaning about returning. Some things never change—but I've been reminded how many do through the relocation ritual of sorting out my desk.

Beneath reams of press releases, among stolen salt cellars and green tea bags, I found some of the pro-audio curios that have become part of the *Studio Sound* editor's legacy. Preventing my contributors' invoices from blowing away, for instance, was an IC the size of a cigarette packet purporting to be an A–D convertor. Between files marked 'Ballet Shoes' (containing a pair of ballet shoes) and 'Made-Up Words' (containing a selection of dictionaries in various languages), I rediscovered an exchange of letters on the merits of digital audio dating from 1983 that passed between Richard Elen and Linn's Ivor Tiefenbrun.

Elsewhere, near a file marked 'Pension' (containing unpublished pictures of industry personnel), there were photographs of early APRS shows containing earlier versions of familiar faces along with the accounts of the Digital Information Exchange. And inside the cover of *Studio Sound Index to Vol.1-30 (1959-1988)* a misfiled press release reminded me of the open-ended promise of the DISQ digital mixer core...

As with any move, there is a temptation to lighten the load of accumulated memorabilia, but I found myself wondering who, if not *Studio Sound*, would take care of these memories? Most manufacturers can be trusted to keep tabs on their own histories and examples of the equipment that document them, but few are likely be concerned with the exchanges of information that helped drive their industry forward. And while many recording studios have archives of technical information and magazines, they themselves are periodically subject to the economic upheavals that make the news.

So if I don't answer the phone next time you call, it's probably because I'm in a dusty room as Acting Unofficial Archivist to the Audio Industry. But when you write, I'll make a place special for your letters.

Love...

Tim, editor

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

...all still very much alive!

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

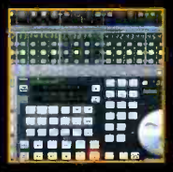
It makes you think!

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

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

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

So... you didn't die before you got old, now what ?



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

R-1 can support hard drives of up to 100Gbyte capacity enabling the system to comfortably manage long-format recordings, end drives can even be hot-plugged.

Altogether a great new system!

Get an R-1 !

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R-1 MULTI•TRACK RECORDER

FRANKFURT LONDON PARIS AMSTERDAM MADRID MILAN

CONTRACTS

Japan: Tokyo's Toei film and postproduction facility has replaced the Soundcraft TS24 analogue console on its dubbing stage with an AMS Neve Digital Film Console, joining Nikkatsu, Tokyo TV and IMAGICA as recent DFC converts. The console will be used for TV programmes and feature film work.
Toei, Japan. Tel: +81 3 3867 2731.
AMS Neve, UK. Tel: +44 1282 457011.

Denmark: Danish National Radio has replaced the Tannoy monitors in its OB truck with an M&K monitoring system 'on wheels'. The system comprises two MPS 2510P mains, MPS 2810 subwoofer and LFE-4 bass management controller. The system is similar to that in the broadcaster's Aarhus studios, near the Danish School of Journalism, which has purchased 27 Maycom Easycorders for use as part of its radio journalists' training program. The school is the largest and oldest institution for journalism education in Denmark and works closely with Danish Radio.
Danish National Radio, Denmark.
Tel: +45 87 39 70 80.
Miller & Kreisel, US.
Tel: +1 310 204 2854.
Maycom Audio Systems,
The Netherlands. Tel: +31 481 377740.

Turkey: National broadcaster, Turkish National Radio and Television, has purchased 20 Marantz CDR631 CD recorders for use in its television and

radio studios, bringing the operations takeup of Marantz machines to over 90. TRT has also ordered its first DPA 4065 mics, for on-screen presenters.
Marantz Professional, UK.
Tel: +44 1753 686080.
DPA Microphones, Denmark.
Tel: +45 4814 2828.

France: Paris-based Labomatic studios has purchased a 70-channel Euphonix System 5 digital console to work with its Pro Tools system via two Euphonix FC727 MADI format convertors. Owned by producer-engineer Dominique Blanc-Francard and his sons, the studio will be providing mixing for music DVD-Video and DVD-Audio. Recently home to Hubert Blanc-Francard's work with Cassius and MC Solaar, the premises previously provided the venue for the Beatles' German-language version of

Secure future for music

UK-US: With industry analysts projecting that by 2004, 25% of all media will be distributed via the Internet, a new partnership between EMI Recorded Music and Roxio could soon see the legitimate burning of the EMI catalogue on home CD-R systems. EMI's catalogue of approximately 1,500 artists releasing over 1,000 albums annually, and Roxio's Easy CD Creator (for Windows) and Toast (for Macintosh) offer to lead the way towards direct distribution of music over the Internet.

Under the arrangement—which also sees EMI making an equity investment in Roxio—the California-based technology developer will provide its technology and multiple distribution channels while EMI will provide strategic guidance and advice with both parties seeking solutions that will prevent unauthorised reproduction of copyrighted content. 'By partnering with a market leader such as Roxio, EMI will work to develop ways for consumers to easily record authorised music onto recordable CDs,' said Jay Samit, senior VP, New Media at EMI Recorded Music. 'Co-operation between technology companies and the music industry is at the core of our plans to develop new revenue streams for our artists.'

'EMI continues to demonstrate leadership in pioneering technologies for digital distribution that are both effective and practical,' added Chris Gorog, president and CEO of Roxio. 'We want to continue to work with leaders in the music industry, like EMI, to not only provide for the protection of their digital content, but also to enable record companies and artists to get paid for burning. Our goal is to enable consumers to legally download and record music to CD in a consumer-friendly manner while fairly compensating copyright owners and creators.'

The shipping of blank CDs is expected to top 5bn in support of an estimated installed base of 100m CD recorders by the end of 2001 and the agreement between Roxio and EMI is intended to recognise the fundamental changes taking place in the way content is distributed and to create a secure standard for digital content delivery.

Foundation and empire

UK: The evolution of Nottingham's Square Centre Recording Studios (SQC) continues. Adding several new elements to the roster of services available, the complex has been reinvented as The Foundation, and now embraces a truly multimedia array of disciplines.

Under the same roof as the two-studio SQC is O3 Media, a film, video and Internet production resource; and a training school called The Nottingham Foundation For Music & Media. Both extensions of SQC's remit draw on the region's vibrant cultural life, and there is even an in-house talent agency called exposeme.com.

The school features an IT suite, where students can access most current multimedia production tools and the Internet. Courses, from BTEC to HND, are validated by New College, Nottingham.

O3 Media's postproduction suite integrates both video and audio post, and is based on the Pro Tools platform together with Sony ES-3 NT-based nonlinear video editing.

'Put bluntly, the media business can generate £500 in 20 minutes,' comments O3 Media producer Jake Shaw, 'whereas that would take a studio half a day. As a musical act, you're dead in the water without a video. In media, if you haven't got good sound it will kill your project stone dead. The two things support each other really well.'

SQC's Studio One is based around a 56-channel Amek Mozart, Quested and Genelec monitoring, Pro Tools and an Otari MTR90 Mk.II, and has a 1,300ft^2 live area. Studio Two is digital, with two Yamaha O2Rs, Pro Tools 24-Mix and Logic Audio, and DynaudioAcoustics M1 monitors. The Foundation, Tel: +44 115 947 0044.

Alesis' future secured

US: Breaking during the first days of June, the news that Jack O'Donnell has acquired all the assets of Alesis follows the earlier filing of Chapter 11 immunity by the American electronics innovator. Alesis had made a dramatic rationalisation of its busi-

Multichannel in Munich

GERMANY HAS SEEN the opening of a dedicated surround sound facility near Munich, predicting a boom in 5.1 production across all the main audio markets. Waters Edge, situated by Lake Ammersee about 35 miles south-west of Munich, is adopting a specific strategy to cater for music, film, TV and many other clients requiring 5.1 mixes. Combining analogue and digital multitracking with editing and mixing, Waters edge is deliberately not providing mastering and authoring services while format considerations remain volatile. The studio provides 5.1 mixes on Tascam DA-88 which can then be sent to a mastering facility that handles the required format. Strong IT experience within the team also makes the studio Internet-ready. Marketing director David Ellis spoke to *Studio Sound*.

Q: *Where do you draw the production line, as it were?*

We draw the line at what we do best, so we'll record and go as far as postproduction but then we'll hand over. We have a partnership with a mastering studio anyway—MSM in Munich. We prepare six tracks, plus a stereo mix, on DA-88. If it's a DVD it will usually go to MSM; if it's an SACD project it will go directly to Sony. We're not tying ourselves up with one medium.

Q: *Directly to Sony?*

If you are a record company, Sony has a service which partly finances the production costs of creating an SACD. We have a label, Wave Records, so we generate the tape and Sony takes on the authoring, mastering and distribution.

Q: *Can you sum up the mood at Waters Edge?*

The air is fresh, you can see the mountains and it's a really beautiful, relaxing place. We have three recording rooms and two control rooms. Control Room 1 has custom Dynaudio M4s with XTA DP226 digital controllers; Control Room 2 is also 5.1 Dynaudio.

Q: *Which formats DO you think are important?*

We're really turned on by all the new surround formats, and we think there is soon to be a real boom in surround material. We wanted to get a head start. The concept of surround sound is what we're interested in, and we don't have to put all our eggs in one basket by trying to predict the end medium most likely to do the most business with the public.

Q: *How have you put your IT experience to good use?*

Everything is networked via a central machine room—any input, in any room, to any recording device. The patch panels can handle anything. For example, we have 48 tracks of analogue on Otari MTR90, and 48 tracks of digital on Radar. Any track can be copied between them.

Q: *Do you do stereo as well?*

Of course. Our first customers required stereo mixes, and we showed them what kind of a surround mix we could make out of them. On the back of those demos, we're now getting a lot of surround remix work.

Q: *What distinguishes your surround work?*

Surround is not about putting a little bit of hall ambience at the back and calling it Dolby Digital. We're taking it to a new dimension, and putting the listener in completely new places. We can put you in the middle of the band, not just in front. There is so much more that can be done, which simply hasn't been done yet. Waters Edge, Germany. Tel: +49 81 929 33933.

Sweden: The Swedish Broadcasting Corporation, Sveriges Radio has purchased three 24-track Fairlight Fame2 digital audio production systems from Swedish Distributor TTS Protel. Destined for the Corporation's drama department where it will serve postproduction duties on plays and documentaries for Channel P1, the Fame2 System will replace 'outdated analogue desks'. Gran Broberg (pictured, left) commented, 'Our popular music channel, P3, already uses Fame workstations for sketches and youth drama, and produces extremely high-quality results. We spent time evaluating other systems on the market and came to the conclusion that Fame2 was the best system for our requirements.'

ness before naming O'Donnell, president and owner of Numark Industries, in its Chapter 11 filing.

In a press release, O'Donnell announced, 'I've always held the technology and innovation of Alesis in very high regard. In fact, it was this technology that initially interested me in the company. I'm thrilled that I will have the opportunity to help bring Alesis into their next era of innovation. I recognised a few years ago that in order to stay in front of this fast-paced market, Numark needed to bolster its engineering and product development efforts. While we've seen the fruits of these efforts in recent years with the introduction of numerous new products with breakthrough technology, I'm looking forward to the kinds of products and technologies we'll be able to provide the market with Alesis' stellar engineering team.'

The release further detailed the continued operation of Numark and Alesis as separate business units while O'Donnell and a 'transition team' including Numark COO Paul Antrop 'begin looking for areas where the two companies can benefit from each other's strengths'.

Streaming jazz

UK: The recent Freedom of the City jazz festival saw independent radio production and online specialist Somethin' Else deliver a new web site for its coverage by BBC Radio 3. The long-running series Jazz on 3 celebrated its move to a new slot on Friday nights with coverage of the event. Somethin' Else also produces the radio series with the web site allowing responsive tailoring of its content to the radio programme.

The site will be updated twice weekly and feature extensive background information on the artists and music featured on Jazz on 3. Additionally, there are to be a further four online-specific 'special projects' for Jazz on 3 throughout the year—the first being the online broadcast of the Freedom of the City.

The festival celebrates radical and improvised music and streamed live for three days on the Net over the May Bank Holiday, showcasing new and improvised music from over 50 artists—something that has never been done before on such a large scale. Artists include Evan Parker, Phil Minton, Maggie Nicols, John Butcher, Eddie Prevost, Veryan Weston, Steve Beresford, Caroline Kraabel, Mass Producers (an orchestra of 21 saxophones), and the London Improvisers Orchestra. All the performances will be recorded for future transmission on Jazz on 3, and video footage of the event will be archived and available online afterwards via the Jazz on 3 web site until the 2002 festival displaces it. www.bbc.co.uk/radio3/jazz/www.emanemdisc.com/festival.html

Studer gets Amek in restructure

Europe: In a surprise move, Harman has announced the formation of the Harman Pro Electronics Group, within which Studer will acquire Amek to form the Recording and Broadcast subgroup while Soundcraft will form the basis of the Sound Reinforcement subgroup. The announcement came from vice chairman CEO, Bernard Girod who proclaimed the sharing of resources and technology between Soundcraft, Studer and Amek would form the world's largest manufacturer of mixing consoles but admitted that, 'some product rationalisation will take place between the two subgroups to reflect their specific market focus'.

John Carpanini, who was recently appointed MD of Soundcraft-BSS, will head the Pro Electronics Group group reporting to Mark Terry, president of Harman International's Professional Group. Reporting to Carpanini will be Bruno Hochstrasser as president of Studer and VP of sales and marketing for the Recording and Broadcast subgroup. BSS will continue to report to Carpanini under its current structure. 'I am very pleased at the formation of this new group' said Girod. 'It possesses the best brands, products and technology in

CONTRACTS

'She Loves You'. Also in Paris, Studio Guillaume Tell is upgrading its Boxer monitoring system to a custom surround system based on the Boxer T5.
Labomatic, France. Tel: +33 1 40 74 01 22.
Guillame Tell, France. Tel: +331 4204 0505.
Euphonix Europe. Tel: +44 20 8901 7510.
Coastal Acoustics, UK.
Tel: +44 1483 885678.

US: Now known as The Cave, Billy Bob Thorton's new studio belonged to Guns N' Roses axeman, Slash when Jim Mitchell recorded his album *Ain't Life Grand*. Having changed hands, the studio has seen the installation of an iZ Technology Radar 24 hard-disk recording system and hosted late-night jam session with the likes of Robbie Robertson, Billy Gibbons and Penelope Cruz.
iZ Technology, Canada.
Tel: +1 604 430 5818.

Australia: AV editing and mastering facility, Editel, has added ARX Level 8 Line interfaces to its extensive equipment stocks while ARX dealer Soundcorp has supplied a further four Mixx 4-channel mic mixers to the Triple M FM Network to expand its football commentary rig.
ARX, Australia. Tel: +61 3 9555 7859.

India: Mumbai-based recording operation Western Outdoor Media Technologies has taken a 24-track DAR SoundStation Storm editing system for its new digital facility in Mahalaxmi. The Mahalaxmi facility also has a 56-input Sony DMX-R100 console and outboard equipment including Amek 9098 modules, tc electronic Finalizer Express and a Tascam DA98HR.
WOMT Mahalaxmi, India.
Tel: +91 22 490 2013.
DAR, UK. Tel: +44 1372 742848.

UK: Having completed its relocation from Wembley to The Watford Coliseum, CTS Studios now claims one of the finest orchestral acoustics in Europe. In the course of moving and updating its Capricorn desk and ATC SCM150 monitors, CTS called on VDC to supply over 500m of Van Damme Brown-series 8-way quad multicore, 200m of AES-EBU Green-series 4-pair and 8-pair multicore, various custom panels and 275 analogue and digital XLR patchcords. The first project was Alan Silvestri's score for *The Mummy Returns*. At CTS' sister facility, Lansdowne Mastering, a new SADiE Artemis system has been installed along with CEDAR restoration tools.
CTS Studios, UK. Tel: +44 20 7467 0099.
Lansdowne Mastering, UK.
Tel: +44 20 7727 0041.
VDC Trading, UK. Tel: +44 20 7700 2777.

CONTRACTS

UK: London-based OB specialist, Wired For Sound, has taken Telos' new Zephyr Xstream ISDN codec, marking its first placement in Europe. Launched at NAB, the codec is compatible with Zephyr and features MPEG2 AAC coding. Wired For Sound offers the largest rental stock of Telos ISDN codecs in Europe, along with ISDN and POTS codecs from other leading manufacturers and a full range of OB and production equipment.
Telos Systems, US. Tel: +1 216 241 7225.
Wired For Sound, UK.
Tel: +44 20 8880 4840.

Switzerland: Che Lab Studios, owned by gold-selling Swiss recording star Che, has opened just outside Zurich. The multi-room facility was designed by Swiss architect Peter Vetsch with architectural and acoustical design by the Walters-Storyk Design Group Europe, and offers a Tascam TMD-8000 digital console, DA-88 plus recorders and the first Swiss install of Behringer Truth close-field monitors.
Che Lab Studios, Switzerland.
Tel: +41 1 776 11 11.
WSDG-E Switzerland.
Tel: +41 61 903 13 40/41.

US: Seattle-based Real Broadcast Network has installed over 100 Symetrix 421m and 422 AGC-levellers at its new Internet Broadcast Operations Center Internet streaming hub. Seventy-six 421m units manipulate incoming telephone signals to ensure that the level is consistent while an additional 52 422 Stereo AGC-levellers perform the same task on incoming satellite channels. RBN has also installed a comprehensive Philips routeing system, CircuitWerks phone couplers, and Snell and Wilcox Kudos Series A–D convertors, and custom Pinnacle System digital AV encoders.
Symetrix, US. Tel: +1 425 787 3222.

US: American Mastering houses Bernie Grundman Mastering and Bob Ludwig's Gateway Mastering have taken four Cube-Tec AudioCubes and six channels of Millennia TCL-compressors respectively. Grundman's identical 24-96 AudioCube systems are configured with Dual Pentium processors, DDP Pre-Mastering software, and a 'full compliment' of VPI mastering and restoration tools unique to the AudioCube platform. The TCL-2 Twincom Twin Topology Opto-Compressors are for the surround mastering room at Gateway where they will serve surround dynamics applications.
Cube-Tec, US. Tel: +1 905 469 8080.
Millennia Media, US. Tel: +1 530 647 0750.

the marketplace. Under the leadership of Mark Terry and John Carpanini, I expect it to perform splendidly.'

AudioFile Pro Tool friend

UK: AMS Neve has released vSC2.10 software for the AudioFile. Notably, the new software features DSP plug-ins and compatibility with Digidesign's Pro Tools system with the ability to import Pro Tools session files into the AudioFile SC.

Version SC2.10 allows browsing of folders and Pro Tools 5.0 session files. Pro Tools files to be rendered or converted to AudioFile including real-time fades. The import process offers an AudioFile events list which can be played and edited as desired. DSP Plug-ins are another key feature of Version SC2.10 and can be divided into three basic categories: time-based plug-ins including SuperTimeflex, pitch change, delay, delay with modulation, room echo and Doppler effects; frequency-based plug-ins offering single and 4-band EQ with a choice of different algorithms; and a suite of creative sound effects for sound design. Plug-ins include ring modulation, resonance, multiband resonance, multiband frequency-selective delay, distortion, harmonisation and feedback. These effects can be combined together by the user as desired and saved as presets. Other features of vSC2.10 include: Multitrack Trim (enables zones to be, events are added to the zones by the user) and enhancement of Msoft Serversound Integration. Sound effects can be transferred from Serversound to AudioFile from the Msoft browser which now incorporates an icon which initiates

US: Occupying the site of Kendun Recorders (originally constructed in 1971 and the subsequent home of a number of studios), Glenwood Place Studios is Burbank's latest music production complex. Owned by Alan Kubicka, president of the Chicago Recording Company, the facility offers a 72-input Amek 9098i console in a recording and mixing room, a second 9098i in a 5.1 tracking and mixing room and additional production and pre-production rooms. Ancillary equipment includes a new ATR new 1-inch analogue stereo machine, Studer A827 Gold Edition analogue 24-track and outboard from API, Lexicon, Manley, Neve, tc electronic and Urei. Wave:Space provided acoustic design and engineering services including installation of a proprietary control room monitor system in every studio. Coincidentally, Wave:Space chief Carl Yanchar helped owner Kent Duncan design and build Kendun Recorders during the seventies. Glenwood Place Studios, US. Tel +1 818 260 9555.

Sintefex' criminal activities

THE SINTEFEX AUDIO FX8000, the world's first digital 'audio effects replicator', is attracting suspicion. Quite literally, as an encounter at the recent AES Convention in Amsterdam confirmed, the Portugal-based company was approached by a representative of The Netherlands Ministry of Justice, interested in the Replicator's potential for forensic applications. As a result, Sintefex is now gearing up for sales to both Dutch and US clients engaged in forensic research. Sintefex co-founder and Replicator inventor Mike Kemp spoke to *Studio Sound*.

Q: *Who was that masked man?*

He was from the Forensic Department, and a specialist in speech and document recognition. He was obviously very familiar with recording equipment.

Q: *How did they get onto you, as it were?*

I gave a paper on dynamic convolution in Munich two years ago, and another one in LA last September. The papers are readily available. It was the Munich one which showed how you could sample a signal chain and recreate it.

Q: *Is it the same principle for forensic use as for creative recording use?*

Exactly the same, that's the great thing. The original concept was for any signal chain, and not only can you do a high-quality signal path such as for music recording, but also simple things like telephones and cheap things like old radios. I always thought there might be film dubbing applications, for atmospheric room effects and dialogue replacement.

Q: *Are they using it to bug hotel rooms?*

It's for telephones, mainly. If you stick our test signal through a loudspeaker into a telephone, a Replicator records what comes out the other end, from then on any signal you put through that program sounds like it's been through the same telephone.

Q: *How does this help them with their enquiries?*

The problem they have is convincing a jury that a suspect's voice on a distorted tape recording of a telephone conversation actually belongs to the suspect. Most people would have difficulty identifying a voice once it's been through a particular cell phone, over a link and recorded somewhere.

Q: *So you Replicate the signal path in court?*

Exactly. If you sample the signal path from the cell phone to the tapping point, you can then play back a recording of the suspect through the same path, that is in the Replicator. You could even do it live in court, a real-time comparison, with a microphone connected to the Replicator. That would certainly work for expert witnesses.

Q: *How about an Audio Identity Parade?*

Absolutely. You could have six people behind a screen, talking in turn through the Replicator...

Q: *Do you feel on the verge of unimaginable industrial wealth?*

Well, the possibilities are enormous. When our visitor first asked if we could do this, I thought blimey—it could almost have been designed for it! Sintefex Audio, Tel: +351 82 361748.

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Head Office: Soundtracs PLC, The Clock House, 4 Dorking Road, Epsom, Surrey, KT18 7LX, England Tel: +44 (0) 1372 845 600 Fax: +44 (0) 1372 845 656 Email: sales@soundtracs.com

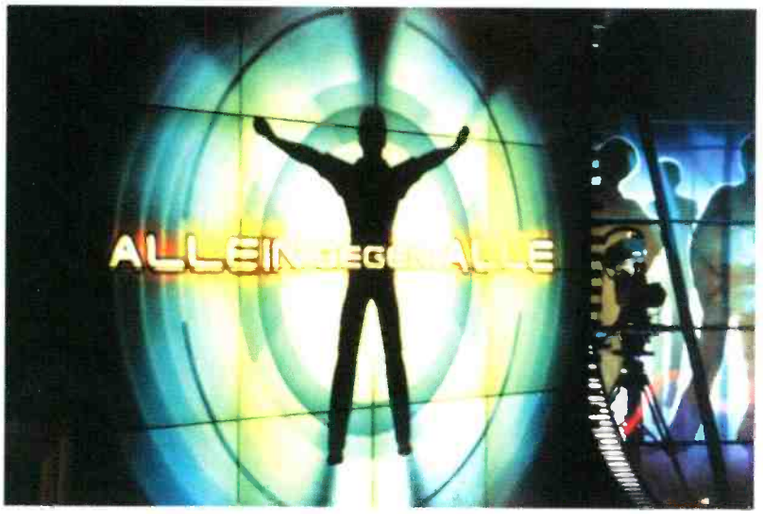
CONTRACTS

Switzerland: Swiss Radio International has taken a further three 4-channel Waves Maxxstream M-200 Internet streaming processors following its initial purchase of an M-200 around four months ago.
Swiss Radio, Switzerland.
Tel: +31 350 97 74.
Waves, Israel. Tel: +972 3 6081752.

UK: London-based post facility The Sound Store has installed a second Fairlight Fame2 and a third MFX3plus all networked with Fairlight's MediaLink server. Providing documentary and current affairs programming, the facility has recently completed work on the BBC's *Human Face* series featuring John Cleese and Elizabeth Hurley and the documentary series *Hell in the Pacific*, a Carlton Television Production for Channel 4. Meanwhile Magmasters, now part of the 4MC Group, has placed an order for a second AMS Neve Libra Post console and three AudioFile SC editing systems. The Libra Post part of a refurbishment and will work on drama, documentaries and light entertainment while the SCs will be installed in new

suites at 4MC serving features and drama.
The Sound Store, UK.
Tel +44 20 7637 7472.
4MC, UK. Tel: +44 20 7439 0600.
Fairlight UK. Tel: +44 20 7267 3323.
AMS Neve, UK. Tel: +44 1282 457011.

UK: The latest in its ongoing programme of improvement and refurbishment, London's Abbey Road Studios is re-fitting Studio One. Cabling for the project has come from VDC and includes Van Damme Blue series 24pr, 8pr and 4pr; Red series 5-way miniature video multicore, and over 1km of Standard 75R co-ax. VDC is also involved in off-site cable termination, and is completing 64 EDAC 90-way 24-channel assemblies which will be returned to Abbey Road fully tested and ready to be installed. The studio's new Audio Restoration Suite, meanwhile, has had a Leitch AES-EBU Integrator digital routeing system and RouterWorks graphical control software installed. The 64 x 64 router matrix was chosen partly for its signal transparency, avoiding the use of resampling.
Abbey Road Studios, UK.
Tel: +44 20 7266 7000.
VDC, UK. Tel: +44 20 7700 2777.
Leitch, UK. Tel: +44 1344 446000.



Germany: Cologne-based TV production company MAP has equipped its second studio with a Telex intercom system. Completed at the beginning of this year, the installation comprised Telex Zeus system with seven KP12 key panels and accessories. Telex, Germany. Tel: +49 9421 706464.

the transfer giving even faster integration than the previous drag and drop system. Version SC2.10 also includes vSC2.00 wave file import and export, cue folder system and enhanced user defaults.

Sonic's DVD tour

US: Sonic Solutions is running a 46-city seminar series entitled DVD Fundamentals around North America. Intended to explain the latest developments in DVD technology, the seminars focus on automated DVD production, web-enabled DVD production, and developing DVDs for distribution on multiple formats including DVD-R, DVD-RW, DVD-RAM, DLT, CD-ROM and the soon-to be-introduced DVD+RW drives. Demonstrations will feature Sonic Scenarist and DVD Creator and DVD Fusion, an advanced DVD production system designed to integrate seamlessly with nonlinear video editing systems.

The first seminars will be held in New York, Los Angeles, Seattle, and Phoenix with additional seminars for Atlanta, Chicago, Miami, Montreal and others, through September 2001. The tour will introduce attendees to the steps involved in authoring DVD titles and integrating DVD content with the Web. In addition, the sessions will explain how to create DVD titles that play from CD-ROMs on virtually any PC. DVD project workflow will also be discussed, covering configurations from a single computer workstation to distributed workflow models across a workgroup for further efficiency and productivity. Other topics covered at the event include approaches to tap the entertainment power of DVD, finding and keeping DVD customers, keys to understanding today's market and customer demographics, project planning strategies, and rethinking facility design for DVD production. To register visit www.sonic.com.

It's only business

World: The recent European AES Convention provided the backdrop for Otari's Mr Hosoda and Lawo's Philipp Lawo to formalise the Japanese distribution of German-based Lawo equipment by Otari Japan. The OtariTec company has now taken on exclusive marketing and sales of Lawo products including engineering, installation and servicing. The contract is seen by Lawo as the first step into the powerful Far-East market sector, and by OtariTec as a further opening of the Japanese professional audio market to European manufacturers. The Tokyo AES subsequently saw Lawo present its Diamond-series and mc^2-series consoles to the Japanese.

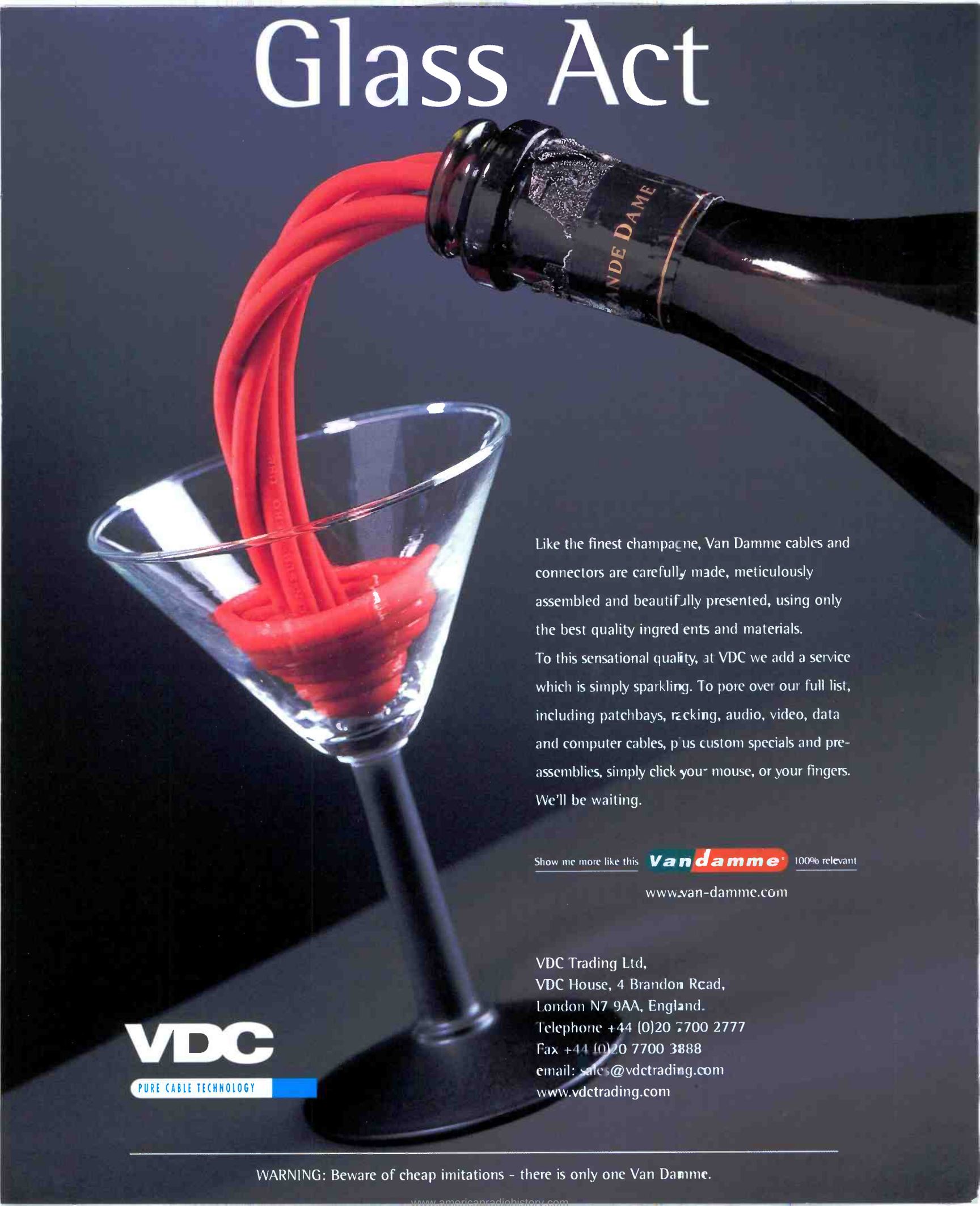
San Francisco-based Rocket Network has received $9.3m from Cisco Systems, Weston Presidio and Paul Allen's Vulcan Ventures in the first close of a new round of investment. Both parties have previously invested in Rocket Network, and have seats on the Company board. Pam Miller, President and CEO of Rocket Network commented, 'This investment will allow us to implement new capabilities that further simplify the audio production work flow process for our customers. This round was focused on continuing relationships with current investors and bringing in new corporate partners who can help us grow the business and enhance our technology.'

Colorado came to Texas when Austin-based Cirrus Logic acquired Boulder's Peak Audio. The DSP chip specialist has taken over the developer of key audio technologies—including CobraNet and MediaMatrix audio network systems—in order to 'leverage Peak Audio's industry-leading skills and complementary technologies to develop a broad range of entertainment-centric audio solutions for networked environments in both the commercial and consumer audio markets'. The move sees Cirrus retaining all Peak's technical personnel and retaining its Boulder base.

British-based Harris Corporation it to acquire assets of Hirschmann Multimedia Communications Networks had sales of US$26m last year and is the broadcast business of Hirschmann Austria. A member of Aditron AG, the Electronics sector of Rheinmetall, Germany, Hirschmann MCN is a leading provider of European-standard DVB-T digital television and DAB transmitters, digital cable systems, and low-power analogue television transmitters. The acquisition is subject to regulatory and other closing conditions, and continues Harris' digital broadcast systems strategy. Phillip Farmer, chairman and CEO of Harris said, 'Hirschmann MCN will accel-

UK: Manchester's LBS recording studio has placed a Soundtracs DS-M digital console-recorder in its Studio A as part of a complete refurbishment. Studio A offers a live area and three voice-over booths serving music production and agency work as part of the three-studio facility. LBS +44 161 477 2710.

Glass Act



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APPOINTMENTS

Aphex Systems has appointed Eric Brooking to the new position of engineering manager, with responsibility for DS and algorithm development, and power-supply design. Brooking was VP of engineering at Kove Audio Group, and previously responsible for initial work on the POD from Line 6.

Klotz Digital America has named Christopher Kemp project engineer. He will be responsible for system design, installation and maintenance and also include customer support in installation-related capacities from project implementation to completion. Most recently, Kemp was owner of Willowhaus Audio Productions providing audio services for music and television applications.

Telex EVI Audio Europe has made Christian Latzelsberger responsible for the distribution of Telex and RTS products in North Europe. His brings experience of the mobile and stationary event sound reinforcement and broadcasting market to the post.

Fairlight ESP has appointed Matthew Causon as director of European Sales. Based in London, Causon brings understanding of the European pro-audio markets from his prior position as European director at Digidesign. He will be responsible for developing distribution for Fairlight's post and music recording products. Over at Fairlight On Air, Chris Brandsema takes the new position of European sales manager, based in Amhem. He will plan and implement new sales strategies for the European Broadcast market, covering CoSTAR and Fusion.

Transamerica AG has appointed Richard Bowman as sales manager. Based in Las Vegas, he will handle

sales, technical problems, installations, and troubleshooting. Bowman's previous experience includes Mars, Tascam, and Guitar Center.

France: Daft Punk founder Guy-Manuel De Holmen Cristo and record label partner DJ Rico (pictured left, with assistant engineer Juan Carlos Pellegrino), have installed a Neve Melbourne console at their studio in Paris. Recovered from a studio in Australia and supplied by Funky Junk France, the console will be used at all stages of the writing and recording process with Daft Punk as well as on collaborations with other artists

erate Harris' penetration of high-potential DVB-T and DAB transmitter markets, which are expected to exceed $1bn in the next decade as the transition from analogue to digital technology increases in pace.'

Dolby looks to new business models

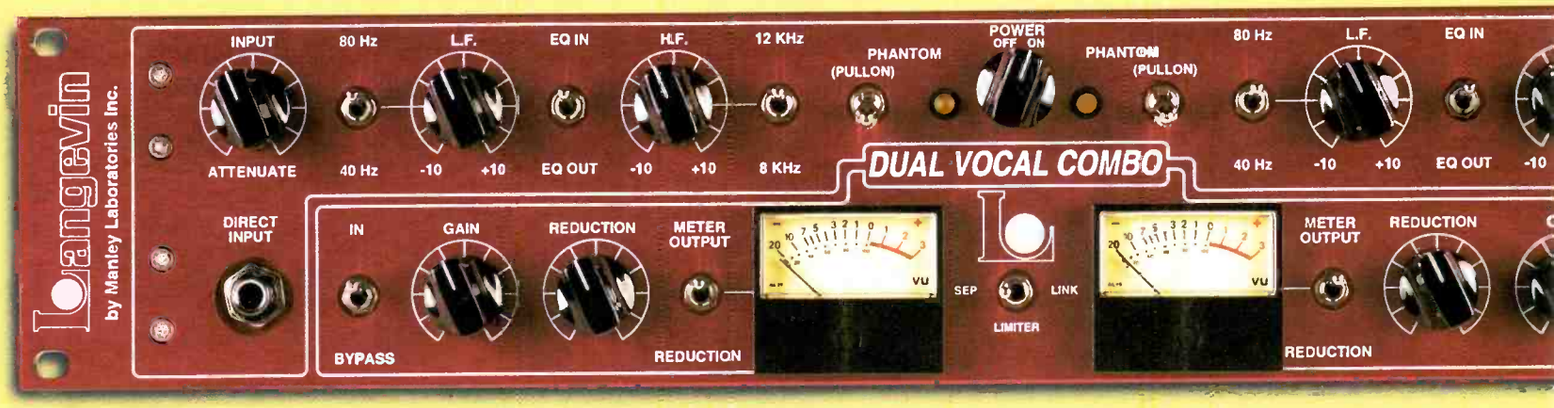
US: Dolby Laboratories has launched a new implementation of its AAC coding technology, designed to help incorporate AAC encoding into CD-ripping applications or other consumer-targeted high-quality audio encoding applications. The announcement of AAC Consumer Encoder Implementation comes with claims that AAC 'is state-of-the-art in audio compression technology, allowing users to create compressed audio that sounds just as brilliant as the original due to its remarkable ability to eliminate over 90% of the original audio signal without noticeable differences or distracting artefacts, AAC is widely regarded as the successor technology to MP3'.

While major record companies such as BMG, Universal Music Group and Warner Music Group are using AAC for Internet distribution, the assertion that a lossy compression format is in use for audio archiving applications may be of additional concern to the pro-audio industry.

AAC Consumer Encoder Implementation sits alongside Dolby's Professional Encoder Implementation which supports a variety of input sample rates and output bit rates and is intended to be suitable for creating AAC-enabled products intended for professional applications 'such as audio-editing software, broadcast encoding hardware, or mass encoding solutions for content preparation applications'. The AAC Consumer Encoder, meanwhile, 'is designed to achieve high-quality audio with maximum encode speed. The consumer encoder can produce AAC bitstreams up to three times faster (depending on input material and target bit rates) than the professional encoder; and this code base is recommended for creating consumer products such as CD-rippers'.

Dolby's Ramzi Haidamus commented, 'We look forward to helping AAC licensees produce high-performance AAC products such as CD-rippers, music players, and PC-based jukeboxes. These next-generation products will include digital rights management technologies to enable new business models and increase distribution security. AAC perfectly complements these important elements while at the same time improving audio quality over all existing audio compression formats.'

AAC encoder implementation licenses are available to AAC patent licensees. For more information about AAC, visit www.aac-audio.com, or email aacla@dolby.com



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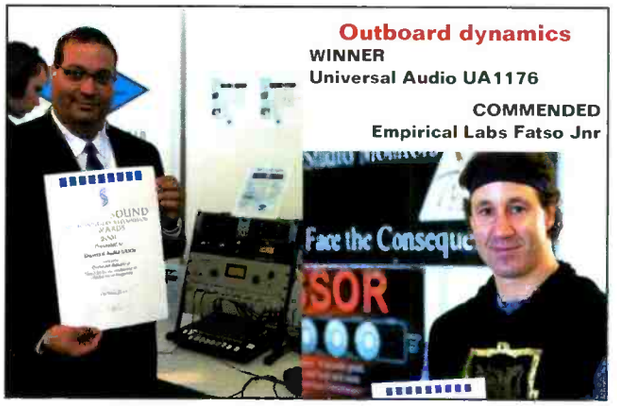
SSAIRAs RESULTS 2001

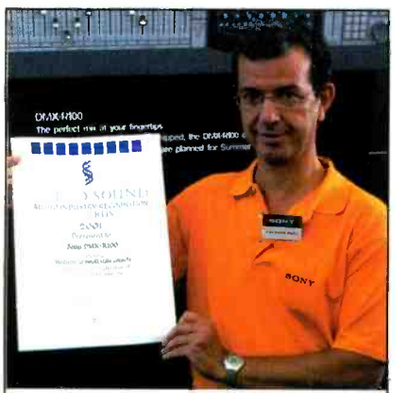
Studio Sound's readers completed their voting in time for the presentation of the magazine's SSAIRA awards at the AES Convention in Amsterdam. Highlighting the cream of the crop of last year's product releases in a number of categories, winners and commendeds should be encouraged by the fact that their best efforts have been recognised by the best informed and most influential international readership in the professional audio world

Large scale console
WINNER
AMS Neve 88R



Outboard dynamics
WINNER
Universal Audio UA1176

COMMENDED
Empirical Labs Fatso Jnr

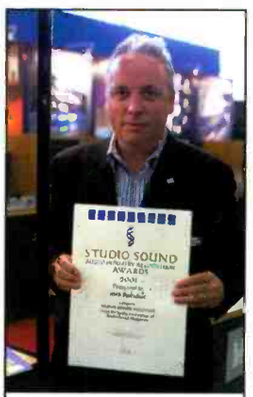


Medium to small scale console
WINNER
Sony DMX-R100

Microphone
WINNER
Audio Technica AT895

COMMENDED
Sennheiser MKH800

Monitor
WINNER
Klein & Hummel 0198

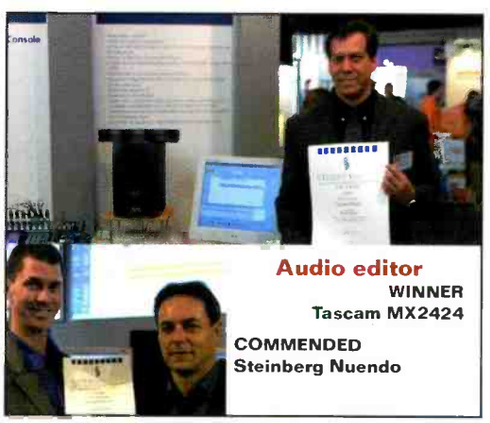


Location portable equipment
WINNER
HHb Portadisc

Outboard preamp
WINNER
Avalon AD2022

Audio recorder
WINNER
Marantz CDR500

COMMENDED
Tascam DA98HR



Audio editor
WINNER
Tascam MX2424

COMMENDED
Steinberg Nuendo

Outboard EQ
WINNER
Millennia Media Origin STT-1

Combined outboard device
WINNER
Sintefex Replicator

COMMENDED
Roland VP8000

Outboard reverb
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Lexicon 960

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WINNER
Cedar DNS1000

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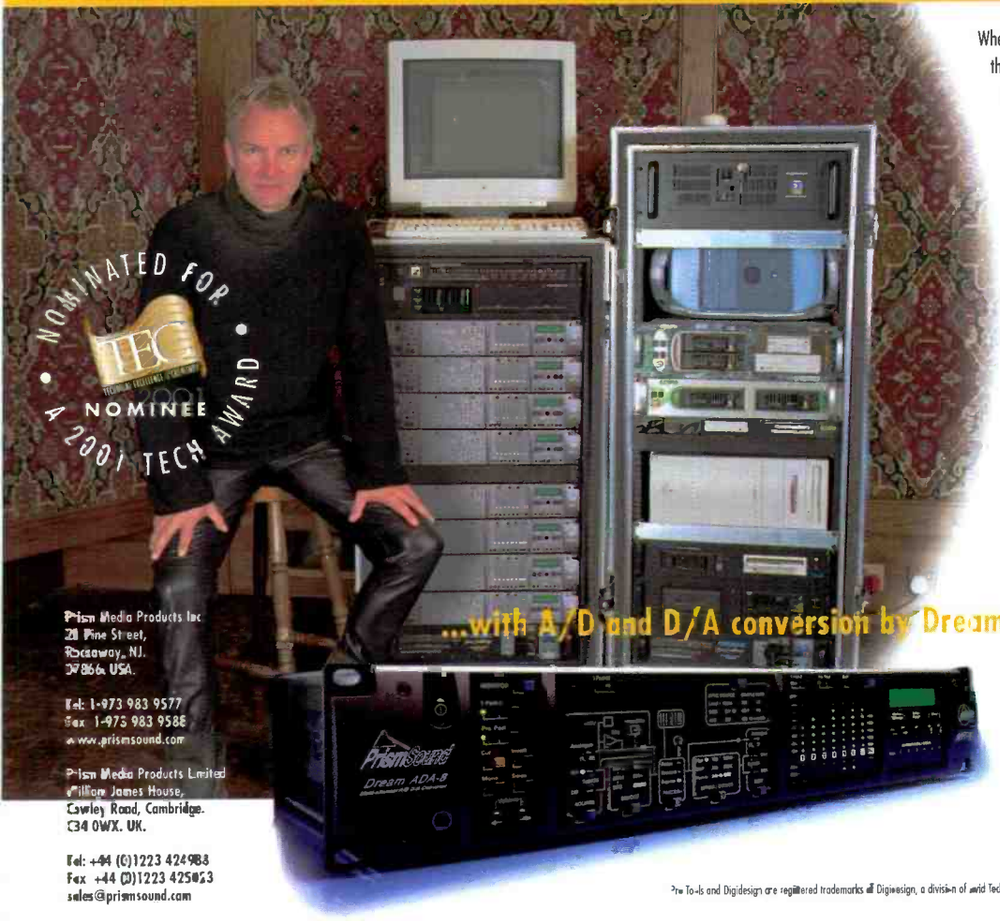

When Sting and engineer/mixer Simon Osborne went shopping for a new multi-track recording and editing system they wanted the best A/D and D/A conversion available. The new system is equipped with 8 ADA-8 units providing 64 channels of Prism Sound A/D and D/A conversion and AES I/O.

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Simon Osborne – Engineer/Mixer

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PrismSound

ON THE ROAD

With the refit of the Artisan remote recording truck, South Florida's professional audio is on the move again in more ways than one reports **Dan Daley**

IF THE RECENT US PRESIDENTIAL election didn't sufficiently imprint South Florida on millions of minds, it's also worth noting that many of those same middle-class, middle-aged voters we saw squinting at the hanging chads on television were also around the area 30 years ago. That was when Miami seemed to be the centre of the rock music universe, with artists like Eric Clapton and the Bee Gees settling for long stints at Criteria Studios. In the case of the Bee Gees, they stayed for good.

Miami is once again in the pop music limelight, though this time the artists, led by Ricky Martin and Christine Aguilera, are less scruffy, polished to the point of squeakiness. Once again, everyone wants to come to South Florida to make records, though mostly during 'the season', which runs from the first hint of frost in Manhattan to the onset of hurricane season in June.

With all the world seemingly coming to Florida, you'd wonder if Florida could ever come to you. Actually, it has been doing just that, since 1977, when Peter Yianilos, a 21-year-old starry-eyed and earnest guitar player living in Orlando decided to combine a love of music and a penchant for travelling into a new venture on wheels. At its inception, Artisan Remote Recording was housed in a GMC motorcoach, but it was one of those Interstate behemoths from the days before they were called RVs, when they were unintentionally cool because, short of an actual 45-foot lorry, they were the biggest civilian things on the road in the pre-SUV era. 'But it wasn't like some Winnebago', Yianilos recalls. 'It was very cool and fun to drive, very sleek and modern for its time. The driver sat almost in the middle and was surrounded by glass and really sat above it all.' Yianilos also remembers how, not having ever seen a professional remote recording truck, he designed his first one on instinct. 'I just built it how I thought it should work,' he says. 'It seemed logical putting the console up against the back wall of the truck and to put the gear racks up along the driver's side. Besides, you could part the curtains and sit at the console and look out a nice big picture window while you worked.'

Yianilos is positively misty about those days, which were particularly rewarding because Artisan managed to become a successful proposition fairly early in the game. With a few high-profile recordings for acts like CSN&Y, Linda Ronstadt and Weather Report in its first year of operations, the truck, with its very-Florida complement of MCI JH-400 console and MCI JH-24 multitrack decks, caught the eye of another MCI aficionado. Mac Emerman, founder and owner of Criteria Studios and running buddy of MCI founder Jeep Harned, got his own start in the audio business with remote jazz recordings he did from the back of a station wagon. He contacted Yianilos and they hammered out a handshake deal that made Artisan Criteria's *de facto*

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remote truck, an arrangement that lasted for over three years. (It ended on a sour note, Yianilos recalls sadly, which prompted Criteria to build its own remote truck, which Yianilos says was modelled on his, and which was not a success, partly a victim of Criteria's own sliding fortunes in the 1980s. The Criteria truck was sold a company in Puerto Rico not long after it was commissioned.)

That first truck would last for 16 years, until 1993, when Yianilos made the transition to the biggest leagues, moving over to a 36-foot-long/8.5-foot-wide (the broadest legal width for US highways) Pace trailer attached to a Volvo tractor with a 370hp, Cummins engine and a 10-speed gear box. Oh yes, there was a studio in the trailer, but Yianilos—who does all his own driving as well as recording and mixing—seems as boyishly fascinated by the rig as he is by audio gear. 'People get a real kick out of watching me climb out the trailer after doing a mix and then climb into the cab and drive away,' he says.

Yianilos remembers the date of the changeover from small to large truck precisely, for an interesting reason. 'We had the last date for the old truck on 15th March, 1993, at the Calle Ocho festival in Miami's Little Havana,' he recalls. 'On the 22nd March, the new truck had its first gig, which turned out to be a hit record.'

That record was 'I Will Always Love You', Whitney Houston's monster hit from the film *The Bodyguard*. The track had already been recorded in Los Angeles, and Artisan had originally been hired just to record audio for a series of exterior shots for the film being shot outside Miami Beach's legendary Fountainbleu Hotel. Inside the hotel, however, Houston was to do a critical scene with co-star Kevin Costner, the one in which their relationship transitions to love, and the one for which the Dolly Parton-penned song had been intended.

'It had been planned all along that Whitney would lip sync to the track they recorded in LA,' says Yianilos. 'But apparently Whitney said something to the effect of, "I never lip-sync anything". They hired a great band, including Steve Gadd on drums, and in my truck Bill Schnee is engineering and David Foster is producing. We did five takes and number four was the keeper. I thought it was great but figured that this was something you do when the star wants to do it; I never thought it would be the actual track in the film. But then I got a call from the music supervisor a few months later telling me exactly that, the vibe they got from recording on the set was so unique and emotional. So the track on the score and the hit record was recorded in the ballroom of the Fountainbleu Hotel by this truck.'

It was an auspicious start for the new truck, which still embodied Yianilos' youthful exuberance in its design. In 2000, as Miami-based artists increasingly began ascending the charts, it was time for another revision of the truck.

'It was a comfort issue and a matter of being able to accommodate new formats,' says Yianilos. 'We couldn't fit a 48-track digital into the old design, and we were getting more and more clients at the level where you couldn't say "No, I can't" to them.'

Yianilos hired John Arthur, a Miami-based studio designer, to help with the remodelling of the truck, now based in Ft Lauderdale, an hour north of Miami. The refit of the truck was substantial, Arthur recalls. 'We stripped the trailer to its skin,' he says. With the interior walls peeled away, a spring-loaded resilience strip, also known as an RC-1 channel, was run around the perimeters to hold $^{5}/_{8}$-inch-thick panels of MDS and $^{1}/_{8}$-inch-thick panels of 'loaded vinyl', a sound insulator which Yianilos jokingly refers to as 'politically correct' because it contains no lead. The same combination was applied to the floors beneath a new $^{3}/_{4}$-inch layer of tongue-and-groove plywood covering. This sandwich of the two materials resulted in a dramatic reduction of external noise penetration.

Yianilos decided to stay with the Amek Hendrix console he's had in the truck for several years. The desk has 40 mono inputs and eight stereo ones, and is fitted with SuperTrue automation, and is buttressed by a pair of Hill Multimix 16:4 submixers, and two Yamaha 02R digital mixers, which give the truck a maximum of 120 inputs. Yianilos believes that an upgrade to the physical plant didn't necessarily require an upgrade of console. 'It's not a matter of always having the latest, the greatest,' he says. 'Music recording is very well served by analogue consoles, and the Amek is a good fit for both music and for remote recording. It's simple, clean, reliable and robust. And most other engineers can come right in and sit down and be comfortable with it.'

With new walls in place, Arthur refitted the control room area acoustically, designing in soffits for the new Hafler TRM-8 active monitors. Though 5.1 was not implemented in this go-round, soffit provisions were made for that for future upgrades. A broad-band trap was fitted to the front wall, with bass traps in the room's corners. Using graduated custom acoustical panels along the walls, Arthur had the truck's acoustics gradually change from front to back. 'We wanted the mix position to be very, very flat and accurate,' he explains. 'But as you progress to the back of the truck towards the producer's position, it becomes slightly brighter. The reason for this is that the sound can open up as it hits that area without having to turn the volume up from the mix position.'

Along with flat-panel display monitors for video and automation, the finishing touches are curvilinear cabinetry and other furniture and trim elements that both create an aesthetic and serve a function. 'They help delineate and separate the spaces on the truck,' says Arthur. 'You want a sense that each area —the mixing position, the machine area, the producer's area—are all complete spaces unto themselves but that they also integrate into the entire truck. We accomplished that with trim and low-voltage lighting.'

The machine area in the rear of the truck can accommodate two racks of Tascam DA-88s, or a pair of Sony 3348 decks, or one rack and one 3348. The trucks HVAC was also boosted and better zonal climate control added.

The truck, which celebrates its silver anniversary next year, had been taken to the next level, and the total investment in the rig and gear was up over three-quarters of a million dollars. Would Miami's market continue to follow an upward course, as well?

'Remote recording is still a good market, especially down here,' says Yianilos. He notes that for most of his time in the business, he had no significant competition in the region, indeed hasn't had any until Transcontinental Studios—the R&D centre for In Synch, Backstreet Boys and a host of other boy bands—in Orlando launched their own truck two years ago. But that hasn't dampened Yianilos' enthusiasm or optimism about the market; Artisan has been ranging farther afield in recent years, logging 45,000 miles just on its work with the syndicated and successful Tom Joiner radio programme, which regularly does a live remote, with live music, from one of the 99 markets its affiliated stations are in.

But like every conventional for-hire studio facility these days, fixed or mobile, Yianilos has to balance the necessary upgrades and ongoing maintenance with cost-savings measures. 'I drive the truck. I do the engineering. I do the maintenance,' he says. 'I work my [expletive deleted] ass off! If I had to hire a driver and a full-time tech, I wouldn't be able to live and work at the level that I do. The costs of remote recording are about 50% higher than regular studios' costs. We can get between $3,000 and

$4,000 a day for the truck, which is higher than most studios get. But you have to offset that with additional costs, like road use fees and taxes, accommodations and security, as well as the amount of [equipment] rentals you have to do in a truck.'

Artisan is unquestionably a major-league remote facility in the US market. But Yianilos is nonetheless sandwiched between two other layers of remote classifications, both of which have grown in the last several years. On one hand, there are the large trucks that cater to the broadcasting business. Audio trucks have gained in importance in that market as televi-

sion sound has improved. But they still generally operate as support for video trucks, and they generally have high technology costs as a result. It's not a market niche Yianilos aspires to. 'Staying focused on music recording only is something of a restriction,' he acknowledges. 'But it's still a good market. And I'm partial to it because I'm a musician. And I confess to being a bit of a brat who doesn't want to work on stuff that doesn't turn me on. And sports broadcasts are not something I find exciting to work on. I'd much rather do music, from chamber orchestras to rock bands and everything in between.' (Yianilos still actively plays in a band, and co-produced and engineered all of the late Jaco Pastorius Warner Bros releases.)

The other niche is the ADAT-in-a-bread-truck sector, which has grown as pro audio technology has gotten smaller and more affordable. Yianilos says small start-ups of that sort haven't affected his business at this point, and he believes there is a place for them in the market. 'They give bands the opportunity to make a decent live recording in a club for $500,' he says.

In fact, Yianilos adds that he hopes some of them become successful and join the ranks of pro audio's road warriors. It's a community that exists as a tightly knit subset of the larger studio community, and with its high price of entry, considering the miles you have to cover in addition to the investment and the long hours of any studio, Yianilos says its clan members have a special kind of respect for each other. 'We were out on the road a few months ago and we saw the Sheffield truck going the other way on I-95,' he says. 'We honked. I don't know if they saw me. But they know we're out there.'

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iZ Technology Radar 24

Soon to be reborn as a fully-integrated, 192kHz 48-track machine, iZ's 24-track hard-disk recorder has received some clever fine tuning. **Dave Foister** gets on track

WITH THE RECENT APPEARANCE of dedicated hard-disk multitracks from the likes of Mackie, Tascam and Alesis (not to mention Euphonix) it's easy to forget that there's been a machine quietly getting on with the job for several years. While it's perhaps not part of the mainstream, there are many users around the world totally devoted to their RADAR systems, not just for convenience but for all the good reasons of sound quality, support and reliability. The system has previously appeared with Otari and Tascam badges but since August 2000 it has assumed the identity of its originators, iZ Technology, who continue to add to its capabilities and develop the concept. RADAR 48 will be with us shortly, offering 48 24-96 tracks simultaneously on a single box, but for now here's RADAR 24, the natural successor to RADAR II reviewed here in 1998.

RADAR is a two-box system; the big lump contains the works, but can be stashed out of sight as it has no controls on it at all. The only reason to get at it is to swap the removable hard drive (mounted in a standard Kingston caddy) or to use the backup and restore drive. The standard hard drive is 18Gb, giving 86 minutes of full 24-track recording at 48kHz; more about the back-up options later

The front end is a slim key-filled dedicated remote, and there are now two versions—the Session Controller, a familiar black keyboard that looks a bit basic and functional but is famously fast to use once you know it, and the new KC-24. This is now the standard remote, an altogether sleeker device that streamlines things, perhaps at the expense of direct access to some the functions, and the Session Controller is an optional extra. A meter bridge bolts on to the back edge of the remote, and shows track status as well as signal levels on up to 48 tracks. The system supplied to me was a RADAR 24 with Session Controller and meter bridge, so to all intents and purposes it looked pretty similar to RADAR II.

It's important to understand the basic concept of RADAR. Hard-disk recording generally began with stereo editing systems that gradually expanded their track capabilities as the power of the technology increased; RADAR came at it the other way, setting out to emulate the familiar working methods of a multitrack tape machine and then adding some basic editing functions. This is of course the way the recent crop of stand-alone hard-disk multitracks present themselves, but RADAR did it first, and makes no pretence at being a DAW despite its facility to connect an SVGA monitor to see waveforms and status displays. The editing functions remain basic but useful, including features designed for picture work, and retain the merit of being very fast and simple to operate.

Most of the new bits on RADAR 24 concern the inputs and outputs, which have had to keep pace with industry requirements in both analogue and digital domains. One thing that has always distinguished RADAR is the quality of its onboard convertors, and iZ can boast of users who bought it for its features and found themselves using it for its sound—no mean feat for a hard-drive workstation. The standard convertors were only 48kHz, so new interfaces have been made available to address the higher end of the market. Both use Nyquist convertors to give increased sampling rates, and the more expensive S-Nyquist option fulfils the promise of the 192kHz legend on the front panel. The review sample was 96kHz capable, and selecting this mode allowed only 12 tracks to be recorded simultaneously, as might be expected. The results are excellent, with the kind of solidity and clarity that we have come to expect from 24-96 recording; the frequent claims of analogue-like warmth seemed entirely justified.

On the digital front, optional boards are available to provide full 24-track I-O in most current formats. The one I had was fitted with the standard TDIF board, with three 25-pin Ds offering the standard Tascam interface. This is compatible with all Tascam-style machines but I had trouble getting signal into it either direct from a DA-38 or from a Yamaha 01V fitted with the optional TDIF card, even when connecting the wordclock (which I would not expect to be necessary). In this I was not helped by the manual; the only printed bit is a very basic quick-start guide, the rest being on a CD-ROM in Acrobat format. Not only is this not at all convenient for real use, but the pdf files turn out to have white spaces where there should be screen display graphics in several places, and to be rather badly organised if you actually want to find something. As it turned out, success depended on completing a set of menu options that included selecting internal TC reference, which in the case of the job I was doing was irrelevant, so I'd been skipping it. This wasn't in the manual and finding it wasted quite a lot of time.

TDIF and analogue are optional, and there's room for one more 24-channel interface. The same format of three 25-pins can provide 24 channels of AES-EBU in what's become the standard pin-out arrangement, as used on (again) the 01V and the tc System 6000 among others. An ADAT interface is also available, and along with the six 25-pin Ds for balanced analogue connections this makes for a rear panel that is very full despite its size. The back shows the presence of a PC chassis inside, with standard cards providing some of the nuts-and-bolts interfacing, and connectors on offer for PC control of the machine and two USB ports. Meanwhile the main panel carries the audio and sync stuff: all the expected connections are here, for time code, wordclock, and straight stereo digital in and out, as well as the chosen set of audio interfaces. Two channels of AES-EBU and-or SPDIF are standard, and which pair of tracks they go to or come from is selectable.

On the front the main difference from RADAR II is the backup drive. The standard drive used to be an Exabyte Eliant 820; this is fine for a system like SADiE that can back up and restore in the background, but RADAR can't do this, and also tends to have a lot more data for a given project, so speed is everything. DVD-RAM now outruns Exabyte in the data transfer stakes —1.4Mb/s as against 1—so this is the medium of choice on RADAR 24, currently giving 9.4Gb of storage per disc. Exabyte is still available as an option, and with this in place projects are interchangeable between RADAR 24 and earlier versions, as long as they're done

in a format that the earlier machine can support. This of course restricts the choices to 16 bits and up to 48kHz sampling rate if dealing with RADAR I, and precludes higher sampling rates with RADAR II. On the other hand, iZ also offers Exabyte Mammoth drives as options, whose capacity and transfer speeds leave DVD-RAM standing. All this lot runs on the machine's SCSI bus, and there's a SCSI port on the back for additional devices.

The Session Controller remote is perhaps more elaborate than its appearance would suggest. Like all good interfaces, it offers more than one way of skinning most cats; you can operate it almost entirely by wading through menus if that suits you, but the apparent forest of keys in fact comprises very logical groups of shortcuts to functions contained within those menus. For example, one group of buttons gives access to editing functions, another to synchronisation and locator parameters, and another to project management. The top rows of keys numbered 1-48 are primarily track arming buttons for two synchronised RADARs, but also choose tracks to edit, solo, route and various other functions. Not everything appears directly on the front panel, but most of the things you're likely to want in actual operation are there. In addition, there's a QWERTY keyboard that not only allows naming of projects, tracks and locator positions, but provides shortcuts to menu options. It also provides a nice smooth jog-shuttle wheel for precise identification of edit, auto-punch and locate points.

The editing facilities are deceptively straightforward. A chunk of audio is defined by using MARK IN and MARK OUT keys, and both points can be found using the scrub wheel, which itself is very analogue in feel, with a reassuring weight and a very realistic response. The tracks that are to be cut or copied to the clipboard can be selected, and then the whole chunk pasted in anywhere else on a corresponding number of tracks, with a choice of over-writing the existing material or pushing it aside in Insert mode. Edits can be looped, moved and slid around, and there's even an Undo function with corresponding Redo, also available with the Auto-Punch function. An additional feature that's particularly useful for pictures but has applications elsewhere is the facility to mark a Sync point, like other systems' hot spots, that allows, for example, an effect to be aligned to picture by spotting a door closure to the instant the door actually shuts. Again this can be defined using the WHEEL or the CURSOR keys acting as nudge buttons.

Work is organised in Projects, and several can be stored on the drive at once, numbered and named. Projects can be copied and deleted, and hard drive space can be automatically reclaimed when the audio on it is no longer in use. Smooth varispeed is available, with limits determined by the sampling rate in use, and there are no less than eight user-definable macro keys for your commonly-used sequences of functions.

There are tape machine remotes more elaborate than the Session Controller (never mind the simpler KC-24) that do less. If the aim of RADAR is to make non-linear recording as straightforward as tape recording but without the waiting around, iZ has clearly succeeded, as once you've mastered the apparently primitive layout there aren't many faster more direct interfaces than this. On the other hand, if the aim is to make RADAR a high-level recording medium with no quality compromises, again iZ has succeeded, with a sound that justifies the testimonials. And if the aim is to make the fundamental editing jobs as simple and intuitive as possible, success is again the result. There's no on-board processing or mixing, but that's no hardship; the manual needs re-writing but there's a new version on the way; and after I'd bent it to my will, I found myself feeling very comfortable with it. RADAR is a system I could happily live with, and not feel I'd cut any corners, and there are far more sophisticated users than me out there whom I'm sure would feel the same. □

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Magtrax Select Series

The evolution of multichannel monitoring controllers continues with a new series of units from the UK. **Rob James** talks sophisticated switching

I REMEMBER THE PROBLEMS that arose when television finally began to take stereo seriously. Not the least of these concerned monitor control which saw, in many cases, comprehensive mono monitoring reduced to a pair of direct-replay sources. The film industry was similarly afflicted by the arrival of analogue Dolby Stereo (now Surround) and once again when the various digital formats appeared. Then as now, many consoles were perfectly capable of handling the signal routeing to record in the desired formats but seriously lacking in adequate monitoring. The solution, of course, was to add a dedicated monitor controller. Today, multichannel formats are an increasingly important requirement in more modest surroundings. Fortunately, as this has begun to dawn on users, several manufacturers have brought their expertise to bear on the problem and more affordable units have appeared.

Monitor controllers have been around a long time but until recently most were semi-custom-built with commensurately high price tags. Magtrax, the company who manufacture the unit reviewed here and whose upmarket Ultima controllers are often found in film and broadcast installations, has more experience than most in the field. Its MusicBox controller was an off-the-shelf product for people who didn't need the complexity or cost of a bespoke solution and led to the development of the modular Select series. This supersedes the original MusicBox and extends the concept into an expandable system addressing specific applications. Five off-the-shelf permutations are available: WorkBox serves simple applications with DAWs and compact digital mixers; MusicBox adds Wide and Matrix inserts; MasterBox is aimed at music mastering and DVD authoring; DiscBox is also for mastering but with two digital inputs; and MixBox is for TV post and multistem music mixing.

As you might expect, with this many variants, Select is highly configurable. Many of the menu selections are effectively one-time setup options depending on how the rest of the installation is configured. Nine user memories store snapshots of all parameters.

Some screen messages are necessarily a little cryptic until you learn what they mean. For example; in the Speakers menu the choice SPKS B-A signifies the use of alternative front speakers but retains the main surrounds whereas SPKS B-B means alternative front and surrounds.

Apart from the dedicated direct input, all other installed multichannel input cards may be configured as 8-channel wide, two LCRS, four stereo or eight mono (centre). If this were not enough the Wide format may be freely defined globally to enable the system to accept signals in the 'house' order. Where an input is configured other than as wide the channels are split into Sets—for example, with two LCRS signals there will be two sets, (A and B) while with eight monos there will be eight sets (A-H). A further menu allows (in fact requires) the user to decide how the individual sets will respond to PEC-Direct (replay-direct) switching—will the input set be muted, locked on, only heard on replay or only heard on direct.

Yet another option, Input Flip, globally switches the inputs between LCR or LRC. This is to allow the Direct input, which would normally connect to a console's bus outputs, to accommodate LR or LCR panning.

At present all assigned inputs are mixed. So, for example, you could listen to dialogue and a couple of effects sources mixed on direct with a recorder return on replay mixed with the dialogue as a guide. Other inputs not relevant to the job in hand can remain muted on both replay and direct. An alternative mode will enable switching between any of the assigned inputs on direct. This is useful for mastering and authoring applications where there is a requirement for monitoring one source at one time compared with another, using the REPLAY switch.

The plethora of other menu choices include downmixing options with fully adjustable levels and parameters, phantom speakers (any or all of cen-

System details

A SELECT SYSTEM comprises the DataBit remote controller—where the 'intelligence' resides.

- A 1U-high mainframe with all the connections. The motherboard inside this unit accepts daughterboards to make up the various configurations.
- A separate, linear power supply.
- A mere 140mm wide by 122mm, theDataBit remote seems tiny. In applications such as OBs where real estate is at a premium this will be greatly appreciated. This is fractionally larger than the previous MusicBox unit although this is deceptive since the 13mm thick surface overhangs the 'box'. This facilitates simple and neat panel mounting by simply dropping the unit into a 130mm by 110mm hole. For free-standing use the surface is angled towards the operator.

The downside of such a compact controller is that room for keys and other controls is obviously limited. This results in many keys having multiple functions. However, the angled stance and clever layout makes the most of the available space and the alternative key functions are mostly restricted to set up operations. On the left nine CUT-SOLO keys are arranged in a logical representation of speaker positions. LCR at the top, Left Inner SUB-LFE and Right Inner in the middle and Left Surround, Mid Surround and Right Surround. The ALL CUT key is most prominent at the bottom. These 10 keys also double as 0-9 numeric. CUT/SOLO keys are illuminated when active. This may seem obvious but a surprising number of consoles and other kit use the reverse logic making it far more difficult to trace finger trouble. The individual mute keys momentarily mute all the outputs as they toggle.

In an arc above the rotary encoder are NEARFIELD, CALIBRATE, DIM and REPLAY, above in a straight line ESC/SPEED, ENTER/CUT, UP/SOLO, DOWN/MONO and SETUP complete the key set. All are internally illuminated. Adjacent to the backlit LCD display are LEDs to indicate whether inserts are bypassed, in Monitor or LtRt and 6.1 Record.

On the mainframe, all audio connections are on 25-pin D-subs which mostly follow Tascam conventions. When fully populated there are 13 of these. A 9-pin D-sub is used to connect the remote and a multipin latching Molex connector goes to the power supply. The 1.7m cable is captive at the power supply end. On the front panel a small push button switches power and a red LED indicates. Fans of the MusicBox colour scheme may be disappointed by the more restrained Select design but the current look retains the yellow theme and looks a lot smarter.

The Select range

ALL VARIANTS OF the Select have one surround speaker system output; two stereo speaker outputs, LCRS and Stereo Downmix outputs; a wide direct input and wide metering outputs; a wide recorder out; bass management and console talkback and solo remote functions.

- WorkBox adds a single extra 8-channel input.
- MusicBox is the same plus Wide and Matrix inserts (LtRt and 6.1 encode-decode).
- Masterbox adds five 8-channel inputs plus a second surround speaker system output.
- MixBox adds four 8-channel inputs plus Wide and Matrix inserts (LtRt and 6.1 encode-decode).
- DiscBox adds three 8-channel inputs, plus two AES-EBU 8-channel inputs.
- Each additional 8-channel surround input card may be software configured as a single 8-channel multi-format surround, two LCRS, four stereo or eight mono inputs.

All this adds up to a maximum of 72 input channels.

tre, left and right inners and sub), the size of the volume control steps and bass management. Not forgetting insert options, level trims and security locks. These last can, among other things, prevent nasty accidents when using the Select controller to route signals for recording.

Bass management functions determine if bass below 80Hz is to be re-routed from the main speakers to the sub and allows an 80Hz 12dB/octave filter to be inserted into the sub feed. Bass management is essential if overloads in domestic decoders are to be avoided. The meter feeds (a welcome addition) can be either pre or post insert, selected by an internal jumper. Once configured, the Select is reasonably convenient in day-to-day operation. For power users a Speed function is provided. This takes you into the last menu accessed and also enables direct numeric access to any menu.

The dubious practice of switching the unit on or off with the monitors powered does not give rise to horrendous thumps. Unlike many other units.

In addition to dealing with monitoring, Select controllers can be used to route signals to a master recorder of up to eight tracks. In Dolby Surround and 6.1 (Dolby EX or DTS ES) modes, the encoder and decoder can either be bypassed, inserted in series in the monitor path only, for discrete recording, or used with the encoder moved into the record path and the recorder return routed via the decoder to the monitors. Audio quality through the unit is subjectively transparent which is born out by the manufacturers figures.

In fully-expanded form, a Select controller is a highly complex beast. In routeing and busing terms the equivalent of a medium-sized mixing console. If you need the options and the power they bring this is a good thing. The downside is the steep learning curve. For casual use it may seem a little daunting at first although with familiarity it should not pose a problems.

We now have real choice in monitor controllers from the very simple to the highly complex at a variety of price points. Manufacturers design philosophies are refreshingly diverse. This is not surprising. Making a console purchase decision is relatively easy. Working out the monitoring and other control issues can take weeks of discussion. It usually comes down to personal preference and familiarity with the existing arrangements.

The Select series of monitor controllers cover a comprehensive variety of applications from a simple workstation up to a low-end film theatre with the bonus option of digital inputs. If the standard models do not exactly fit the bill they may be customised by adding other modules. All the common current surround formats are catered for including the relatively new 6.1 varieties. Interfacing with an existing console is made more convenient by the provision of solo and talkback remote switching.

For simple applications the Select may seem overkill and the ergonomics may not be to everybody's taste. On the other hand there is nothing else available which offers all the necessary breadth of options and depth of control for mastering work at the price. □

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Behringer Truth B2031

Studio Sound's 'bench test' loudspeaker reviews continue with the Behringer Truth B2031. **Keith Holland** reports

THE TRUTH B2031 by Behringer is a 2-way active loudspeaker comprising a 220mm woofer with a polycarbonate cone and a 25mm titanium-domed tweeter which radiates through a shallow axisymmetric horn. The drivers are mounted symmetrically on the front panel of the ported cabinet, which has external dimensions of 400mm high by 250mm wide by 300mm deep and also houses the power amplifiers and crossover elec-

tronics. Behringer specify a 150W power amplifier for the woofer and 75W for the tweeter giving a maximum sound pressure level of 116dB at 1m distance for a pair of loudspeakers. The crossover is a 4th-order Linkwitz-Riley with a crossover frequency of 2kHz. The rear panel has both 1/4-inch jack and XLR-type balanced input sockets, an input level control and three equalisation switches, along with a power mode switch, high and low driver mute switches, an IEC-type mains socket and a power switch. The equalisation switches comprise a low-frequency cut-off, switchable between 50Hz, 65Hz, 80Hz and 100Hz, a low-frequency room compensation control, switchable from 0dB to -6dB in 2dB steps, and a high frequency control, switchable from -4dB to +2dB in 2dB steps. The review measurements were carried out with the controls set to the factory 'default' positions of 50Hz, 0dB and 0dB respectively. The loudspeaker is magnetically-shielded.

Fig.1 shows the on-axis frequency response for the B2031. The response is seen to lie within ±3dB limits from 55Hz to 20kHz except for a small dip at about 14kHz (see later). Low frequency roll-off is 6th-order, indicating the use of an electronic high-pass protection filter, with -10dB at a respectably low 35Hz. Shown on the same figure is the harmonic distortion for an output level of 90dB SPL at 1m distance. The 2nd harmonic distortion is seen to lie below -40dB (1%) at all frequencies above 100Hz, and the 3rd harmonic below -50dB (0.3%) at all frequencies above 60Hz. The level of low frequency 2nd harmonic distortion is perhaps a little higher than expected given the size of the woofer, but the 3rd harmonic is good. Figs. 5 and 6 show the horizontal and vertical off-axis frequency responses respectively. The horizontal directivity is very well controlled up to about 15kHz, above which the radiation beams along the axis. The vertical responses show the characteristic interference notch at the crossover frequency due to the spacing of the drivers. Interestingly, the dip in on-axis response at 14kHz noted above does not occur in any of the off-axis responses. This suggests that the dip is probably confined to a narrow beam on the loudspeaker axis and thus may have little effect on perceived sound quality. The response of the B2031 to a stepped input signal is shown in Fig. 3 which demonstrates that driver time alignment is fairly good with the high frequencies preceding the mid frequencies by around 0.5ms. The acoustic source position (Fig. 2) is seen to shift to beyond 3m behind the loudspeaker at low frequencies which is typical for a 6th-order system. The power cepstrum in Fig. 4 shows little evidence of any distinct echoes, but the waterfall plot (Fig. 7) shows pronounced low-level ringing at around 300 to 400Hz, which corresponds with sharp peaks in the 2nd harmonic distortion, perhaps suggesting a rattle. The low frequency decay is seen to smooth and rapid however.

Overall, the Behringer Truth B2031 has no one particular aspect of performance that stands out and little to criticise. In common with many modern small active monitors, it has an extended low frequency response, coupled with a 6th-order roll-off to protect the driver. This arrangement should endow the loudspeaker with an impressive low frequency output for its size, but may also compromise low-frequency transient accuracy. □

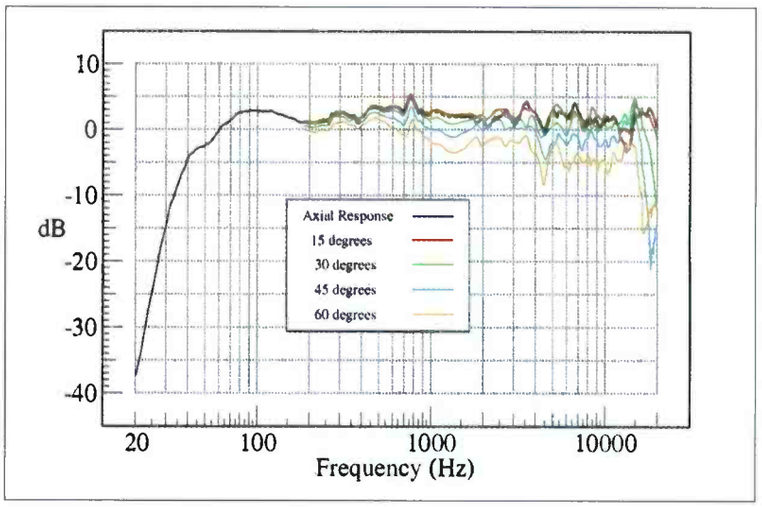

Fig.5: Horizontal Directivity

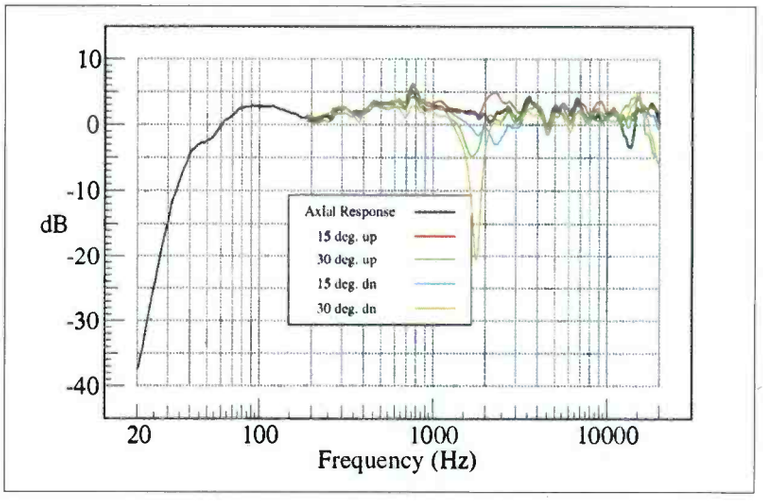

Fig.6: Vertical Directivity

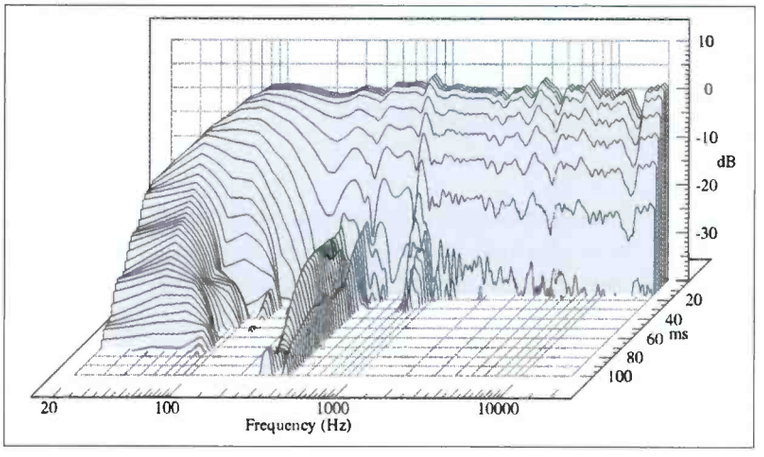

Fig.7: Waterfall

Contact

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Methodology

Studio Sound, April, page 14.
Net: www.studio-sound.com/archive/apr98/r-tannoy.html

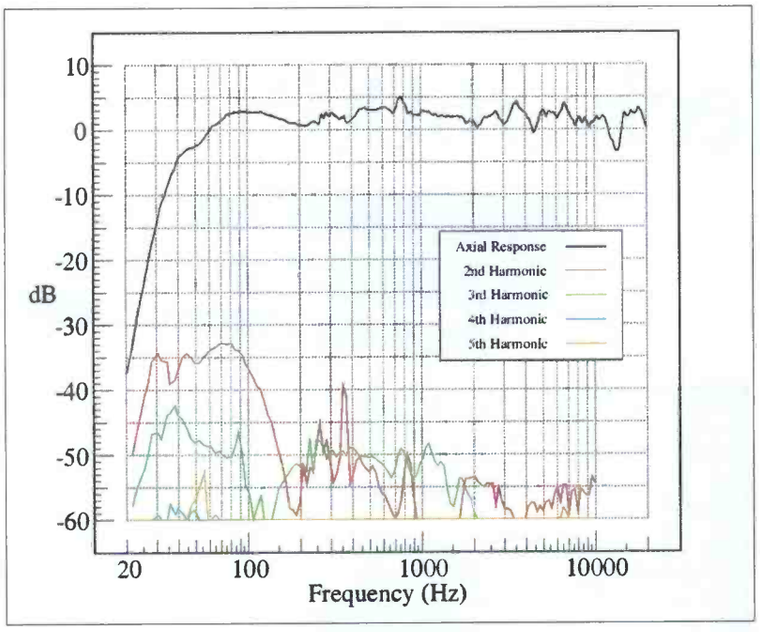

Fig.1: On-axis Frequency Response and Distortion

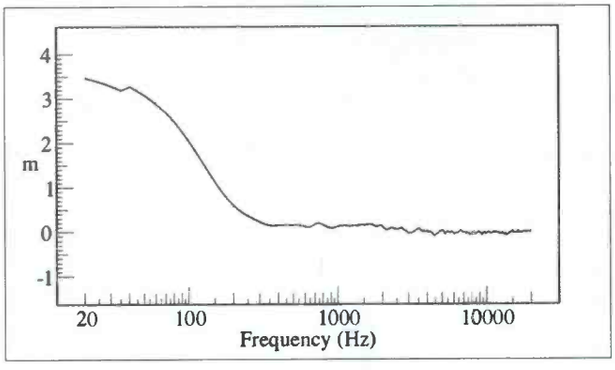

Fig.2: Acoustic Source

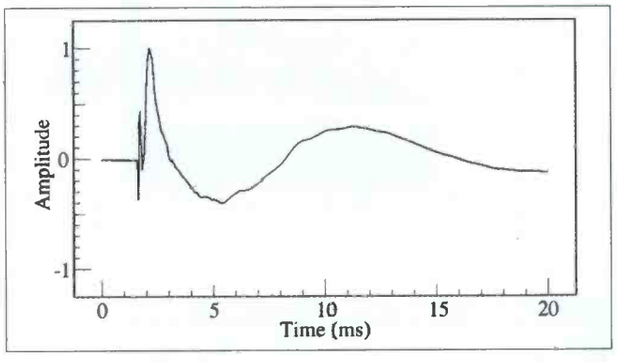

Fig.3: Step Response

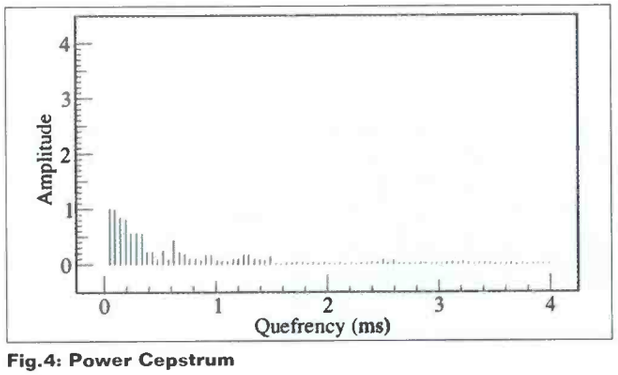

Fig.4: Power Cepstrum

Crown Macro-Tech 3600VZ

Studio Sound's 'bench test' amplifier reviews continue with the Crown Macro-Tech 3600VZ power amplifier. **Paul Miller** reports

ALTHOUGH CROWN is unlikely to thank me for the comparison, the ethos of its Macro-Tech series is not dissimilar to that of Bryston's big power amplifiers. Sure enough, there are few parallels in the design of either the power supply or output stages but both products succeed in packing awesome reserves of power into relatively compact enclosures without compromising either thermal stability or allowing harmonic distortion to run unchecked. Crown's Macro-Tech 3600VZ is a perfect example of this heavyweight engineering approach, an amplifier capable of delivering just under 1kW/8Ω with full protection against shorted loads, over-temperature and RF oscillation while maintaining typically 0.003% harmonic distortion through bass and midrange frequencies.

Stereo, parallel and bridge-modes are available with both balanced XLR and jack-style line-level input connections. Nevertheless for an ostensibly sophisticated design, Crown's forced-air cooling blasts noisily away, seemingly independent of signal level. If the 3600VZ is stuck out on the side of a stage then it's unlikely to be troublesome but, if the neutrality of the amplifier is to be enjoyed in a studio environment, then its 19-inch rack-mount case should be ferreted away in a closed, air-conditioned cabinet. Better still, banish the box to an equipment room though this necessitates the use of longer speaker cables which, typically, is less than ideal.

Particularly, I might add, if the 3600's fabulously low output impedance is to exert any influence (see Fig.5, black trace). This hovers at just 0.002Ω through the bass (equivalent to a notional 8Ω damping factor of 4000) before dropping <*below*> 0Ω through much of the midrange and treble. Negative output impedances are not unknown and depend on the precise execution of the circuit's compensation (feedback). Crown already has a history in this regard with the 'adjustable output impedance' feature included on its old Delta-Omega amplifier. The upshot is that the 3600 will demonstrate little or no response variation (red trace) with complex speaker loads, provided cable runs are kept short.

Its cooling, meanwhile, is very effi-

	20Hz	1kHz	20kHz
Max Continuous Power Output, 0.1% THD into 8Ω (two channel)	960W	960W (965W)	940W*
0.1% THD into 4Ω (two channel)	1200W	1210W (1325W)	1220W*
Frequency Response @ 0dBW	0.0dB	0.0dB	-0.1dB
Dynamic Headroom (IHF)		+2.5dB (1690W) (1060W)	
Maximum Current (10msec, 1% THD)		34.8A	
Output Impedance	0.002Ω (<0.008Ω)	-0.001Ω (0.01Ω)	-0.002Ω (0.13Ω)
Damping Factor	4000		
	Balanced Input (Driven Unbalanced)		
Total Harmonic Distortion, 10W/8Ω	0.0015%	0.003% (<0.05%)	0.035% (<0.1%)
Total Harmonic Distortion, 1W/8Ω		0.003% (<0.05%)	
Total Harmonic Distortion, 50W/8Ω		0.003% (<0.05%)	
Total Harmonic Distortion, 500W/8Ω		0.003% (<0.05%)	
S/N Ratio (A wtd, re. 0dBW)	87.5dB/84.9dB		
(re. 2/3 power)	115.6dB/113.0dB		
Residual noise (unwtd)	-80.3dBV		
Input Sensitivity (for 0dBW)	45.6mV		
(for full output)	1.413mV		
Input loading	10-20kΩ		
DC offset	+0.3mV / +0.3mV		
Serial Number	664687		
Retail Price	£2360 (ex-VAT)		

Crown Macro-Tech 3600VZ Specifications

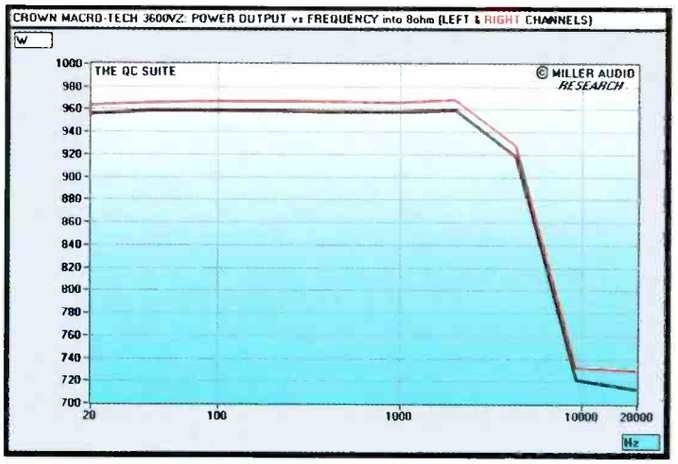

Fig.1: Power output vs frequency

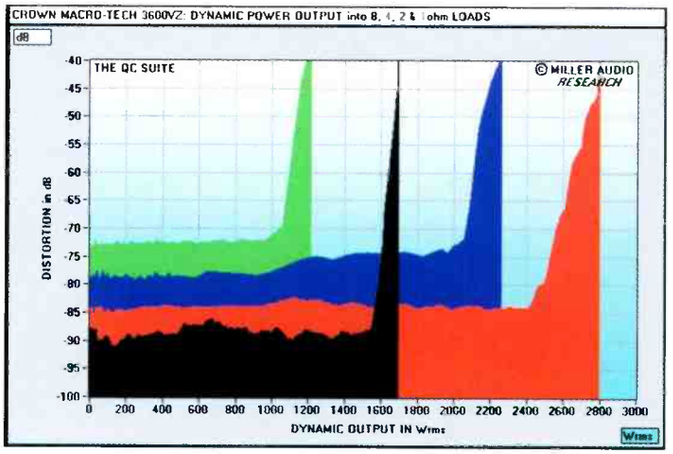

Fig.2: Dynamic power output

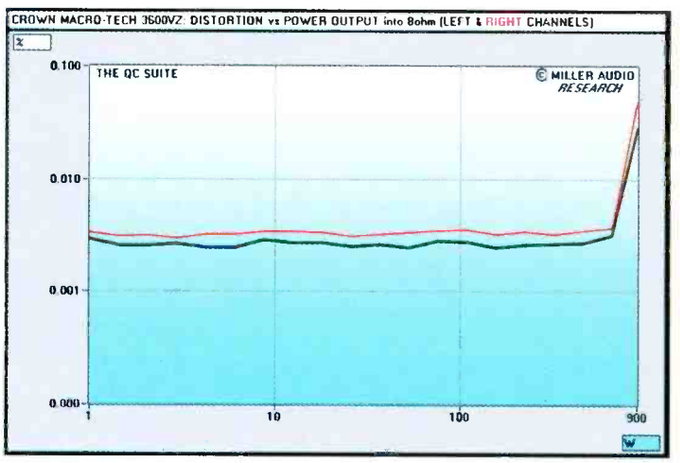

Fig.3: Distortion vs power output

Fig. 4: Distortion vs frequency

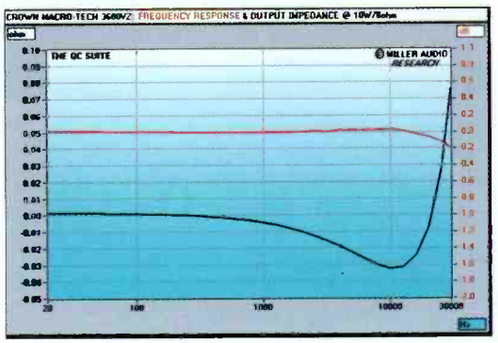

Fig. 5: Frequency and output impedance

cient indeed not least because the compound output devices are mounted <*directly*> onto a folded 'heat spreader'. This forms part of the circuit and offers a huge surface area to dissipate unwanted heat when the amplifier is running flat out. Fig.1 indicates that this amounts to ~960W/8Ω over the first eight octaves up to Crown's own THD limit of just 0.1%. Above 0.05% or so, a pair of green signal LEDs register an overload condition by flashing all the more brightly. Incidentally, relaxing the THD restriction till the 3600VZ clips in traditional fashion (~1% THD) allows it to achieve its rated 940W/8Ω output at 20kHz.

As ever, efficiency is a watchword to the design of high-power professional amplifiers like the 3600VZ which, in this case, employs a 'variable impedance' (hence the VZ) power supply. At moderate power, the two halves of its articulated supply are connected in parallel so there's always sufficient current to sustain the voltage across the speaker load. As the output rises, the supply operates in series mode with less current available but offering potentially higher swings in voltage.

Under dynamic conditions, the 3600VZ is actually more durable than Crown suggests with 1690W (14.6A), 2790W (26.4A), 2257W (33.6A) and 1212W (34.8A) available into 8Ω, 4Ω, 2Ω and 1Ω loads, respectively. The current limit of ~34A determines the maximum output reflected in Fig.2, with 8Ω, 4Ω, 2Ω and 1Ω loads represented by black, red, blue and green traces, respectively. Two things are impressive about Fig.2. Not only the high peak output but also the consistent level of distortion achieved up to the point of clipping (the uniform increases in THD into 8Ω, 4Ω, 2Ω and 1Ω loads are expected). This property is visible under continuous output conditions into 8Ω on Fig 3, plotted from 1W to 900W, beyond which the amplifier approaches its limit. Nowhere on this graph is there a glitch or other discontinuity caused by the 'VZ' power supply switching from low to high voltage rails...

Neither is there any significant crossover distortion. Fig.4 shows distortion vs frequency at 10W (black trace) and 200W (red trace), both rising gradually to a very respectable 0.03-0.04% at 20kHz which is well within Crown's <0.1% specification. Noise is about average relative to 0dBW, though there is a difference between channels at 87.5dB and 84.9dB. Relative to two-thirds output, the A-wtd range extends to ~115dB. The amplifier's input sensitivity is selectable, though the maximum gain amounts to +35.9dB and can be further adjusted via two, detented attenuators on the front panel.

One click off the bottom and the attenuators offer a ~-77dB cut from full scale, with stepwise increments of -55dB, then -38dB, -33dB, -30dB, -27.5dB, -25.5dB and finally -24dB at the position marked 9 on the front panel. The 12 o'clock position, or 15, represents -15dB below full scale. Interchannel tracking is good, while separation is excellent at >80dB across the audio range.

All of which adds up to a powerful and versatile package, though not one that places any great emphasis on portability! The fan noise may also prove restrictive, depending on its application, but the Macro-Tech 3600VZ is otherwise a very polished and high-quality design, inside and out. □

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Langevin Dual Vocal Combo

Returning us to the roots of the 'channel strip' Langevin's stereo vocal processor matches application with implementation in a cost-effective package. **Dave Foister** enjoys basic instincts

LETS NOT KID OURSELVES. Throughout its brief but prolific history, the agglomeration of processors that has become known as the Channel Strip has only really had one main purpose: recording vocals. For all that it presents itself as a versatile high-quality front end for a multitrack, and however much it might get pressed into service for other instruments, the typical channel strip is fairly clearly geared to the requirements of the voice. Manley has recognised this; it knows that the various devices that go under the banner of Langevin are popular for voice, and so has produced a new collection, known with rare directness as the Dual Vocal Combo.

Manley Laboratories is of course best known as a tube manufacturer, and its acquisition of the Langevin range in 1992 allowed it to add a solid-state wing. The new processor doesn't pretend to offer all the facilities of the specialised processors, like, say, the British Focusrite with its complete EQ and compressor sections, but has pared them down to the bare essentials to offer not one but two channels of simple quality treatment.

The cosmetic design intention is to hark back to traditional equipment. All the knobs are big and black, including a rotary switch for turning the whole thing on, and the switches are simple silver toggles, all up-

for-on in accordance with the unit's US origins. Phantom power switches are special pull-to-operate ones, to avoid accidental flipping while in use. A pair of mechanical vu meters deals with signal levels and gain reduction indication, and the whole panel is finished in metallic red. The major quirk, which you may not notice immediately and will still catch you out even when you have, is that the two channels are arranged as mirror images of each other. Normally the left-hand controls would be the input gain; here it's the outer two, and so on in towards the middle. This means that a simple dual-band EQ has its controls effectively back to front on Channel 2. This may make for symmetry but it strikes me as being a bit like the two-keyboard contrary-motion piano somebody invented—an interesting idea but we're more comfortable with familiarity.

The facilities on offer are immediately apparent from the front panel. Each channel has a high-grade input stage, two-band EQ and a limiter; what you can't tell from the panel (although you could guess from the simplicity of its controls) is that the limiter is an electro-optical circuit in the style that is so much part of the Manley approach, paying tribute to the likes of the Urei LA-3A. The limiting characteristics—attack, release and ratio—are determined by the carefully-selected Vactrol photocell, with the intention that they will be optimised for transparent vocal limiting. The nature of the Vactrol's behaviour even includes a degree of programme dependency, so that the only user controls needed (or possible, come to that) are for Reduction, which simply adjusts the threshold, and Gain. Use of the limiter bears out what Manley claims for it; it can introduce quite heavy gain reduction according to the meters, but not interfere with the essential sound. The manual does not go so far as to claim universal application for the design, acknowledging that drums in particular may suffer from the chosen behaviour, but when the front has Vocal written in big letters on it you can hardly complain. In fact it has uses far beyond just vocals, as can probably be imagined. If you do want to stick it across a mix, the LINK switch is obviously useful—unfortunately it only gangs the limiter controls together.

Preceding this limiter in the chain is the simplest EQ you're likely to see on a piece of professional equipment. All it has is shelving filters for HF and LF, with boost-cut controls and a choice of two turnover frequencies for each. HF can be set to 8kHz and 12kHz, while the bottom end is rather less flexible, offering 40Hz and 80Hz. At 40 it's little more than a rumble filter, and with only 10dB of reduction available the rumble had better not be too bad. Having said that, I found it useful for subtle removal of minor LF problems, and the 80Hz setting makes a useful contribution to the tonal shaping possibilities. The manual again makes no pretence that this is a 'do everything' EQ, describing both bands as safe, smooth and basic, and the description is apt. It's impossible to do anything nasty with the circuit, and easy to give the signal a little extra something. As a complement to the particularly unobtrusive limiter it's ideal; they make very good partners, with an obviously shared intention.

EQ and limiter can both be individually bypassed, and additionally the limiter has its own line-level balanced input, circumventing the input amp and EQ. There's also the now-obligatory instrument jack on the front, now rejigged to accommodate a wider range of input levels at a higher impedance. Each channel also has separate balanced and unbalanced outputs, although both are at nominal +4dB.

The Dual Vocal Combo sets out to do a specific job without the frills that often accompany the basics, but with the emphasis on quality and a certain style. As such it does an excellent job, and is going to be a usefully affordable shortcut to that style and the vintage sounds that go with it. □

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Net: www.manleylabs. com

NEW TECHNOLOGIES

Phono playback system

Millennia has released the LPE-2 'analogue legacy' modern and archival phonographic playback system. Featuring a 'virtually unlimited' array of compensation networks for modern 33⅓rpm and 78rpm pressings, the LPE-2 has four bands of class-A biased, all discrete equalising filters for correction purposes.
The front end uses the company's HV-3 preamp technology optimised for phono applications with user selectable input impedance and capacitance and is differentially balanced. Designed for moving magnet and moving coil cartridges it has a 36-step gain range up to 60dB, stereo matching to 0.08dB, polarity reversal, mono functions and decoding for vertically grooved pressings.
Millennia Media, US. Tel: +1 530 647 0750.

HD cases

Recorded Media Supply (RMS), a distributor of recording media and removable hard drives to the film and professional audio video markets, has launched a line of removable hard drive shipper cases. The cases have a durable double-skinned anti-static moulded foam insert to hold one, three, or six removable hard drives. Cases include a professional label set and are airtight, waterproof and lockable.
The variety of sizes also include a shipper for JAZ drives with space for PSU and SCSI cables.
RMS, US. Tel: +1 818 562 6527.

Voice modelling processor

TC-Helicon has released the VoicePrism Plus Human Voice Modelling|Formant Processor. Voice Modelling is described as real-time resynthesis and reshaping of the human voice and offers a variety of ways in which to process the vocal input, including the ability to add breath, growl, rasp, head and chest resonance, inflection or vibrato. Features include a range of effects, harmony and backing channel vocal processing under preset control.
VoicePrism Plus can go directly from a phantom powered mlc into a high-quality 48V preamp and access any of the onboard processes including compression, gate, dual fully parametric EQ, 4-voice harmony, lead voice Human Voice Modelling, two separate post-effects blocks (including chorus-flanger, delay and reverb with predelay), and effects and harmony libraries. I-Os include ¼-inch analogue, 24-bit AES-EBU and SPDIF digital.
TC-Helicon also has the VoiceCraft Voice Modelling Card, a new upgrade card for the company's debut live and recording vocal processor, the VoicePrism. VoiceCraft adds the additional DSP power, algorithms,

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Audix 'classic' condenser

Audix's SCX25 is a brass condenser microphone with a 25mm gold sputtered diaphragm and features a new suspension mounting system that effectively isolates the capsule from the housing and the electronics thereby minimising reflective surfaces and maximising phase coherence. This also means that the microphone does not require a shock mount clip. Claimed to have an extremely low noise preamp design, the SCX25 provides a wide cardioid pattern with an 'open-air' sound quality. The SCX-25, which operates on 48V-52V phantom power, has a MSRP of US $799. Audix, US. Tel: +1 800 966 8261.

ATI production desk

ATI's Paragon II Production Console is designed to complement the company's Paragon II Monitor Console and is suited to FOH mixing, broadcast production, or live theatre. A stock Paragon

Buzz Audio SOC 1.1

Making quiet references to vintage design, this Kiwi compressor outperforms many modern units with louder claims to 'classic' valve status. **George Shilling** favours photons over electrons

THIS UNIT HAILS from a company in New Zealand which apparently has many strings to its bow, including PA installation, studio design, sound systems for public areas, and custom-build electronics. The SOC 1.1 is a stereo optical compressor for pro-audio, and a couple of these have already found their way to a London postproduction house. The SOC 1.1 uses an in-house designed gain reduction element, comprising four selected miniature Light Dependant Resistors driven by a 4x LED light block. They claim that by using four LDRs they can even out the wide tolerances of the devices and get a predictable result. The LED light block is driven differentially, similar to an output stage in a power amplifier, where one half of the block handles positive waveform and the other negative waveform.

Construction is fairly conventional, with a sturdy 2U-high housing, which feels rigid. Inside the unit is a collection of small circuit boards hosting discrete components, connected by ribbon cables and flying leads. The whole package has something of the appearance and character of a unit made about 20 years ago—which is not necessarily a bad thing. The back panel is very simple, with inputs and outputs on XLR connectors only, the inputs without latches.

The front panel layout is excellent, dominated by each channel's vu meter. These are unconventionally backlit with an arced row of yellow LEDs behind the scale markings. A 3-position toggle switch accompanies each meter, allowing display of input and iutput levels, along with conventional gain reduction indication. Each channel includes a huge DRIVE knob which sends more signal to the sidechain circuit. This circuit processes the audio to drive the light block. A similarly large OUTPUT knob features alongside, which in reality is a make-up gain control with a range of 0 to +15dB, although halfway round is only a 5dB boost, enabling precision setting of final levels in most instances. Both of these controls have a loose feel, (they are the same type used by Manley), but this was not a problem, as their size makes adjustment easier, and the knob pointers are clearly marked. Unfortunately, this is not true of the panel legending—fairly small and quite dark blue lettering on a black background is not ideal for the lighting situations in most studios. Even in a fairly bright room I found it hard to read the settings and labels.

Ratio is controlled separately for each channel with a 4-position rotary switch with a positive feel. Settings are 2:1, 5:1, 10:1 and 20:1, although these reflect ulti-

digimax

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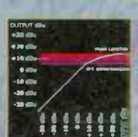

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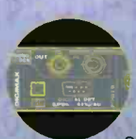

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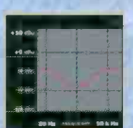

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mate ratio after crossing a fairly soft knee that covers a range of about 10dBs, or 5dBs in the 20:1 setting. Attack is set using a toggle switch with three positions: Slow, Auto and Fast. All three settings are useable, with the programme-dependent Auto setting sounding most natural and musical in many situations. Slow is approximately 70ms and is great for adding punch to percussive sounds, while Fast is around 1ms and most suitable for heavy compression settings. Release is controlled by a rotary switch with six positions. This is labelled 1, 2, 4, 8, 16 and Auto. The numbered settings approximate to release time in

100s of ms. The Auto setting is programme dependent, releasing quickly from fast transients, and taking longer after a period of continuous gain reduction. With the optical circuit, all settings are somewhat programme dependent, and this makes for an excellent sounding characteristic. I generally used the unit in Auto mode for attack and release, which seemed to sound the most natural. The overall sound of the unit is large, full and open, and it is not difficult to find a setting that pleases the ear on all kinds of individual sounds as well as on programme. Each channel includes a hard-wire BYPASS toggle switch, and the unit automatically goes into Bypass mode if power fails. Unfortunately, using these Bypass switches revealed a wiring fault: with one channel in circuit and the other bypassed, a phase reversal was evident, and both channels exhibited this behaviour. A power switch is accompanied by a small LED, which is the only indicator light on the front panel. There is also a toggle switch to enable stereo linking of the two channels. This links the compressor sidechains, but all controls remain active. It is therefore important to set both channels' controls similarly for proper stereo operation.

Overall this unit is terrific; whether pumping or transparently controlling, it out-performs many over-hyped valve designs, and has a good range of settings for different uses and tastes. It always sounds large and full, and performance is excellent in terms of frequency response, noise and distortion. The large DRIVE and GAIN knobs are great for making fine tweaks. The manual is clear and helpful, and apart from the phase change wiring and poor panel legending, the whole design and construction is excellent: there is no nonsense or hype. The NZ dollar price quoted to me sounds very reasonable, and I heartily recommend auditioning one of these alongside more familiar designs and names. □

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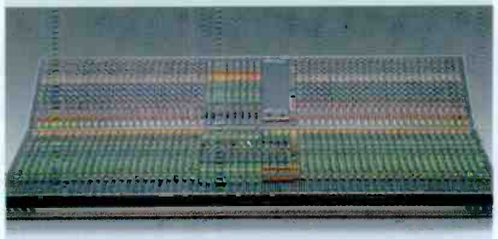
NEW TECHNOLOGIES



Production unit contains 64 mic inputs with full routeing, eight stereo line inputs with routeing to groups or the mix buses, and four stereo line inputs with routeing to the stereo masters or the matrix. Outputs include eight mono and four stereo aux busses, eight stereo audio groups with inserts, eight stereo matrix outs with inserts, two main mono mix outs, and two main stereo mix outs. All input channels also have a stereo direct out and an insert send, each with its own level control. Fully expanded, the desk can incorporate more than 100 high-gain microphone inputs.

Audio control capabilities include eight VCA groups and two VCA grand masters. Each channel features 4-band parametric EQ, on-channel gate and compressor, true LCR panning with LCR audio subgroup capability, and the company's Distributed Intelligence technology which allows the console to route and remember group, VCA, and muting assignment without the need for a central computer. ATI, US. Tel: +1 410 381 7879.

Earthworks SR68, SR69 and SRO

Breaking from its studio persona, the American Earthworks mic specialist has produced a live line that's so good it deserves to be in the studio. **Dave Foister** takes the stage

OCCASIONALLY A MANUFACTURER espouses a particular technology with such evangelistic zeal that it's hard to imagine them countenancing the production of anything else. If ever a company fell into that category it's Earthworks, whose fervent promotion of the omnidirectional microphone (along with DPA) as a much more useful all-rounder than it's normally given credit for is applauded by all those who already knew.

But even Earthworks knows that for live work there will always be a need for directional microphones, and has broken with tradition sufficiently to introduce two new models with this market in mind. Although the outward appearance is a bit radical for Earthworks, internally these have a lot in common with the existing directional studio microphones, which themselves boast specifications rare among cardioids.

Another thing Earthworks has always understood is the value of packaging. Its studio broad-band omnis come in matched pairs presented in a wooden box like a brace of duelling pistols, giving them an air of exclusivity disproportionate with the price. In complete contrast with that, the SR68 and SR69 are packed in the most outlandish protective cases I've seen in a while; each microphone is clamped into a plastic base which then screws into a clear plastic tube. It seems to be well supported, and the integral foam shield buffers it against the sides at the top. An advantage of the tube is that the microphone is very visible, and this microphone certainly stands out, especially in metallic red—it's also available in more normal black and silver finishes.

The two models are distinguished by the pattern, the 69 being cardioid and the 68 hypercardioid. There is nothing about the two to identify which is which other than the number printed on them; on the other hand, there is plenty to make them stand out from the crowd. It doesn't take long to discover that the body unscrews half way down, and the business end is actually a thin removable grille covering a much more familiar shape. Inside is a standard Earthworks snout, and it's clear that the basic design has much in common with the Z30 models, with this protective sleeve attached. The foam shield in turn is glued on to the removable part, and is all that covers the slim capsule element at the end of the narrow-nosed internal tube. The narrow slots in the tube behind the tiny capsule give away the cardioid nature of the design as they do on the exposed Z30 nose.

A separate tubular box contains a standard springy plastic stand mount (no adaptor!) and with the excellent handling noise of the body this is all that's needed. Indeed both models are intended to be used as hand-held vocal microphones as well as for general functions in the studio, and the performance makes this an attractive idea. There's a crisp, open but natural top end in both, so much as to make it sound a little light even though there's no significant presence lift. Because of the directional character, both exhibit useful proximity effect for vocal work, and the fixed foam sock helps maintain a sensible distance from the capsule itself. At the same time the sock does nothing to detract from the top end behaviour, and the grunge-free bite on saxophone and snare says much for both the SPL handling and the basic flatness of the response.

But there's still room, says Earthworks, for an omni on stage. Some interesting applications are suggested, from very close miking of double bass and drums (no proximity effect you see) to an ambient pair fed to in-ear monitors to avoid the feeling of being cut off from the world, to a reality check for FOH and monitor engineers, stuck up in a place where the people you're mixing for would be standing. With these uses in mind there is the SRO omni, a relatively inconspicuous black body with the characteristic measurement-microphone shape. It's not intended for measurement, but the literature points to a virtually flat frequency response and very high SPL handling ability that mean for some jobs where a close approximation is all that's required the SRO comes close enough. It also means that it makes a good introduction to the world of the Earthworks studio omni without having to shell out for the full-blown 40kHz stainless steel jobs (not that they're expensive; but the SRO is even less so). This too comes with a basic stand mount in a rather more conventional foam-lined plastic box.

It may be the entry-level sound reinforcement version, but with a frequency response within 1dB from 10Hz to 20kHz there's not much missing. Add a maximum SPL of 150dB and a real omni characteristic and this is a good example of what omni microphones are all about. It's quite at home in the studio and can do those useful things like deliver a clean accurate double bass sound from behind the bridge, close enough to deal effectively with spill from the room.

It's to be hoped that the use of the letters SR for sound reinforcement in the names of these microphones won't limit their perceived market. While the arrival of new quality microphones to the live arena is welcome, and the encouragement to try the unlikely prospect of an omni on stage is well-placed, these are excellent all-rounders that should raise the profile of the splendid Earthworks designs across a much broader spectrum. □

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NEW TECHNOLOGIES

Stagetec Star routeing

Stagetec has introduced a new star connect routeing element, the Nexus Star which uses a 100MHz twin-switch fabric design. The Nexus Star can be fitted with up to 16 I-O cards, each with 256 inputs and 256 outputs, providing routeing of as many as 4,096 inputs to 4,096 outputs. This gives a total of more than 16 million possible crosspoints, all housed in a 6U-high box. If more capacity is needed systems can be cascaded. The system is a switching node that serves as a star hub for an entire Nexus decentralised audio routeing system. Traditional Nexus Base Devices, each fitted with various I-O cards as required by the Client, would be connected to the Nexus Star with fibre optic cables. It supports connection cards in Fibre Optic or RMF, the latter providing four standard MADI interfaces which can be used for connecting multitrack tape machines directly. Like all other Nexus devices, it is fully synchronous and the latency within the system is constant for all signals at only six samples.
Stagetec, Germany. Tel: +49 9545 440 300.

Nady studio mic

The Nady Audio line now includes the TCM 1050 and TCM 1100 tube condenser microphones. The TCM 1050 features a gold-sputtered, ultra-thin 1-inch diameter mylar dual diaphragm, tube preamplifier circuitry with 6072 vacuum tube and an output transformer designed for transparency. Construction uses almost all brass parts and power is provided by a dedicated AC supply with remote switching of nine polar patterns—omni, cardioid, fig-8, and six intermediate stages. It comes with its own aluminum flightcase, 30-foot, 7-pin XLR cable, elastic spider shockmount, and foam windscreen.
The TCM 1100 is a cardioid microphone which features a hand-tooled brass capsule with a 3-micron 1.1-inch gold-sputtered mylar diaphragm. Like the TCM 1050, it uses a 6072 tube, the same output transformer and comes within a similar selection of accessories.
Nady's PEM-500 Personal Ear Monitor system combines frequency-agile PLL synthesised UHF technology and high-end performance in an affordable package. It offers 16 user-selectable UHF channels in the transmitter and receiver as well as stereo (MPX system) or mono mode transmission. The transmitter design is a rugged all metal half-rack that can be rackmounted singly or side-by-side with optional rack kits. Its front panel features an input level control, stereo headphone monitor output jack and volume control, select button for selecting one of the 16 channels, LED channel display, and left–right 10-segment audio input level displays. The back panel provides a BNC jack for the detachable antenna, a 1/4-inch TRS mic input and an XLR and combo jack for the left and right line inputs. The portable bodypack receiver offers a switchable built-in volume limiter; output level control; combination bi-colour power ON, signal received, and low battery LED indicator; and operates up to six hours on a 9V battery.

Nady has introduced new VHF and UHF systems. The Encore Series includes the Encore I, Encore II, and Encore Duet. All three models are available on selected frequencies in the VHF high-band. The Encore I (non-diversity) and Encore II (DigiTRU Diversity) are both half-rack models with retractable front panel antennae. Both

The Yamaha SREV1

Some of its best programs were written centuries ago

Nobody has more experience in DSP than Yamaha, as evidenced by our heritage of ground breaking digital reverbs including the SPX90, REV1 and ProR3.
The new SREV1, however, is a revelation.
With Convolution Sampling Technology the SREV1 uses impulse response samples of actual acoustic environments to produce reverb of staggering realism.
Comprising the 24-bit/48kHz mainframe, EC-SREV1 remote and optional expansion board, the system offers true surround reverb in 4 channel mode and can even operate as two fully independent stereo processors.
The SREV1 comes with a CD-ROM of sampled famous venues from around the world and includes bundled PC software allowing users to sample and create their own programs.
For more information call Richard Metcalfe on 01908 369243.

Σ-ENGINE

YAMAHA
Commercial Audio
www.yamahacommercialaudio.com

NEW TECHNOLOGIES

models feature RF and AF 5-LED displays for monitoring incoming signal strength and audio level, and balanced XLR and unbalanced adjustable 1/4-inch jack outputs. Transmitters are available in handheld, lavalier, headmic, and instrument. The Nady Link 2 is also available which attaches to any dynamic or condenser microphone, enabling operation as a handheld mic or bodypack transmitter.
The Encore Duet uses the same housing as the other Encore receivers and features two discrete VHF channels that can be operated simultaneously.
New UHF units from Nady include the UHF-10, URR-10 and UHF-16. The UHF-10 and URR-10 are both single channel professional UHF systems featuring DigiTRU Diversity for dropout protection. The UHF-10 receiver is a table top model featuring dual antennae, A–B diversity, AF peak and power ON LED indicators, and balanced XLR and adjustable unbalanced 1/4-inch outputs.
Nady, US. Tel: +1 510 652 2411.

WorldNet Rio

Audio Processing Technology's WorldNet Rio is a full duplex multichannel, multi-algorithm audio codec designed to interface with all previous APT products. Aimed primarily at the broadcast and postproduction markets, the 1U box offers backward compatibility with the NXL 384A, NXL 384D and DSM X21, which it is designed to replace. The unit features a primary X21 data port and a secondary X21 data port as backup, ensuring that in the event of main line failing it will automatically switch to back-up. The company says the WorldNet Rio is the first commercial product to incorporate APT's enhanced version of apt-X, offering 20 and 24-bit operation as an extension to the performance of

Omniphonics SM1

Making a smart job of monitor matrix switching, the SM1 could be the friend you never knew you needed. **Jon Thornton** crashes the Stereo Manager's ball

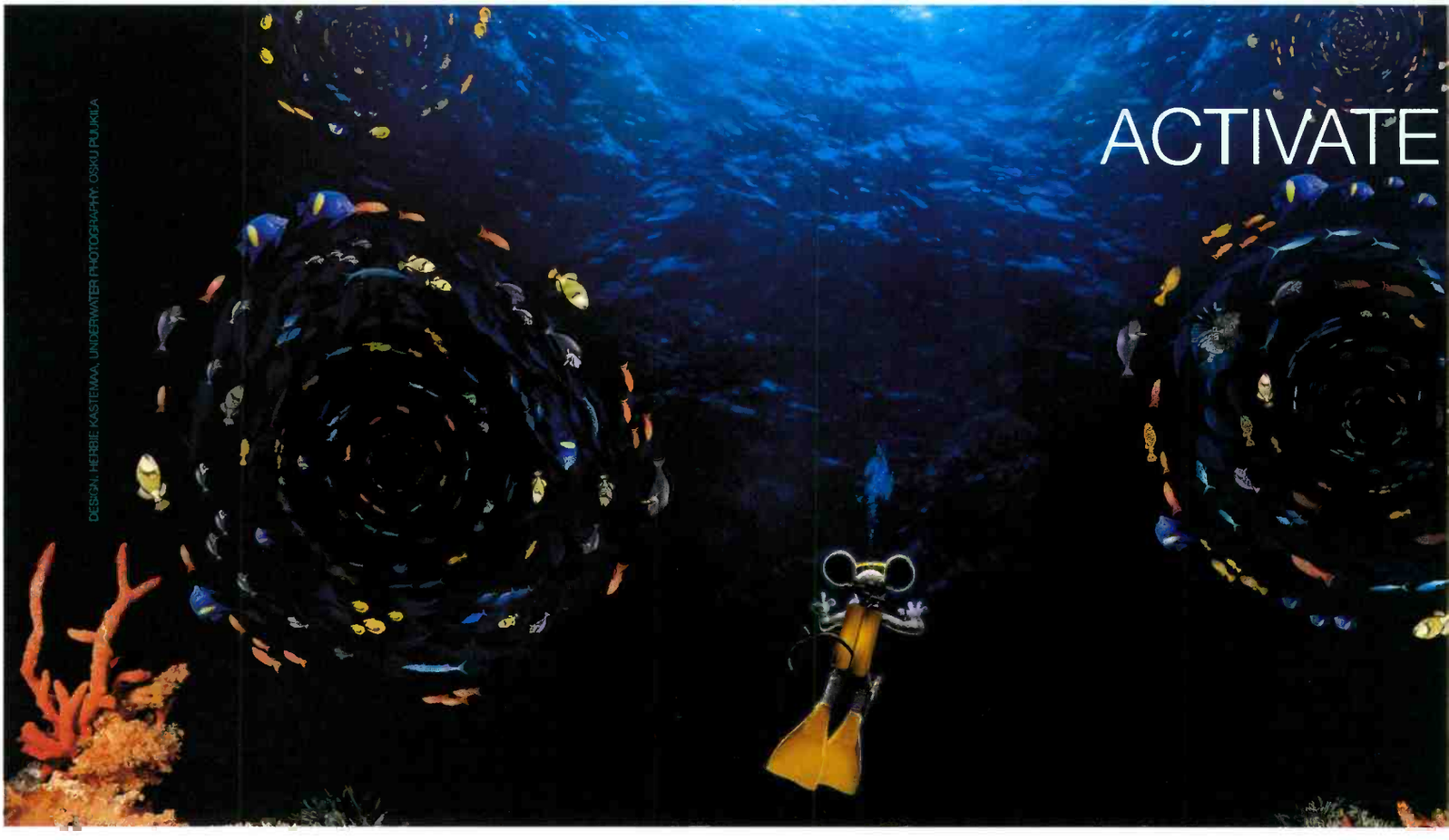
IN MY EXPERIENCE, outboard equipment tends to fall into the same categories as the people you invite to parties. First are the 'classics', whom anybody would be happy to have at a gathering. Then there are the 'flavour of the month', smartly dressed, full of show and the ones that everybody wants to meet. And finally there are the solid unassuming ones, who turn up on time, don't drink too much, leave when they're expected and probably volunteer to do the washing up as well.

It's probably fair to say that the SM1 from Omniphonics falls firmly into the last category—maybe it wasn't on your A-list for acquisitions but it could very well be just what you were looking for to solve a few problems.

The Stereo Manager 1, to give it its full name, is effectively a matrix switcher that allows up to nine stereo input signals to be assigned to either one of two stereo outputs. It supersedes a previous Omniphonics unit, the PRE1, and incorporates a number of updates and improvements, many of which have been driven by customer feedback, most notably from the BBC.

A quick perusal of the back panel shows the two balanced stereo outputs on XLRs, two pairs of balanced inputs, and a further six pairs of unbalanced inputs on phono sockets. Nominal input levels for the unbalanced inputs are -10dBV, although each set of inputs can be trimmed individually by ±8dB. Accessing these trim pots does necessitate removing the lid from the unit but thankfully this is an easy two-screw job. The two sets of balanced stereo inputs and the balanced outputs can be switched for either +4dBu or -10dBv operation by means of links on the main circuit board.

Also on the back panel is a pair of phono sockets which give an unbalanced monitor output, again at



-10dBv. This output can be derived from a number of sources, of which more later. A global earth lift switch is also provided for combating potential earth loops.

The front panel is logically and clearly laid out, and consists of two banks of pushbuttons with integrated LEDs which allow the assignment of any of the eight stereo inputs, plus a further auxiliary input located on the front panel, to either of the two output channels. The buttons are quite positive in their action, and not easily 'un-set' by accidental brushing against the unit. Switching in the unit is performed by miniature relays, which give a reassuring 'click' whenever an assignment is changed, but don't cause a noticeable spike on the audio outputs. In use, the audio paths seem very clean, with a useful amount of headroom.

Each of the two output channels has a global level control, which again have a very firm and positive feel. Output Channel 2 pretty much stops there in terms of complexity, but there are some additional and useful features available on output Channel 1. A balance control allows the adjustment of signal level between the left and right outputs, and switches are provided to mono sum the selected stereo input, mute it, or reverse the phase of the left channel.

A headphone socket with associated level control and a pair of 8-segment LED bargraph meters make up the monitor section. A switch here toggles between either or both of the output channels presenting themselves to the headphones and meters.

A further degree of flexibility in how the unit can be configured for specific applications is available by altering jumper settings on the main circuit board. The unbalanced monitor output can be fed from either of the two output channels, and in each case either pre or post the output level and other controls. The output of Channel 2 can be derived entirely pre-level control, or can follow the selection of the monitor section. Added to this are optional cards that allow remote control of both input assignment and level by infra-red, serial data (RS232), or a combination of contact closure and control voltage.

All of which leads to the question of what the SM1 can do for you. Some applications, such as duplication, format transfer or media archiving are obvious—indeed Omniphonics cite the Bibliotec National in France as the largest single user of the older PRE1, and have already shipped the first 10 SM1s to the BBC World Service. Other applications are less immediately obvious, but include extending the stereo monitoring capability of any mixing console, or perhaps in handling the input selection and output monitoring requirements of a standalone DAW, where the functionality of a separate mixer just isn't required.

In fact, the more you think about it, the more you realise that the combination of switching, unbalanced signal resolving and monitoring flexibility opens up all sorts of possible uses.

If having only two sets of balanced inputs is a problem, or you have no need to interface unbalanced equipment, the SM2 is due for release later this year, and is functionally identical to the SM1 save for being fully balanced on all inputs. Sure, it might not be the most exciting party guest in the world, but it does its business very well. So the next time you have a scenario that could use its talents, go wild—give it a call. □

Contact:

Omniphonics, UK.
Tel: +44 207 278 8216. **Fax:** +44 207 923 3731.

NEW TECHNOLOGIES

the company's original 16-bit algorithm. This improved algorithm is the result of intensive in-house research and development that has incorporated the latest advances in DSP technology. A single Motorola DSP563xx device provides increased stereo and mono audio channel capability and simultaneous full duplex operation, guaranteeing that the algorithm will meet the needs of current and future PCM standards.
APT, UK. Tel: +44 2890 371110.

Schoeps shows new cardioid mics

The MK 4 V microphone capsule and CCM 4 V compact microphone from Schoeps, were created in answer to requests for a cardioid microphone whose main axis is along the side of the capsule. In addition to its usefulness in the concert hall, this microphone type is of particular value in speech recording, since its slight emphasis around 10kHz helps to improve intelligibility. Due to the acoustically transparent housing, the directional response is said to be especially well maintained even at higher frequencies. The high-frequency emphasis of off-axis sound typical of most cardioids occurs less with the MK 4 V/CCM 4, but because of its inherent frequency response, it still sounds somewhat brighter overall than the MK 4 or CCM 4. Frequency range is 40Hz-20kHz, CCIR is 24dB, A-weighted SNR is 80dB-A, and the maximum SPL is 132dB (with 0.5% THD). For speech applications, Schoeps offers the PR 120 SV pop filter.
Schoeps, Germany. Tel: +49 721 943 200.

DAVID PENSADO

Calling on a variety of musical talents and a variety of technical approaches, David Pensado's latest project, 'Lady Marmalade', stormed the international charts. **Richard Buskin** discovers the man behind the Lady

A MUSICIAN WHO reassigned his love for music to the control room after growing tired of life on the road, David Pensado has forged a reputation as a mix engineer of the highest calibre. Among his credits are records by Destiny's Child, Christina Aguilera, Coolio, Sisqo, Jessica Simpson, Mel C, Boyz II Men, Tevin Campbell, Janet Jackson and Brian McKnight, and currently he is enjoying chart-topping success with his mix of 'Lady Marmalade', the first single from the feature film *Moulin Rouge*, featuring the vocal contributions of Aguilera, Missy Elliot, Pink, Mya and Lil' Kim.

Having previously worked on Christina Aguilera's eponymous debut album, as well as on the productions of Rockwilder, Missy Elliot and, for the past 11 years, Ron Fair, it wasn't surprising that Pensado was asked by these three co-producers to mix their hip-hop-flavoured remake of the Patti LaBelle classic. Equally predictable was Pensado's use of two full Pro Tools rigs to edit the numerous vocal and instrumental tracks with which he was presented, yet a novel angle in this increasingly digital age was his transfer of the material to Quantegy's GP9 analogue tape when mixing on the SSL9000j Series console at his own room at Enterprise Studios in Burbank.

Why the decision to use the tape?

Well, I like going to DAT through 24-bit Apogees, but then I also like going to ½-inch tape on the GP9, and when it is time to master I just see which one I like best. Every once in a while I like the DAT better, but nine times out of ten the GP9 wins out.

Is that because of the warmth and fatness of the sound?

To me, 'warm' is another word for dull. What I like about the GP9 is that I monitor the output of the 2-track machine and I just start slamming the level until it sounds good to me. What I get by doing this is a certain type of tape compression that is reminiscent of some of the all-time greats, like Roy Thomas Baker. I hit the tape hard and it somehow moves the important elements to the front of the mix, producing not necessarily a warm sound, but an incredibly modern digital sound with a familiarity to it that is comforting. It suppresses some of the artefacts of the digital domain that we don't like as humans, and at the same time pushes some familiar elements to the forefront. As humans we like to be surprised and at the same time we need a certain comfort zone. With any sound there has to be a certain amount of originality so that it holds your attention, but if it's all new it becomes unfamiliar and hard to accept, so you must have a combination of both.

When you say 'familiar', do you mean realistic or simply what we're used to having heard on previous recordings?

Well, on a real level I mean the latter, but on a philosophical level it's the former. If you go to a foreign country and taste something completely unlike anything you've ever had you'll probably spit it out, but if there's an element of familiarity to it with an element of a new spice it's suddenly more interesting than either one by itself, and that's kind of what I try to get out of the GP9. I love digital, and I've been mixing out of Pro Tools since early '97.

So the 'Lady Marmalade' single was recorded to Pro Tools and you then transferred it to the GP9?

What I did was mix it through the SSL and then the two-track mix for the CD was recorded to GP9.

(L–R) Dave Pensado and A&M Records president Ron Fair with the SL9000j at The Enterprise recording studio in Los Angeles

© The Enterprise pictures: David Goggin

The recording features five vocalists. What were you presented with?

There were lead, backing and ad-lib tracks by each of the four principals—Mya, Kim, Christina and Pink—and then there was Missy doing little sweetening things like 'yeah, mm-hm', and so on which I made sound like a radio voice and scattered throughout the song. Then, at the end of the song, you actually hear Missy calling out everybody's names.

So how many tracks of vocals were there in total?

Probably 40 or 50.

And what kind of shape were they in?

They were recorded pristinely. The whole recording was pristine, but when you've got that many tracks the difficulty of mixing is having to spend between 500 to 600 minutes listening to all of them.

Were you making hand-written notes?

Well, that's why it becomes difficult, because in order to mix you've got to have all of the elements in your head so that you can pick and choose. If you don't then you're not doing a great job as a mixer. In this case it took me a day just to memorise what I had.

Pictured at The Enterprise recording studio in Los Angeles are (front row L–R) Dave Pensado, Rockwilder and Ron Fair, (back row L–R) Engineer Brian Springer, programmer Tal Herzberg and engineer David Guerrero

Lady Marmalade

You could memorise all 500 minutes?

I had to. I didn't actually memorise everything as much as I memorised the best stuff. The stuff you're not going to use just slips out of your brain.

How many instrumental tracks did you have?

Probably another 40.

Making mental notes of what you were going to use, how did you work your way through everything?

I built myself my own little rough mix, a bit like a writer putting together an outline for a novel. I built my own little outline mix that let me know my major elements and what I was really trying to sell. With this particular song I had some of the best female singers working today as well as one of the top five producers—Rockwilder is just at the top of his game—so what I tried to do was outline the shapes without colouring them. On a normal song that usually takes me about an hour to an hour and a half, but on this song it took me about a day and a half, and to compound matters I didn't have all of the vocals when I started. I had the bulk of them, but I was still getting ad-libs as I was mixing.

Having built my little skeleton mix I then knew the sonic direction that I wanted. I knew the main part just had to be in your face, I knew the cowbell had to be in your face, I knew the kick and snare had to hurt you. I had such strong singers that, if any element in the mix sounded wimpy, they wouldn't be getting the right support. I therefore needed an aggressive track to support the aggressive vocals, and at the same time I also wanted each singer to have her own unique space. I didn't want the song to sound the same from start to finish, so you'll notice some sections where the cowbell is louder... Every chorus that follows a singer, her vocals are the loudest in that background section, and then at the end I just let everybody go for it. There are a lot of subtle things like that which were very time consuming, but when you know you're going to have that kind of high profile record it's fun to do that type of stuff, partly to show off and partly to enhance the song. Ron Fair, in particular, was brilliant in terms of what he provided me with vocally.

In what respects?

Being able to emphasise each singer in their own chorus. Normally what I would get is just a set of backgrounds and I wouldn't have that flexibility, but in this case one of the reasons why there were so many vocals was so that we could emphasise each singer in their own chorus.

I now had my outline, I now had my rough shapes drawn in, and I then started to add broad swatches of colour—the backgrounds and the main parts—while for the little detailed parts I had nuances on organ, guitar and percussion which allowed me to tailor each section to the personality of the singer. If you were dressing for a formal event, those little things would be like your handkerchief, your cufflinks and your cummerbund. The main elements of the song pretty much flowed from start to finish, and the only elements I had to work with in order to provide scene changes every eight bars were those little accents.

I wanted the song to be somewhat like a sledgehammer and not too finessed, while at the same time repeat listening would accustom you to the hard elements and enable you to discover the finessed elements. I didn't want the finessed elements up front, like they would be in a ballad. I knew the song would get a lot of airplay, and so I wanted stuff in there that you could discover the twentieth time around.

What impact did the SSL 9000 have on all of this?

'Being that the automation of that console is probably the most intuitive and user-friendly of any I've ever run across, it really helped me to blend the vocals. The 9000 allows me to be somewhat chameleon-like, where I can tailor my mix to the particular producer style or artist style, so I'm not limited to one or two or three configurations. I knew they liked a sound that was not all digital and not all analogue. Also, if I have to stop and think about a console then I'm affecting my creativity, but the beauty of the 9000 is that its technical sophistication actually makes it simpler and less intrusive in the creative process.

Having programmed most of the song's elements, what did you do next?

Well, then I had to build in the dynamics. In other words, I didn't have the luxury of having a drummer push the choruses or a guitar player getting happy and loud. Every kick drum and every snare was recorded at the exact same level, and so what I did was to add some other kicks and snares of my own that helped me to change the tonal qualities of the drums as the song progresses. I put each kick and snare at its own level as if I was playing it live.

The kick drum that I received from Rockwilder was incredible, but I just felt like I could use that extra octave below what he gave me; that sub which vibrates your body. So, I added that component, and I felt that I could get a little more attack, like the sound of a live drummer. If you think about it, in a live performance, the harder the drummer hits the kick drum, the more attack you hear, so in the choruses I raised the attack a bit to give the impression that the drummer was hitting harder, providing that thud which makes you so angry when it comes from a car that pulls up next to you at the traffic light. I had to have that, and

Moulin Rouge

the same thing with the snare drum and some of the other percussion elements.

Hearing and vision are interpreted somewhat the same way by the brain. If nothing ever changes in your living room, everything stays in exactly the same place, you never notice anything there, but if after a year someone moves a lamp from one table to another you'll immediately notice that lamp. Well, what happens with a lot of synthesiser and drum machine-based music is that by the end of the song you're not noticing things like you should, so a lot of times I'll just move a lamp from one table to another and it'll catch your ear and sustain your interest. The musical equivalent is to just turn up a drum for one hit or crank up a guitar or keyboard part for one lick.

That's one of the reasons why hip-hop music works so well. When we mix that we're not trying to make a smooth piece of music; we're letting all of the little warts jump out. That has a tendency to sustain your interest, because there's always furniture moving around in the living room. On a song like 'Lady Marmalade' it was imperative to keep moving things around. If you listen to that song, there's not a lot at the end that you didn't hear in the first chorus, so the way to sustain the interest is to constantly keep those levels moving around, and then your ear won't hear it as a nuisance but as 'Wow, that's cool. I never heard that cowbell before.'

Did you differentiate the effects between each of the vocals?

I like bringing my vocals up on three or four faders. One fader will put the information through a real hi-tech chain, so I'll be using all plug-ins on that particular fader. Then I'll take the same exact vocal and run it through an all-tube chain, so when my singers get kind of loud and shrill and screechy I'll pull up the fader that has rich harmonics on the tube stuff, while on the breathy, soft parts of the singing I'll pull up the fader with the hi-tech stuff. Sometimes I'll also pull up both. I'll just sit there with different combinations on these faders, and each word will have its own character and flavour depending on what I think sounds best. Then I'll take my effects, like reverbs and delays and choruses, and those are on separate faders, so each word will have its own individual effects.

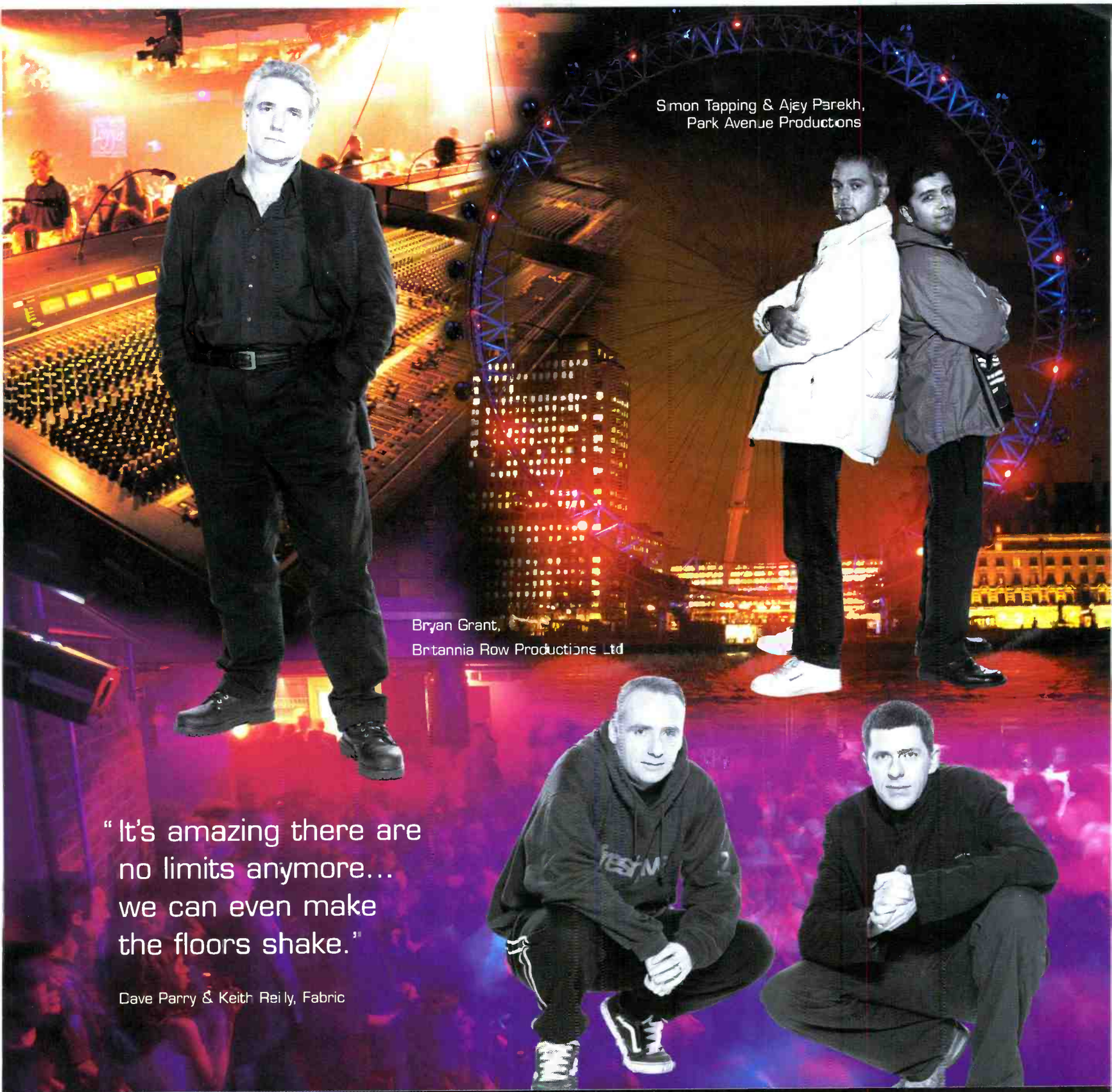
In fact, I'll take different parts of the frequency spectrum and put effects only on those. So, for example, instead of putting a chorus across the whole vocal, I'll only chorus everything from, say, 10k up. That keeps the mud out, and then in the mid-range I might put a nice reverb, and only put the delay on, say, the 1-3k range. That way, instead of getting cloudy mud and my effects swirling all over the place, I'm getting only the best elements of the frequency spectrum for each effect. I've found that gives me a little more space and clarity in the mix, and psycho-acoustically it gives me more width than I could get by applying effects to the entire spectrum. I not only do that with vocals, but also with drums, percussion, keyboards and stuff like that.

In summary, what was the biggest challenge of this particular project?

The pressure of dealing with so many personalities and movie deadlines. Imagine five artists, five managers, three producers and all of the movie people. Logarithmically it was incredibly difficult, but I was blessed to have producers who were very generous and very trusting. Ron Fair wore several hats; he was the A&R guy and the record company president as well as the co-producer, but he felt that unless he had each girl's total blessing on the mix he wasn't going to put it out. So, we had each of them come by, listen, give their opinions and finally their approvals before we proceeded. Fortunately, they could only critique their own parts.

The whole process with Pink took maybe 30 minutes; Christina had some very definite suggestions about effects and actual syllables, and we finished with her within an hour; Mya had some harmonies and different parts that she wanted us to amplify, and so we spent about an hour with her; Lil' Kim took about 30 minutes; and Missy approved it by phone. So, the process wasn't that bad in terms of the artists' professionalism. Managers, on the other hand, sometimes need crises to solve in order to look important, so that was another story...'

If you want to ask Dave Pensado more about his work, you can e-mail him at fdpen@ix.netcom.com □



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NASHVILLE: HOME TO HOOD

Robert Redford brings *The Sopranos*' James Gandolfini to Nashville and ADR brings him right back to California and New York. **Dan Daley** visits the little post house that turned the tables on Hollywood

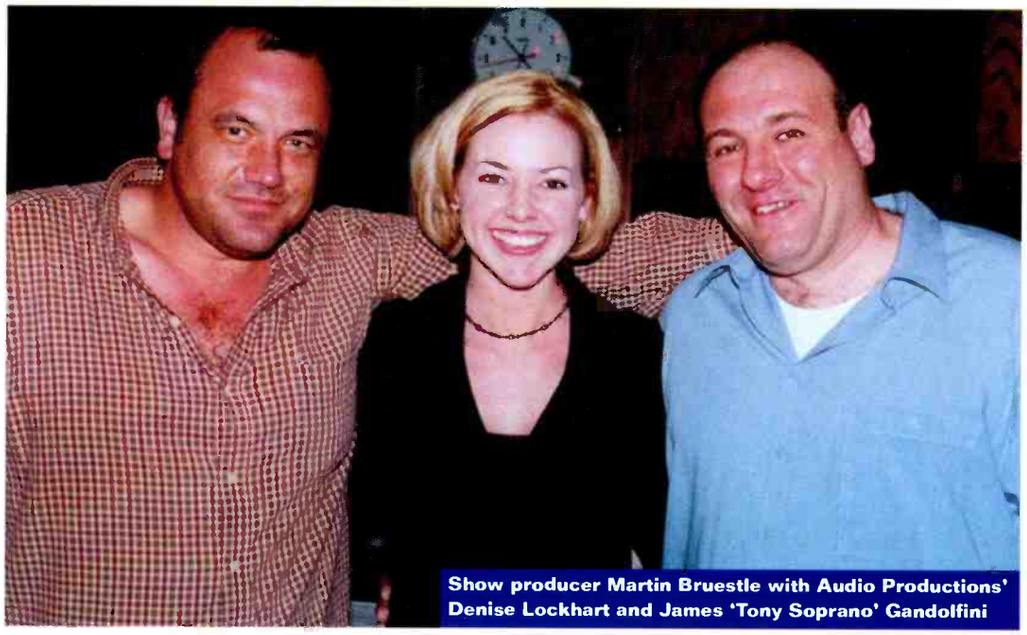
'I THINK OF US as a tugboat—small but powerful. We can turn on a dime.' So says Jim Reyland, president of Audio Productions Nashville, an audio postproduction facility in a city where you have to work very hard to not make your money recording music. 'The post houses in Hollywood and New York are big,' Reyland continues. 'But that's where the work is always going anyway. To get it to come to a place like Nashville—I mean, to get major, feature-film level post work here—you have to work as hard at letting them know you're here as you do doing the actual work.'

Reyland's observations will be increasingly relevant as more audio facilities in more places seek to get a piece of an overall entertainment pie that's growing more diffuse. Not everyone gets to have a facility exactly where it makes the most sense for every given application. But taking what you have, where you have it, and adding as equal parts persistence and chutzpah can help minimise geographic disadvantages.

Not that Audio Productions Nashville is in the sticks, media-wise—Tennessee did $35m worth of film production last year, with seven major feature films. And Nashville continues to host numerous tracking and mixing sessions for film scores and soundtracks. But it's still closer to Dollywood than to Hollywood, and country music remains Nashville's best friend and worst enemy, in terms of perception.

But by staying out of the music-only game, Audio Productions Nashville has managed to avoid the roller coaster that the city's studios have ridden since country began its slide, losing about half its market share from its high-water mark of 1994. 'We were very lucky,' Reyland acknowledges. 'We got established just before country started taking off again in 1989, and in that time we were able to carve out a radio and audio postproduction niche for ourselves that has allowed us to float pretty nicely even after the music itself has started slowing.'

In fact, Audio Productions, as it was called when it was founded by a radio announcer and a producer in 1982, evaluated country's coming potential to the point where Reyland added 'Nashville' to the company name when he came in as a partner in 1987, coming to town after years hosting a radio talk show in North Carolina. Reyland oversaw the company's move to a new Music Row studio and began working every audio angle that country music could offer, short of actually making the stuff. It worked, bringing to Audio Productions a range of clients for whom country had value, including, interestingly enough, the BBC and indie London country radio station Ritz 1035. BBC uses Audio Productions as its home away from home when producing spots out of Nashville, which it covers fairly regularly and often rather avidly, country offering a melodic counterweight to the dance, trance and hip hop that now infuses UK television audio. And because country's more marginal stars, such as the Mavericks and Delbert McClinton, have established firm fan bases in England, Nashville remains a central gathering point for the BBC and other media outlets to corral them.



Show producer Martin Bruestle with Audio Productions' Denise Lockhart and James 'Tony Soprano' Gandolfini

'We still do about three days of location audio a month for UK radio companies,' says Reyland. 'We regularly send feeds over there via ISDN, and send a lot of posted audio on tape, too.' And country still has a deeply ingrained relationship with marketing—for some reason country singers are viewed by advertisers as more trustworthy than rock stars. So when clothing line Jerzee's wanted JoDee Messina, and Budweiser wants Tim McGraw, Audio Productions has been the conduit for recording voice-overs for national commercial radio and television spots.

At a time when country has caused any number of studios in Nashville to rein in their ambitions, Audio Productions has been able to expand its facility to include a pair of audio post suites, each equipped with a Fairlight MFX-3plus workstation, a Mackie D8b digital console, and Mackie powered monitors. There is also a MIDI-based music production suite, the purview of staff composer-producer Michael Stanton.

Country isn't all there is; the company's client roster lists corporate and institutional entities, such as the recently opened Frist Art Center in Nashville, and Stanton has composed 5.1 surround productions for museum kiosk displays, produced, recorded and mixed at Audio Productions. Audio restoration and the occasional bit of audio forensics work round things out. All in all, a nice little boutique in a nice little place. As Gambino family Godfather John Gotti might have once said, it would be a shame if something were to happen to it.

Everybody wants *The Sopranos*, the dark-rimmed contemporary crime family that HBO has turned into an international powerhouse since the show debuted three seasons ago. And when it became known that James Gandolfini, the show's lead as Tony Soprano, would be spending a couple of months in Nashville, playing a prime role in an as-yet unnamed DreamWorks Pictures film (working title: *The Castle*) opposite Robert Redford, who was also directing, Reyland's interest was piqued, to say the least.

'I definitely sent them a few letters, telling them who we were, what we'd done,' he says, referring to the *Sopranos* production company in Los Angeles. '*The Sopranos* would still be shooting its final episodes of the season, so it was clear that ADR was going to be a service they would need. The thing was to let them know we could do it.'

Audio Productions had done it before, and the way they got into it would have made the real Sopranos proud. In the mid-1990s, when a Hollywood production company tracked down the voice of Nashville's Channel 5, Norm Wodell, for the feature film *Radioland Murders*, they also needed someone to record the cues via a phone patch. When Reyland was contacted, from a lead from the Tennessee State Music & Film Commission, he assured them that Audio Productions had done plenty of this sort of work.

'That wasn't exactly the case,' he says slyly. 'But fortunately Travis Turk, our chief engineer, is as good an engineer as I am a salesman.' Since then, the company implemented ISDN in its studios and has accumulated credits on network television shows such as *Baywatch* and *Nash Bridges*, as well as a few feature films such as the Jim Carey vehicle *Me, Myself and Irene*, for which country star Rex Allen Jr—son of the legendary voice of all the Walt Disney television shows—did the narrations.

Still, connecting with Soprano Productions was hit and miss, with the production company hesitant to commit to any facility that was not within a 15-minute cab ride of Spago's or the Tribeca Grill. Meanwhile, the stakes were getting higher: Gandolfini would not only have to do the last three episodes of the season while on location at the old Nashville prison, where *The Castle* was being shot, but would also have to do an ADR session for DreamWorks Pictures' *The Mexican*, in which he starred with Julia Roberts and Brad Pitt, to create a cleaned-up version for airline and broadcast use, and Skywalker Sound in Northern California was looking for a local facility to handle looping for that.

'We really, really wanted the project,' says Reyland. 'And we were getting closer to getting it, to convincing [HBO] that we could do it. We could tell that they were calling around, getting bids from a few other facilities—there aren't that many that can do ISDN ADR in Nashville, that have the equipment and the experience. They would call and schedule a session, then call back and cancel, then reschedule, then call and cancel and reschedule again. You can really hear it in their voices, that going outside the usual facilities in new York and Los Angeles and few other places is very difficult for a lot of production companies to do. There's a lot riding on big productions, and it's hard to take a chance on a new place, especially if it's somewhere you think that all they can do is country music.'

The grilling continued, about Audio Productions' experience, even the size of their ADR iso booths—not a minor consideration, since Gandolfini is not a small guy and the parts he would be looping for both *The Sopranos* and *The Mexican* would require emotion and the expansive gesticulation that comes with being of Italian descent.

Things started to get when Turk and *Sopranos*' sound supervisor Anna Mackenzie found common technological ground. 'Once she realised we were both using Fairlights, and that she could get her ADR recordings back on Exabytes, things started to roll,' says Reyland.

When Travis Turk arrived for the first *Sopranos* session, he lined his cues up in the MFX-3plus in sequence, and chose the traditional three-beep approach for cueing the talent. Turk acknowledges that at first Audio Productions' ADR expertise was pretty much relatively limited to his own experiences working on production and postproduction film audio in Toronto 20 years earlier.

'But it did teach me the basics of what needs to be done,' Turk says. 'And by the time we had gotten around to *The Sopranos*, we'd had a lot of experience under our belt.'

Martin Bruestle with Audio Productions' Jim Reyland and James Gandolfini

What Turk didn't have, ironically, was a familiarity with the programme itself. 'I don't have HBO at home,' he says. He gave himself a quick *Sopranos* primer by watching the work tape that HBO had sent down. That tape was of Episode 113 — the final show of the season and one for which bets were being placed nationally on whether Jackie Jr would get 'whacked' at the end of the episode, which was cablecast on Sunday night, 20th May. (Junior did get whacked.) When told he could have won a few bets with that kind of inside information, Turk replies, laconically and sounding not unlike Gary Cooper, 'It never occurred to me. I'm not really a betting man.'

Turk did take a somewhat original approach to the recording of the ADR, though. 'Rather than just one microphone close up, I like to use two of them,' he explains. 'I use a large-diaphragm condenser microphone set about six inches to a foot away from the talent, and a shotgun set up 18 inches to two feet away. That allows me to send back two tracks of audio: the close-up microphone approximates the effect of the lavalier mic they use to get production sound, and the shotgun approximates the sound of the overhead boom mic they also use on location. I've found that supervising sound editors and producers really appreciate having that choice available to them.'

Turk chose a Neumann TLM 103 for the close-in mic and a Sennheiser 416 shotgun, set up in an iso booth with variable wall acoustics (movable panels), a Sonex ceiling and a carpeted floor, with a 36-inch video monitor in the room and a table set up for show producer Martin Bruestle, who prefered to monitor and direct as close to Gandolfini as possible. Turk says he never applies dynamic or electronic signal processing to ADR, but usually sends the signal through a high-pass filter, rolling everything below 80Hz off. 'There's no information in dialogue at that low frequency range, and you eliminate the potential for a lot of low-end noise by just taking it out,' he says.

Gandolfini's ADR for *The Mexican* was done similarly, although the director, Gore Verbinski, remained at Skywalker Ranch. That session was supposed to have been done via ISDN, with a time code signal from the Ranch driving the video playback in Nashville. But technical problems that day caused the sessions to revert to standard telephone lines. 'They had to depend on us for synch,' says Turk. 'And you really can't hear the enunciation or the high-end as well with a regular telephone. We got the job done and everyone was happy with it. But you realise just how much you come to depend on certain technologies only when they're suddenly not available.'

HBO got their ADR finals on Exabyte, in the MFX format and with a backup on DAT; *The Mexican* was sent on a time-coded DAT to Skywalker Ranch, where it was transfered to a Pro Tools system for editing.

ADR and other film audio postproduction services will remain just a part of the service mix for Nashville facilities such as Audio Productions. Hollywood isn't planning on setting up a satellite shop on the Cumberland River anytime soon. But as the region continues to draw location work for feature films (Tom Hanks' *The Green Mile* was shot at the same prison three years ago), Nashville will be seeing more celebrity actors who aren't just coming to town to make vanity country records. And *The Sopranos*' Gandolfini was about as non-Nashville as you can get.

'He's very much himself on that show, I found,' says Turk. 'He doesn't play the character Tony Soprano—he is *Tony Soprano*. He made that character. Fortunately, considering he 'whacks' people, he's also a very nice guy.' □

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RADIO'S WATERSHED

GWR's new HQ combines almost every aspect of modern radio operation in its quest to serve present and future broadcasting needs. **Kevin Hilton** visits 'the biggest radio-only installation since Broadcasting House'

THE NEW TECHNOLOGICAL AGE has blurred many issues. At one time a local radio station was exactly that, one that was based in a specific town and served the immediate catchment area. A national radio service was generally located in the capital city of the country and would be housed in some great grey edifice. Which is why the new GWR group building in Bristol is such a conundrum: it houses the local radio stations for both the West Country port city and its picturesque near-neighbour of Bath, plus a raft of digital services for the UK national commercial DAB multiplex, Digital One.

GWR grew out of the commercial radio station for Bristol, Radio West, named partly to cash in on the popularity of *Shoestring*, a BBC television drama series from the late seventies and early eighties that featured a fictional radio station of the same name. The real Radio West went on air in October 1981. Its studios were built into a then new development called the Watershed, which was part of a general redevelopment of Bristol docks. This became home to a number of trendy shops, art galleries and an exhibition centre as well as the new radio station.

The GWR empire has been built up largely through acquisition rather than applying for new licenses. However, the GWR group has been successful in gaining a number of new digital radio licenses; as well as local services it has a stake in the national digital multiplex, Digital One, and originates several of the stations that make up its schedule.

These digital services, plus Internet feeds, also came from the Watershed, which was already pushing its ageing resources by housing the GWR FM services for Bristol and Bath, the latter going on-air during 1987, and the AM 'golden oldies' station, Classic Gold 1260, plus providing support facilities for other stations in the group.

'The Watershed was an older building,' observes Tim Donaldson, head of engineering services for the GWR group. 'The functions we carried out there grew but we still had the same number of studios we had always had. It was home to the local radio station for Bristol but had also become a centralised base for stations around the country and a centre for the satellite delivery of GWR's FM network. Consequently, the Watershed became cramped—some people were working in corridors, which was obviously unacceptable.'

New premises were found in the form of the old Wessex Water Authority building. This is further up Bristol's floating harbour, on which the Watershed also stands. Comparisons can be invidious and often lead to hyperbole, but Tim Donaldson has been suggesting that the complex is the largest since the BBC built Broadcasting House in the 1930s, and no one has contradicted him so far. When built in 1932, BH housed 22

studios; GWR now has 18 studios and 5 technical areas taking up a total of 24,000ft², a jump from six studios in 8,000ft² at the Watershed.

Part of the brief to the Oxford Sound Company, which undertook the whole technical build and installation contract, was to consider future expansion. 'The idea was to be forward-looking, both in terms of technology and space,' confirms Andrew Riley, the company's managing director. 'They wanted the freedom to move within the building in the future, so the infrastructure can be allowed to grow.' Tim Donaldson says that his brief from the GWR board was not just to think about the existing stations in the group but the possibility that these could total in the region of 200 sometime in the future.

Andrew Riley observes that the new complex combines both extremes of modern radio: new technology but with traditional control surfaces. The on-air desks have faders the presenters can get to grips with, most of the machinery is local but the stations are based on servers and there is full provision for voice tracking (the process whereby a presenter can record the links between music tracks in advance; these are later combined with the relevant songs, which are stored on a server, by means of an automation system).

This does not mean that GWR's stations rely solely on automation. Donaldson believes that a successful radio still needs live presenters: 'Phone-ins and the like are important because listeners want to interact with what is going on. Automation is all very well but it suffers from the inability to include that sort of interaction.' The automation systems used within the complex enable both fully automated driving of programmes and live assist for presenters actually sitting there and speaking in between the tunes.

The announcement of a new radio complex would usually involve the selection of a single automation system to run the entire output, from music play-lists to commercials to the news content. GWR considered a move to just one package but its growth over the years has seen the use of different systems to run the different elements. The result is that the new broadcast centre incorporates five automation packages: Computer Concept Corporation's DCS handles commercials play-out; either Enco Systems' DAD digital audio delivery system or the well-established RCS Selector is used for music play-listing; Barrcode's BRIAN editor operates in the newsroom; while GWR's in-house designed GLAM acts as a transfer mechanism for the Group.

Managing the installation on a day-to-day basis for the GWR group was its project engineer, Tim Lowther. He acknowledges that all the automation systems 'do pretty much the same thing' but explains that the various departments are used to working with their particular system. 'DCS works very well for commercials play-out because it has an integral switcher and it has been used within GWR for a number of years,' he says. 'Music play-out has evolved recently and while many prefer DAD, no one system has offered the complete functionality we were looking for.'

GLAM is a PC-based system that was developed by GWR technology staff to transfer linear audio around all of the Group's sites over its Intranet WAN. A promo produced at the Bristol centre can be tailored for ten different stations and then automatically sent to those destinations. 'The benefit is that it is linear,' Lowther explains, 'so there are no coding problems. We steer clear of the Minidisc because the coding algorithm is pretty aggressive.'

The digital-vs-analogue console argument is as strong in radio as it is in live television production and live concert sound, but the large-scale broadcast complex does seem to be shifting towards digits. GWR surveyed the current makes and models available and settled on the Klotz Vadis.

Tim Donaldson comments that, to his mind, decisions on digital consoles are not really about the audio quality: 'It's the same situation as CD, the success of which was to do with its usability rather than sound quality. The quality of digital desks is fabulous but it's the other things that really matter—flexibility, recall of configurations for specific presenters in whichever studio they happen to be allocated, reconfigurability and the potential to expand the system in the future.' Another reason for GWR in Bristol selecting Klotz is that Classic FM has been using Vadis consoles for some time.

The Oxford Sound Company tendered for the project in October–November 2000 and went on site around the middle of December. At this time most of the building was still wet concrete; cabling began just before Christmas and continued for a few weeks into 2001. As well as handling the radio station installation, OSC was also responsible for RF distribution and the public address and telephony systems, or, as Andrew Riley puts it, 'anything that wasn't to do with power'.

A total of 1500 Cat 5 outputs are spread around the building, while there are full terrestrial radio and television connections, DAB links and specific satellite feeds for GWR's services carried on the Sirius and Astra birds. The production area has a dedicated feed of MTV as a source of material because the services are all music-orientated.

The building is on five floors: the third floor houses the GWR Group secretariat; the second is home to the terrestrial services, both FM, AM, plus local digital stations, with supporting programme operations. The first floor offers four studios for digital services, primarily the national stations heard on Digital One and the Internet. It also houses six production studios and a studio dedicated to network sustaining programmes.

There are four main studios for terrestrial services, covering GWR FM in Bristol and Bath, Classic Gold and overnight sustaining services for the GWR group network. While saying that there is a lot of data 'flying about', Andrew Riley views the building as more a big local radio station, rather than as a broadcast centre.

On the first floor there are four booths for the digital services; but there are likely to be more stations than there are studios. Riley explains that these areas can be used for live transmission and preparing voice tracks. 'The four booths dip in and out of the chain as and when they're needed,' he says.

Six identical production booths feature Fairlight MFX3plus digital audio workstations (networked to a Fairlight server) and Yamaha 02R digital consoles. Also included is a terminal connected to the RCS system, which is in turn linked to the Klotz network. The production booths are linked to the studios and can be used as a control room in the rare event of a musical guest wishing to perform 'live'.

Generally, presenters will either drive the desks themselves or sit on the guest side of the console while their producer handles technical matters. There are occasions when the production booths feed the whole network. Tim Lowther observes that again the intention was to achieve flexibility, with anyone able to go and work in any of the booths. 'All the way along we've tried to involve the users in what we were doing as much as possible,' he says.

Among ancillary areas are two small booths, which can be used for local digital services and branding of specific stations, and a network control area, which fulfils a supervisory role for the digital services. Incoming material, such as music tracks and promos, is received here and ripped onto the server. As all GWR stations are music-led, the newsroom is a minimal concern, with four workstation positions. Text and audio feeds are taken from Independent Radio News (IRN) in London; the audio clips are automatically captured and appear on the BRIAN workstations. Local material is also recorded and edited using the same facilities, allowing the mix of local and national news to be adjusted to suit the needs of the day. Internet services are streamed in-house and handled on a day-to-day basis by the same personnel looking after the digital output.

The ground floor contains main reception and the central technical area (CTA). This has the capacity for 96 racks and currently houses 55. All the IT, cable and broadcast infrastructures are contained here, with music and promos held on a series of Compaq Proliant 1600 servers. These include a number that are dedicated to digital services The Mix, Storm, The Core and Planet Rock. Also in the CTA are telephone switchers, a Telos hybrid system, terminals for communications provided by NTL and BT among others, off-air receivers for the FM, AM and DAB services, satellite receivers, the SMS-IRN feed, the DCS commercials play-out system, GPS clocks and the Klotz processors. All studios and technical areas are connected by means of a Trilogy Orator talkback system.

Cabling work continued up to late January and by the end of February GWR had access to all the technical rooms. Commissioning took place at the end of May and the whole changeover from the Watershed to the new building was due to take place by the middle of June. The Oxford Sound Company's on-site installation team was led by Mark Lever, who supervised the studio build; Marcus Boynton, responsible for the construction of the CTA and general infrastructure; and Mervin Marshallsay, in charge of all digital systems.

Of the £1m budget allocated for the technical build and installation, approximately one third went on the Klotz consoles, while the Telos 2101 telephone system cost in the region of £50,000–£60,000. All this is a long way from the heyday of ILR, when manufacturers and engineers were striving to build stations at cheaper and cheaper prices. That need still exists but the new GWR complex is both a throwback and a pointer towards the future. □

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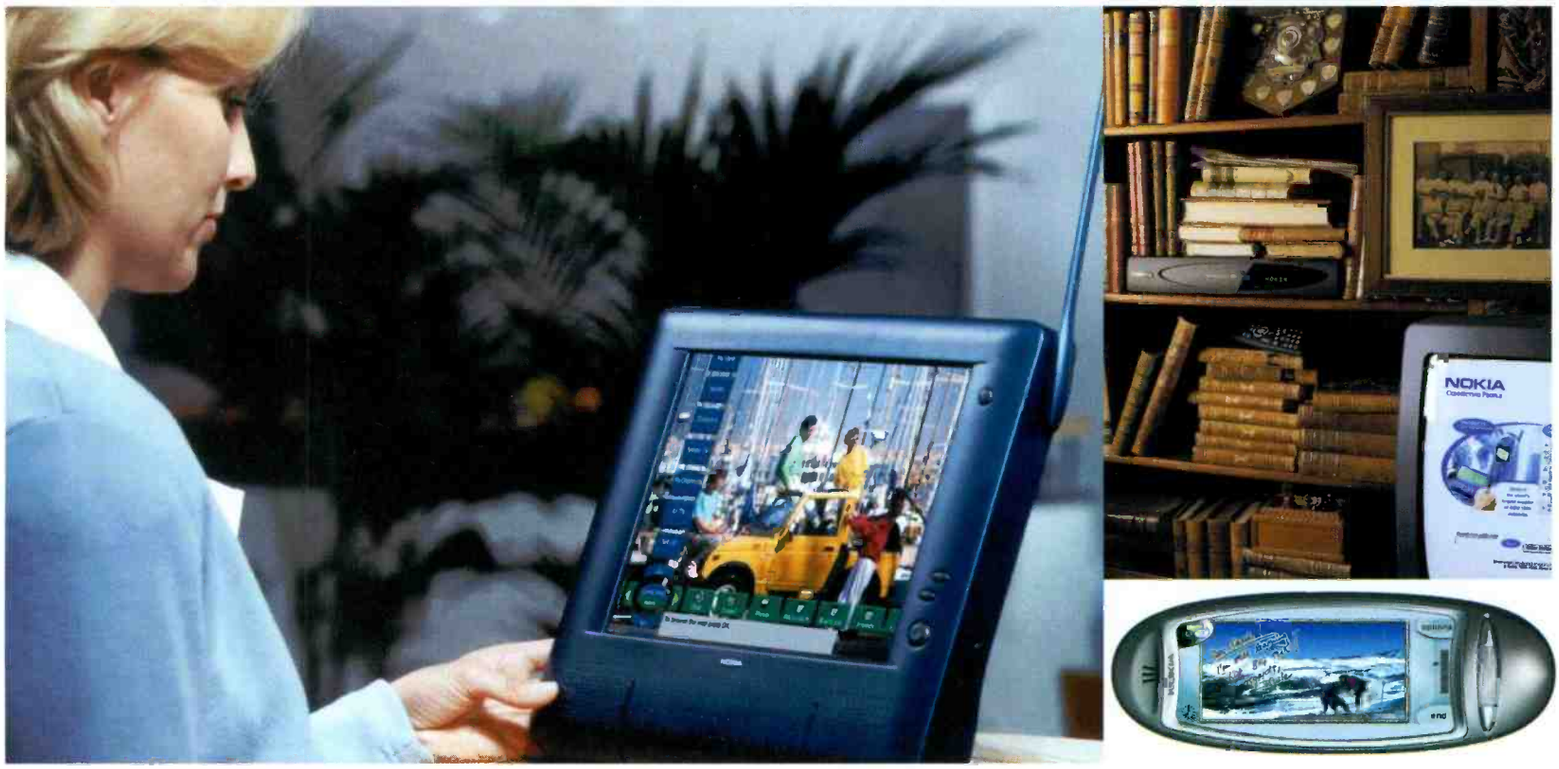


THE HOME OF THE FUTURE

Only a look into the home of the future can provide the pro-audio industry with an accurate indication of its future fortunes and requirements. *Studio Sound* invited a selection of its consultants and industry commentators to consider the possibilities and the problems presented by the home of the future

I REMEMBER A FRENCH magazine called *Le Monde de Demain* (The World of Tomorrow) that I bought secondhand when I was 14 or 15 years old. A bundle of black-and-white articles and images of the (near) future, it showed technological visions of how people would be living in the nineties—and in the magical year 2000.

To give you a taste: cars would all have been replaced by computer-controlled plexiglass-covered individual monorail vehicles delivering us safely and on-time to our offices. Just type in your destination or, better, say aloud your intended destination and the almighty computer would slip your carriage into the never-ending gliding chain. There would be no accidents, no traffic jams, just a smooth glide to an enormous city of light populated by towering skyscrapers built on pillars, high above immense lakes, lawns and fields. Far away, in an eternally lit rural zone, farmers drove their space-age tractors, picking enormous amounts of something mysterious that was immediately flown away in mega-helicopters to huge barns in a remote industrial area.

Bad weather would be a thing of the past, since we would be protected by huge, folding, plexiglass domes that covering the human environment, with artificial (and of course very beneficial) sunlight. Remote oxygen factories would provide forever-clean air. And after a happy day at the office and a smooth glide home, there would be no extra work to do: the robots would have cleaned the house and your meals would be served out of a computer-controlled kitchen.

Today we call this kind of literature science fiction. At the time, however, many people believed that it was only a matter of time before it became reality. These magazines were, after all, not exceptional. It was the belief of that period—that science was unstoppable and it would only bring us happiness and health... In short, it was 'progress'.

If you need further proof, a few years later, in 1969, some 3,493 journalists gathered in the hot Florida air to witness the launch of Apollo 11. Some hours later, Neil Armstrong set foot on the Moon. Science had prevailed and The Future was here. Soon, we would all be able to book trips to Mars or Jupiter instead of holidaying in 'ordinary' destinations like Ibiza or Las Vegas.

This just to say, my friends, that prophesies are very dangerous things. There's only one thing we can be sure of—over the ages, mankind has not changed much. We will always have the same need for food, safety, identification, status, comfort, love and appreciation from others, communication and, of course, self-preservation (like all living beings). There will always be lust, egotism, greed and aggression. The only things that have changed during the ages are the tools we have made in order to meet these needs. These 'tools' will, again, be the main keys to our technological future.

To rephrase the question 'how will domestic technology present itself in the future?', we might ask what tools will have been created to and for what purpose? Let's leave today's traffic jams, the greenhouse effect and never-ending wars over religion aside, and concentrate on what information technology has achieved today and what it could bring to our homes in the future. Let's, for the moment, forget that some 30% of the world's population doesn't have a decent roof above its head and is starving and sick, and start a personal mystery tour into the audio-visual future...

Modern electronic home entertainment was introduced to us by means of electricity and elecro-magnetism bringing sound and, later, images into our living rooms. During the last century, it was one of the major changes in the history of mankind. It was called 'mass communication' even though it was one-way. Radio and TV were soon an unavoidable reality in the Western hemisphere and beyond. Some even feared that the new technologies would replace information sources like newspapers and magazines.

The buzzword of the last decade was IT (information technology), the offspring of another buzzword: digital. From there came scientific, corporate and later 'personal' computers. With digital technology, mobile communication came to the masses—the Global System for Mobile telephony (GSM). Who could live without an I-pac or WAP phone? Who could live without e-commerce and i-commerce, streaming or webcasting? Was there

anyone out there who could afford not to be informed about the latest movements on the stock markets?

Well some of us had to, because the unstoppable, future-proof e-thing crashed. Based only on belief in yesterday's science fiction and fictitious finance, a little market crisis was all that was required to shatter the dream.

It even prompted the conference's chairman to say at this year's NAB Convention, 'maybe we were a little bit too enthusiastic about the future technologies given the fact that many of last year's players weren't around anymore'. And that,'we should maybe concentrate on our core business of making radio and TV'.

A very wise reflection indeed. Back to basics?

Am I saying that it has all gone wrong and that we should return to the good old days? Of course not. Although I could live without a PC or the Internet or a digital mobile phone, things are much easier and faster with them. And drawing a block schematic now takes a few hours instead of a few days of hard work. Besides, IT is here and it's here to stay—it regulates national and international banking and communications and too many other things to mention. It sets a faster pace than before and will continue to increase it. The broadcast world is saturated in IT-related technologies (not all make life easier, though, as some of my colleagues have found out). The question is, how are we going to use it in our homes in the future and to what extend will it affect our lives?

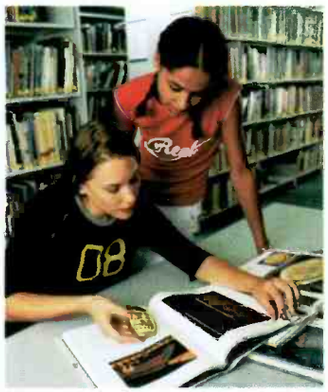
Let's see what I would like to see become a reality within the next ten years...

First, ATM networks should make homeworking widespread and reduce the hole in the ozone layer. People will also save travelling time and energy by doing their job in the realms of their homes—the idea already exists and I hope it will spread massively. Gone then will be (most) traffic jams, gone will be the stressed, sour and aggressive faces on our motorways. If we extend teleconferencing all over the world (even from our homes) then we could reduce air travel (and immense air pollution and human stress) dramatically while still conserving some kind of human contact. (I must say that in Belgium, fibre networks are now established all over the country, so this idea of homeworking, Internet and 'interactive' communication will become possible within the time frame. But I'm aware that in many countries this network will not be available within the next 15 or 20 years, if available at all.)

Second, information of all kinds can already be found in the huge data-libraries all around the world. It's called the Internet and I use it all the time to get professional information fast and reliably. However, at home it's a different thing for two reasons—when we got our first Internet connection at home, everybody was eager to spend hours and hours surfing. But when we realised that we had no specific goals, the fun quickly faded away and we went back to being entertained by radio or TV. (Though this is not to say that we don't do anything else.) The second reason is obvious—surfing on the Internet still costs a lot of money. Let's not forget that it was created by the communications industry (mainly your phone company) and that industries have one goal, and one goal only: to make money. And that money, in the end, has to come from you, the consumer. The more, the faster, the better. After all, they didn't invest in ISDN, ATM and cable networks because they love you.

With regard to the future: yes, the Internet as an integrated home information and entertainment system will stay and it will expand, but it will only explode as such if the connection costs will be radically reduced or will be included as standard in your electricity bill.

Now, imagine that an Internet connection and a workstation or PC will be available to even the poorest among us (with 'public' workstations if necessary) and we could find a way to secure Internet transactions so that fraud can almost be excluded. Once this is a fact, we could go as far as thinking of the Internet as a major pillar of democracy. If every citizen in a country has access to his Internet terminal, we could realise an old dream: the direct voting of laws. First we vote for our representatives, then they propose a law and everyone can vote for or against it via the home (or shared) terminal. Everyone has a personal electronic ID. We could even withdraw votes and influence our politicians drastically if we disagree and make them modify or even forget their propositions. It would be like a continuous referendum where the people of a nation rule all of the time. It's a giant parliament, thanks to the electronic gateway. (Am I drifting now?) I bet a lot of people who



are now apathetic about their faith will be a lot more involved in active politics. And it would be a lot more stimulating than surfing to sex sites.

Third, I believe radio and TV will be as healthy in 10 years time as they are now because most people are lazy when it comes to entertainment. They like to be amused and informed in a passive way (it's called comfort).

A few years ago some industry gurus started mentioning interactive TV. What can be 'interactive' about TV programmes? The fact that you can vote for one or another film? Or give advice through the cable to a quiz candidate? Is that what they meant by interactive? Or did they simply mean we show you how to spend your money by SMSing or tele-voting for the profit of the telecom operators? I'm sorry, but there's nothing interactive about TV —TV is there to inform and entertain you, while you are lying in your seat, hopefully distracting yourself, or while you are willing to be informed about the latest news. All the rest is simply costing you money without any real return.

A real danger for the future of TV however is the fact that some cable operators are already playing with the idea of offering a base bundle of selected channels for a fixed price while the consumer must pay an extra amount to view other, less popular channels. This may prove catastrophic for viewers with a wider than average view on the world. And cable operators also are part of the industry that loves your money. So I fear this to become a reality. Pay TV is not that popular, and in my opinion never will be.

Radio is also the best way to be kept informed quickly, and while driving a car it's one of the only means of getting entertainment or information safely. The kids on the back seat can play their video games or look to animation via the mobile DVD player on the build-in TFT screens but you, as a driver, will still want to listen to the radio.

Radio is here to stay and probably in the same form as it exists today. It will become a fully-digital medium, but when? Five years, 10 years, 15 years? If DAB doesn't become a transmission standard soon (with every station hooked on, without exclusion, thus without any monopoly strategy of some major players) it will most probably be taken over by digital AM. (A lot more space is available there with the same audio quality.) But whatever technology used, it's the consumer market that decides: if there are no bottom-priced digital receivers massively available, the FM technology will survive for a long, very long time.

As far as home technology for radio and TV goes,

At home with the technology

THE ROUTE TO THE HOME of the future lies less through the habits and preferences of the audience than through the technical fabric of the society that will support it. It's why the machinations surrounding the control of satellite, cable and the airwaves has provoked conspiracy theorists to doubt our future freedom.

The most recently widespread technical revolution has, of course, been the advent of the mobile phone with take up around the world being incredibly rapid and rising. Predictably the players in this arena have a strong technological 'in' with the consumer that borders on dependence. It leads to the suggestion that we are not far from the day when a child will be given a telephone number at birth against which the rest of its life will be referenced.

What characterises the main players is that they have fingers in a number of pies and major on complementary technology. As an illustration, Symbian Ltd was created and is owned by Nokia, Motorola, Panasonic, Ericsson and Psion with a mission statement of setting a standard for mobile wireless operating systems. The idea is to develop a core operating system which customer companies can license and build their own systems on. It is clear from this that these players are setting out their stalls and making sure as much as possible is stacked in their favour as the battle for the consumer of tomorrow begins. You could draw analogies to the electricity companies selling the concept of supplying electricity in to homes for the first time. Once the decision is made there is no going back.

It is interesting that companies like Nokia will claim that 'in the Mobile Information Society, consumer behaviour is driving the development of applications and services' which is not quite how it is given that nobody thought that Internet access on a mobile was possible or required until the mobile phone concerns started telling us that we couldn't live without it.

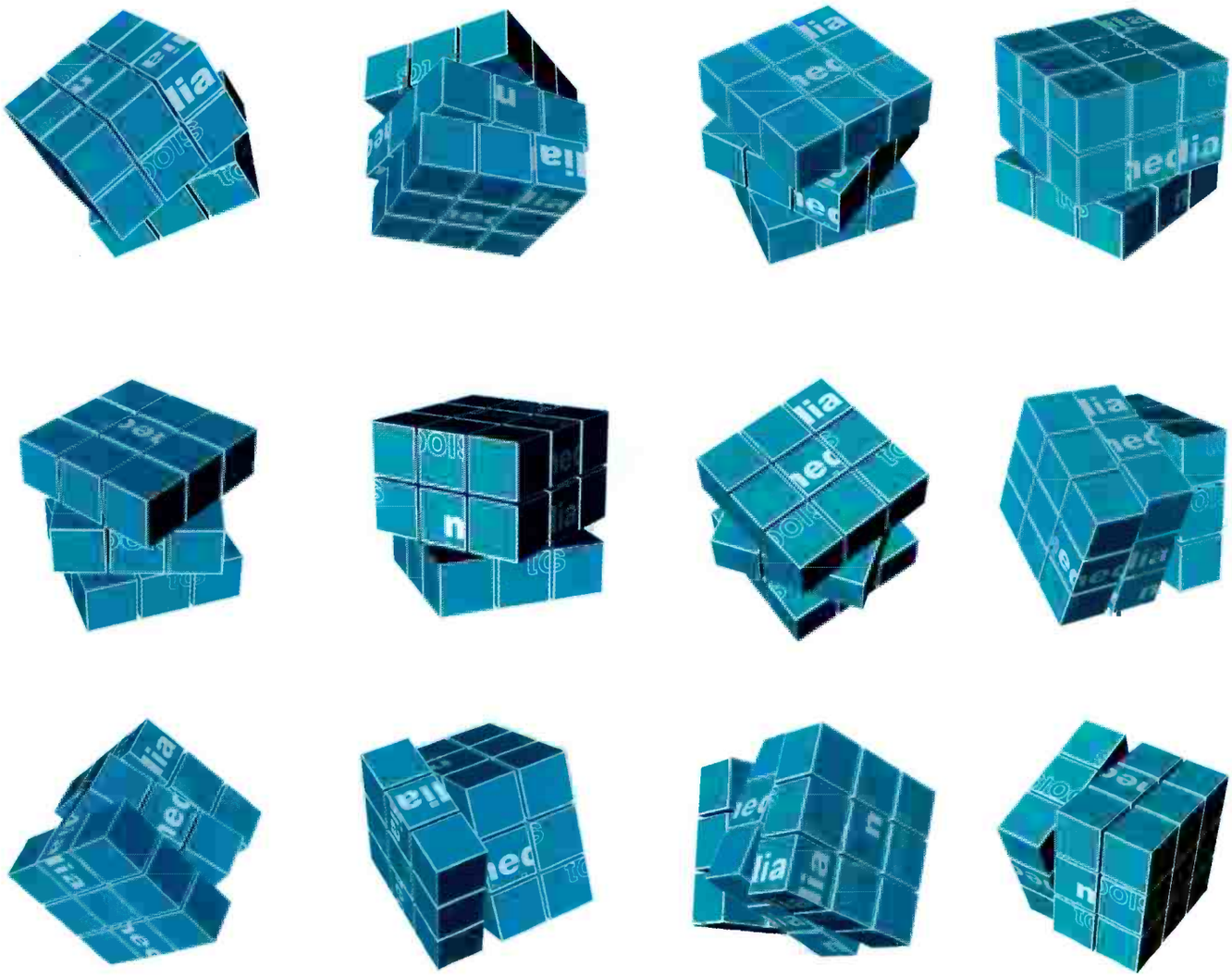
For the domestic environment and wireless technology, it all centres around the term that follows on from WAP and that is Blue Tooth. Whereas WAP will be used for high-speed communication outside the home, Blue Tooth is described as a means by which multimedia terminals and peripheral devices can communicate wirelessly in the home with the potential for integrating a Blue Tooth-enabled mobile terminal in the home as a central control console.

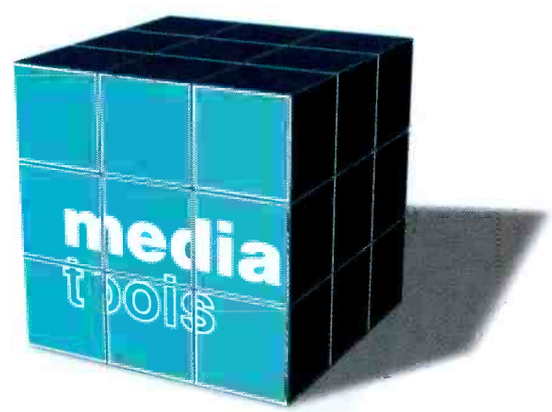
This technology addresses the practical problems that convergence between data, telecoms and broadcasting will bring. Most specifically the location of multimedia terminals, PCs and peripheral devices around the home and the wiring considerations. Nokia, for example, believes in a local area network wireless technology operating at 2.4GHz with high-speed data and video transmission for up to 100ft.

Whether it be wireless, broadband, cable, or satellite technology, a company like Nokia is putting itself in the running and combines Internet, digital television, and broadcast services for the consumer. A product like its Mediamaster 9902 S is a digital satellite receiver based on DVB standards for free and encoded channels and stores more than 15 hours of programmes. The Nokia Media Terminal brings together entertainment devices into one product that can swap seamlessly in and out of Internet sites and television channels, while at the same time, recording a television programme or playing music. The sofa surfer will be able to enjoy interactive gaming, personal emailing and chatting, and store music, movies and photo files on the internal hard drive.

It's all attractive and well thought out but would your parents buy into it?

Choosing the right audio system can be a problem.





providing solutions...

one thing will be for sure—bulky, massive TVs will be replaced by a flat screen with built-in tuner and an eventual connection to your PC or with a build-in tuner-processor-terminal-and-remote, wireless-keyboard. These already exist but in order to be regarded as standard-in-house gear for everyone, they must be sold at your local supermarket at a discount price. This, I think, will be the most realistic approach to our home entertainment system in, maybe, 10 years time. For music lovers and hi-fi purists however, the sophisticated stereo will still exist next to the TV screen (not necessarily connected). And with the cyclic life of all fashion things in mind, I think good stereo systems (digital *and* analogue) with good (and expensive) speakers will find new life and boom again in 10 years time. It all has to do with people who are returning to durable, lasting things in their homes.

This may be an interesting thought: go back to lasting, durable things.

Very often, when I read magazines or ads, I think to myself 'fine, but who is going to buy all this?' How many times in a decade are people going to change their radio, their TV set, their PC, their home entertainment system, their freezer, even for professionals: their studio equipment, and to what end? Just because something is 'new' or 5% or 10% more efficient or has some extra bells and whistles? Will the consumer (and aren't we all) who receives more and more confusing information on what to buy keep up with this trend? And at such a pace? Many of my friends already 'buy once'. It may be expensive, but they don't change for the next ten years because they bought a quality item.

Because the consumer industry is not only dictating the new trends, it also has to be sure of selling enough quantity before they will invest in mass production. It means a lot of hype and marketing, representing sometimes more than 40% or even 50% of the value of the goods. (That means that the real value you get as a consumer is only a third or less of what you paid for.)

Also, the rate of so-called new and 'indispensable' technologies is ticking at such a speed that I wonder if there is enough raw material left on this earth to go on producing it. And if there is, how many people will buy all this and how do they get rid of all their 'old' stuff. And if it goes on at this speed, how long will it take before every possible market is saturated? To whom are they going to sell? To the Martians? Believe me, I'm not the only person who asks these questions. And I'm not naive. I simply do believe that the time will come that consumers are becoming saturated with all this hype that is now constantly used by marketers to empty our wallets.

Let me explain... A few years ago I bought a 'multimedia' computer—a Pentium with a 3.2Gb hard disk. It did everything I wanted it to do (text and graphics) and an occasional Internet visit. But I had a 12-year-old son (I still have him but he's 14 now). Each time he came home with a new computer game, I had to go out and buy a new video card. (The game usually didn't work because it needed more DSP. Today, it's the fourth video card I'm at, together with a massive RAM memory extension and a 20Gb hard disk replacement. Just to play video games.

In other words, I feel pushed (not to say robbed) by the industry because it forces me to renew hardware on a continuous basis so my son can play PC games. Today, he's not interested in games anymore and during the last year I haven't replaced anything in my PC —it still works fine. I suppose it's called 'progress'.

Yes, the electronic multimedia, interactive world (for those who can afford it) is coming. But I think it will not be as fast as some industry leaders would like us to accept it. Electronic gateways such as fibre optics ATM and ISDN are already becoming a fact. But if prices do not drop dramatically, these technologies will mainly be used by professional organisations, not by the consumer masses.

A flat-screen TV, I suppose, will be a fact. The use of Internet with more interesting applications (provided it gives the user more power over his or her faith) will also be a fact. A merging between Internet and TV could very well be possible, provided it's at no extra cost. And one can find these appliances at near-discount prices in the supermarkets. I don't believe in 'real' interactive TV and someone still has to explain to me what that really means and who could benefit from that apart from picking up the phone (or use the cable) and pay extra for a vote of any kind.

As you can see, my opinion on how our audio-visual home appliances will (or should) look in the future contains more questions and wishes than prophesies. One thing is sure: I don't like buzzwords. I don't like prophesies either. I tucked my crystal ball away long time ago, together with that black-and-white magazine called *Le Monde de Demain*. And if I look at it, it's with a good sense of humour.

Chris Wolters

I AM QUITE SCEPTICAL of the hype surrounding the total integration of communication and entertainment gear. Okay, the Internet is already as commonplace as the newspaper, but what we have seen happen to the book market (more

Home servers

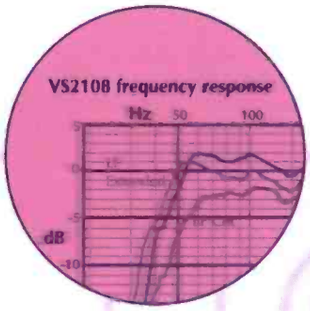
INCREASINGLY, leading players in the domestic entertainment market are anticipating the use of a 'media server' as the heart of tomorrow's home systems. UK-based Imerge, for example, launched a new single room version of its hard-disk-based stereo audio server at the recent Cebit show in Hannover. The S1000 is based on a successful multi-room server that is presently aimed at custom audio installations and will be available directly to the public through independent hi-fi retailers. The launch sits squarely in line with the thinking of major media manufacturer Toolex whose discussion documents have placed magnetic and optical media servers—or 'information refrigerators'—in the home since 1999.

These developments are facilitated primarily by increasing storage capacities and falling material costs. A domestic system combining magnetic and optical media with solid-state/flash memory and appropriate data compressions systems is theoretically viable today with future refinements sure to follow. The biggest opposition to such a development would presently come from the consumers' likely reluctance to consider such a fundamental change so closely on the heels of the launch of MiniDisc, DVD and SACD. As an indication of how likely the domestic entertainment server is to appear, however, Toolex even acknowledges the 'collector' instinct in human beings—our ability to collect music and film that we will never play again, safe in the knowledge that future servers will safely accommodate our indulgences.

In the interim, Imerge's S1000 has been designed to complement existing hi-fi products as the heart of a home entertainment system. A 30Gb hard disk provides storage for up to 560 hours of music in MP3 format, played back through conventional music systems using standard in-room controllers with the assistance of a TV interface. Users can record, play and edit information in their music database, using the system's remote control. CDs are recorded onto the hard disk in faster than real-time and, using the embedded Internet functionality of XiVA software, the S1000 automatically connects to the CDDB Internet site for track listing information.

At the heart of the SoundServer is XiVA software which, according to Imerge, 'is rapidly becoming the standard for the next generation of consumer electronics products that are hard disk-based and Internet-enabled'. Music tracks can be stored and played back by album, track, artist or genre, where the software selects tracks from the entire catalogue to fit a mood or style selected by the user. Connecting to the net via the XiVA-Net portal, XiVA-enabled appliances will soon allow the automatic search and retrieval, from the Internet, of more music and information about favourite artists or music types and XiVA software will in future be upgraded online via XiVA-Net.

Robin Courtenay, sales and marketing director at Imerge commented, 'The S1000 will capture the imagination of the hi-fi enthusiast who wishes to embrace the next generation of home entertainment that is Internet-enabled and allows sophisticated playback in a traditional lean-back, relaxing way. The Internet connectivity will be increasingly used to deliver new features and services, such as finding music matched to your personal taste, through simple software upgrades without the need to change the basic hardware or compromise on audio quality.'



VS2108

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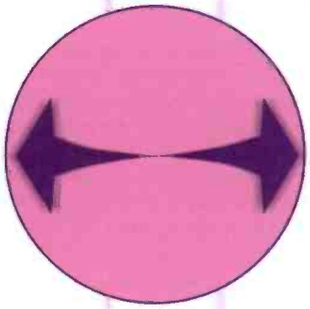
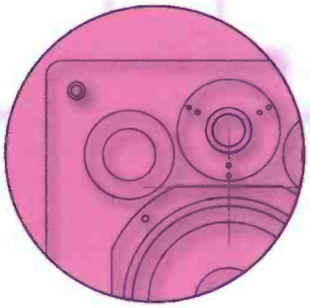


With Roger's range of smaller cabinets you can now bring Quested quality into your studio, whatever the size. The **VS2108** retains the superb stereo imaging and flat response which characterise the Quested range.



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books than ever) will also hold true for other sectors. People want to talk to real people, want to feel the pages of a book—the environment is often as important as the content.

Content is a major problem even today. Ever-increasing quantities of information inevitably result a lowering of quality. It seems the product of the two is constant, and the bottom line is that low-quality programming 24 most of each 24 hours with little to satisfy the intelligentsia. We are only now seeing new laws governing programme content where broadcasters are being forced to invest in more quality (a good point one might think, but probably with £50m less budget killing several high-quality niches).

In many cases I see very often *l'art pour l'art* and technical gizmo-ism that doesn't serve the story line. It is the same with some in our business—new programme makers may be technical wizards on new gear, but when it comes to using their ears creatively, they are found wanting. The tools themselves are not important, it is what we do with them that counts. And unless those tools are really so invisible to the average consumer that they don't force themselves into the foreground, I don't think this total integration will be successful. This will certainly take longer than 10 years, because it will require the generations being brought up with the Internet now to belong to the well-paid middle class, so I'd give it at least 15-20 years.

Technology changes fast, people don't —look to Israel and the Palestinians or to Bosnia. They are killing each other for reasons that are several hundred years old.

Florian Camerer

THE HOME OF THE FUTURE will not just contain a TV set and music centre for entertainment. Instead it will have a TV receiver, video recorder, computer, computer games console, digital camera, hi-fi player, DVD player, telephone, answer phone, intruder alarm, and gym allowing high bandwidth Internet access with credit cards transactions verified by voice and picture recognition. All in one box.

The flat-screen TV of today will be a huge wall-to-wall, floor-to-ceiling experience, hung on the walls ceilings and floors. It will come in rolls giving the user a 3-dimensional picture and sound for great interactive games play. It will detect where in the room you are and move with you, so if you are playing a Doom-type game as you walk towards a door the perspective will change with you. A rolling mat will measure how fast you're running or walking so you will be able to stroll along the most popular virtual scenery around the world or you can take part in the New York marathon from Hounslow.

You won't need wallpaper. Or paint or pictures to hang, because you will be able to redecorate on a daily basis from some of the best art galleries around the world. The new age will not only offer pictures but multidirectional sound with pinpoint accuracy and the screen or wall covering will also act as a digital camera.

The video recorder will be software based MPEG stored on hard drive, with video editing software for home movies to send to granny. There will be no need to record TV programmes as TV on demand will mean that you can watch what you want when. The computers of 10 years time will be a 1000x more powerful than they are now, remember back to when a fast Mac was a Quadra 950 with 64Mb of RAM.

The QWERTY keyboard will be replaced by voice recognition software as will the remote control. You will be able to control all your electrical gadgets remotely from a phone and video conferencing and surveillance will be standard. If someone enters your house while you are away, it will inform you of an intruder, take pictures of them, and alert the police. It won't be any use stealing the magic box as it won't give them access because of voice and picture recognition.

Lloyd Billing

SURROUND SOUND WILL BECOME as common as stereo over the next 10 years. This will be initially fuelled by the rapid increase of DVD and related games and entertainment formats, but the main impetus will increasingly be from broadcasting. Digital broadcasting will need to compete with other forms of home entertainment, and although there may still be some compromises on the ultimate quality delivered to the home, transmitting in surround will become a major feature of television. Radio has more of a mountain to climb in this respect since the DAB standard does not provide enough bandwidth for any discrete surround information.

The introduction of new technologies that will allow broadband transmission over the Internet will also allow surround sound to be packaged with video or streamed as pure audio. The quality will be far short of today's DVD at the beginning but rapid

increases in transfer rates, the diminishing costs of mass storage and faster computers will see a change in how entertainment is delivered to the home. Set-top boxes will increasingly become computer terminals with two-way communications capable of receiving large amounts of information in addition to the basic broadcast. Shopping, information gathering and communications will be possible through this terminal rather than using the desktop PC. Homes will contain mass storage devices that can be accessed by different terminals all over the house. It will be possible to select which sort of music should be played in the room you are in, games can be downloaded onto a games console in the children's bedroom and the latest movie can be accessed from the home cinema system. Archiving may still be done on removable media but the capacity of these devices will be way beyond the present DVD using blue lasers and multi-layer technology.

Just in case you are already drooling at the prospect, you are probably already imagining utopian sampling rates and extraordinary quantisation as being a natural evolution. The number of channels could easily be 10.2 or more, as has already been demonstrated on numerous occasions. Pictures of extraordinary quality could appear on your flat-screen display at the touch of a button and this amazing entertainment experience would be played back through speakers you cannot even see with no wires connecting them.

Dream on brother... All this technology and more will very probably be available 10 years from now—but what will the penetration of this technology be like, and what will the average household contain? The answer is that it will probably not be that much different from today unless governments have a way of turning the structure of the economy on its head. Digital television will certainly be with us by then because analogue will (probably) have been 'switched off', but the average home installation will continue to be fairly basic. Even though many transmissions will be available in a digital surround-sound format, much of it will still be listened to in stereo.

The reason is that many of the householders will not have sufficient income or enough space for this wonderful dream. The enthusiast and the wealthy will certainly be enjoying surround sound in as many places as possible. The video and audio will be very likely compressed because there is always going to be a fight for sensible download times and sufficient storage space. Lossy compression will still have a place provided it offers sufficient quality and can grow with the improvements in technology as is the case with DTS. The more highly compressed systems may cease to have relevance as the needs to compress audio to this extent become less imperative.

There have long been predictions that each new consumer technology will take over the existing formats in a short period of time. These calculations always seem to come from the notion that there is a one-for-one replacement cycle in operation. This might be a theoretical possibility but it very seldom turns out to be true. What usually happens is that several different products or technical solutions fight for the market and this usually has the effect of slowing down the replacement cycle and fragmenting the numbers.

There is already a ton of low-end audio products addressing the music download and portable market and this remains one sector that will probably take longer to move into surround. Undoubtedly, the improvement in virtual surround technology will start to impact portables but it will be slow to adapt. Going for a ride in the car is likely to be very different. This is where surround sound really works and the idea of having a home entertainment system in your car is already a reality but at a price. Once prices start to fall and systems start appearing as standard equipment with the major manufacturers, there is likely to be a fairly massive change in the car audio world.

You may well be able to order your groceries from your net-enabled fridge but the average home in 2011 will be very similar to today. There will still be families with 2.4 children who need to be entertained, either in or outside the home. There will still be arguments about what to watch or listen to and the remote control will still disappear when you most need it. The mobile phone will still work everywhere except where you need it most and the dishwasher will still break down on Christmas Day.

But perhaps instead of Aibo, Sony will have perfected the robot that takes the real dog for a walk so I can stay in the pub.

Chris Hollebone □

It's a wrap

The confusion that characterises the marketing of DVD-A is extending its influence even into the packaging of discs, writes **Barry Fox**

EVERY YEAR for the last 30 years Matsushita-Panasonic-Technics has held a seminar for the technical press, to show off new developments. This year's event in Rhodes (no envy please, a lot of it was spent on planes and in airports waiting for planes) was sandwiched between two DVD-Audio launch events in the UK; a series of listening tests staged by Warner Music at the plush Landmark hotel in London and a glitzy showbiz event at a Mayfair nightclub.

Because Warner is closing the Teldec and Erato subsidiaries operation in Hamburg, the London events were held for all Europe.

Jordan Rost, Vice President in charge of New Technology at Warner Music, was at Landmark wondering why there were so few audio journalists there to hear the DVD-Audio system installed by Bob Stuart of Meridian. At Rhodes, a few days later, he found out why after making a speech which urged the European audio press to listen to DVD-Audio and 'hear the difference, because the mass market looks to the audiophile for a lead'.

Rost learned that although Technics and Panasonic had provided Warner UK with a hit list of audio journalists to invite to the London events, Warner had ignored it and invited lifestyle and tabloid press. The very few audio journalists who were at Landmark had taken the initiative and contacted Warner to ask for an invite. Almost none of the audio press at the Technics seminar had even heard about the London listening tests.

During the course of the seminar we heard several demonstrations of DVD-Audio. But requests to hear the same music material played in Dolby Digital were refused. Because I was alone with Bob Stuart at Landmark for an hour and a half (which tells how many people were attending) I was able to indulge in some comparative listening. I heard some differences on some material, which triggered a train of thought.

DVD-Video already offers surround sound, but powerful Dolby Digital data compression is needed to squeeze the sound on the disc along with a feature movie.

DVD-Audio needs no such data compression because there is no feature movie taking up space on the disc.

It is often forgotten that Dolby Digital is scaleable, that is to say the amount of compression can be adjusted to suit the amount of space available on the disc. The studios currently use 384kbps and 448kbps, but the theoretical maximum bit rate for Dolby Digital is 640kbps. All decoders can handle this, but it has so far been used only for demo discs.

An audio-only DVD-Video disc could use 640kbps, and play on all the tens of millions of DVD-Video players already sold round the world.

Yes, I hear the purists cry. But there would still be a difference between pure DVD-Audio, with Meridian Lossless Packing, and Dolby Digital. But would the difference be audible?

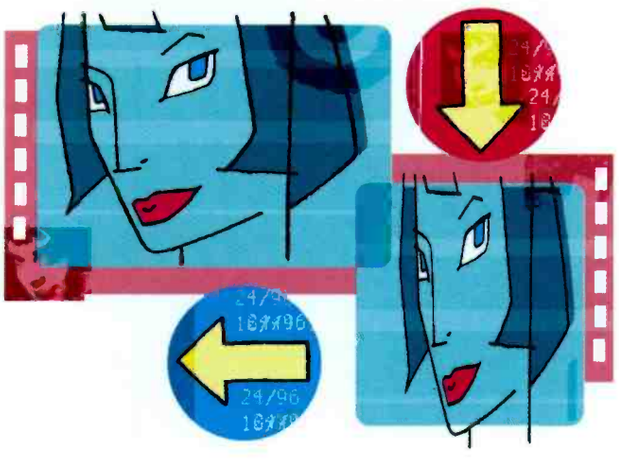
When justifying Warner's investment in producing DVD-Audio discs, Jordan Rost insists that the cost of building DVD-A playback into a player will soon be so little that the feature will become standard for all players. The mass market cost of DVD-players is now below $200 and falling. These players will not have D–A convertors and audio circuitry that can do justice to uncompressed 24-bit, 96kHz material.

So the record companies will end up mastering DVD-Audio discs for the benefit of the very small minority of audiophiles who have bought the very best players. The mass market might just as well be hearing Dolby Digital at 640kbps.

Maybe this is why Universal has lost its early enthusiasm for DVD-Audio. The company now sells 24-96 in a different way; and has come unstuck with that too.

After Philips sold off PolyGram, rights to the Philips Classics record label went to Universal. The company is now releasing 50 CDs to mark 50 years of Philips recording, with the music 'enhanced by use of the latest 96kHz, 24-bit technology'.

Transferring an analogue tape to 24-96 digital is a good way to capture all the available quality. Whether it is fair to claim 24-96 quality when releasing it on 16-bit, 44.1kHz CD is a moot point. But let it pass. More to the point, and for good engineering reasons, Universal's engineers in Germany used 24-96 transfer only for analogue originals. There was nothing to be gained from squirting 16-44.1 originals through 24-96 processors.



In fact, some of the new 24-96 CD releases have the same glass master numbers as the original CDs (both versions of *Romeo and Juliet* are 432 167-2 and 432 168-2). Universal is now having to reprint the CD sleeve notes and says it will send the reprints out to record stores. Shop staff will now have to open up the shrink-wrapping and replace the offending sleeve notes, says project manager Antoine van Heck.

But surely this means that shops will be selling opened goods; and the offending wording is also on the spine of the CD jewel box, which can only be replaced by breaking open the box as well as unwrapping it?

'I admit it's a problem,' says van Heck 'We will have to look into that.' You betcha, you bet.

Cruisin'

It's official: the entertainment industry is experiencing a sea change, but cruise boats have a model answer, writes **Dan Daley**

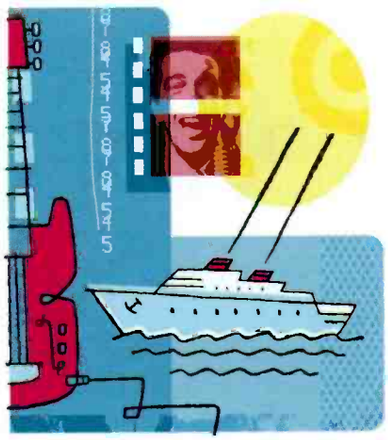
EVERY TIME a record is downloaded without payment, the record label that funded the recording loses a portion of its investment. When you take away the emotional turmoil around Napster and other online music schemes, that's the clinical version of what's happening. In the case of major record labels, a first-time artist release will represent approximately $250,000 in recording and other advance costs, with about the same amount allotted for video production, promotion, marketing, tour support and bail bond costs. So each download chips away proportionally at a half-million-dollar investment.

Now apply that to the film industry. Jack Valenti, chairman and CEO of the Motion Picture Association of America (MPAA, the cinematic counterpart to Napster foe RIAA), told the US Congress in April that by the end of this year an estimated one million films will be pirated daily. I repeat, daily. Napster downloads are approaching a half billion, so film is a couple of years behind music in the download department. But in film, the stakes are considerably greater: Hollywood averages $60m-$80m per film in production costs. Thus, each on-line nibble in the form of an unpaid-for download has an even greater impact on the film industry.

In concluding his testimony before Congress, Valenti asked rhetorically what I've been baldly stating for some time: that the Internet is changing the economic model for the entire entertainment industry. Valenti's words were, 'Who will invest the huge amounts of private risk capital in the production of films if this creative property cannot be protected from theft?'

My version has always tended to be a bit more Spock-like in tone, but says essentially the same thing. So let's have it one more time for the record. Call it Daley's Theorem & Corollary. Theorem: 'Anything which can be digitised can be stolen.' Corollary: 'Anything can be digitised'. More elaborately stated, the inability to protect intellectual property creates a tremendous disincentive to capitalise any venture that derives revenues from royalties. Less elaborately, say goodbye to Hollywood, and the rest of the entertainment industry as we know it.

This observation has been criticised as negative in the past. Having Valenti's words underscore it is cold comfort, either to me or to the studio industry. But the key lies in the phrase 'as we know it'. The download phenomenon hardly spells the end of music, which was around for thousands of years before Edison fiddled with it, or for visual media, which like music has also become considerably more accessible to many more people via the desktop computer. The real irony in this whole equation is that even as downloads chip away at the economic underpinnings of the entertainment industry, more entertainment product is being made than ever before. More records come out of people's basements and garages than ever before; more independent film festivals globally are showcasing more filmed entertainment than ever before. Just as cable television's voracious appetite for content has fuelled the video business, to the point where programming is now being predicated on security-cam videos and police surveillance recordings, digital radio's



hundreds of channels will need more music, all the time.

What this means to the recording studio industry is significant. Studios are having a tough time of it now for the same reasons their main clients, the record companies, are: they continue to follow an older business model even as that model is invalidated a bit more every day. This is not a criticism or a judgement or an indictment—it's an observation; change comes hard for everyone. But as the explosive demand for entertainment product continues to burgeon at the same time that the old order crumbles, the evidence of opportunity is everywhere to be found.

The title of this month's column comes from some history I learned about the cruise ship industry. When you live in Florida, the cruise ship port capital of America, you will learn about it by osmosis. But what's most compelling to me about the history of the industry is that, from the time that shipboard tourism started, in the second half of the 19th Century, though 1958, cruise ships carried virtually 100% of transatlantic tourist traffic. In October of that year, however, Pan American inaugurated a Boeing 707 jet service across the Atlantic. Within five years, the cruise ships' market share of transatlantic tourism was down over 95%.

Yet, 25 years later, cruise ships are a booming business, and ever-larger ones are constantly one-upping each other as they roll down the ways. In perhaps the best illustration of life imitating art imitating life, White Star line plans to have an exact replica of RMS Titanic ready for boarding next year. (This one, we're assured, will have sufficient lifeboats.)

An industry seemingly on the verge of collapse finds renewed vigour—it's a story that's been repeated dozens of times in the last 100 years. The bottom line here is, why not the same for the recording studio industry? Adaptation is critical to survival. Strangely enough, pop stars are seemingly the least Darwinian in this regard, as any number of oldies tours indicate. There's no reason why the studios they use have to follow suit.

We're already seeing significant new trends in the studios business, most notably the one in which facilities consolidate and grow via acquisition, and expand geographically. The addition of new services has been another trend; DVD authoring, mastering, audio forensics, have all been new features studios have added to their cards.

The expiration of the old economic model of the entertainment business means that the conventional sources of revenues for recordings will ultimately dry up, as, ultimately, will work for many conventional postproduction facilities. But while companies like AOL Time Warner may eventually get out of the new music business (and I'm betting they and the other four major labels will), the amount of catalogue material that will need editing and other work will soar as they seek to maximise earnings from existing content.

Change is a lot of work. But in this case, look at it as though it were a cruise. Just make sure you don't miss the boat.

Brotherly love

Moving on doesn't mean never looking back, as the rash of reality television programmes is demonstrating, writes **Kevin Hilton**

MODERN TECHNOLOGY seems to come with many caveats. Every time it is discussed, people trot out little warning phrases reminding others not to throw away all the traditions and techniques that had been developed and refined during the days of so-called old technology. Just because it is something that is now often heard—and is danger of becoming a modern cliché—does not mean that this comment is not relevant or should not be reiterated.

Its relevance occurred to me as the second series of *Big Brother* began to dominate Channel 4 in the UK. The 'reality' game show was a massive success last year; it, to use another cliché, captured the imagination of the public, to the extent that its run has been dubbed by media analysts and academics as 'the summer of *Big Brother*'. During this period it was difficult to escape news from the House: not only was it a fixture on C4 but it was discussed on other TV and radio programmes and made easy copy for the national newspapers. And then there was the Internet. A live web feed gave addicts—and there were many—the opportunity to log in and watch events as they unfolded in real time.

This year things are slightly different and the coverage has moved on. *Big Brother*, born in the Netherlands and a massive success in Germany and the US as well as in the UK, inevitably spawned a rash of other reality TV shows, some a variation on a theme, others merely cynical cash-ins that took the concept to its illogical conclusion.

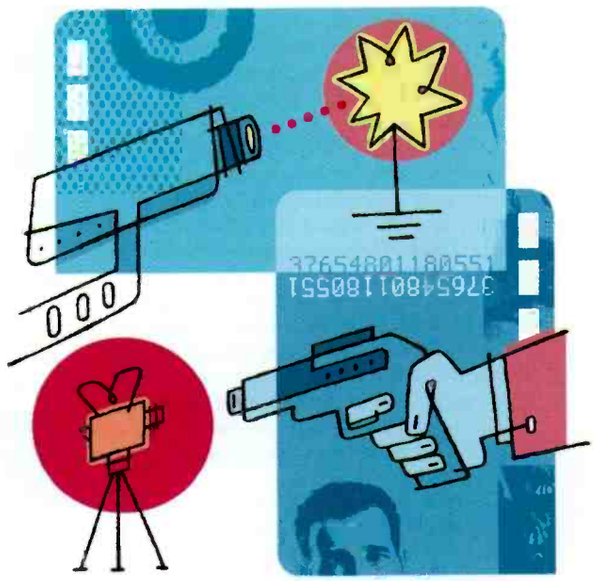
C4 is up against the first British series of *Survivor*, a home-grown version of the American show that is part reality TV, part game show and part *Lord of the Flies*. It has also faced a less than enthusiastic reaction from the press, which appears to be bored with the whole genre, although one of the female contestants 'accidentally' (twice) letting her towel slip while getting out of the shower has undoubtedly boosted the show's fortunes.

In terms of technology, the production team is using new camera monitoring equipment, while the web sites offer a choice of four cameras (two live 'edited' feeds, a 'pan' camera that allows the viewer to choose their own angles and a Fan cam, which is dedicated to follow a nominated member of the group each day). Mobile phone users can have updates delivered directly to their handsets—we should doubtless be grateful that GRPS has only just arrived and that G3 is still a way away, otherwise we could have video clips of towel-slippage beamed straight to us.

Perhaps the biggest departure is that TV viewers can now watch live coverage of the goings-on through C4's recently established digital entertainment channel, E4. For 18 hours a day, if one has the inclination or a lot of patience, everything unfolds in real time. Just. There is a delay, because this is meant to be real life and in real life some people swear a lot. 'And they do swear a lot,' a technician working on the show told me.

My contact and his colleagues have the unenviable task of sitting in the control room, watching everything going on. He says the danger is that the concentration lapses because there is very little happening and, so, when someone does utter an obscenity, it is sometimes missed and gets through. This is probably less of a sin than what happens when a swearword is caught: the audio feed is switched and traffic noise incongruously fills the soundtrack, masking the offending words.

Much of the time there are very few changes in camera angles; it is a little like watching those Andy Warhol films of the 1960s that were just a camera pointing at a wall or something equally unriveting. Those, of course, were serious, albeit pretentious, attempts to discuss art and reality. The high point of *Big Brother 2000* was the unmasking of 'Nasty'



Nick as a duplicitous schemer; although seen live on the web, the producers saved up the footage and transmitted a superbly edited special programme that contained so much drama, cynics were convinced the whole thing was a setup from the start.

Edited highlights are going out on C4 but uncut, as-it-happens transmission is a backwards step. My reaction to the E4 coverage was: 'Thank God for whoever invented editing'. Ken Russell once criticised Alfred Hitchcock's *Rope*, which was filmed in a series of continuous takes, by saying that it was retrograde, throwing away all the editing techniques that had been developed since Eisenstein had stunned audiences with *Battleship Potemkin*.

The development of new technology has been responsible for contracting the stages of acquisition, production, postproduction and transmission. Live *Big Brother* is the extreme example of this, creating merely a continuous delivery stream. For the sake of creativity and our sanity, it should not be considered a good idea, regardless of the technology involved.

COMPONENT DIGITAL VIDEO

Digital techniques abound in video just as they do in audio. **John Watkinson** discusses the standards for digitising component video for production purposes

ANY ANALOGUE VIDEO SIGNAL can be digitised with a suitable sampling rate and wordlength. For production purposes, this is done with colour difference signals. While signals such as Y, R, G and B are unipolar (positive only), colour difference signals are bipolar and may meaningfully take on negative values.

In production systems, the important requirement is for image manipulation in the digital domain. This is facilitated by a sampling rate that is a multiple of line rate because then there is a whole number of samples in a line and samples are always in the same position along the line and can form neat columns. A practical difficulty is that the line period of the 525 and 625 systems is slightly different. The problem was overcome by the use of a sampling clock which is an integer multiple of both line rates.

ITU-601 (formerly CCIR-601) recommends the use of certain sampling rates which are based on integer multiples of the carefully chosen fundamental frequency of 3.375MHz. This frequency is normalised to 1 in the document.

The bandwidth of analogue video is nearly 6MHz, and to sample this with real filters requires a sampling rate of around 13MHz–14MHz. 3.375MHz x 4 = a sampling rate of 13.5MHz. This frequency line-locks to give 858 samples per line period in 525-59.94 and 864 samples per line period in 625-50.

In the component analogue domain, the colour difference signals used for production purposes typically have one-half the bandwidth of the luminance signal. Thus a sampling rate multiple of two is used resulting in 6.75MHz. This sampling rate allows respectively 429 and 432 samples per line period.

Component video sampled in this way has a 4:2:2 format. While other combinations are possible, 4:2:2 is the format for which the majority of production equipment, such as VTRs, routers and vision mixers, is constructed. Fig.1 shows the spatial arrangement given by 4:2:2 sampling. Luminance samples appear at half the spacing of colour difference samples, and every other luminance sample is co-sited with a pair of colour difference samples. Co-siting is important because it allows all attributes of a picture point to be conveyed with a three-sample vector quantity. Modification of the three samples allows such techniques as colour correction to be performed. This would be difficult without co-sited information. Co-siting is achieved by clocking the three A–D convertors simultaneously.

For lower bandwidths, particularly in prefiltering operations prior to compression, the sampling rate of the colour difference signal can be halved. 4:1:1 delivers colour bandwidth in excess of that required by analogue composite video.

The sampling rates of ITU-601 are based on commonality between 525 and 625 line systems. The consequence is that the pixel spacing is different in the horizontal and vertical axes. This is incompatible with computer graphics in which so called 'square' pixels are used. This means that the horizontal and vertical spacing is the same, giving the same resolution in both axes. However, high-definition TV and computer graphics formats universally use 'square' pixels. Converting between square and non-square pixel data will require an interpolation conversion process.

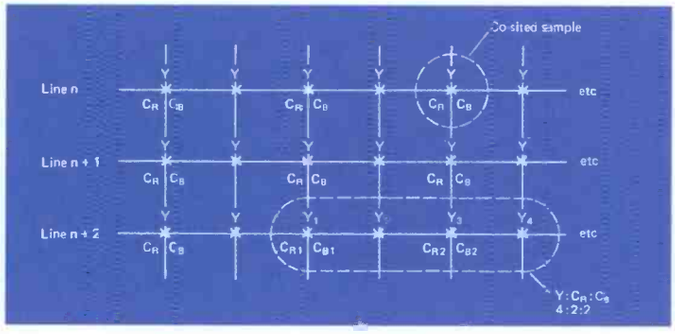


Fig.1: In CCIR-601 sampling mode 4:2:2, the line synchronous sampling rate of 13.5MHz results in samples having the same position in successive lines, so that vertical columns are generated. The sampling rates of the colour difference signals C_R, C_B are one-half of that of luminance, that is 6.75 MHz, so that there are alternate Y only samples and co-sited samples which describe Y, C_R and C_B. In a run of four samples, there will be four Y samples, two C_R samples and two C_B samples, hence 4:2:2

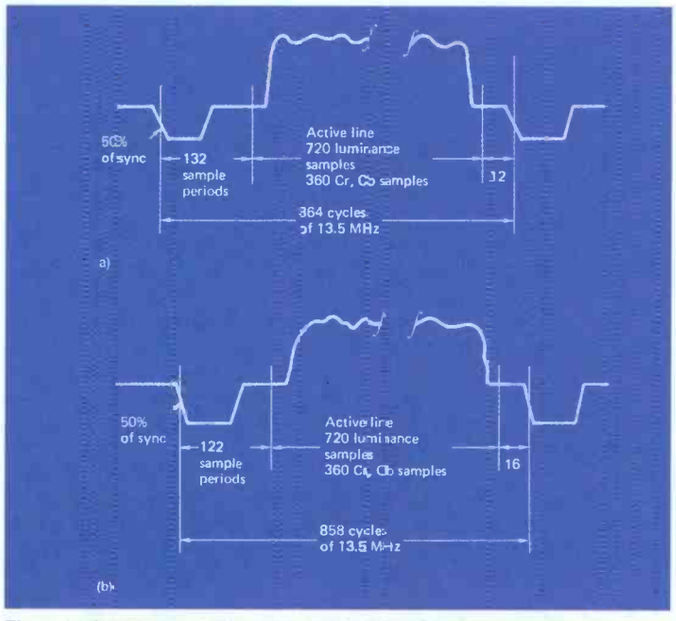


Fig.2: (a) In 625 line systems to CCIR-601, with 4:2:2 sampling, the sampling rate is exactly 864 times line rate, but only the active line is sampled, 132 sample periods after sync. (b) In 525 line systems to CCIR-601, with 4:2:2 sampling, the sampling rate is 858 times line rate, but only the active line is sampled, 122 sample periods after sync. Note active line contains exactly the same quantity of data as for 50Hz systems

It is not necessary to digitise analogue video syncs in component systems, since the sampling rate is derived from sync. The only useful video data are those sampled during the active line. All other parts of the video waveform can be recreated at a later time. It is only necessary to standardise the size and position of a digital active line. The position is specified as a given number of sampling clock periods from the leading edge of sync, and the length is simply a standard number of samples. The component digital active line is 720 luminance samples long. This is slightly longer than the analogue active line and allows for some drift in the analogue input. Ideally the first and last samples of the digital active line should be at blanking level.

Fig.2 shows that in 625 line systems the control system waits for 132 sample periods before commencing sampling the line. Then 720 luminance samples and 360 of each type of colour difference sample are taken; 1440 samples in all. A further 12 sample periods will elapse before the next sync edge, making 132 + 720 + 12 = 864 sample periods. In 525 line systems, the analogue active line is in a slightly different place and so the controller waits 122 sample periods before taking the same digital active line samples as before. There will then be 16 sample periods before the next sync edge, making 122 + 720 + 16 = 858 sample periods.

Fig.3 shows the luminance signal sampled at 13.5MHz and two colour difference signals sampled at 6.75MHz. Three separate signals with different clock rates are inconvenient and so multiplexing can be used. If the colour difference signals are multiplexed into one channel, then two 13.5MHz channels will be required. If these channels are multiplexed into one, a 27MHz clock will be required. The word order will be: Cb, Y, Cr, Y, and so on.

In order unambiguously to deserialise the samples, the first sample in the line is always Cb.

In addition to specifying the location of the samples, it is also necessary to standardise the relationship between the absolute analogue voltage of the waveform and the digital code value used to express it so that all machines will interpret the numerical data in the same way. These relationships are in the voltage domain and are

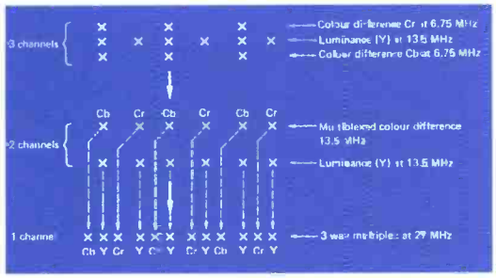


Fig.3: The colour difference sampling rate is one-half that of luminance, but there are two colour difference signals, Cr and Cb hence the colour difference data rate is equal to the luminance data rate, and a 27MHz interleaved format is possible in a single channel

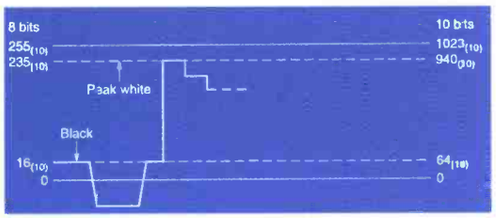


Fig.4: The standard luminance signal fits into 8-bit or 10-bit quantising structures as shown here

independent of the line standard used.

Both 8-bit and 10-bit resolution are allowed by the interface standards. Fig.4 shows how the luminance signal fits into the quantising range of an 8-bit system. Black is at a level of 16 decimal and peak white is at 235 decimal so that there is some tolerance of imperfect analogue signals. The sync pulse will clearly go outside the quantising range, but this is of no consequence as conventional syncs are not transmitted. The visible voltage range fills the quantising range and this gives the best possible resolution.

The colour difference signals use offset binary, where 128 decimal is the equivalent of blanking voltage. The peak analogue limits are reached at 16 decimal and 240 decimal respectively allowing once more some latitude for maladjusted analogue inputs.

Note that the code values corresponding to all ones and all zeros—the two extreme ends of the quantising range—are not allowed to occur in the active line as they are reserved for synchronising. Convertors must be followed by circuitry which catches these values and forces the LSB to a different value if out of range analogue inputs are applied.

The peak to peak amplitude of Y is 220 quantising intervals, whereas for the colour difference signals it is 225 intervals. There is thus a small gain difference between the signals. This will be cancelled out by the opposing gain difference at any future D–A convertor, but must be borne in mind when digitally converting to other standards. Computer graphics standards often use the entire number scale with black at all zeros.

As conventional syncs are not sent, horizontal and vertical synchronising is achieved by special bit patterns sent with each line. Immediately before the digital active line location is the SAV (start of active video) pattern, and immediately after is the EAV (end of active video) pattern. These unique patterns occur on every line and continue throughout the vertical interval.

Each sync pattern consists of four symbols. The first is all ones and the next two are all zeros. As these cannot occur in active video, their detection reliably indicates a sync pattern. The transition between the all ones and all zeros value indicates the timing necessary to distinguish between the multiplexed components. In a serial system, this transition will also enable the bitstream to be parsed into words again. The fourth symbol is a data byte which contains three data bits, H, F and V. These bits are protected by four redundancy bits which form a seven bit Hamming codeword for the purpose of detecting and correcting errors. Fig.5 shows the structure of the sync pattern. The sync bits have the following meanings:

H is used to distinguish between SAV, where it is set to 0 and EAV where it is set to 1.

F defines the state of interlace and is 0 during the first field and 1 during the second field. F is only allowed to change at EAV. In interlaced systems, one field begins at the centre of a line, but there is no sync pattern at that location so the field bit changes at the end of the line in which the change took place.

V is 1 during vertical blanking and 0 during the active part of the field. It can only change at EAV. □

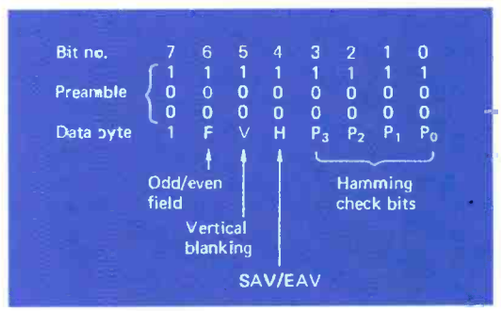


Fig.5: The 4-byte synchronising pattern which precedes and follows every active line sample block has this structure

MIC MECHANICS

Synonymous with high-quality 'classic' valve microphones, the Neumann name continues to set standards today. But what of yesterday's heroes, asks **Ashley Styles**

LET US BEGIN with a little background information relating to the model codes used by Neumann. As a rule of thumb, any Neumann valve microphone, with a type number using three digits and prefixed with a '2' is the same as it's two-digit counterpart with the advantage of an RF proof connector. The letter 'M' lets us know that the microphone uses a 'wired-in' valve, rather then a plug-in type, which is indicated by the letter 'U'. The letter 'K', meanwhile, tells us that the microphone is a miniature type. So a KM256 would be a miniature microphone, using a wired-in valve, with an RF-proof connector whereas a U67 is a standard sized microphone, using a plug-in valve. This also applies to the U64, using a plug-in nuvistor—but as the U64 is a miniature microphone perhaps it ought to have been called the KU64. (Note that this code does not apply to the 'East German' Neumann Gefell microphones.)

Looking specifically at the Neumann KM54 (early type), KM56-KM256, KM88 and the SM2-SM23, stereo, microphones, we find that the diaphragms used in the KM54 (cardioid), KM56 (multi-pattern) and the KM88 semiconductor version of the KM56 microphones, were constructed from nickel foil. As a result, these capsules can all suffer from two ageing problems which can eventually render the units useless. The diaphragms can either corrode and suffer from noise problems, or, the adhesive used to fix the diaphragm to the backplate becomes porous with age making the mic noisy. The electrical connection to the diaphragm can also corrode and this connection then goes open circuit. The SM2 and SM23 stereo models also used nickel foil type diaphragms and therefore share susceptibility to the same problems.

Two SM2s showing the Neumann and Telefunken models

These capsules were discontinued many years ago and there are very few spare units hidden away anywhere. Sadly, if one of these units fails, there is very little that can be done. Re-skinning sometimes works, but is generally not all that successful.

When receiving any of these models for repair, should the fault lay with the capsule, then the client is advised of the problem regarding unavailability of spares. I do occasionally fit small, single-diaphragm fixed fig-8 capsules into the KM56 and KM88 keeping the microphones in a 'useful' condition. This also applies to the stereo SM2-SM23 where the capsules can be completely dismantled and—providing enough 'matched' capsule elements can be used—be reconstructed for M-S use using the small single-diaphragm fixed fig-8 capsule for the 'side' element and a reconstructed multi-pattern capsule for the mid. Again this enables the microphone to have a continued, useful life.

The polar pattern switch used on the KM56 is very fragile. When connecting or disconnecting the microphone and lead, only the body of the microphone should be held, not the area around the pattern switch. If the switched is forced beyond it's normal working range, then the fibre board switch assembly can be damaged. Sometimes the switch can be repaired, however a modification is available, enabling the microphone polar pattern to be remotely controlled from the PSU which is sometimes far more useful and convenient then the original offering.

MSC2 valve fitted into the Hiller M59 microphone

KK56 Capsule assembly, note this is a damaged one

Before the Telefunken AC701 valve was produced, very early examples of the Neumann M49 used the MSC2 valve. The MSC2 is no longer in production and almost totally unavailable. Sadly, the wonderful Telefunken AC701 valve, that was used in so many different microphones by many different manufactures is also no longer in production and is becoming difficult to find.

The MSC2 valve, like the AC701(k) was also a wire-ended design, specifically developed for use in valve microphones. However, the MSC2 uses a directly-heated cathode-type valve. As opposed to the AC701 which uses an indirectly-heated cathode. With the directly-heated cathode MSC2, there can be an increase in noise, especially if the power supply is not designed correctly or develops a fault such as a leaky smoothing capacitor. This type of fault would normally show up as an increase in background mains hum.

If I receive a microphone with a MSC2 type valve that needs replacing, then—space providing—it is refitted with a Telefunken AC701. The MSC2 valve (being quite large at around 17mm in diameter and 42mm long) allows this modification without too much trouble and the associated PSU and valve electronics both require minor modification to work with the replacement AC701. The sound quality changes very slightly too, making the apparent background noise level somewhat lower.

Neumann M50 3xKK50 showing (L-R) the Flush type, Retaining Ring type and KK53 type

The M50 is a superb and much sought-after microphone with an ever-increasing price tag to match. There appear to be three versions of capsules used, the earliest being a flush fitting sputtered gold type, followed by the 'popular' aluminium foil type with the diaphragm retaining ring in view, and finally the modern version of the sputtered gold foil KM53 type capsule. Each type is imbedded in the famous 40mm diameter perspex sphere or 'eyeball', to obtain the required pattern-frequency response.

If the model uses an aluminium foil diaphragm and has been literally hanging around in an old damp hall, then the capsule could well be performing poorly because the diaphragm is constructed of aluminium. Corrosion plays a large part in the demise of this type of M50 capsule.

All of the M50 type capsules were discontinued many years ago. They can normally be rebuilt but as the material used to re-skin the capsule is very expensive to manufacture, this is reflected in the price of the rebuild. If you have an M50 that has a damaged KM53 type capsule, a KM83 capsule can be fitted in its place, but it will not work to specification required for correct operation as an M50. The capacitance of the two types of capsule is totally different, and together with other differing design factors, will prevent your M50 from working correctly. I have received M50s where the client is complaining of 'incompatibility' with other M50s. This type of problem is only likely to happen if a single M50 is sold at a bargain price, with the unsuspecting purchaser buying a complete freak of a microphone.

Whether it's the popular U47 (offering cardioid and omni patterns) or the less well-known U48 (featuring cardioid and fig-8 patterns), the microphones share a common age-related problem as the valve holder suspension, somewhat akin to a broad rubber band, perishes with age. If the suspension of the valve holder is defective, then the valve is more prone to physical damage and the microphone body will become more susceptible to picking up structural noises—the microphone case will become 'microphonic'.

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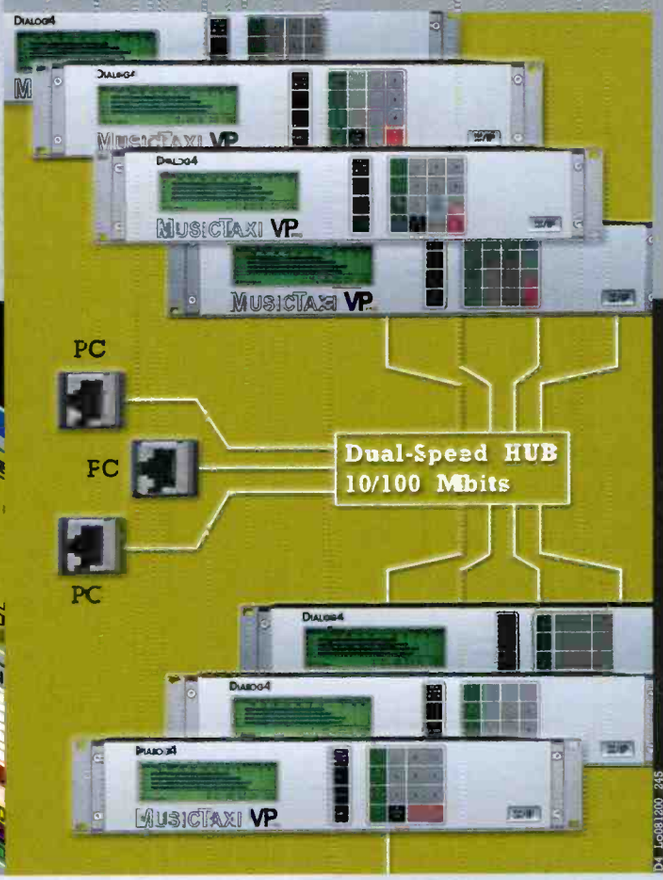
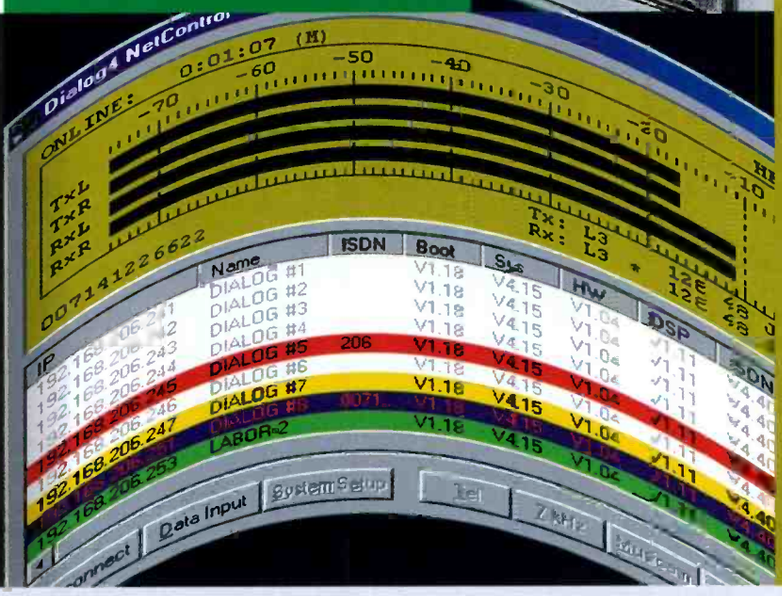
DIALOG4





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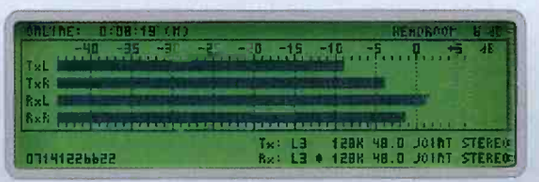

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Ad Index

Inside the U47 and U48 using the VF14, or where the electronics have been modified for use with a valve of the same physical dimensions as the VF14 such as an EF14, there should also be a damping ring around the body of the valve. This is constructed of a foam type of material and it is intended to reduce any acoustic resonance within the valve and its casing. The ring also gives additional help to the suspension of the valve. This is sometimes found to age and become solid and crumble away. Again this problem also gives rise to aspects of possible physical damage to the valve and the microphone becoming microphonic.

On nuvistor versions of he U47 and U48 using the 13CW4 or equivalent, only the broad rubber band type of suspension is employed. One of the reasons being, that the PCB and nuvistor socket assembly, are physically too small to accommodate the foam type damping ring. The fitting of a new suspension band and ring, can dramatically help towards recovering the sound quality that the designer intended.

I cannot over emphasise that a U47-U48 type microphone should never be allowed to be knocked while powered up. For some reason, the heater in the VF14 valve and other valves in it's closely related family (including the EF14) seems to be very susceptible to this type of damage.

The socket, on the base of the U47 and U48 is cut directly into the alloy of the microphone base, Being a relatively soft material, this is very prone to damage such as cross-threading and thread wear. When this has occurred, a replacement base needs to be fitted to the microphone, a job that is time consuming and expensive, so take care of those threads.

Neumann U67 Pre-Soc, showing damage to the plastic preamp socket assembly

Neumann (Telefunken) CMV3. M9 showing the interchangeable M9 capsule, with its 'bayonet' type fitting

The M269 was a replacement for the very popular M49-M249 mic. When Neumann discontinued the M49-M249, there was no other microphone in its range of products equal to it's superb sound quality. The U67 was the nearest model, in terms of acoustic quality, however the EF806s valve was somewhat noisier then the AC701 used in the M49-M249, and the U67's KK67 capsule response was not suitable for use in the U67 a substitute for the M49-M249. The broadcast and recording industries required a replacement for the M49-249, prompting the design and introduction of the M269; it is basically a U67 with an AC701 in the place of the EF806's valve and using the capsule from the M49-249—the KK49. Like the M49-M249, the M269's polar pattern can be remotely controlled or fixed in cardioid mode, via the microphones built-in pattern switch. From its model number, we can also see that it has an RF-type connector, making it the ideal choice for the broadcasting industry.

The most common problem with the U67 and M269 and their semiconductor relations (the U77 and U87) is that of damage to the plastic type of material used for the preamp connector. This is normally caused when replacing the capsule assembly incorrectly or through the microphone being dropped.

Another frequent problem with the U67 is a low-level mains hum. This is sometimes associated with receiving a slight electrical shock when touching the microphone case and relates to the internal wiring of the microphone grounding arrangement. This is not a design fault, it only happens when the microphone socket-connector has been incorrectly re-wired.

The chassis and case of any microphone must always be connected to an earth point. All studios should have what is known as a CEP (common earth point) and is where all the equipment earths, PSUs, effects, local metallic pipes and so on share a common electrical connection. For the sake of safety, the CEP should situated somewhere close to the area in which a microphone is to be used—such as the studio itself—and prevents the build up of any voltage potential between two different earth points. Apart from situations involving several pieces of equipment, this also includes resting on a metal water pipe (or something at one potential) while being in contact with the microphone (at another potential) with some part of the face. To disregard proper use of a CEP is to invite a letter from the claims court.

Although badged Telefunken, the Neumann CMV3 microphone was manufactured by Neumann and distributed through Telefunken. This is seen as the original 'Neumann' microphone, sometimes refered to as the Neumann Bottle, and as seen in pictures taken during WWII. There were also predecessors to the CMV3, namely the CMV1 and CMV2.

The CMV3 became the most popular, with it's ability to employ interchangeable capsules and extension tubes. The basic design, which has not really changed all that much, was built around a directly heated cathode type of valve (RE084k—k meaning 'short'). As with most very old valve equipment, we're taking about a microphone designed in the late 1920s, and it is consequently difficult to track down these old valves. There are equivalents, however, and fortunately these work very well.

The case and connectors of the CMV3, are so well engineered, there should never really be any problems with damage to these parts. However, because of the size and sheer weight of the microphone, it demands a particularly sturdy microphone stand. If the microphone was to suffer a fall, then despite the suspension-packing around the valve, I do not think the survival rate would be that good. Ideally, when using something of the size and weight of the CMV3, only a stand of the original quality should be used—such as those manufactured by Konstantin Danner of Berlin. The capsules too are no longer available, but these are of the type that can be re-skinned. □

Contact:

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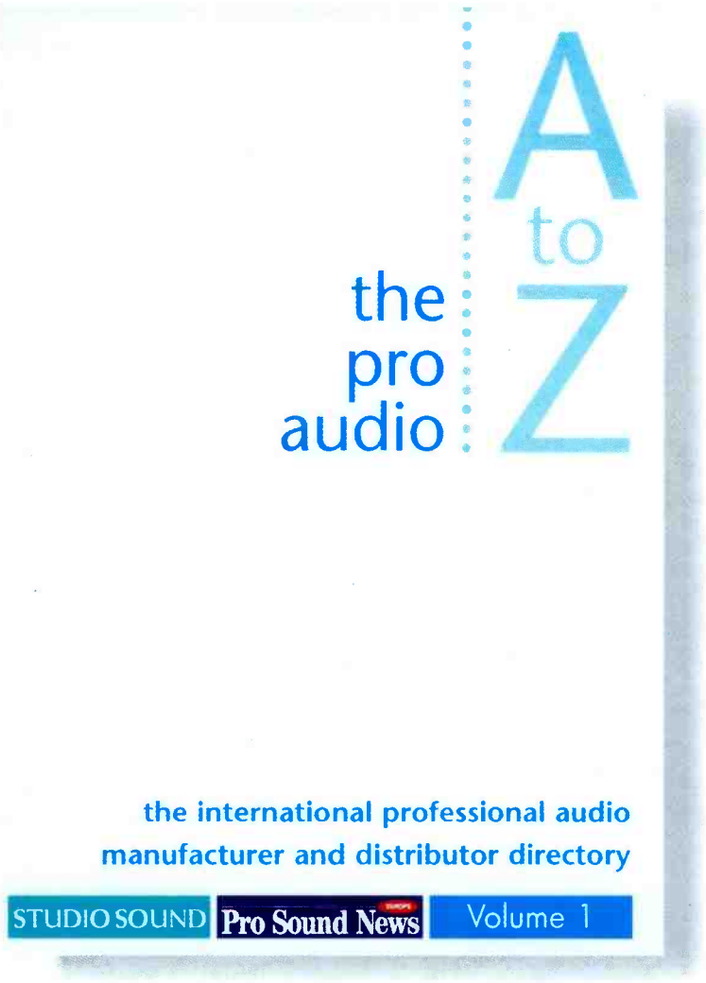

Volume 2

Coming in September

Launched in September 2000, the Pro Audio A-Z Directory was the first ever comprehensive and definitive listing of all the world's leading audio manufacturers and distributors. The 300 page volume has since become an invaluable source of reference for anybody in the business of pro-audio, particularly for manufacturer's seeking new distributors and dealers (and vice versa).

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Wild, Peaceful & Kool

I MUST PROTEST in the strongest way about Harvey Goldberg's claims regarding Kool and the Gang (*Studio Sound*, April 2001). Upon seeing his claim that this 'unknown' group 'signed on' for their 'debut album' in 1971, I dug deep into the depths of my LP archives and found that this was far from the truth. As their engineer (at Bell Sound Studios) I recorded three albums for them on De-Lite Records, the last of which we recorded live in Hollywood on May 29 1971. An earlier one was recorded live in Philadelphia around 1970 and before that, their first album which included their first single hit—'Kool and the Gang'. I am aware that they moved on after that last album and now I know to whom and where. However, in all fairness, please, credit where credit is due! Kool and the Gang was a well established group by the time they went to Media Sound.

May I also point that, historically, you are wrong in your statement 'the idea of studios operating independently of record companies was new before 1970'. There is a long history, going back at least to the 1930s, of the independent studio. There were thousands of record labels in the States most of which had no recording facilities. There are many examples, one of the most prominent being Radio Recorders in Los Angeles, where most of Capitol Records' output was recorded in the forties and fifties. Western Recorders was another studio of similar stature in LA. In New York City radio station WOR had a music studio which was well used by the independent labels, that is those other than RCA Victor and Columbia. Obviously there isn't room here to detail all of them, but, for example, Bell Sound Studios was the most popular indie studio from the fifties to the late seventies, when it fell into crooked hands. A&R studios was an incredibly busy studio from the mid sixties.

Malcolm Addey, New York City

Harvey Goldberg replies

Malcolm is correct when stating that *Wild & Peaceful* was not Kool & the Gang's debut album, but I beg to differ when he says they were 'a well established group' prior to that album. Although they may have had a small following, *Wild & Peaceful* was the album that catapulted them to national (and international) success.

As far as his assessment of independent studios, he is probably correct in his history here also. However, I think you'll find that it was really in the seventies that the independent studios became the norm, to the point of causing most of the major label owned studios to shut down by the eighties.

Gerber PCB for web site

LAST YEAR I published a circuit of a typical 'British' EQ on my web site, so that anyone could download it— as lots of people, mainly in the US did.

I've now updated the circuit, and added a PCB layout in Gerber form, but the site has changed. The new site is: www.porteraudio.co.uk

I've sent the info to the main NG's concerned, but as rec.audio.pro is so large, it will probably be missed by many.

Barry E Porter, Professional Audio Creativity, UK

Size matters

WHILST I THOROUGHLY ENJOY *Studio Sound* I cannot say I am happy with its larger footprint. It no longer fits comfortably in my briefcase, filing system or shelves and if I am unlucky enough to have to endure the pain of travelling on a rush-hour train then A4-sized audio magazines get my vote. There are also articles etc that I like to keep, particularly those by Dr John. Have you ever tried to photocopy one of these? Its a real mess!

I can see no upside for the larger format, maybe it's cost? For me, a return to A4 could not come soon enough!

Clive Read, Brighton, UK

Tim Goodyer replies

It's certainly not a matter of cost, Clive; the resized and revitalised *Studio Sound* costs more than yer average A4 rag to produce and post. And for our money, it looks reads and feels a lot better too.

Maybe you feel more comfortable with a trade magazine that is constrained by old-fashioned looks and outmoded presentation but many of your colleagues clearly disagree. Certainly, it requires mastery of your photocopier to reproduce (issues of copyright infringement not withstanding) but it would be a cheap briefcase that doesn't offer an inch-and-a-half additional headroom for pages that carry more information with less crowding. (Interestingly, I noticed that the mag has about the same footprint as my laptop.)

I share your discomfort over the Brighton rush-hour trains, I really do, but next time you're a commuter captive you might look around at your newspaper-reading companions—some are happier with convenient but shallow tabloids while others demand the quality of the broadsheets. Smaller than a tabloid with the kudos of the big boys, *Studio Sound* makes all kinds of sense. Ask Wim Archie Pearson, for example (see page 72).

July

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20–22
NAMM
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August

1–3
Broadcast & Cable
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8–10
Broadcast & Networks
Bangkok, Thailand.

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

23–26
BIRTV Broadcasting
Beijing, China.

September

5–7
NAB Radio
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9–12
PLASA
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11–13
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16–19
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22–25
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28–30
CAB
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November

1–3
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4–11
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8–12
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14–15
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15–17
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23–25
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Birmingham, UK.
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27–30
Radio, TV & Comms
Nizhny, Novogorod.

LETTERS

The wisdom of Buda

I WANT TO take this time to thank you and *Studio Sound* for the many great years of interesting, wonderful articles and great new equipment to check out. It has always been a pleasure to get each new edition.

I have stopped working at Lost In Austin studio and now work at Williams Marketing, a full-service radio and TV advertising company in Buda Texas. The production staff here also really enjoy reading your magazine. By the way, it was a pleasure to see our CEO, Roy Williams, in the February 2001 issue.

Wm Archie Pearson, Buda, Texas, US

Ghost of Beatles past

SOME YEARS AGO I worked as a freelance sound engineer at Scottish TV. One of my humbler tasks was to dub various vinyl LP tracks to various formats.

One day I was dubbing a Beatles album (the White one, I think) and noticed that although the music sounded fine, I could hear what seemed to be the Fab Four speaking to each other (in normal speaking tones) at quite a low level 'beneath' the music itself. It was more pronounced on some tracks than others (John Lennon's voice cut through particularly well, I seem to remember) and the effect was most definitely repeatable. Time, I'm afraid, was short so I called the maintenance people and they fitted a new cartridge and stylus, and the problem disappeared.

A chat to the maintenance engineer later confirmed that there hadn't been any obvious fault, and, no, I hadn't been hearing things 'cos he'd heard the effect too'.

I suspect that the cartridge was mistracking slightly and I wonder if there could also have been a mechanical phase problem within the unit (an expensive Goldring one, I think) which allowed it to collect 'extra' information from the disc.

Has anyone else ever noticed this on a Beatles album? Is it a common subliminal effect? If so, what could be the reason for it—cutting edge artistic experimentation (excuse the pun) or just 1960s recording-pressing technology?

Come on, Sir George, I think we should be told!

John Gould, Ayrshire, Scotland

THE WISH LIST

< Continued from page 74

Roland MS-50 monitor speakers (4)
Rodgers FR1.7 speaker

System 2: Sound and Vision System
Pioneer A-N701 stereo amplifier
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For Special Ambience
Roland SRV-3030 digital reverb
Roland CPM-300 powered mixer
Roland MS-50 monitor loudspeakers (2)

Video Display
Pioneer PDP-502HD

'In the future, I myself believe that sound and vision will become closer than ever before, so a 50-inch plasma display is installed beside the sound system. Something I discovered about sound and vision through using this system is that I care less about the choice of playback equipment when the sound is accompanied by picture'.

Although Kakehashi-san has built this listening room for his pleasure rather than as a professional facility, he is acutely aware of the way consumers' listening experiences relate back to the decisions made on the instrument designer's board and in the recording studio.

'It is virtually impossible for one listening system to play back the music of all genres with satisfactory character and quality, so I have optimised my system for my own favourite music—organ music, choir, classic ensemble, jazz, ethnic music and so on. Of course, I adjust the parameter settings to fit the genre of music I'm playing.

'For my work—creating musical instruments—it is very important to be familiar with the live (real) sounds of instruments. But this room is not for that. The 'live' sounds that exist in nature are not necessarily comfortable for everybody to listen to. In order to design a better listening room and listening system, the most important thing is to identify the requirements and taste of the person who is to use it, I think.' □

THE BALANCE SHEET

Ikutaro-san has chosen to indulge his personal listening preferences over any concessions to professional 'correctness' or hi-fi hysteria. But rather than equipping an imaginary room, this room already exists and has proven its worth. The combination of 'traditional' home entertainment equipment with some of Roland's innovations makes the results both unique and thought provoking. Maybe we a l need to reconsider the concept of 'home entertainmen'

PAINTER'S TOP 10 ARTISTS

1	Hello Dali	6	Concrete and Klee
2	Monet's Too Tight to Mention	7	That Don't Impress Me, Mucha
3	Miro in the Bathroom	8	Da DoDoDo, Dada Da Da
4	I want Kand(insk)y	9	Too Manet Rivers
5	Get Braque	10	River Deep, Mondrian High

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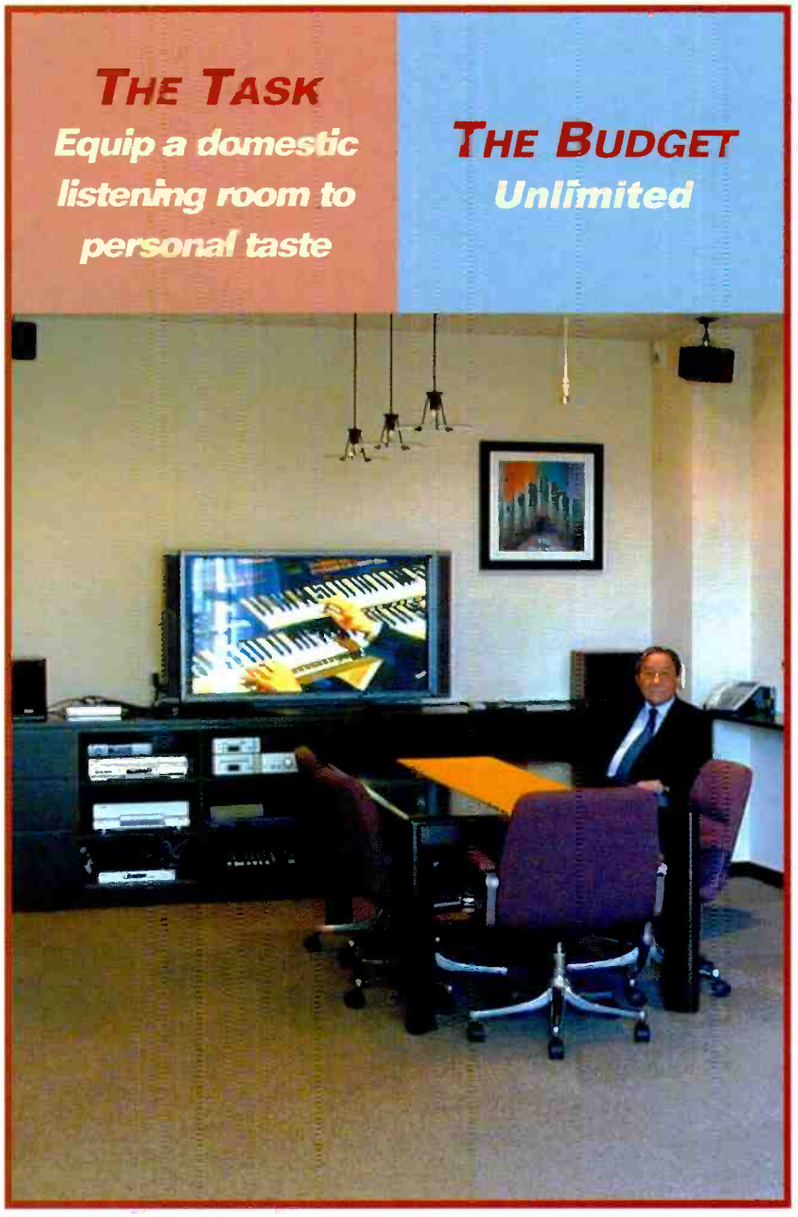
IKUTARO KAKEHASHI'S LISTENING ROOM

Pursuing the theme of domestic entertainment environments, we invited Roland founder and music lover Ikutaro Kakehashi to define his ideal listening room. **Tim Goodyer** hears all



AS THE YOUNG IKUTARO KAKEHASHI busied his hands in his electronics shop, his thoughts were preoccupied with music. He wanted to learn to play piano but issues of practicality were steering him toward an electronic alternative. Finding an American organ among his regular stream of television and radio repairs provided him with the means to build his own, and Ace Electronics was born.

In the wake of WWII the market for electronic organs was sufficiently small that Kakehashi-san diversified into amplifiers and rhythm machines before developing portable keyboards. A joint venture with the American Hammond company followed (Hammond International Japan) resulting in Kakehashi-san's designing the F-series of organs for Hammond. The subsequent marriage of the Rhythm Ace and Hammond's organ produced the single-manual Hammond Piper—the first organ with an integral rhythm unit.

Thirteen years after starting Ace Electronics, Ikutaro-san sold his share of the company and began afresh with the Roland name. He returned to amplifiers and rhythm machines before designing his first synthesiser, the SH1000. This paved the way for the immensely successful Jupiter synthesisers which, along with the Space Echo tape delays, TR808/606 drum machines and TB303 'bassline' sequencer made Roland a formidable force in electronic instruments. The back catalogue now features everything from modular analogue synths, sequencers, pioneering synthesiser hybrids, electronic pianos, effects processors, loudspeakers, the RSS 3D process and of course, amplifiers—all having benefited from Ikutaro Kakehashi's touch. Along the way he also founded Boss and acquired the American Rodgers organ manufacturer.

More recently, Kakehashi-san's attention has returned to the electronic organ with the development of Atelier series in which the RSS (Roland Sound Space) system has found a ready partner.

'Thinking about an 'ideal domestic listening room', I concluded that 'ideal' status varies from person to person,' Kakehashi-san begins, 'and so I would like to introduce you to my current listening room. It is a room in the private office built next to my house. All the units are standard models currently on the market and all system contol signals can be connected amd operated via digital bus. I had taken the wiring of the equipment into account from the time that the room was being built, so the layout of the equipment is very tidy. Having constantly improved the room for the one-and-half-years since its construction, I am finally satisfied with it.

'Basically, the purpose of listening room can be either a room to have fun and relax while listening to music or a room to playback the sound with highest fidelity and analyse any aspect of it.

'I opted to build my room for pleasure, and gave priority to the "comfortableness" of the sound coming from the speakers and how much I can enjoy music. Some people prefer to be analytical about their music and construct huge and complicated systems to evaluate-analyse the sounds, but that's not for me. It used to be so—perhaps age has changed my taste (ha ha!). Please understand what I mean by "comfortableness"—it is different from the technical terms used by audio critics such as the balance of each frequency range and so on. It's just my personal "comfortableness".'

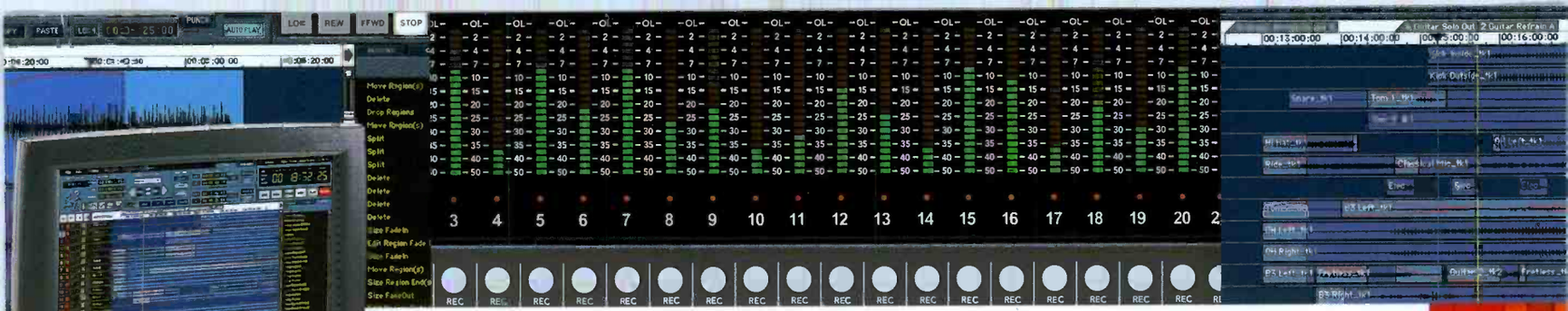
System 1:
Main Audio System (with RSS)
Pioneer A-N701 stereo amplifier
Pioneer PD-N901 stereo CD player and tuner
Pioneer MJ-N901 MiniDisc recorder
Pioneer T-N901 cassette deck
Pioneer S-N701-LR speaker system
Roland AT-90R Atelier home organ

Roland Sound Space (RSS) employs a proprietary system based on Roland's COSM technology. COSM—or Composite Object Sound Modelling—allows the reverberation of different acoustic environments to be 'modelled' and the sound of an electronic instrument or sound programme to be placed within them. The same technology is also used by Roland to model other instrument and amplifier characteristics.

'To create the ambience which is an indispensable element in a comfortable listening room, I have chosen to include the RSS-303 Roland Sound Space system. With this speaker system, you do not have to worry about being tied to one particular sweet spot for optimum listening, but you can walk around the room enjoying the ambience. The location of the loudspeakers is optimised for this system.'

For RSS Ambience
Roland FM-40 4-channel mic-line mixer
Roland RSS-303 RSS Ambience System
Roland SRA-200E 2-channel power amplifiers (3) (100W 100W at 8Ω; 150W + 150W at 4Ω)

Continued on page 72 >



RECORD! EDIT! PLAY!

Save your computer for e-mail.

Plug in the HDR24/96 Recorder/ Editor and start recording. No external computer to boot up. No hardware and software configuration night- mares. No compromises like settling for 20-bit audio or just 12 tracks at a time.

Recording is easy with the HDR24/96.

Simultaneously record 24 tracks of 24-bit digital audio…without waiting for lock-up, tape shuttle or CPU lag. Drop up to 192 alternate takes into "virtual tracks." Record onto affordable, removable media that you can swap in and out for each project.

And do it all with your hands on a familiar, analog-style machine (or two sizes of wired remotes) instead of resorting to myriad mouse clicks. All basic functions are right on the HDR24/96 front panel including transport buttons and a Record Enable button for each track.

Professional remote for a very professional hard disk recorder. Our new Remote 48 lets you run two HDR24/96s – 48 tracks of total control including a weighted jog/ shuttle wheel and full display!

Create fade-ins, fade-outs and crossfades just by dragging and dropping them …and then set their length by dragging the mouse.

Add volume envelopes for simple level automation of regions or whole tracks.

Then use Track Render to combine all or selected regions of a track just as you hear it complete with crossfades, volume envelopes, mutes, etc.

Play with the HDR24/96.

Play back 24 tracks of pristine digital audio —instantly without any pause or lag time. It will be synched rock-solidly to everything in your studio — from MIDI-based sequencers to VTRs (via SMPTE and video black burst). Then let your partners, clients and friends "play" with your tracks anywhere in the world, thanks to the HDR24/96's Ether-net port and built-in FTP server.

Need to back up a couple of songs? Plug a Mackie Media™ Project drive into the HDR24/96 external bay and transfer over 2GB to an ORB™ disk.

Editing is easy with the HDR24/96.

Plug in an SVGA monitor, keyboard and mouse, choose from 2x, 4x, 8x, 12x or 24-track views and then watch them scroll smoothly past a centerline.

Mark hundreds of cue points and four locate points for looping and auto-punch-in modes.

Use the mouse to "scrub" individual tracks, Cue, Punch and Loop points with continuously variable velocity.

You can mark a segment (or multiple non-adjacent segments) as a *region* and then cut, copy and paste it anywhere — onto a blank track or right in the middle of an existing track without erasing anything. The part of the track after the insert just "slides down".

You can audition regions or modify their start/end points instantly, capture them as "sound elements" for later use or quantize them to user-defined time grids.

Twenty-four track masters for under £10 each!! Divide the cost of a Mackie Media M90 into the 20+ pop tunes you can record on it and you'll appreciate why we call it an affordable medium. Non-linear hard drives store audio data only, not silence. Tape (and linear hard disk recorders) just roll merrily along… eating oxide and costing money.*

*based on average of length of current pop songs using 24 tracks @48kHz/24-bit and a liberal number of extra regions and virtual takes. Does not apply to extended trance remixes. ©2001 Mackie Designs Inc. All Rights Reserved. Mackie and the Running Man figure are registered trademarks of Mackie Designs Inc. Mackie Media™ is a trademark of Mackie Designs Inc. ORB is a trademark of Castlewood Systems.

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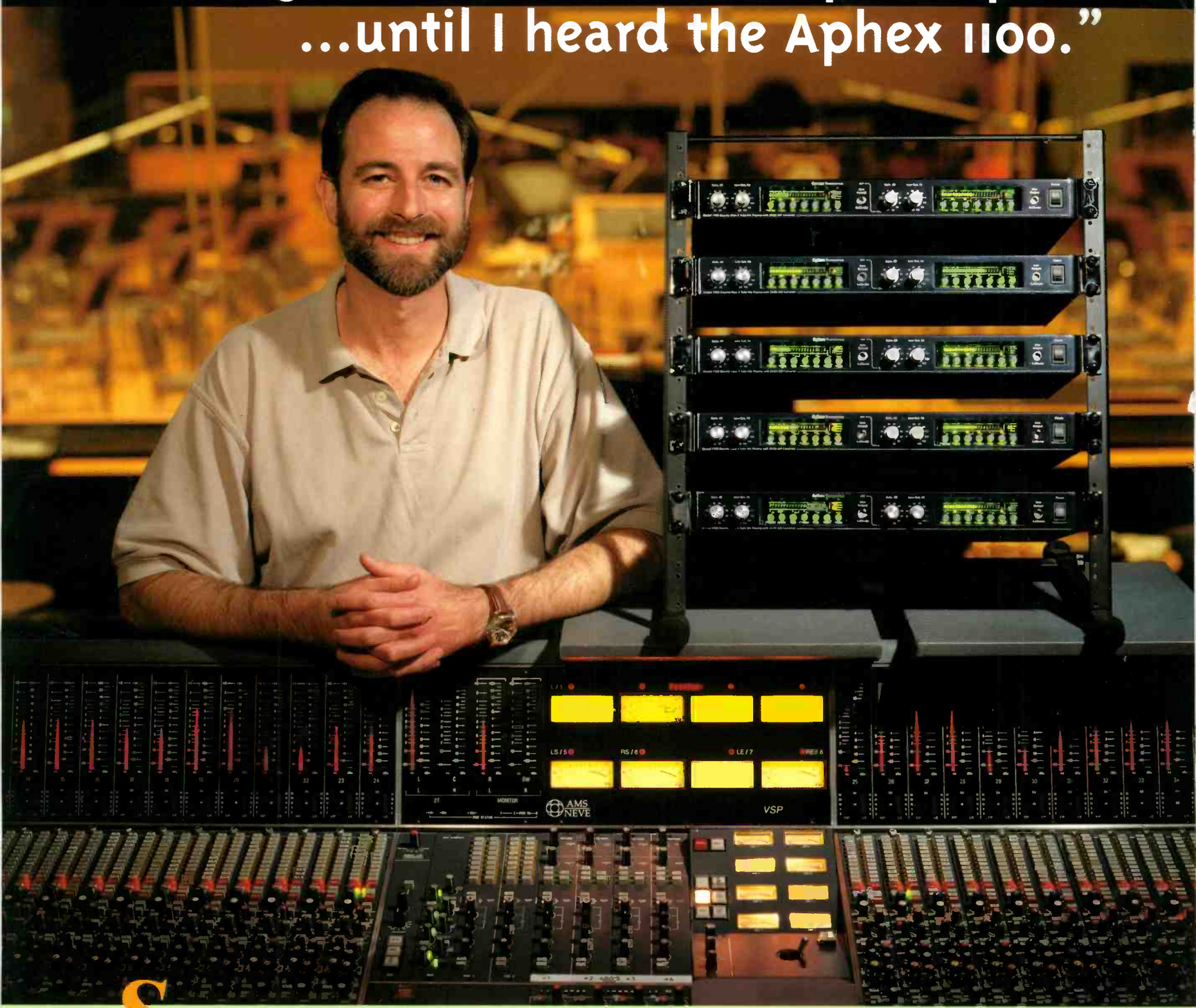
"…the HDR24/96 is a stunning development with excellent sonic quality, (and) an extensive feature set…it's easy to use and priced right. This one rocks!"

George Petersen
Mix Magazine March 2001

"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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