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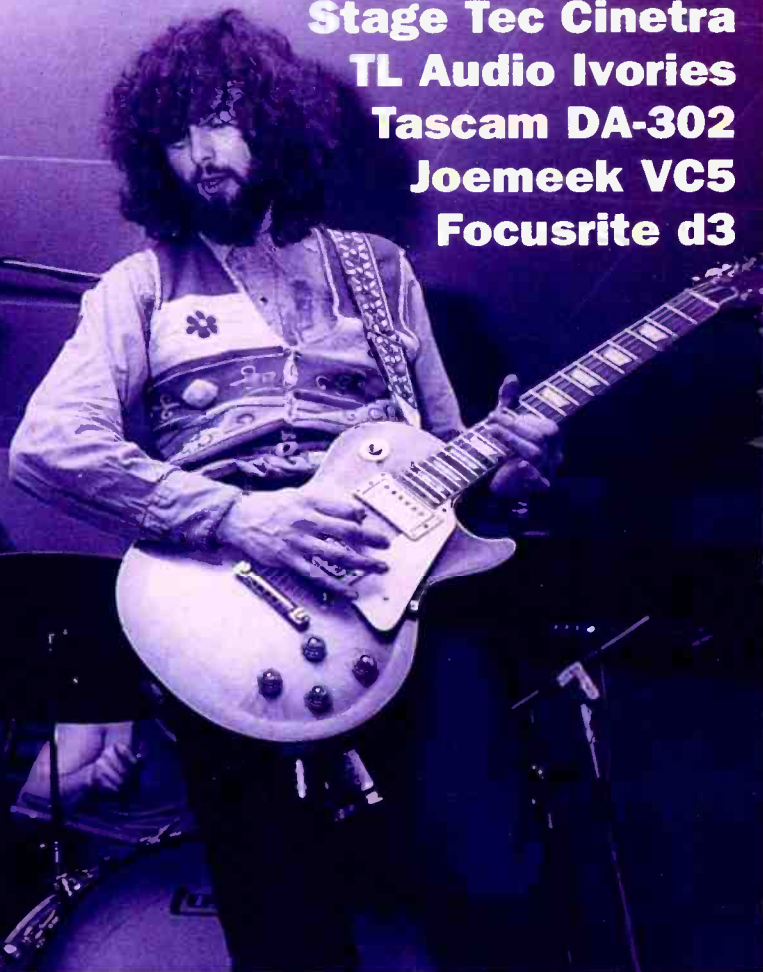
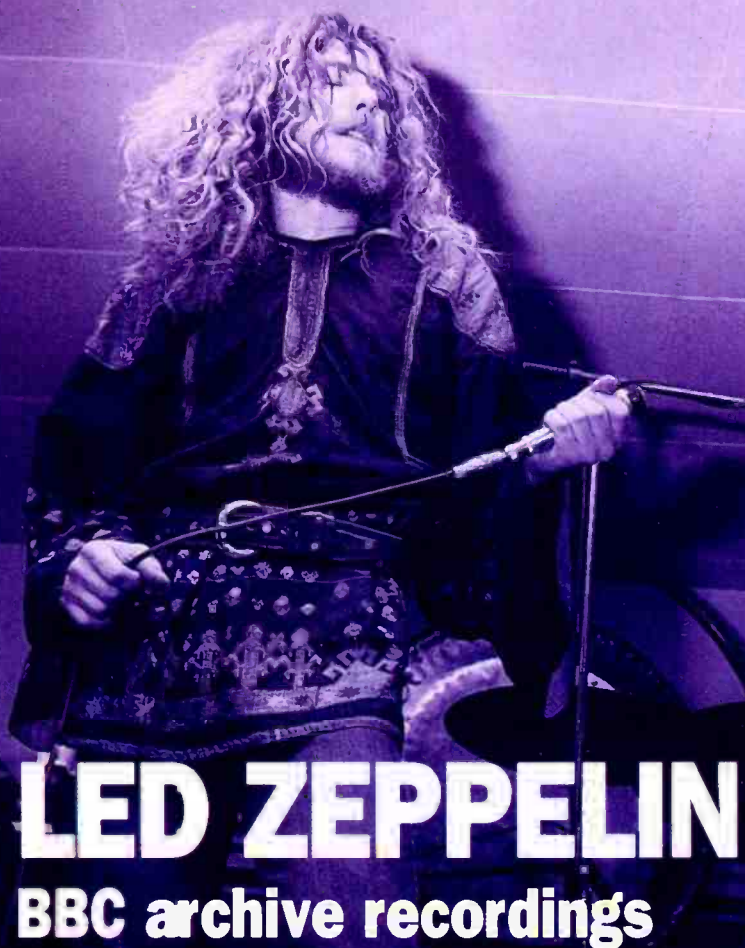
# Studio Sound

THE INTERNATIONAL PROFESSIONAL AUDIO MAGAZINE  
FOR RECORDING, POSTPRODUCTION & BROADCAST



## EXCLUSIVES

**Soundtracs DPC II**  
**tc electronic Finalizer Plus**  
**Aphex TDM Aural Exciter**  
**Stage Tec Cinetra**  
**TL Audio Ivories**  
**Tascam DA-302**  
**Joemeek VC5**  
**Focusrite d3**



# LED ZEPPELIN

BBC archive recordings



**The**  
**CHET**  
**ATKINS**  
**Interview**

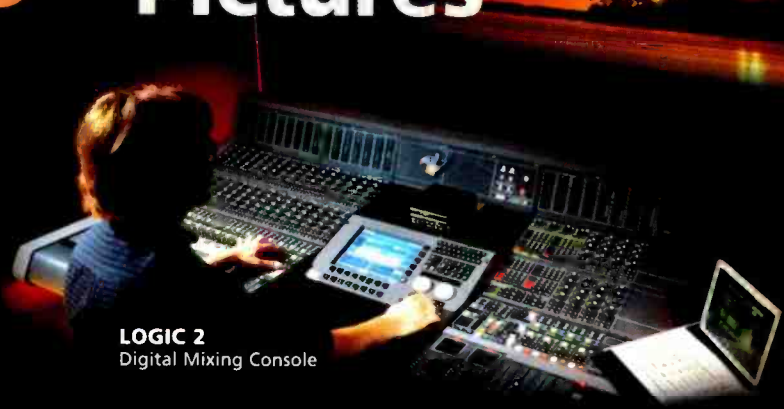
**PREPARING FOR MULTICHANNEL PRODUCTION**  
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**TOMORROW'S ARCHIVES**  
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# AMS Neve Digital First Commercials Video Motion DVD Pictures

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[www.prostudio.com/studiosound](http://www.prostudio.com/studiosound)

**BELOW: Joemeek's first EQ;**  
**German desk tec; Led**  
**Zeppelin BBC archives;**  
**Peter Gabriel's new studio**



Studio Sound January 1998



## A better spoon

IT ALL STARTED with the push-button tone phone. Faced with the prospect of needing to be seen to offer greater caring attention to those they provide a service to, and while desperately wrestling with the realities of reduced staffing, companies and organisations the world over hit on the bright idea of placing the power of selection and direction into the hands of the customer.

It is now practically impossible to approach any large entity without having to wade through the touchtone equivalent of a worthiness test.

The method is flawed. You are presented with choices that can be made most effectively when you already know the information that you are phoning up to find up about. You are confronted with multiple selections within categories and sub-categories, your finger trembling in fear of pressing the wrong key lest it whisk you off to a level that you will have trouble getting back from or, worse still, put you into a state of limbo from where there is no escape. The irony of ironies is that if you complete your intelligence test correctly and are admitted into the inner sanctum of the knowledge that you seek, the chances are you will end up listening to piped music interrupted regularly by a message reminding you of how important your business is to them and requesting that you stay on the line until a member of staff becomes available.

There is only one thing worse than a system that doesn't work and that is one that almost works. So often we see new solutions to age-old problems that introduce new frustrations. Technology that wastes your time and gives no improvement over what it replaces is no advance.

It's a very natural belief that everything can be bettered and the chap who spent a quiet evening hollowing out a piece of wood to make the first spoon probably thought the same. Perhaps we should consider the suggestion that some things, like the best microphone and the best recording and playback mechanism, have already been built.

**Zenon Schoepe, executive editor**

## The new order

'CRACK THE DOCUMENTATION, not the system,' was the advice I was given. And sound advice it was, for having been formally introduced to the full floor of electronics on which I was to be working, I was in no doubt that mastering it was going to be quite a task. This was in the days when the documentation came in the form of paper circuit diagrams kept in real folders filed in ranks of filing cabinets—the big, heavy metal things that were used for storage before hard and MO drives took over.

The message was clear: learning about the equipment was to take second place to managing it. Instead, my learning efforts were best directed to the information system that supported the electronic system. I didn't know it, but this was my first serious encounter with the precursor to what today we all glibly term 'information technology'. And it's been getting worse ever since.

With the dam of paper filing systems broken, the present deluge of information is as confusing as it is deep and it's presently only those who have previously enjoyed exclusive access to facts that are feeling threatened. But surely it's only matter of time now before we impose some sort of new order on information and turn our attention to refining the delivery systems we need to usefully access it. The age when the adage 'knowledge is power' gives way to 'instant access to knowledge is power' is almost upon us. And with it may come a new kind of equality—one that relies on management of resources rather than old-fashioned learning.

Where then will this leave the artist? Any kind of artist, I don't care—musicians, painters, dancers, record producers, script writers... Anyone for whom no amount of information can describe their talent or adequately analyse their work. For them, the possession of knowledge will be as simple as it is for everyone else; for everyone else, the skills of artists will remain as mercurial as ever. If we're smart, artists will gain a renewed respect. If we're not, we're missing the point.

**Tim Goodyer, editor**

# Studio Sound

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Singapore  
+65 285 9300



▲ **UK:** Built for the studio, but acclaimed on the stage, Neumann's TLM50 won the respect of the BBC Philharmonic's Stephen Rinker when it was used by the French Erato classical label to record one of the BBC's Music Live festivals last year. Since then, Rinker—the orchestra's main engineer and responsible for most of its live and studio performances—has purchased two TLM50s. The new mics are now used as an A-B stereo pair alongside other Neumanns including U89s, KM140s and KM84s

## Business moves

**US:** In a number of concurrent business developments, the LA-based POP Studios is to be acquired by Four Media in a bid to 'expand... its market leadership position in providing fully integrated technical and creative services to entertainment content owners and creators'. Ensoniq is to be acquired by Singapore-based Creative Technology to 'enable Creative and Ensoniq to extend their reach in the PCI audio segment of the PC OEM and PC motherboard markets', while Silicon Graphics and Microsoft have declared a strategic alliance intended to 'define the future of graphics'.

Beyond the business speak, all three indicate the kinds of change being experienced through pro-audio and related industries. POP's establishment in 1984 as one of the world's first all-digital studios and its subsequent development to track such markets as animation, virtual reality and DVD (and its

1996 revenue of \$32.5m) have made it an obvious target for the cash rich and power hungry TV-advertising arena. The facility will, however, continue to operate under its own name and the management that has built its reputation.

The acquisition of Ensoniq, meanwhile, identifies the ongoing convergence of the sound and computer industries—a fact partly underlined by the Far-Eastern base of Creative Technology. The move will undoubtedly bring support and opportunity to Ensoniq's cause, and the official line makes much of the new owner's dedication to Ensoniq's musical equipment development. The Silicon-Microsoft alliance indicates both the level of the powers now influencing pro-audio and the relationship between the silicon and creative industries. And while the focus here is primarily on the graphics market, the implicit threat to the poorer and less well recognised area of audio is unavoidable.



▲ **Denmark:** Nordisk Film is the world's oldest film company still its original site—in this case, Copenhagen, from where it lays claim to being the largest independent movie and television production company in northern Europe. But while the location is old, the gear is new and includes an Avid AudioVision system, a Yamaha DMC1000, tc electronic M5000s Genelec and DynaudioAcoustic monitors and DK-Audio MSD200SA metering. Nordisk's current project is resurrecting a TV cop series entitled *Strømer*, which was very popular when it first ran on TV.



◀ **UK:** Angel Studios hosted the soundtrack recording of Dragon Pictures' acclaimed film *Welcome to Sarajevo*. Composed and produced by Adrian Johnston, the music was recorded in Studio 1 with the London Chamber Orchestra using an AMS Neve VR60 console on 24-track analogue and mixed to Tascam DA-88 in Dolby A.



## Net gains

**Worldwide:** The Web continues to host new and improved sites from a variety of quarters.

Amid the action in the closing weeks of 1997 were the opening of Nashville's Starstruck studio site ([www.starstruckstudios.com](http://www.starstruckstudios.com)) that features a multimedia virtual IPX tour of the facility designed 'with the music professional in mind'; another from the Canadian Mushroom Studios ([www.showcontrol.com/ms.html](http://www.showcontrol.com/ms.html)), the launch of

Recording Studio Menu.Com, an American site designed to prove a contact base for studios, engineers, producers, and so on; renowned equipment wizard Pete Cornish's 25th anniversary electronic foray ([www.localnet.co.uk/pcornish/](http://www.localnet.co.uk/pcornish/)); the improvement of the Spirit Website ([www.spirit-by-soundcraft.co.uk](http://www.spirit-by-soundcraft.co.uk)); and new sites from EVI ([www.eviaudio.de](http://www.eviaudio.de)), KRK ([www.krksys.com](http://www.krksys.com)), Euphonix ([www.euphonix.com](http://www.euphonix.com)), Sescom ([www.sescom.com](http://www.sescom.com)), and KEF ([www.kef.com](http://www.kef.com)).

**US:** Jimi Hendrix returned to New York's Electric Lady studio for a remix of his *First Rays of the New Rising Sun* and *South Southern Delta* albums. The remixes were performed by Hendrix producer and engineer Eddie Kramer on the studio's 80-input SSL SL9000j console—the first being a remix of Hendrix last LP, *The Cry of Love*, with seven additional tracks, and the second a solo Hendrix LP with an additional six tracks. Alongside the modern 9000j was a stack of vintage outboard that allowed Kramer to 'preserve the vintage sound of several prerecorded songs'.



## Re-Pro chairman

**UK:** Welcomed as new Re-Pro chairman is industry veteran Gerry Bron. The British-based Guild of Recording Producers, Directors and Engineers has appointed the producer, studio owner, founder of Bronze Records, and latterly producer manager to the hot seat

as well as appointing a new directorate: Peter Filleul (vice chairman), Benny Gallagher, Nicky Graham, Phil Harding, Michael Howlett, Jeff Jarratt, Steve Lipson, John Leckie, Alan Parsons, Pip Williams, Alan Winstanley and Will Mowat. Re-Pro: [www.aprs.co.uk/repro](http://www.aprs.co.uk/repro)

**UK:** The Fleetwood Mobile spent 14 hectic days camped at London's Barbican Centre late last year in order to capture a benefit concert for American composer La Monte Young. The event involved a wide variety of artists including Pulp, Spiritualized, Nick Cave, the Gavin Bryars Ensemble and the English Chamber Orchestra. The session involved some 116 inputs arriving at the Mobile's CS2000 console on their way to a Sony 48-track DASH machine. The day following the Barbican recording, Fleetwood left the UK for the Netherlands and the MTV European Music Awards.

■ Nashville's dB Post has installed a new 68-input Harrison Series Twelve film console in its Studio 4. Installed last month, the desk is part of a complete refurbishment of the facility for nonlinear working which includes a full surround monitoring system from DynaudioAcoustics and will accommodate up to 8 channels of discreet surround including DTS and SR.D. dB Post specialises in feature film post-production, M&E work and TV posting and is looking to expand its operations. **Harrison, US. Tel: +1 615 370 9001.**

■ Finnish broadcaster, YLE, is upgrading its 10 DAR SoundStation Gold and Sabre Plus workstation systems to DAR's Genesis operating platform and installing its D-net network. The upgrade extends to the CDAdvance access system and TranslationStation allowing direct transfer of files from Avid and Lightworks nonlinear systems. Headquartered in Helsinki, YLE is one of Europe's largest DAR installations using them to serve its six suites, two preproduction rooms and viewing theatre through which it delivers TV post and radio productions. **DAR, UK. Tel: +44 1372 742848.**

■ London's Metropolis studio complex has installed a dual-screen SA&V Octavia system for postproduction work in its surround mastering suite where it will make use of the file interchange capability with a Genex GX8000 MO recorder. The suite also uses Prism AD124 and DA1 A-D and D-A converters. **Metropolis, UK. Tel: +44 171 2408423. SA&V, UK. Tel: +44 1353 648888.**

■ New York's Sony Music Studios has installed a custom 5.1 monitoring system from ATC. A result of collaboration between Sony's David Smith and ATC, the system—which uses special versions of the SCM100A for LCR, SCM50A surrounds and SCM0.12 subs—is intended to serve the studio's mastering requirements for DVD and other multichannel work. Together with Sony's Capricorn console, the new installation has been used on *Fantasia*. **ATC, UK. Tel: +44 1285 760561.**

■ Cardiff-based Sound Works studio has fitted an M3-based surround monitoring system in its Axiom room. Designed by Andy Munro and serving TV post and music recording, the new installation employs an M3 LR pair, BM15 surrounds and an M1-ABES centre channel. The commission was prompted by Munro's recent work at Shepperton and De Lane Lea in London. **Munro Associates, UK. Tel: +44 171 403 3808.**

■ American TV production, the *Tonight Show* with Jay Leno, has recently equipped with Danish Pro Audio DPA4060 miniature microphones. Generated by NBC and internationally networked by satellite, the show uses the DPA4060s not only for lavallier situations but also for hidden miking of dynamic sources such as music. **Danish Pro Audio, Denmark. Tel: +45 4814 2828.**

■ Independent London post house, Wild Tracks, has ordered two Amek 16-fader DMS digital consoles for its

main surround-capable rooms. Partnered with the Wild Tracks' DAR SoundStations and Tascam DA-88s, the desks' Stargate control protocol will centralise operation of outboard equipment and set the format for the facility's remaining rooms.

**Wild Tracks, UK. Tel: +44 171 734 6331. Amek, UK. Tel: +44 161 834 6747.**

■ Danmarks Radio has ordered a Calrec S2 broadcast console for its DR-TV and Sports Studio 5 audio control room. The 48-channel analogue desk is already lined up for news and events work which includes the forthcoming Nagano Olympic Games. It also paves the way for further S2 and C2 installations at Danmarks Radio. **Calrec, UK. Tel: +44 1422 842159**

■ London's Trojan Records has committed to the complete range of CEDAR Series X units. The DCX declicker, CRX deackler (reviewed in this issue) and DHX dehisser. The Walthamstow facility will give the 'X' treatment to its catalogue of old recording from the likes of Bob Marley and Desmond Dekker to remove unwanted noise and deterioration.

**Trojan Records, UK. Tel: +44 171 383 4889. CEDAR, UK. Tel: +44 1223 414117.**

■ The Glasgow-based studio of Wet Wet Wet bass player Graeme Clark has recently seen the addition of a Joemeek SC-2 compressor and a VC-2 Tube Channel. The purchase follows a close encounter with both units while recording the Wets' album, *10*, but will see more widespread use in their new role. **Joemeek, UK. Tel: +44 1626 333948.**

■ Belgium has proven a receptive ground for Quedsted monitors, with numerous dance music producers and engineers opting for Q2108 close-fields. Among the converts are Ruud van Rijen (Twenty 4 Seven) and Antwerp's Alaska Swimming Gear studio and the partnership of Serge Ramaekers and Dominique Sas. For ASG and Ramaekers and Sas, the Q2108s led on to the installation of Quedsted's Q210s and 15-inch subs as main monitoring systems.

**Quedsted Monitoring, UK. Tel: +44 181 566 2488.**

■ The London studio base of Bryan Ferry has installed a new Otari Radar hard-disk recorder in time to use it on his forthcoming album. The 48-track Radar marks the move away from traditional tape-based working.

**Stirling Audio, UK. Tel: +44 171 624 6000.**

■ Swedish power amplifiers from Lab Gruppen are proving popular with UK rental companies serving a wide range of requirements from corporate events through musicals to Spice Girls concerts. Among recent orders are those for 19 4-channel LAB1200Cs from Orbital, 12 LAB2000Cs and 12 LAB4000s from Skan PA, and 14 LAB1200Cs from Sunderland's New York Sound Company.

**Lab Gruppen, Sweden. Tel: +46 300 16823. Autograph Sales, UK. Tel: +44 171 267 6677.**

## February 1998

### 5-6

#### Live! 98

The Roundhouse, London, UK.

**Contact:** Justine Smart.

**Tel:** +44 1322 660070.

**Fax:** +44 1322 615636.

### 8-11

#### Milia 98

Paris, France.

**Contact:** Armelle Coatsaliou.

**Tel:** +33 1 41 90 44 79.

**Fax:** +33 1 41 90 44 70.

**Email:** armelle\_coatsaliou@midemparis.ccmail.compuserve.com

### 17-19

#### Integrated Communications 98

Level 2, Olympia 2, London.

**Contact:** Turret RAI.

**Tel:** +44 1895 454438.

**Fax:** +44 1895 454588.

**Email:** 100730.1313@compuserve.com

### 17-19

#### Video Forum 98

Wembley Hall 3, London.

**Tel:** 0800 731 1089.

**Net:** www.videoforum.co.uk

## March

### 11-15

#### Musikmesse

Frankfurt, Germany.

**Contact:** Anke Witte.

**Tel:** +49 69 7575 6596

### 16-17

#### AES UK Conference: Microphones

and Loudspeakers:

the ins and outs of audio

Church House, London.

**Contact:** AES.

**Tel:** +44 1628 663 725.

**Fax:** +44 1628 667 002.

**Email:** AESUK@aol.com

### 16-19

#### Technology India 98

Bombay Exhibition Centre,

Mumbai (Bombay), India.

**Contact:** Above & Beyond Exhibitors.

**Tel:** +91 11 651 0205.

**Email:** vikas.gulaty@gems.vsnl.net.in

### 18-21

#### ITA

Ritz Carlton, Laguna Niguel, Dana

Point, California.

**Tel:** +609 279 1700.

**Fax:** +609 279 1999.

### 23-27

#### 4th BTV China 98 and

#### 3rd COMMTEL China 98

**Contact:** Business &

Industrial Trade Fairs.

**Tel:** +852 2865 2633.

**Fax:** +852 2866 1770.

## April

### 14-16

#### PLASA: Light and

#### Sound Shanghai

Intex Centre, Shanghai, China.

**Contact:** P&O Events.

**Tel:** +44 171 370 8231.

**Email:** shanghai@eco.co.uk

## May

### 16-19

#### 104th AES Convention

RAI Conference Centre

Amsterdam, The Netherlands.

**Tel-Fax:** +31 35 541 1892.

**Email:** 104th-chairman@aes.org.

**Net:** www.aes.org

### 18-20

#### Cable & Satellite 98

Earls Court 2, London, UK.

**Net:** www.cabsat.co.uk

### 26-28

#### TV 98

Thermal Hotel Helia, Budapest

Hungary.

**Tel:** +361 153 1027.

**Fax:** +361 153 0451.

**Email:** hiradastechnika@mtesz.hu

**Net:** www.mtesz.hu/

hiradastechnika

### 26-29

#### Midem Asia 1998

Nusa Dua Beach Resort, Bali

**Tel:** +331 41 90 46 31.

**Net:** www.midem.com

### 29-31

#### 5th Annual Latin-American Pro

#### Audio & Music Expo Miami 98

Miami Convention Centre,

Miami, Florida, US.

**Contact:** Studio Sound International.

**Email:** chris@ssiexpos.com

**Net:** www.ssiexpos.com

### 30-June 2

#### Nightwave 98

Rimini Exhibition Centre, Italy

**Contact:** Ms Gabriella de Girolamo.

**Fax:** +39 541 711243

**Net:** www.fierarimini.it

## June

### 2-5

#### 5th Broadcast Asia 98

and others

World Trade Centre, Singapore.

**Contact:** Overseas Exhibition

Services.

**Tel:** +44 171 486 1951.

**Fax:** +44 171 413 8211.

**Email:** singex@montnet.com

**Net:** www.montnet.com

## June

### 15-17

#### Mecon 98

Medienforum NRW, KölnMesse

trade complex, Cologne, Germany.

**Contact:** Musik Komm.

**Tel:** +49 221 91655.

**Fax:** +49 221 91655 160.

**Email:** mecon@musikkomm.de

**Net:** www.mecon.de

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Home of a generation's engineers; Allen Stagg's IBC

## Hello, London calling...

I HAVE READ your very interesting article ('London Calling', *Studio Sound*, November 1997) and I know that John Terry won't mind if I point out a few things.

John—IBC's manager before me—was not involved in training any engineers.

The era of IBC-trained engineers started out of necessity in 1955. There were just no other studios which employed engineers with the required skills since none had a history of music recording. There was only one way to find them and that was to train them ourselves—and IBC did just that. When I became manager in 1955 the existing staff had all left for the exciting new field of commercial television. That left me! My first call was to Eric Tomlinson—who was semi-trained in his spare time while I was at Radio Luxembourg. He joined me at IBC very quickly, which was just as well since, as I discovered, there were still only 24 hours in any day and I was already familiar with the whole clock.

The reason why I regarded Joe Meek's involvement 'sourly' still has relevance to the employment of young males today, even if

that sounds terribly old fashioned. And IBC was full of young males.

Regarding my move to Abbey Road, suffice to say that my orders from the managing director were to 'Go and sort that bloody mess out'. I make no further comment at this stage.

If my memory serves me correctly, and just for the record, Eric Tomlinson left IBC before me and so did not succeed me at the helm.

Eric's memory, however, is a little out of sync as the first stereo session at IBC was done for Ampar in Studio A. And the engineer was—Eric Tomlinson. (I still have a copy of it.) The musical director of the Ted Heath band for those sessions was Johnny Keating, not Johnny King.

I believe it is fair to claim that no studio before or since has trained more engineers than IBC. If there are any ex-IBC people out there who would care to contact me, I would be pleased to hear from them (Tel: +44 1594 860313).

You might be interested in a list of people employed by IBC during my 15 years as skipper. Many of them are still familiar names in the recording business. If there is anything else you need to know please don't hesitate to contact me—I hope I haven't forgotten anybody.

**Allen Stagg, Ross-on-Wye, UK**

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# Soundtracs DPC II

Sporting a gentle face lift and a serious upgrade, Soundtracs' latest digital console is turning heads. **Zenon Schoepe** gets an exclusive hands-on

**U**NDOUBTED STAR of the Munich AES, where it was shown as a prototype, Soundtracs' DPC II aligns the company with the intelligent middle market between cheap and unapproachable extremes of console design. It is also the most expensive console the company has ever made.

Since then there have been subtle changes to the cosmetics and layout of the desk most notable the nature of the touchscreens, some of the switch gear, and unless I'm mistaken a reappraisal of the rake of the whole desk surface. However, what it set out to do remains: this is Soundtracs' bid at the higher ground with more than a nod of recognition to postproduction.

Here is a digital desk that combines a phenomenal amount of localised hard physical control of parameters, touchscreen displays that are crammed with information, an in-line-style arrangement of inputs and 7.1-channel capability. Add to this the automation system of the Virtua digital desk, a variety of work-surface sizes, and I-O possibilities, and you've really got a desk that appeals to the appetite as well as to the pocket.

More of a profound change has occurred beneath the skin of the desk, not in terms of what it does but what it offers, as all DPCs will now be supplied with the full complement of available DSP in all sizes whereas ini-

tially it was thought that this would be scaled according to worksurface size. Thus even the smallest DPC II comes able to process the maximum number of channels of the system, what will restrict it, or rather how your budget loads the system, is the number, selection and variety of I-O cards that you choose to equip the DPC with.

Consequently, it is simple to change the numbers and types of converters in the rack, although changing the size of the worksurface after it has been built is harder. If you do intend to make your desk physically bigger in the future then it pays to have blanking panels inserted into the chassis that can be filled at a later date. It's worth pointing out that even if you restrict the number of converters, for example, the DSP is not wasted and sitting idle as such a configuration will allow you to take any bus or signal as an input to a channel, so you can use it for group EQ, for example.

Options on the worksurface are the small version with 16 faders as two rows of 8; 64 faders as 2 rows of 32; and the 96-fader version that would be strikingly big for those eager to impress. As already mentioned blank bays can be accommodated, but you can also use the space for DAW control panels. There's also a patchbay option.

One of the best things about the DPC is

that you can refer to it as a desk and not just a worksurface as it contains all the processing core with only the I-O racks removed. The system is software upgradable via diskette, or via modem directly into the desk. The company points out that the latter route is likely to be of most use as a means of providing remote support.

Racks can be anything you want up to the system's limit and these connect via MADI and there are four pairs of these connectors on the rear of the console so you could connect four racks to it. The links are also used to send back to the rack analogue matters like analogue gains for the mic inputs, phantom power switching, mic-line selection and insert on-off switching. Each rack has 7 slots for inputs and 7 for outputs with each slot being a different format be it AES-EBU, A-Ds, or D-As. For AES-EBU a slot handles four pairs, A-Ds have EDACs, there's also TDIF, ADAT optical planned and MADI for external machines.

All inputs and outputs are 24-bit and run at 44.1kHz and 48kHz, but you can also switch the desk over to 96kHz operation which halves the number of channels, plus you'll need the relevant converter boxes to be added. Higher resolution audio has thus been planned in; although it has not yet been prototyped.





There is quite a bit of Virtua in DPC II, but it would be unfair to compare the pair too quickly or directly. Automation is identical to Virtua and you can import mixes from Virtua for pre-dubbing situations. It's a good system and has been covered already in these pages including the significant enhancement of v2.0 software. The channel strip essentially comes from Virtua, but has more EQ, bussing, and routing. Virtua's limitation is that 48 channels is the maximum you can mix due, not to the rack, but because of the limitations of the DSP to handle multiple signals simultaneously. This eats up its bandwidth.

As the requirement for the number of channels increases so does the number of cross-patching permutations. The DPC II uses stacks of DSP from a Virtua, but each of these is only handling 32 channels rather than 48 and that's how the size of the system has been increased and the flexibility enhanced. There are effectively 6 Virtua processors in the DPC and each channel is doing more than a Virtua.

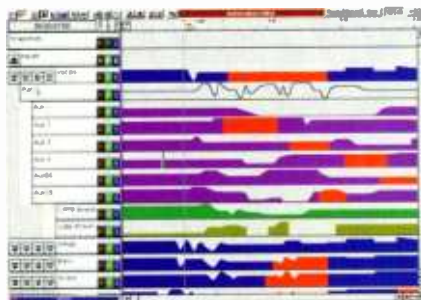
The physical fader maximum is 96 with the maximum number of channels for mixdown being 160 all with complete EQ, dynamics and access to auxes and buses. The number of physical connections in the rack is 224 allowing more than can be processed to be lined up and switched to for particular sessions and tasks. This patching is part of session data. Again it's worth reiterating that even the smallest 16-fader worksurface can run the maximum-sized system.

There are a number of options including a dedicated D-A that can be used to output sets of signals for use by external metering to supplement the meters on the worksurface. Arranged to correspond to one meter per dual fader path, worksurface bar-graph meters always follows whichever signal path is being worked on with a small meter reflecting the activity of the other signal path being shown on the touchscreen.

Soundtracs stresses that it has tried to keep an open mind to the sort of 'customisation'

that users at this level will want and this has extended to a custom panel for such things as additional transport controls, monitoring, and extra talkback functions. To this end a control room sources arrangement is planned for film mixing where rows of buttons will allow tape output and group combinations to be made quickly and easily.

In terms of cost, the cheapest DPC II comes in at £60,000 (UK) and includes the smallest interface, and one rack loaded with 32 inputs in a mixture of analogue and digital and



32 outputs. A middle-sized package would cost around £100,000 with 64 faders, 48 analogue and 48 digital. It's important to note that you could not spend more than some £150,000 even with the largest worksurface and every conceivable extra.

The DPC II's biggest difference operationally over Virtua is in its extensive use of touchscreens. When you look at the console and dismiss the fairly obvious 'centre section' with its two screens, one above the other, for such things as setups and automation, what you have left is a repeating block of 8 faders wide containing 16 stacked faders in total, 8 meters in the meter-bridge and a touch screen surrounded by hard controllers. The touchscreen is also split vertically to reflect the 8 dual fader paths it represents as graphical channel strips—condensed for general overall viewing but easily expanded with a touch to show more.

Touch the screen to access a channel's sec-

tion and control of the accessed section is handed over to the hard controls that surround the touchscreen. Thus there is a physical pot and switch for every on-screen controller, and that goes for the EQ and dynamics so you're never in any confusion as to what it is you want to adjust or are adjusting. Touch an on-screen channel strip on its EQ block and up comes its EQ section, touch it again and up comes the EQ graph with the exact numerical read-out of values. EQ is 4-band with switchable characteristics—bell, shelf and high-pass filter—augmented by a PRESETS button, that is not operative yet but is already proven on Virtua, and gives access to EQ presets which can be stored and recalled on a per-channel basis, but also applied across the board.

Touch the dynamics section and you get display of elaborate dynamics control, again in layers, with rudimentary control presented on the surface and full and extended control provided on a second screen press. High-pass and low-pass filters have been included for the compression and gating functions, but when not needed they can be patched back to operate along side the channel's EQ for 6-band control. The dynamics capabilities are very similar to that on the Virtua or for that matter on the ADP (Assignable Dynamics Processor) digitally controlled analogue devices included in the company's top-end analogue boards.

Rotary controls are also provided for the auxes further down the strip reflecting their mono or stereo status. There are a maximum of 24 aux buses, but you can split your aux-group buses wherever you want within a maximum of 40.

This repeating 'blocks of 8' theme is how you get from the smallest to the biggest DPC as what you are adding in worksurface terms is more direct control. While you can 'scroll' the whole desk across all the screens, the relationship between touchscreen 'strip' and associated faders is inseparable.

Smaller worksurfaces access layers of channels with dedicated keys and the process permits channels to be locked into all layers so they are constantly to hand.

In terms of multichannel working, the DPC II can handle 4-channel surround, 5.1 and 7.1 and in all modes you can either conduct side to side and front-back movement via pots or touch the display and pick the relevant channel up with the joystick with a very neat graphical representation of trajectories. Preliminary controls are provided for divergence and sub-bass contribution.

Touch screen output bussing indicators show the primary assignment on one level, but an extra touch brings up all the available formats that the desk has been setup for it. It's possible to mix in a couple of formats simultaneously and a screen shows how the groups and auxes have been split up for the job. It's able to achieve compensated panning routines for discrete isolated panning of signals. The arrangement is clever enough to mix stereo, 4-channel surround and 5.1 at the same time and still set up some additional splits that might be needed.

Each channel display shows two basic modes: one concerned with the actual processing EQ and dynamics, the other >>>>

concerned with its busing. Global switches permit all EQ and dynamics to be switched out while the monitor section allows you to visualise the other row of faders on a single key push.

A pull-out QWERTY keyboard allows naming of fader paths and buses the latter being important as it makes it clear that you are sending to effects or music rather than anonymous group numbers. Auxes can also be named for the effects box they are driving. Post-fade limiters are provided on all the bus outputs with adjustable threshold and release time.

Signal-path order is fixed and always hits the EQ followed first by dynamics and the insert (the A-D cards have pre-converter inserts also). An input routing section gives selection of the analogue or digital input you want to assign to a channel complete with input gain, phase reverse, delay (2s maximum), the routing choices, phantom power, and MS decode. Any spare I-Os can be assigned to perform as channel inserts.

One of the tidiest additions to the desk, and one that you will not see in any of the photography yet, is the inclusion of another set of EQ controls and joystick to the side of the bottom screen in the centre section. The idea will be that the last touched channel can be picked up from here and tweaked, and worked on in conjunction with the display and locked out from interference from the rest of the desk while this is being done.

The console is geared to multi-operator use as there are two sets of automation master controls which can be used to lock out sections of the desk and keep the automation save and discard routines independent.

Transport controls take care of MIDI, SMPTE and RS422 machinery with locates and looping, plus the promise of a jog-shuttle wheel and track arming from the channel automation status switches.

The control-room section has three sets of outputs with levels, mono, dim, solo clear, headphones output and level. It employs the same talkback section as that on the Virtua with its own mini-mixer for setting levels, but with the addition of sending talkback to either of the two dedicated studio feeds which can additionally receive the mix buses and auxes.

It's worth stating that this console is deliverable now. Many of the provisional features mentioned in this review should have been sorted by the time you read this. Even if some of them aren't, like the preset functions on the EQ, then they are effectively frills and in no way impact on the fundamental operation of this desk.

The DPC II is a delightfully simple console



**Soundtracs, Unit 21-D, Blenheim Road, Longmead Industrial Estate, Epsom, Surrey KT19 9XN, UK. Tel: +44 181 388 5000. Fax: +44 181 388 5050.**

to operate and is individual in how it is presented. Rather than the now-accepted process of an assignable super channel strip working in conjunction with paltry additional local control. Soundtracs has gone for a super strip per 8 dual-fader paths with never any ambiguity in what is going on.

It's an approach that is drastically different from that employed on Virtua, which was always designed to run from smaller worksurfaces and in retrospect now looks incredibly complicated in comparison to the DPC.

The DPC II is altogether friendlier and is packed with analogue-desk-style desk analogies. You select, route and attenuate a signal in a completely normal manner and then proceed to EQ and process its dynamics simply. There's no trauma because you have what I would describe as category-leading amounts of hard control available.

If you're already used to operating a different digital desk then the DPC II could be a bit of a shock to your system. If you've never used a large-scale digital desk before then I would suggest you try this one first as it illustrates extremely well what can be done to make the face of digital acceptable. Then visit the others and use the DPC II as the reference.

It might not be to everybody's taste, but if the what you see is what you get ethos really appeals to me, I defy anyone to get lost around the DPC II once the principles have been explained. There are no real hidden menus or functions, and it's without some of the complexities that you might expect for the money with a digital board. The truth is that people want digital desks not for complexity, but for their full automation and resetability.

The DPC II also challenges the assertion that an analogue desk always gives back more visual feedback than a digital one because the screen-based nature of the displays gives you more information than you can handle.

I was always sure that Soundtracs would go bigger rather than smaller with its Virtua technology simply because it is easier for a small company to box clever in a specialised niche than it is for it to slug it out in the mass appeal bear pit of the big Japanese giants. The DPC II is an astounding achievement that is better sorted and better thought out than I thought it would be, and represents a quantum leap in clarity and functionality over the Virtua, as indeed it should be.

It's a thoroughly modern desk from a company that has effectively reinvented itself and realigned itself very successfully with the digital desk age. Soundtracs is now a major league digital console player and if you're serious about this sort of technology then you should be investigating it. Remarkable. ■

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# Tascam TM-D8000

Retrieving the gauntlet thrown down by Yamaha's O-series consoles, the TM-D8000 is an important development. **Zenon Schoepe** assesses the state of the affordable digital desk debacle

**A**T THE TIME of its preview at the LA AES in 1996, Tascam's TM-D8000 was seen as a predictable response to Yamaha's O2R and then its O3D successes. In fact, Tascam appears to be the only player inclined to trade blows with Yamaha in the affordable digital desk game, regularly demonstrating the wherewithal to create and take on new product sectors. Besides, its long and respected, although recently largely quiet, activity in console manufacture is overdue for a boost.

Thus the TM-D8000, as it was eventually called, was wheeled out with a decidedly individual approach to the task. We were told it sported new generation technology that has emerged in the DA-38 and DA-98 MDMs and that it would partner these multi-tracks intimately.

It's now shipping and this review will be split into two parts, in the first instance, to examine the out-of-the-box capabilities of the stand-alone console and follow this up next month with the external computer hosted automation package that expands the power of the system. This is because the desk arrived before the automation did.

Of all the comments that greeted the appearance of the prototype TM-D8000, the lack of moving faders was the most commonly observed. Yet despite this, the desk has arrived, and the only way to get the faders to move remains to push them. Tascam has

flown in the face of popular opinion and gone for the old inanimate VCA-style approach. This is not necessarily a disadvantage, but it would be safe to say that the precise nature of the external automation package could make or break this desk because it is that important.

However, opinion has been united in deeming the desk brilliant in appearance and inherently right in feel and presentation. This is still the case as the clarity and simplicity of the top panel belies the power beneath it and Tascam has come up with an ergonomic feast of console.

It's big enough to look substantial, something the O2R can't always claim, and there is a lot of relief and contouring in the surface as it rakes up from the near-flat lower-fader bays to a nicely inclined meter bridge. With all the faders concentrated on the left of the desk, there are none that are hidden or layered, fine control and more advanced functions are taken care of by the right-hand side of the surface. You get an inclined back-lit LCD, not dissimilar in dimensions to that on the O2R, that for the majority of tasks works in conjunction with a panel of 4 by 5 knobs of continuous controllers, most also having associated push-buttons, that are assigned to hard control of parameters displayed on the LCD. It's here that you also find a jog-shuttle wheel that can be employed for data entry and cursor movement, cursor keys, and a mass of transport controls. Other sections take care of automa-

tion control, general monitoring duties, desk setup, and cut and fader grouping.

The desk can accept word lengths of 16, 20 or 24 bits at 44.1kHz and 48kHz with  $\pm 6\%$  varispeed. It will handle 40 digital inputs on TDIF to stereo with 8 digital output buses. Analogue inputs encompass 16 mic or line sources. Employing an in-line architecture, long and short (60mm) fader paths can be assigned for channel or tape returns according to the requirement and grouped to 4 fader and 4 cut groups.

All paths have access to 4-band fully parametric EQ and 6 aux sends complete with dedicated stereo returns. You also get an assignable 4-insert matrix which can be programmed to route external processing into signal paths and the facility to assign 8 internal dynamics processors.

**A**S IT STANDS on its own, apart from full real-time control of all parameters the desk is capable of running only snapshot automation as the aforementioned external Mac computer and the automation software package is required to realise full dynamic automation in conjunction with the snapshots if required.

Extensive machine control is included as are some rather nice general console monitoring facilities for the control room and the studio. In this respect it's a very 'real' desk that happens to be digital. >>>>





# NEWS FROM TUBE-TECH EQ 1A

How you connect to this console is interesting and the rear panel is peppered with a variety of sockets. The simplest way of measuring up the desk is to look at it working with 24 tracks of Hi-8 (all on 25-pin D-sub), the returns of which are presented on the long faders, fed by 16 channels of traditional analogue input signals from mic or line level sources. It is these 16 analogue input channels that can be additionally switched over to accept TDMF and therefore yield 40 channels of digital for mixdown. However, there are also 6 rudimentary stereo returns patched into the equation, with no EQ, for example, but with routing to all the buses.

The aforementioned 4-point insert matrix is assigned by calling up a page and pressing the SELECT button of the signal path you want to insert into. The result comes up on the back panel as unbalanced TRS jacks—it's a way of getting an analogue insert into a digital signal path. A similar process is employed for allocating the 8 channels of dynamics; although in both cases you cannot apply these to the effects returns. The analogue input section additionally has its own TRS inserts.

The 6 aux sends exit as unbalanced jacks, although it's worth mentioning that Auxes 3&4 can be assigned to appear at their own dedicated AES-EBU output and effects Return 6 can come back in in the same format for accommodating digital outboard. Then you find 4 assignable AES-EBU inputs (two of these can be SPDIFs) and stereo outputs in AES-EBU and SPDIF.

The connectors that remain are in the analogue domain giving balanced and unbalanced outputs for two 2-track returns, the main stereo output, studio output and control room output. There are also time-code inputs, a multipin remote output, RS422 socket, MIDI, a couple of GPI outputs and an inconspicuous little port for the Mac that drives the automation.

General operation is best referred to the analogue input paths as these are the most elaborate. The 16 analogue input channels boast mic-line selection, phantom power, 20dB pad, +16dB to +60dB Trim pot and a -10dBu signal present indicator all on analogue nonautomated controls. Each fader path has a SELECT switch that assigns the path to the controller panel, a CUT and a solo (selectable PFL and solo in place).

**S**TRIKE A SELECT key and the relevant channel's parameter information appears. EQ is 4-band fully parametric with shelving HF and LF and all bands sweepable from 31Hz to 19kHz with  $\pm 15$ dB available plus a notch on the extreme cut. The three rotaries for each band are stacked vertically and any tweaking is reflected on an EQ graph. Usefully each band has a switch that flattens its gain, but less usefully it is not reversible. While it's handy to be able to flatten a band quickly, it's less smart than it would be to be able to compare the flat and tweaked contribution of a band. Almost.

The remaining rotaries are taken up with aux sends, again with switches for on-off and pre-post switching where relevant. An additional digital pad with a phase reverse and a pan pot that can be centred on a switch.

A collection of buttons select routing to



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the 8 buses, the main stereo and a direct out (only available on the analogue inputs), a graphical representation of the fader position, signal bar-graph metering, gain reduction (if one of the assignable dynamics blocks is plugged in) and information on group cut and fader membership.

Add to this a collection of buttons next to the LCD that select global, all-signal path viewing on the LCD of such parameters as each of the six aux sends, the aux masters, pans, routing, additional digital pads and phase reverse, and a condensed version of the desk fader positions, then all you need to do 90% of the standard desk operation is concentrated here and to hand.

This section is also where you stereo link adjacent odd-even numbered inputs, adjust delay in samples or time (up to 92.9ms), and set up the analogue or digital origin of incoming signals to the inputs.

This patch of real estate is a lesson in ergonomic excellence that is surprising given how relatively small the area it occupies is. Part of the charm is that each rotary controller has an associated LED next to it and when you flip pages these light to tell you which controllers are operable. You very, very quickly get the hang of this.

EQs can be named, and stored, and recalled from a library, and the same applies to the eight assignable dynamics modules. The compressor has variable Threshold, Ratio, Attack and Release, while the gate has variable Threshold, Range, Hysteresis, Attack, Hold and Decay. There's also gain make-up and because it's digital you get the benefit of pre-delay, a smart dynamics curve, but no frequency conscious operation. Mind you, it's good strong stuff, the gate is particularly crafty and the compressor sounds good enough for analogue until you start to wind up the ratio.

I'm a little unclear as to why this desk has been limited to just 8 channels of dynamics, but I would have to surmise that this number corresponds to some processing cut off above which Tascam was not prepared to go. Even so eight is a perfectly useful number to supplement any outboard when tracking, but its worth pointing out that when running 40 digital channels at remix, these 8 and the 4 matrix breakout points will be the only means of adding dynamic control for the final.

Control room monitoring is possible of the 6 auxes individually, the 4 supplementary digital inputs, the two 2-track returns in stereo or mono, but unlike the great analogue Tascam desks of old there is no ability to combine selections, so you cannot monitor two auxes simultaneously from here. There's a level control for the dedicated studio output, that can follow the control room selection, while a comms panel with a built-in mic can route to the Slate, Studio or Auxes 1 and 2.

Metering is excellent and tied in to a clutch of switches that allocate the 24 bar-graph meters to register multitrack return, the channel inputs and stereo returns, the multitrack sends and the aux sends. Multitrack and channel inputs can be read pre or post EQ, and hold and release times are programmable. There is also a decent pair of main stereo meters that combine quasi-rms with a peak display.

The disposition towards hi-8-based

machines is underlined by the presence of switches beneath the meters that can be used to arm tracks for recording and are protected by an ALL SAFE key. These are supplemented by a close approximation of a DTRS-style manual locator remote section and large chunky transport keys with familiar MEMO, FIDT and REPEAT keys and 10 location points. It will control DTRS machines, RS422 devices, the MMC capable and other things of a MIDI nature.

**T**HE OUTPUT buses are employed for surround operation and will stretch to 5.1 via a simple selection screen that automatically allocates the buses to the corresponding format. Thereafter panning in the soundfield is achieved by using rotary controls for left-right and front-rear plus their corresponding divergence controls and a sub woofer feed with cut. The manual mentions a JL Cooper pan controller, but

how this element of the desk will be accommodated within the external automation will really illustrate its suitability for heavy-duty surround work.

As it stands without a computer and its relevant software connected, automation on the TM-D8000 is restricted to snapshots.

And there are 99 of all fader levels, cut settings, EQ, aux send and status, pan or balance or surround settings, aux master levels and links, bus levels, channel linking, insert on-off, routing and dynamics settings. You store these by selecting a memory location with up-down keys (snapshot numbers and names are always shown at the LCD's top left), and press STORE. You recall on a RECALL key or via external MIDI program change command.

Simple and effective, but it amounts to less than a fully automated digital desk without the accompanying computer.

Judging the desk entirely on how it performs once you've put a mains cable into the >>>>

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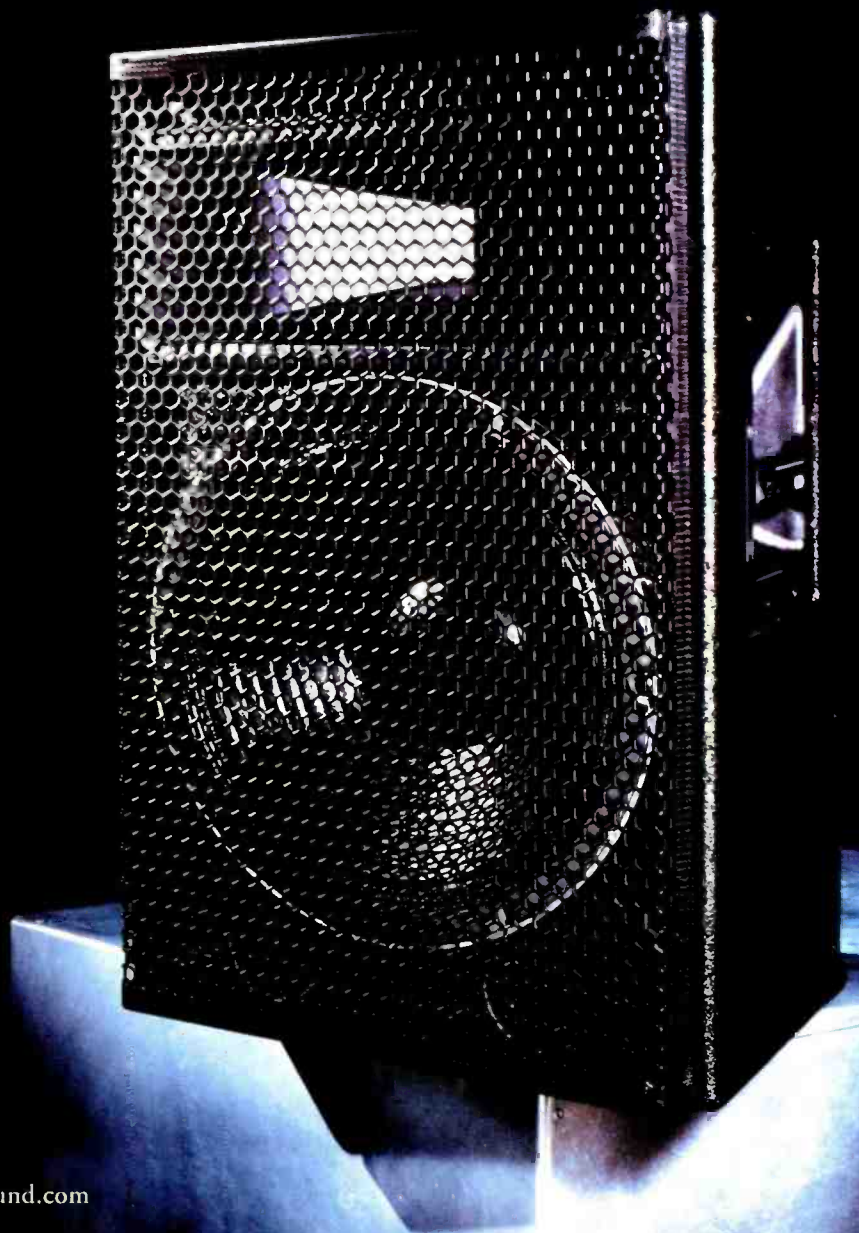
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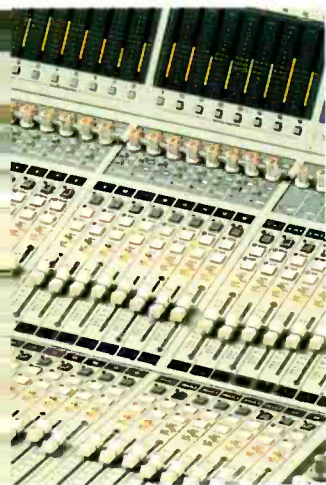


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«««« back, the impression is one of solidity and dependability. It has a great operational feel and seems comfortably geared. Screens come up quickly, rotary adjustments are immediately reflected on the LCD, and everything seemed to live where I thought it should.

A **SHIFT** key activates a small number of more setup-specific pages, and I managed to allocate digital inputs across the board without any hassle, and even copy some EQ settings across channels without resorting to the written word. Similarly, selecting a machine for transport control is as simple as selecting a name from a list. In some instances more pages are revealed with repeated presses of the same key, but there is nothing cryptic or hard about setting up or operating this console.



Sonically it's good, the mic pres are fine and there are plenty of them, and the EQ is sympathetic and a pleasure because you have all its controls available to you all of the time, there is no stepping between bands.

Points to note are that the analogue input channels are switched over to digital sourcing in pairs and while you can 'flip', or Swap, long and short faders, the process is global and involves dipping into a page even though you do get a top panel LED reminder of the status.

The desk's dependence on TDIF is uncompromising and you will need to get fancy with external boxes if you want ADAT or more analogue, although there is an argument that suggests you should resign yourself to an easier life and go with what this board was intended to do.

I will be very interested to see whether Tascam will continue upgrade this desk via software as a means of developing it. There is an **EXTERNAL CONTROLLER** button that currently does nothing, although I could imagine what it could do, but more curiously there are two faders on the desk surface, the two furthest on the right in the top row, that seem to do nothing, but

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make up the numbers and the symmetry. In practice this makes no odds but there must have been a reason for their presence.

In summary, the TM-D8000 is a beautifully built and thought out piece of machinery that integrates seamlessly with DTRS and houses stacks of accessible processing. It's a delight to use.

However, as already said, the external automation package is crucial to this console so I'll reserve final judgement until next month. ■

Studio Sound January 1998



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# Stage Tec Cinetra

The digital film console goldrush gathers pace with the introduction of Cinetra from German Stage Tec. **Rob James** puts it through its paces

ONCE, THE INTRODUCTION of a new film mixing console, let alone a digital one, was a rare event. Now such desks are behaving like the legendary number 11 bus—you wait ages for one, then a fleet come along together. In the last year we have seen the first deliveries of the AMS Neve Digital Film Console; the introduction and first sales of the SSL Avant; and the first tentative showing of the Otari Advanta. Today's player is Stage Tec with the first Cinetra console delivered to Geyer Synchron GmbH.

Berlin in winter does not provide a lot of colour with an overall impression of unremitting grey. Close to where the Wall used to be, Geyer is a long-established film postproduction house with a considerable reputation; it is used by Wim Wenders among other notable directors. The Cinetra is installed in the main theatre with a full complement of the splendid Albrecht magnetic film recorders and dubbers, a Kineton continuous-motion projector and a pair of intermittent projectors for viewings. Sadly most of the Albrechts are slowly falling into disuse as tracklaying is increasingly carried out on DAWs. In this context, the Avid Audiovision system is prominent, as are Aegan and FED machines.

The main machine control system for the studio is the Albrecht UCS (Universal Control System). The room has been the subject of considerable acoustics work and a complete cosmetic revamp. The result is a THX-certified room on the more-live end of the allowable tolerances that sounds excellent and looks and feels comfortable and stylish, in marked contrast to its surroundings. The console's sibling, Cantus, has won an industrial design award in Hannover and the surrounding furniture design complements the console to perfection. Outboard includes Lexicon 480s, a number of de-essers, an Eventide Harmonizer, Quantec room simulators and AMS delay.

All of this demonstrates the first production console is successfully in use in a familiar film environment with the much the same level of complexity likely to be encountered in other markets.

When considering film mixing consoles it is important to recognise that it is very unusual for any company to design a machine from the ground up specifically for the purpose. Thus the SSL Avant is a direct descendant of Axiom and Aysis, the AMS Neve DFC is a very close relative of Logic 2. Raiding the parts bin to design a film console is a long and reasonably honourable tradition. One exception is Harrison's MPC, but even this shares back end and other components with other machines in the Harrison stable. Cinetra is no exception to this design philosophy with its origins clearly visible in the earlier Cantus, and none the worse for that. Most of the building blocks

are therefore well tried and tested.

Stage Tec is very well known in Germany, less so elsewhere. As the name implies the company has its roots in theatre and installation systems. The route into console manufacture is via the company's well regarded Nexus routing system. Cinetra sits somewhere between the AMS Neve philosophy of a central pool of processing allocated as required to custom build the back end to a console and the SSL approach with full processing on all channel strips all the time. The control model is, again, a mixture. The surface is both layered and assignable. Only two layers are currently available to be instantly swapped on a global or per-strip basis, but up to 10 layers can exist and be exchanged with either of the current control surface layers or accessed from the assignable section. I think this arrangement lacks flexibility and is an area where considerable improvements could be made to greatly increase the attractiveness of the machine.

In Cinetra, the logical building blocks of a console, I-O, patching, control surface and processing are more tangible than in some other designs. I-O is dealt with by a Nexus crosspoint router (which is also available as a stand-alone item). Patching of Nexus inputs and outputs to processing channels and assigning processing channels to control strips is all managed by a PC built into the control surface.

THE CONSOLE back end consists of one 3U-high rack per section. Fully loaded with 17 DSP cards this will give a maximum of 136 channels per section. This seems amazingly compact when compared with other designs, however, bearing in mind the distributed nature of the console a realistic size comparison must include the Nexus racks. All these units communicate via fibre-optic links.

A number of functions, which on a conventional system would be an intimate part of the console processing, are handled here by router cards—such as MS decoding with width control and input swapping is accomplished in Nexus, although controlled from the console surface.

A Nexus router can have up to 4,095 inputs and outputs if the application requires it, and your pocket is deep enough. The system is highly modular allowing the physical I-O to be situated close to sources and destinations. This modularity also ensures the system is easy to maintain—an I-O rack situated in the machine room, and another in the control room. All the racks interconnect exclusively via fibre optics so cabling can be kept to a minimum. The fibre-optic connections can carry 64 bidirectional channels per cable in time division multiplexed form.

An impressive number of audio and other formats are catered for, although I am rather



surprised at the lack of a video option. Plug-in boards currently available include Analogue options are 4-channel 22-bit A-D converters with phase inversion, four channel 24-bit D-A converters and 4-channel mic input boards with +8V phantom, subsonic filters, switchable input impedance and digital level control. All have XLR connectors with concentric jacks.

AES-EBU or SPDIF digital (optical and co-ax) I-O come four to a board with optional SRCs (sample-rate converters). Multichannel formats supported are, MADI, SDIF2 and Yamaha Y2. Other boards available include RS232-RS422 and MIDI; an intelligent Communication Interface for control panels, the console control surface and machine or power amplifier control; a relay interface board covering routing of GPIs, and there is a DSP board. Third-party modules are available from Junger.



for example, dynamics and data compression.

As you would expect sources and destinations can be given real-world names that helps keep track of the potentially massive number of connections. The control software manages sync sourcing, sets parameters and monitors the system for failures. Curiously, for such a comprehensive system, there is no 'range' or 'array' selection of crosspoints. Each assignment has to be done individually which can get a bit tedious with multichannel sources and destinations.

Cinetra processing is built around trendy SHARC DSP chips. The racks do appear tiny for the amount of processing involved. Each card can currently support a maximum of six (soon to be eight) full channels or 32 'short' channels which would normally be used for pre-dub inputs or aux returns. Processing is

40-bit floating point with 32-bit mix buses giving huge headroom. A large console can be constructed in logical (and physical) 'sections' with a maximum of 136 channels and 64 buses per section. This includes monitor, record, reassign, aux, PFL and solo buses. A card failure will only bring down the associated channels, not the whole console, and, in an impressive demonstration, I watched a hot swap—a card removed and replaced while the console was running. This caused no problems.

The processing is an assignable pool within the 6-channel block. If you want 22 equalisers in one audio channel you can have them, but the amount of processing available to the other 5 channels is correspondingly reduced. The channels are built using processing blocks on a graphical interface running under Windows on the setup computer. This com-

puter is controlled using a Wacom graphics tablet and pen which echoes the SSL approach. A QWERTY keyboard for naming items is fitted into a neat, pull-out, drawer in the console front edge.

Available building blocks are: gain, HP and LP filters, shelving and parametric equalisers, notch filters, dynamics (compressor, limiter, expander or gate), dynamics key input, direct out, aux sends (pre or post fader), inserts, fader, PFL, channel delay (for mic time alignment, and so on) and two meters. One meter is always Input, the other can be placed pre or post fader. The equalisers all have a 20Hz–20kHz range. Parametrics give  $\pm 15\text{dB}$  with Q ranging from 0.5–9. Shelves may be 6dB, 12dB, 18dB or 24dB per octave. Notch has variable Q but cut only.

Of course, there are limitations. Most obvious is the size of the processing pool, although six comprehensive channels can be 'built'. The available processing is displayed as a percentage for the card on the channel design screen. Dynamics are limited to one device of each type per strip.

Like many other film consoles the Cinetra control surface is constructed largely from the manufacturers parts bin with extra modules specific to the application, and a number of switch assignment and label changes. Anyone who is familiar with the Cantus console will recognise much of Cinetra. The moving faders are smooth but the black knobs are a little blocky for my taste and in marked contrast to the majority of the switches which are small, square, internally illuminated devices. These switches have positive feel and are satisfyingly tactile. The rotary knobs are tall, tapered black rubbery components which offer a good compromise between usability and visibility. These knobs are pressed down to activate certain functions and are also touch sensitive, although this is not yet being used for control. Main meters are bars with individual channel meters as arcs. These arcs are also employed, anticlockwise, as dynamics meters. Other arc displays are used concentrically with the rotary controls, to indicate position. The majority of indicators and enunciators are a restful green. Red displays which are increasingly difficult to focus on as age (the operator) increases really have no place in a film console where constant refocusing from screen to console leads to operator fatigue.

The power supplies are built into the console legs and the PC is built into the control surface. Main and short channel strips are in blocks of four. The assignable controls consist of three blocks containing auxiliary sends, dynamics and EQ. The centre section houses a wide acceptance angle TFT screen for the computer, machine control, automation control and the all-important monitoring and record control blocks together with assignable motorised joystick panners.

Up to 32 inserts are allowed with device names. The required device can be dialled up on the channel strip and inserted. Starting in the upstand, the strip has Cinetra specific level and dynamics meters with illuminated legends informing you what is being metered, whether EQ or filters are in and routing information, record, reassign and monitor bus assignments, Master-slave assignments (1–16), an 8-character alpha name display and >>>>



strip or DSP channel number. The bus numbers are fairly small, but each bus number is in a specific position in the display, so for most purposes, the numbers are viewed as a pattern that tells you all you need to know about the assignments. Each channel has a total of eight rotary controls in one group of four, and two groups of two, each group having an associated set of control keys. Normally these controls will have the functions specified when the desk is 'designed', but each rotary can control any function present in the logical strip by dialling it up.

Channels go direct to individual record buses unless Pan is selected. This changes the routing to the relevant block of record destinations depending on the global panning model.

The assignable panels allow complete sets of parameters to be viewed and adjusted at once. Up to 8 bands of EQ are displayed simultaneously. If there are more bands in the channel a second page is used. Two sets of parameters may be saved then compared using 'bank' keys. One 'short strip' fader is normally associated with the assignable panels.

Of the two motorised joysticks one follows the assign panels and the other may be 'held' on whatever you wish. The monitor and record control panels are a model of simplicity. That is not to say they are perfect but the development so far is highly encouraging. The record panel has paddle-type switches which seem to be *de rigueur* on any console with ambitions of selling to Hollywood. Each row has eight grouped paddles plus ALL, LINK and MASTER. The top row controls recording and the bottom PEC DIRECT OF console out and off tape. The switches can control 32 record tracks in groups of eight with a clear matrix display indicating what is going on. The monitor matrix display is similar with assignments to a maximum of eight speaker positions (L, LC, C, RC, R, LS, RS and SW) from the main (record), monitor and reassign buses and returns. At present, if a channel is feeding a record bus it cannot be separately assigned to a monitor.

In a multisection, multi-operator console the Monitor and Reassign buses are console wide. The record and aux buses are section wide except when final print mastering. The 32 main

bar-graph meters are also assignable. For the moment the meters are digital or analogue peak.

The automation is comprehensive and well thought out with all the usual functions and a couple of novelties. The master-slave relationships can be exploited to control say, an 8-wide premix from one fader and strip on the surface with the full eight strips available on another layer if further interference is required. These assignments are automated. Each function has its own (red) WRITE key.

**A** SNAP OFF function holds faders at zero using motor torque. They are still moveable, but less likely to be moved inadvertently. A forthcoming trick is Fader Shake, where the fader will vibrate, without affecting the audio, when the position in the previous mix pass is reached allowing easy judgement of when to release the fader. Cinetra will operate as a time-code or 9-pin slave, but also includes machine control if the application requires it.

The console I assessed for this article is the first Cinetra to be delivered. That said, with any console of this complexity there is a recursive ongoing design process between user and manufacturer. I think Stage Tec is to be congratulated for getting it so right at the first attempt. Cinetra uses a rather different architectural approach to any of the established contenders and the result is a new set of advantages and restrictions. In considering these it is important to remember what we are dealing with—one of the most demanding console applications in terms of scale and scope. On balance I feel the compromises are well handled and are less restrictive than the fixed processing at all times model.

Like much German equipment Cinetra is technically sophisticated and well built. It has some neat tricks not found elsewhere and, if Stage Tec can deliver all it is promising for the future, there is no technical reason why the console should not do well. However, it will need strong input and representation from outside mainland Europe coupled with an attractive price to overcome the barriers to newcomers in the highly competitive film console market. ■

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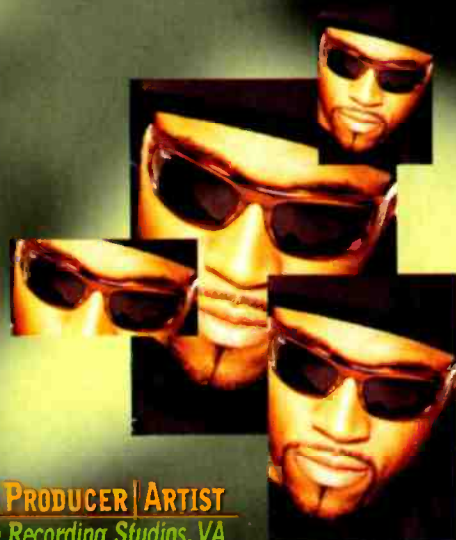
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TASCAM DA38



TASCAM DA88



TASCAM DA98



**T**HE AMSTERDAM AES Convention will be the setting for the first SSAIRAS—the *Studio Sound* Audio Industry Recognition Awards. Before these can be handed out in May, however, we need to gather the nominations from which the winners will be selected. And quickly. This is where you come in...

In short, anyone can nominate a product for a suitable award category and the resulting selection will be published in *Studio Sound* for postal voting (photocopies of this page are welcomed) and on the *Studio Sound* Web site which will permit interactive voting. To be eligible, a product should have released since the Munich AES Convention (held in March 1997) and obviously needs to conform to the description of a particular category. It should be noted that, in the case of outboard equipment, this described a function rather than a product description—hence a ‘voice channel’ may leg-

itimately be entered as a compressor if you feel it excels in this area. Not all the categories work this way, however, but all are explained in the table below for your guidance, and you are encouraged to make nominations in only those categories you feel justified. There is also a special category in which you are invited to nominate equipment, people, initiatives or anything else that falls outside the other 12 categories yet warrants acknowledgement.

The object is not to make a list of all the equipment launched in recent months, nor to identify the best equipment in each area but to identify those items that genuinely warrant recognition as being special in some way. The categories have been derived to encourage entries covering all aspects of professional audio but not all need necessarily to be filled—should any remain empty, it will be as valid a judgement on our industry as one in which there are plentiful nominations.

# Studio Sound audio industry recognition awards

## SSAIRA nominations

<b>1</b>	<b>Large scale console</b>	Analogue or digital, recording or film, has the definitive audio console been built?	
<b>2</b>	<b>Medium to small scale console</b>	The more affordable end of the console has seen plenty of action and innovation in both analogue and digital domains. Has the benchmark been set?	
<b>3</b>	<b>Outboard dynamics</b>	The first of the ‘by-function’ categories covers any outboard featuring dynamic processing	
<b>4</b>	<b>Outboard preamp</b>	A ‘by-function’ choice from outboard including microphone preamps	
<b>5</b>	<b>Outboard equaliser</b>	Graphic, shelf or parametric, and any colour you like as long as it functions best	
<b>6</b>	<b>Outboard Reverb</b>	The final ‘by function’ category addresses reverb processing	
<b>7</b>	<b>Combined outboard device</b>	Some units benefit from the combination of their processes or even their combined shortcomings rather than their excellence	
<b>8</b>	<b>Monitors</b>	Big or small, unbelievably impressive or unbelievably practical, the choice is yours	
<b>9</b>	<b>Microphones</b>	From unprecedently cheap to imitating yesterday’s classics, everyone claims to have deliver the definitive choice in mics	
<b>10</b>	<b>Convertors</b>	Made a hot topic by rising digital standards, today’s convertors will shape tomorrow’s recordings	
<b>11</b>	<b>Audio editor</b>	Ripe for judgement; the boom in audio editors has seen many welcome innovations made in this particularly demanding area	
<b>12</b>	<b>Audio recorder</b>	Your choice can be made anywhere from DAT to HR DASH back to analogue	
<b>13</b>	<b>Special category</b>	This is your opportunity to recognise anything or anyone that has benefited pro-audio. Think carefully and laterally	

Nominations can be made by photocopying or cutting out this page, filling it in and returning it to: SSAIRAs Nominations, Studio Sound, 8 Montague Close, London Bridge, London SE1 9UR UK. Fax: +44 171 401 8036. Alternatively, you can e-mail the category numbers and your nominations to [c273@cityscape.co.uk](mailto:c273@cityscape.co.uk)  
Any discussion may be conducted with Zenon Schoepe or Tim Goodyer on tel: +44 171 620 3636.

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Dave Foister - Studio Sound

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## Otari CD-R and MD

The CDR18 includes a sample-rate converter and a turntable-type disc-drive mechanism. It employs 1-bit A-D converters, XLR and phono inputs and phono outputs in addition to AES-EBU, co-axial and optical digital connectors and co-axial and optical digital outputs.

Features include a digital synchro record mode, automatic track numbering, a digital fader, copy bit selection, parallel remote-control interface, wireless remote and a rackmounting chassis.

The MR30 MD recorder has an automatic recording start function, automatic track numbering, cue point writing and editing (five per track) and basic editing functions to divide and combine tracks, and insert or delete through dedicated front-panel keys.

Two previous editing operations can be undone, a rotary dial can be used to select tracks, pitch control achieves  $\pm 9.9\%$  in 0.1 steps, and up to 20 tracks per disc can be selected for instant playback per disc. The programmable playback of 25 tracks remains in memory even if power is interrupted, while an end of track notification alerts the user and is adjustable between 5s and 35s. SCMS is selectable and an optional sample-rate converter can be installed. The unit has AES-EBU and SPDIF inputs together with XLR and phono connectors while output options include AES-EBU, SPDIF and co-axial. It is remote controllable via RS232C, RS422A and 9-pin or 25-pin.

A standard PC keyboard can be plugged into the front panel to control playback, recording, editing and instant playback, and to enter track names while recording. **Otari, US. Tel: +44 415 341 5900.**

## Korg 8-track

The D8 8-track hard-disk recorder has a 12-channel 4-bus digital mixer incorporated together with a 1.4Gb drive.

It records 16-bit uncompressed at 44.1kHz using 24-bit internal processing with simultaneous recording of two tracks and simultaneous playback of 8.



The mixer's two analogue inputs have balanced inputs with mic preamps. EQ on all channels is 2-band with an internal effects processor providing 65 preset effects of 48 effect types which can be edited and stored to 65 user memories.

Settings for faders, EQ, pan effect send and aux send can be stored to 20 scenes per song. Editing operations, such as record, copy and paste, are nondestructive and songs and phrases that are >>>>

Studio Sound January 1998

# CEDAR CRX

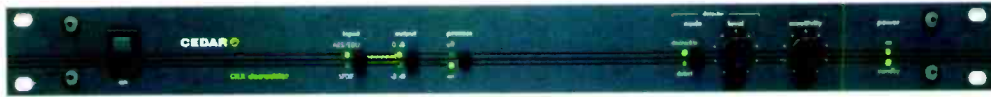
High-quality audio restoration is now within reach of modest studios and broadcasters. **Dave Foister** assesses CEDAR's Series X

**I**F THIS INDUSTRY gave out awards for single-mindedness CEDAR would have a trophy cabinet full of them. Fashions come and go, companies wax and wane, and everybody seems to want a finger in every available pie, but CEDAR never swerves from its purpose of restoration, valeting the flawed recordings of the world.

That is not to say that the CEDAR designers ever appear to rest on their laurels. The move from dedicated PC system to separate hardware boxes came some years ago, and following further refinement of those processors the next logical step was back to the computer. This produced CEDAR for Windows, giving integration with PC DAWs, and CEDAR for TDM, putting the processes firmly into the virtual domain.

click-free. Inputs and outputs are digital only, as has always been the case. Sample rates from 30Hz to 50kHz are supported along with word lengths up to 24 bits, and the front panel LED locks to show the presence of a valid signal.

Crackle removal is, in CEDAR terms, a quite separate process from the removal of clicks and ticks. Its aim is the elimination of smaller and more continuous problems such as LP surface noise, as distinct from scratches. Such is its power that it is also often able to deal with problems like thyristor buzz, mains hum and even certain types of distortion. The procedure for dealing with crackle on the CRX is effectively the same as on the CR-2, and uses the principle of splitting the signal into two parts, one containing the problem



The other area in which CEDAR is keenly aware of the potential for progress is price. Studios, broadcasters and post houses everywhere would love to have the equipment on tap, but only places whose area of work specifically demands it, or those with budgets others only dream of, are in a position to justify buying it. This may all be about to change, however, with the launch of Series X.

CEDAR processing divides into four separate functions: hiss removal, click removal, crackle removal and time correction, primarily associated with misaligned azimuth on analogue tape machines. All four of these are available as separate boxes in the Series 2 range, the familiar 2U-high blue-grey units with display screens in the middle. Now three of them are presented in the new form of Series X, reducing the size to 1U, simplifying the control layout and operational procedures, and in the process slashing the price to less than half that of the Series 2 equivalents. My first encounter was with the De-Crackler, christened with traditional CEDAR logic the CRX.

The look of the unit is a radical departure for CEDAR, with a sleek and uncluttered 1U-high black panel distinguished by three grooves running along its length. Several of the controls and indicators are shared by all three units: a power switch, that simply puts the unit on Standby; an input selector to choose between AES-EBU and SPDIF connections; a 3dB attenuator to allow for the risk that the processing may occasionally actually increase the level; and a process on-off switch. This last is not a true bypass, but is much more useful than that, as it retains the level setting and matches the slight delay inherent in the process. This means that switching it in and out is truly silent and

and the other not: the process then does its work on the affected portion which is then recombined with the other which has passed through untouched.

Defining where this split should be is the first of only two user operations necessary to make it work, and this is done by selecting the Detect mode and adjusting the LEVEL control until the unwanted effects have disappeared from the signal. At this point much of the wanted signal will have disappeared as well, leaving a curious bubbling warbling sound unique to CEDAR. The unit can then be switched back to Decrackle mode, and the extent to which the identified noises are removed is controlled by the SENSITIVITY knob. That's it. Job done.

These two simple adjustments are all it takes to tackle the aforementioned range of problems, and the CRX appears to handle it just as well as its forerunners. While it was with me it solved two problems, one being some small clicks caused by digital glitches and the other some mild distortion on occasional peaks on a flute CD that had come in

for my attention, and in both cases a few minutes' careful listening and adjustment sorted the problem out. If the scaled-down format has a drawback it's the lack of calibration and repeatability, which makes the trial-and-error approach a little more long-winded, but the end result was no different from any other version of the process.

We'll be looking at the other two boxes in a future issue, but the CRX certainly boxes well. Nothing appears to have been sacrificed in terms of quality, functionality or effectiveness, which means we can expect to see Series X bringing full-blown CEDAR processing within the reach of a vastly increased range of studios. ■

**Contact:**  
CEDAR Audio  
9 Clifton Court,  
Cambridge CB1 4BN UK  
Tel: +44 1223 414117

# tc electronic Finalizer Plus

Already an established and popular unit, tc's Finalizer has been updated. **George Shilling** warms to digital processing

**T**HE PLUS VERSION of tc electronic's Finalizer brings a number of hardware and software improvements to the original model. Units are presently being shipped in original Finalizer cartons, with the excellent original Finalizer manual and a 5-page addendum, although a completely new manual is promised shortly—early purchasers will be forwarded a copy provided the registration card is returned. Also, returning the cards activates a free 3-year warranty, instead of the usual 12 months.

Simultaneously, tc is making available an optional extra: the highly desirable Digital Master Fader, which is obtainable separately from the Finalizer Plus. This is a 100mm travel fader with a large metal cylindrical top, mounted in a metal case (approximately 185mm x 30mm x 20mm) with a rubberised base. It is quite heavy, and should not move around on your desktop. The fader connects via a flying lead with a jack plug on the end that goes into the back of the Finalizer Plus. Setup is straightforward—calibration must be performed by setting the fader to extremes, then enabling External Fader in the Utility menu. This fader operates output level in the digital domain after all dynamic processing. The fader itself is very light in operation—there is no damping. Resolution is fairly fine, but fast jerky movements are inevitably subject to a slight processing delay.

The Plus version Finalizer brings a number of hardware changes: new A-D and D-A converters feature 24-bit resolution. These claim a very short conversion delay, and the built-in asynchronous sample-rate converter accepts sampling rates down to 22kHz, although the highest rate remains 48kHz.

Optical connectors join the SPDIF and AES-EBU sockets on the back panel, with ADAT and Tos-link formats supported. Unlike the Finalizer, the Plus version allows you to simultaneously connect multiple digital devices and route them from the front panel. For example, with an ADAT connected you can choose any two independent tracks for processing from the front of the Plus, and send the output back to another pair of ADAT channels or any other digital format, or, of course, the analogue outputs.

Also added to the rear panel is a word-clock input, which is useful in complicated digital setups. It is a phono socket, but tc thoughtfully include a phono plug-BNC socket converter. You can use an external reference for A-D or D-A conversion and sample-rate conversion. The analogue inputs and outputs usefully feature digitally controlled scaling of the analogue

signal, thereby allowing you to make full use of available converter headroom. This is was sometimes a problem on the original unit, but now there is a wide range of adjustment for perfect matching.

The signal path has been changed with provision for one external digital or analogue stereo-insert, depending on your input choice. No separate insert sockets are provided: the redundant sockets of a particular setup are used. This is slightly limiting, of course, but a bonus compared to the original Finalizer.

In the software, the main page has changed only slightly to allow for two insert points instead of one, one of which can be turned into the aforementioned external insert loop. All input and output options are easily selected from the input and output blocks on the main page.

Another minor change is in the way Dither is applied: it is now only added to the digital outputs, and not on the D-A output. If the digital output is selected as and insert send, then dither is not applied and will only be added to main digital outputs.

The Dynamic Filter insert has been improved with an extended frequency range, different notch-curves, and an on-screen gain reduction meter. This is useful, but could have benefited from a slower-than real-time release characteristic to enable one to see short 'blips' of compression. The Stereo Adjust insert now includes an MS balance control, for fans of this technique.

The compressor has a new adjustment to enable you to counteract the automatic make-up gain which changes as you adjust threshold and ratio. You can now trim the gain settings for each of the three bands. You cannot, however, turn off the auto gain, which creeps up as you increase compression settings.

The Finalizer Plus is fully backwards-compatible with presets stored with the original Finalizer, and behaves intelligently in all cases where things have changed. For example,

your old De-Esser settings will be converted into the new-style Dynamic Filter. Memory cards saved on the old unit may be loaded, and if you want to write to an old card you can convert it for use only with the Plus.

All in all, these amount to useful additions to an already popular and unusual unit. It appears that tc has listened to users and added features that genuinely enhance the unit's flexibility. I remain a fan of analogue processing, but here is proof that digital is improving. There is nothing else quite like it on the market, and the Finalizer Plus is a sure sign that tc actually listens to its customers. ■

### Contact

**tc electronic**  
Grimhøjvej, PO box 1420  
DK-8220 Brabrand Denmark  
Tel: +45 86 262800  
Fax: +45 86 262928.

## NEW TECHNOLOGIES

recorded or edited are saved automatically and punch in-outs can be performed manually or automatically. Additionally, the device has 131 rhythm patterns.

Tracks can be scrubbed, there are three locates per song, and 100-mark point memories per song. Songs can be played back in a specified order for sequential playback. Synchronisation is via MIDI clock, MTC or MMC, and connectors are provided for SCSI port, SPDIF and phonos for analogue connection.

**Korg, UK. Tel: +44 1908 857100.**

## Weiss de-esser-comp

More information is now available on the Weiss DS1 de-esser-compressor. The unit features a low-pass, band-pass, high pass



switchable, linear phase, crossover filter with crossover frequencies between 300Hz and 20kHz. The device is fully MIDI controllable with 128 snapshots, uses 40-bit floating point processing, 24-bit AES-EBU I-O with switchable dithering, compressor input-output metering, and gain reduction metering. It offers variable soft knee, programme dependent release, oversampling side chain and gain multiplier, an auto gain makeup feature, compress band-only monitoring, and what the company describes as competitive pricing.

**Weiss, Switzerland. Tel: +41 1 940 2006.**

## A&H desk with valves

Allen & Heath is to launch the 8-bus GS3000, an in-line analogue desk aimed at commercial and project recording studios, with twin-fader, dual path inputs and two patchable valve preamps. The console is available in 24 and 32-input frame sizes, each with an extra two dual stereo inputs, for a total of 52 and 68 inputs to mix respectively. A number of stereo options are available, giving up to 16 dual stereo inputs.

All mic-line inputs have a 100mm A path fader and a 60mm B path fader above, with the former always used for monitoring. The 4-band 'British' EQ section has overlapping swept mid bands and Q pots, plus EQ in-out switching and routing via the A or B path. Each of the console's 6 auxes can be accessed from both paths.

MIDI mute automation with scenes and groups is included together with MMC. Other features include, solo-in-place, PFL, two studio playback feeds, control room and alternative speaker feeds, and an optional bar-graph meter-pod.

**Allen & Heath, UK. Tel: +44 1326 372070.**

## Sony miniDAT

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# 3

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# Joemeek VC5

After many variations on a theme, Joemeek has added an equaliser to its arsenal. **Zenon Schoepe** ponders good sound and bad plots

**F**OR PURE NERVE, few can challenge Joemeek product designer Ted Fletcher. Seemingly flying in the face of other current routes to audio nirvana, in which the pristine and the calculated are to be held in high regard, Fletcher has carved a successful niche for his ever-so-slightly oddball outboard range with an attitude that, for a change, really does reflect its marketing slogan.

The almost disrespectful 'if it sounds right, then it is right' has been borne out by the curious qualities but unmistakable class of the original Joemeek stereo compressor and has been followed by a string of like-minded offerings all roughly adhering to this code, even if it is only in the application of enhancing or compression circuitry.

Until recently the only real omission from the range was that of an equaliser but with the introduction of the VC5, cleverly nicknamed the Meequalizer, the company now also has all the constituent parts required for what I would consider to be the very interesting concept of a Joemeek-based console. Taking in the

those that are clinically precise and extremely useful for corrective measures, but are of limited value when used for creative purposes; those that are not clinical in approach or appeal but just sound dead good; the very few that can truly perform in both the aforementioned roles; and those that are plain dogs to use.

The VC5 definitely falls in to the second category. I remember Fletcher remarking to me with a laugh at the New York AES that he dared't publish a plot of what the filters in this unit do because, as he put it, 'they look so bloody awful'. Only in a compressor or an EQ could the fact that it plots dreadfully be of any passing interest, because in this domain the car is king. The more off the wall you go with EQ the harder it is to predict the influence of personal preference on its acceptance. Surgical steel EQ can be appraised easily in the light of those who are likely to have a requirement for it, but stuff like this falls right in to the 'love it or hate it' dilemma.

I love it, but I'm quite prepared to believe

quirky qualities of the existing range, the clear class of the mic preamps being offered, plus Fletcher's proven console track record we have the makings of a small sidecar-style bright green desk of some substance and character. Am I alone in thinking this would be a good idea?

The VC5 presents two channels of 3-band EQ with little in the way of frills or extras. The three bands are marked TREBLE, MID and BASS, and peculiarly run in that order from left to right rather than the more established reverse convention. The mid is the fancy band with a sweepable frequency pot covering 600Hz-3.5kHz and an associated GAIN pot. All bands are marked to offer a vague  $\pm 11$ dB, but real values probably run into the mid-teens, and each path is capped off with an overall input GAIN pot with  $\pm 12$ dB on offer. The last of these seems a strange inclusion on an EQ, but is actually quite a sensible one because it means you can match the input for drastic reduction or boost, and the VC5 can be quite drastic, or soften up a signal by driving it hard. Each channel has a BYPASS switch with LED indication plus signal present and overload LEDs, no stereo linking and no detents on any of the pots.

Build quality is of the now-accepted utilitarian, adequate and green style that always looks better in a rack than out. Rear panel connectors have balanced jack inputs, paralleled outputs, and an insert.

To my mind, EQs fall in to four categories:

that it may be a little too rudimentary for some.

This particular presentation of 3-band with its LF and HF shelves and swept mid is not the most powerful, but what there is you'll soon be using to the utmost as you get the full travel's worth out of each pot, and an initially unpredictable, but ultimately surprising degree of interaction between the bands.

The EQ is pretty filthy stuff, it has to be said. You can hear the graunch at work here. I'd equate VC5's responsiveness to the EQ on a good electric guitar head, and I don't mean that disrespectfully, simply because the frequencies chosen are so well tuned to causing immediate and apparent EQ effect. Above all else the VC5 has a sound and it's apparent as soon as you twiddle a knob. It's a sound that I would describe as being in the 'classic' old-world EQ style—fat, granular and full of signature. The box can be used on any signal

that you don't mind imposing this character on and with judicious use of the channel gain control you can push the signal hard to give a very pleasant softness. Great on vocals, excellent on drum groups (keep the bass control full on all the time), electric guitars and stereo programme in general (excellent for

warming up lacklustre DAT masters). Treble 'n' bass fiends will have a field day as the fixed bands epitomise what you're about.

A very satisfying little box that is probably one of the cheapest ways into 'classic' sounding character EQ. I encourage you to try it. ■



**Joemeek**  
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Quay House, Quay Road,  
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TQ12 2BV  
Tel: 01626 333948  
Fax: 01626 333157

## NEW TECHNOLOGIES

<<<<< allows for 3 1/2 hours of recording time using the supplied Ni-MH batteries. The device has selectable SCMS, a recording margin indicator, and uses the same mic amp as the SBM-1 Super Bit Mapping adaptor with 20-bit converter and optical and co-axial digital I-O.

It has three adjustable recording levels (automatic, mic limiter and manual) and two automatic gain system modes.  
**Sony, UK. Tel: +44 1256 355011.**

### Dalet 5

Many applications and features have been added to the Dalet Version 5 of the hard-disk audio system for radio.

Dalet News attempts to create a paperless central newsroom, and staff can create, review and modify their news stories using a single application from any networked workstation. NewsWalk transforms a portable computer into a mobile newsroom using Digigram's PCX Pocket Type II PC card. Reporters can record and edit audio, integrate audio into a text document and transfer it back to the newsroom by modem or ISDN.

Dalet Web Publisher enables radio stations to build and maintain a web site that incorporates audio, graphics and text. The site can be updated or modified by dragging and dropping audio, text or logs from the Dalet 5 databases into the web publisher window.

Database replication is a new feature of Dalet 5 and allows multisite exchange and management of audio. By dragging and dropping a file from one database window to another the audio is transferred to the local server. New database management tools take advantage of client-server technology which permits Dalet to install much larger networks.

Dalet's tradition is in providing an open architecture: Windows NT operating system, Sybase Client-server database and Digigram audio cards. ISDN, Internet and satellite technology connects stations within a group.

**Dalet, US. Tel: +1 212 226 2424.**

### Mini stagebox

Deltron has launched a low cost mini stagebox that will accept 40 universal XLR connectors front or rear mounted. Of simple mild steel construction it can be supplied as a plain box or prewired assembly painted matt black.

**Deltron UK. Tel: +44 181 965 4222.**

### 2-way crossover

Claimed to be the most cost effective 2-way stereo crossover available, the C180 from



Studiomaster is an 18dB/octave design with only rear-mounted output-level controls available to the user. Factory-fitted with a crossover point of 150Hz, the unit is supplied with four other plug in frequencies (80, 100, 200 and 250Hz) on SIMM >>>>>



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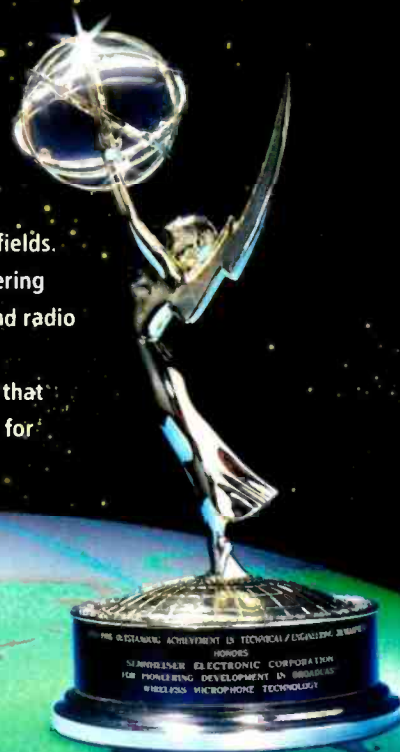
EM 3031 is a single 32-channel switchable receiver in a 1U rack mountable housing, while EM 3032 incorporates two complete 32-channel switchable receivers into the same 1U space.

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www.americanradiohistory.com

# Whirlwind Qbox and MD-1

Having a suitable problem solving box to hand can make your day. Two Whirlwind boxes make it for **Dave Foister**

**O**UR INDUSTRY is so full of shiny new toys that it's easy to overlook the more mundane bits of kit designed to find and solve the little problems to which audio is prone. The American Whirlwind operation, whose name will remain inextricably linked with guitar leads, also does a nice line in such toolbelt-type boxes, which make up in facilities what they lack in glamour.

One such is the Qbox mic-line tester, a convenient portable box for sending signals down a line or checking whether anything's coming back the other way. Since it only does one of these at a time it's not a cable tester as

such, but intended for use in installations and PA rigs where long runs need to be checked and identified with somebody on the other end to send or receive signals. Its small light-weight plastic body houses a single 9V battery and enough facilities to cope with a variety of jobs and applications.

In the first place, it has an internal speaker, and a headphone socket that overrides it, for monitoring the signal on a line. The input to this side of the circuitry is balanced, and has enough gain range to deal with both line and microphone level signals via a single VOLUME pot. As a bonus, a pair of LEDs shows the presence of DC voltages (phantom or intercom power) individually on Pins 2 and 3.

The speaker and cans can also be used to monitor the test signal when the Qbox is being used as a source. For this purpose it has a balanced XLR output and an unbalanced jack, and can send two types of signals at various levels for checking mic and line destinations. A built-in oscillator produces a not-very-pure sine wave at 440Hz, perhaps not to quartz accuracy but in the absence of anything else it could be used as a tuning reference (assuming the review sample isn't just a lucky one-off). Alternatively a small omni



## NEW TECHNOLOGIES

<<<<< type cards. Intended for biamped systems, a mono switch sums the two low outputs for adding sub bass feeds to an existing multiway system. The unit has signal present LEDs, balanced jack and XLR connectors, and separate ground lift switches on inputs and outputs.

**Studiomaster, UK. Tel: +44 1582 570370.**

### Bellari comp

Bellari has released a single channel valve compressor-limiter called the LA120 that has fully variable threshold and output level controls plus bypass and compression-limiting switches. Connectors are on standard jack and XLR, and the unit can be rackmounted optionally. Gain reduction is displayed on an analogue VU meter.

All gain circuitry is valve-based, the only solid-state device is the output buffer for the balanced signal, and gain reduction is handled by optical components.

**Bellari US. Tel: +1 801 263 9053.**

### SCSI decoder

Vela Research's 4-channel MPEG 2 SCSI decoder is designed for the cable and broadcast industry and features a SCSI 2 fast-wide (optional ultraSCSI) interface with NTSC or PAL video inputs. Each video channel is independently configured with separate genlock inputs to allow for the locking of video outputs to exter- >>>>>

One of these is *obviously* the key to a door..



...the other is the key to recording success.



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Spitalstrasse 20  
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Germany  
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Fax: +(721) 49 5750  
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The new CCM-L series is the latest enhancement of the outstanding CCM series. Now fitted with a purpose designed, balanced, tri-axial Lemo connector (or "plug" as we say in the trade); you can pick and choose the cable most suited to the job in hand. Fit a rigid cable for suspension and fixed installation work or an ultra compliant cable for the ultimate lightweight boom microphone. Whether you are recording in Antarctica or The Albert Hall, you can be assured of the results you need. Sonic excellence just crammed into a tiny space - good job they don't need any room for improvement.

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e-mail: project.audio@zetnet.co.uk

## NEW TECHNOLOGIES

nal video sources. Each video channel operates independently to allow playback of different stream types, video resolutions, compression types and start-stop times.

The device decodes MPEG 1 and MPEG 2 system, program, transport and video only streams at resolutions of MPEG 1 SIF, MPEG 2 Half D-1, MPEG 2 D-2 (FOE) and MPEG 2 D-1 (AFF). It also has stereo audio outputs with the option of left audio or right audio only on both outputs plus options for 4-channel audio.  
**Vela, US. Tel: +1 813 572 1230.**

### Mixed Rolls

Rolls Corporation has a portable 4-channel stereo mic mixer called the MX442 field mixer. Four balanced XLR inputs have phantom power, trim controls, 20dB pad and low-cut switch. Each input has trim and volume controls and a pan. Large level meters may be switched to monitor the left and right channel outputs mono and stereo, monitor signal or battery condition.

The field mixer has two oscillators and an internally switchable limiter with adjustable threshold. Powered by two 9V alkaline batteries the mixer is housed in a tough but lightweight aluminium chassis.  
**Rolls Corporation US.  
 Tel: +1 801 263 9053.**

### Monitor Scope

The Monitor Scope 601 can analyse NTSC and PAL serial digital 601, AES-EBU and all analogue signals with data displays, waveforms, vectors, coloured bar graphs and peak level indicators displayed on a built-in colour LCD. The digitised in-picture video outputs may also be transmitted and seen on any monitor.

It comes with an RS232 port for downloading analysed data and traces >>>>

microphone capsule behind a hole in the control panel can be used as a sound source, and either of these can be delivered to the outputs at nominal levels of +4dBm, -20dBm or -50dBm. Source and level selection are on a pair of toggle switches, and if the source is set to OFF then both the oscillator circuit and the mic amp are disconnected from the battery. There is, of course, a risk of the monitor and generator functions clashing, and in this context it's important to set the output LEVEL switch to +4dBm when checking incoming signals as this presents the full 40k input impedance. If the switch is in either of the other positions it presents enough of a load to drop phantom power too low to light the LEDs, whereas set correctly the impedance is pretty much high enough for the box to bridge a line and pass a signal through without affecting it. This is possible because the two XLRs are wired in parallel.

The combination of microphone and monitor circuit means that two Qboxes can be used as an intercom over a single standard XLR line, helped by the fact that the box is light enough to be carried around on a belt hung from its built-in clip.

The other box, the MD-1 Mic to Line Driver, is also intended to be hung on a belt, but I think if I tried to carry it about like that all day I'd end up walking strangely. With its steel case and two 9V batteries it weighs over two pounds, but it's still perfectly portable and its sturdy construction and general usefulness more than justify the weight.

Like the Qbox, there's more to the MD-1 than meets the eye. Its primary function is as a simple microphone preamp with an output stage capable of driving long lines. Its 18V power supply can provide phantom for those condenser micro-

phones that don't need the full +8V, and also powers a substantial onboard headphone amplifier for monitoring its various functions. The headphone amp has a second input for balanced line level signals on a TRS jack, intended for use as a talkback or foldback line, and besides the VOLUME pot there is a BALANCE control for mixing this feed with the output of the line driver.

The main input is on an XLR on the bottom panel, protected by steel bumper rails. It can handle microphone or line level signals as selected by a pushbutton, and has an adjacent output XLR that can either carry the main driver output or be used to loop the original signal through. In this mode it passes phantom from console to microphone and so can be used to check signals on cans anywhere there's an XLR join.

Both of these boxes are the kind of tools you can go on thinking of new uses for, and which keep reminding you of times you could really have done with having one of them around. They don't have very much sex appeal, but are good examples of the kind of flexible friends that can save untold time and trouble over the years. ■

**Whirlwind**  
 99 Ling Road, Rochester,  
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## GCX2 Dual Compressor / Gate



**"..the GCX2 offers extraordinary value for money and is capable of producing fine results.."**  
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**"..the accuracy of the controls is immediately apparent..it's nice to know that LA Audio have produced a piece of equipment where the quoted output levels are accurate and can be relied upon."**  
**Audio Media magazine**

**"The GCX2 is superb for all standard compressor functions like fattening sounds, signal levelling and de-essing, but the auto setting is what makes this unit so easy to use and understand quickly. ...All in all the GCX2 is an indispensable piece of kit.."**  
**Music Mart magazine**



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**MILLENNIUM**  
 SERIES

# SA&V Octavia 824

Bringing additional functionality to its Octavia workstation has given SA&V a viable integrated post system. **Rob James** reports

**L**AST YEAR was a busy one for Studio Audio & Video; its first new arrival, Octavia (now dubbed '808') appeared in production form as previously reviewed in these pages. It was swiftly joined by PORTIA which adds integrated nonlinear pictures to Octavia and SADiE's running the other new arrival, v3 SADiE software. Not content with these novelties, SA&V has introduced another version of Octavia, 824, which has been developed in response to requests from users (and potential users) for more outputs and will enable Octavia to be integrated more effectively with users' existing mixing consoles.

I don't propose to give blow-by-blow account of all the 824's features and functions since it is substantially the same machine as the existing Octavia. Instead we will concentrate on what is new and the likely applications.

The most obvious change is simply the provision of 24 outputs instead of the previous 8. This results in the ranks of XLRs on the breakout box increasing to 24 analogue outs and 12 AES-EBU digital outs. SA&V believes the machine will most probably be used with an external console so the moving fader panel is not part of the standard package. The other changes are the arrival of Sony P-2 protocol remote machine control and MS decoding, which was slated for v3.1 software but has arrived early.

The extra outputs, new machine control options and MS decoding give the clue to the primary market for 824: sound for picture. Integration with existing kit is facilitated by the various machine control options. 824 can be time-code master or slave, 9-pin master or slave. In the latter case, a separate time-code connection is not required as Octavia picks this up from the serial connection.

A neat machine control window—familiar to operators of Betacam machines—is the tangible evidence machine control, along with associated setup menus.

MS decoding is a building block for the internal mixer and includes width control and a useful function known to dubbing mixers as S&M—incorrectly assigned tracks resulting in the MS signals being reversed can easily be dealt with.

Octavia 824 will be most at home in a dubbing theatre replaying material tracklaid on SADiE 3 systems or other Octavias; consequently SA&V now has the complete set of building blocks for complex postproduction processes. If a facility deals with material shot on film and edited nonlinear, rushes can be synchronised on a SADiE and the resultant audio retained on disk or archived to a suitable medium. When the picture cut is completed the sync

rushes can be conformed on a SADiE or Octavia and tracklaid completed on one or more systems. The resultant tracklay, which may be on several disks, can then be physically moved to the dubbing theatre Octavia 824 for mixdown.

The final mix can be rerecorded into the machine, but this will require modification of existing techniques since recording is non-destructive.

While there is currently a great deal of interest and hype surrounding the subject of digital dubbers, Octavia is not such a machine. Digital dubbers are essentially simple replay and/or destructive record devices with film specific features such as track slipping. However ingenious manufacturers are, at simulating and improving on magnetic film machines this particular application of the technology

**Company**  
**Studio Audio & Video**  
 The Old School,  
 Stretham, Cambridge  
 CB6 3LD, UK  
**Tel:** +44 1353 648885.  
**Fax:** +44 1353 648867.

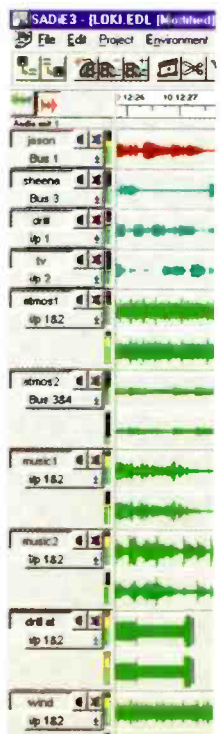
may well be a transitory phase as different mixing techniques develop. SA&V has elected to stay with non destructive recording and a full feature workstation in the mixing environment. This approach allows mixing decisions to be made non destructively at the most appropriate

stage in the process—if original recordings require 'cleaning up', this time consuming process can be accomplished in a lower cost environment than a full dubbing theatre. The arguments for leaving this work to the mixing stage are to some extent territorial, but this need not be a barrier if operators are encouraged to discover the benefits.

The consistent software platform of SADiE and Octavia means decisions taken on one machine in tracklaying or premixing can be modified or restored by a different machine at the mix, keeping options open until the last possible moment. By employing this approach mixing can become what it should be, a highly creative balancing process not a technical exercise in getting the nuts and bolts right.

As noted previously (see Studio Sound, July 1997), the complete mix could be accomplished within the machine but for situations where this is inappropriate, when a dedicated console with a rack full of outboard is required, 824 offers the option of keeping the material in the same format as it is tracklaid, with full editing, at the mixing stage.

Studio Audio & Video has consolidated its range with the 824. Where does it go from here? The obvious next step is networking and, predictably, the hoffs are 'working on it'. Meanwhile, there now exist, the components to create a complete, cost-effective, rushes to final mix solution. ■



## NEW TECHNOLOGIES

<<<<< directly to a computer or printer via a modem and incorporates a new proprietary 10-bit design. Other features include 512 x 512 display resolution; full SDI-EDH analyser; active picture EDH; pixel amplitude; SAV and EAV timings plus embedded filed group study; error time-date stamp; full field line select; vertical-horizontal measurement cursors with precise amplitude and period read-outs; overlay; mix traces with picture-black; 999 function mode memory; and internal colour bar test signals.

**Hamlet UK. Tel: +44 1494 793763.**

### Paris update

Ensoniq claims that it is now shipping its Paris DAW for Wintel PCs or PowerMacs. Core of the system is an Ensoniq EDS1000



PCI card, a cross-platform CD-ROM with MacOS and Windows 95 compatible software and a 16-channel Control Surface It is available in three bundled versions with different I-O options determining the particular bundle.

**Ensoniq, US. Tel: +44 610 647 3930.**

### SuperMini and monitor

Martech's SuperMiniconsole is targeted at Flying Faders users and adds 32 channels with automated faders, EQ, aux sends, 8 buses, panning, direct outs, inserts, solo, mute and dual inputs. As an option, the events control facilities of Flying Faders may be used to automate the input select, EQ and insert functions.

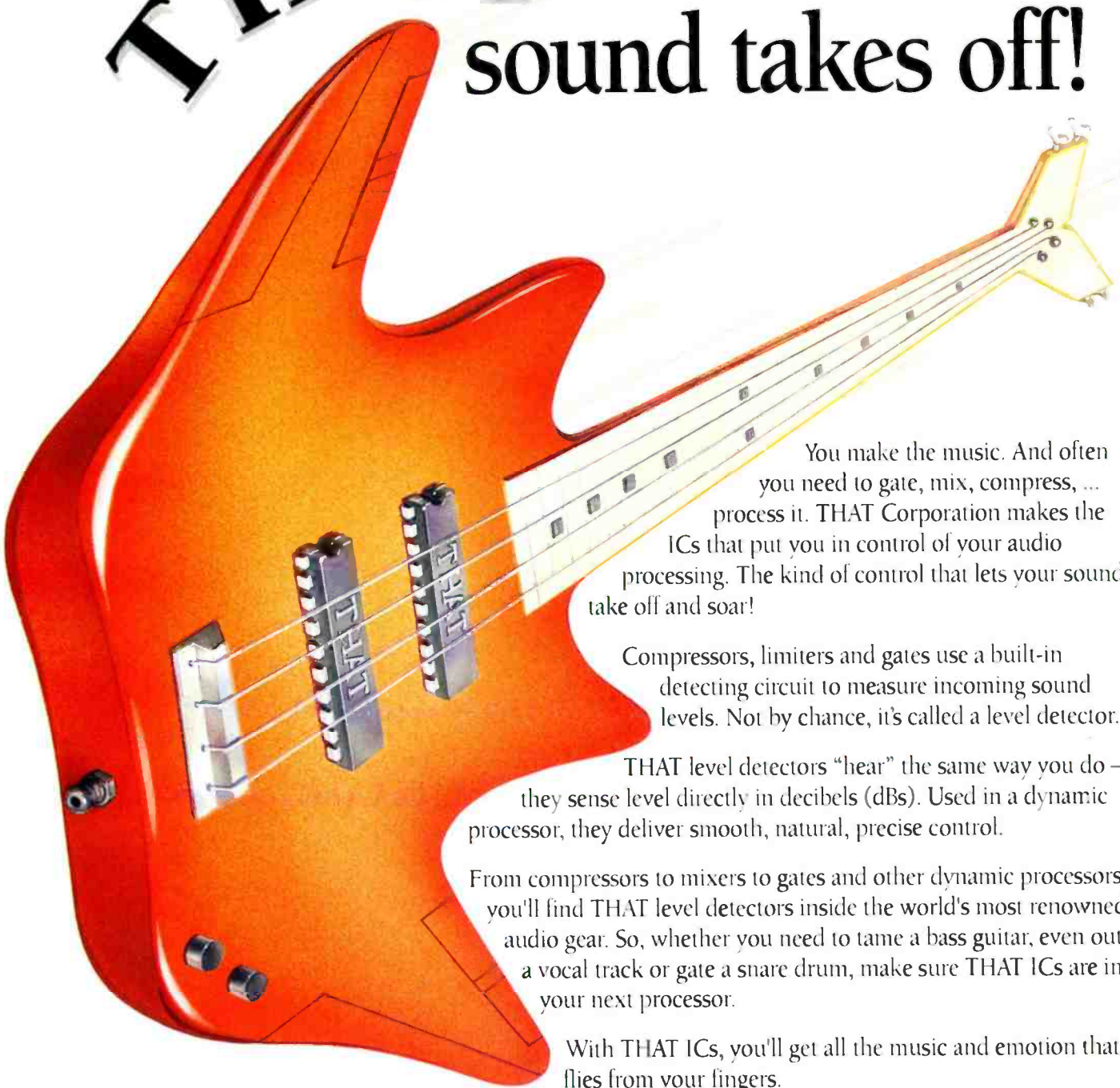
The news coincides with the release of the Martech Recorder Monitor System a multi-input monitor matrix that provides programmable headphones, loudspeaker and VU meter monitoring of recorder inputs, sync outputs and repro outputs of multiple 8-channel audio sources. The listening paths provide LCR placement of each track, separate volume and mute controls for headphones and speaker, and single track solo. The metering path, consisting of 8 meter buses with auxiliary balanced output drivers on each bus, permits metering of one machine at a time or the summed outputs of several machine's stems.

**Martinsound US. Tel: +1 626 281 3555.**

### 4-channel DI

The Radial JD4 is a 4-channel rackmounted direct box that uses Jensen audio transformers and Mogami cable, and >>>>

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# Tascam DA-302

Beyond its consumer origins, the DAT format is adopting various useful forms. **Jim Betteridge** investigates Tascam's double DAT

**T**HE TASCAM DA302 is a new double-deck DAT machine from Tascam—two DAT transports (from Tascam's own DA-P1 portable) tucked into a single 3U-high rack-mount case costing about the same as two standard Tascam DA-20 DAT machines.

So why not just buy to DA-20s? The advantages are numerous: to begin with, the 302 is very compact and offers various continuous and multimachine play-record modes. It will copy digitally between decks at double speed (4x for 32kHz 'long play' recordings) and,

These small concerns are greatly outweighed by the machine's positive points which include various record modes. Looking at copying first: if you load two DATs, select normal or high dubbing speed and push the DUBBING key, both tapes will automatically wind to the top and a clone of the tape in Deck 1 will be created in Deck 2. Very simple. Alternatively, you can start copying from part-way into each tape by selecting the Append mode and pressing the DUBBING key; or thirdly you can key-in a list of the tracks on the master tape in any order required, select PGM Dubbing mode and press the DUBBING key. The record tape in Deck 2 then rewinds to the top and copying commences according to your list. All very elegant.

Other record modes include Dual Record where a source is recorded on to both decks simultaneously; Continuous Record where your

source is recorded on to Deck 1 until an ABS time set by you (presumably near the end of the tape), at which point the second deck starts recording. The first tape automatically stops and rewinds three minutes later (or at the end of the tape if reached first). If you have more than one machine, the Deck 1 on the second machine can be set to start recording near the end of first machine's second tape, and so on across as many machines as you like.

There are a number of similar playback options including Continuous Playback—as per Continuous Record; Skip Playback where the tape skips to the next track when a Skip ID is recognised; Single Playback where the deck enters the pause mode on encountering a new Start ID; Repeat Playback where either one track or the entire tape can be played back in cycle until manually stopped; Program Playback where it plays back tracks in the order you specify. If you're into duplication, any number of DA-302s can be slaved together sharing the same digital feed and all responding to a single set of transport controls. A compact, full-function, wired remote is supplied as standard.

Able to function largely as two independent machines while offering high-speed copies (including time code) plus a variety of clever record and playback functions, the DA-302 offers a compact and ergonomic answer to the day-to-day needs of most facilities. Just who wouldn't fancy one in their rack? ■



unlike a standard DAT machine, the DA-302 will copy time code—it will not read it or display it in any way, but it will copy it. This is of tremendous value to anyone mastering to TC DAT where the obvious need for a safety copy is often ignored because of the need to tie up two expensive TC DAT machines. You have to wonder why no one came up with this before. It's surely what so many facilities need.

There are a few limitations: although each deck has a completely independent digital input and output, plus independent analogue outputs, there is only one analogue input. This can be used to feed either Deck 1, when using the decks to record two separate sources, or to feed both decks in Dual or Continuous record modes. This is not likely to cause too many headaches.

As standard, the analogue connections are unbalanced at -10dB but for the price of a box of (good quality) DAT tapes you can purchase a Tascam balancing box that replaces the rear panel blanking plate on the standard model to bring things up to professional +4dB spec. Another niggle is that the digital ins and outs are SPDIF rather than the professional, balanced +4dB AES-EBU standard. Again, a lot of the time this doesn't matter, but if you're looking at longer cable runs you're likely to lose signal and it's just a nuisance having an unbalanced device in the middle of a balanced system. There's no specific Tascam answer to this, but there are digital balancing boxes on the market if required. Presumably it would be something of a squash fitting all those XLRs on the rear panel and would add considerably to the cost.

**UK: Tascam**  
5 Marlin House, The  
Croxley Centre, Watford,  
Herts WD1 8YA  
**Tel: +44 1923 819630.**  
**US Tascam**  
**Tel: +1 213 726 0303**  
**Fax: +1 213 727 7635**

## NEW TECHNOLOGIES

«««« was designed with input from the live and recording studio communities. It uses the circuitry from Cabletek's JD1 DI which is claimed to be flat to 80kHz, has a phase response that is said to be 'spot on' and is said to be virtually impossible to overload.

Entirely passive, input and through connectors have been paired on the front and back of the unit and supersonic filters on each channel reduce the noise from keyboards and computers. A phase reverse switch is included along with a STEREO SUM switch that takes a stereo output from a keyboard and sums it to mono plus a ground lift and 15dB pad.

The Radial Convertible is a 50-channel audio snake that is set up in metric rows of ten. The last ten channels are paralleled with male output connectors allowing the snake to be used in a 40 x 10 or 24 x 8 configuration. The device is also equipped with a Ground Test Circuit that self tests the 50 channels for abnormal ground hum.

**Cabletek Canada.**  
**Tel: +1 604 9421001.**

## Valentino library

Valentino Production Music Library has released 12 individual and different Production Libraries each based on subject matter and style and called the Evergreen Collec-



tion. Distinct from the 90 CD Valentino production music library, the new libraries are ten-CD sets with styles and subject headings. Subjects include drama, comedy, cartoon, historic, dance, foreign, Americana, documentary, electronic, instrumental solo, industrial, and mystery.

Both libraries are now downloadable via bit stream technology over the internet from the company's web site.

**Valentino, US. Tel: +1 914 347 7878.**

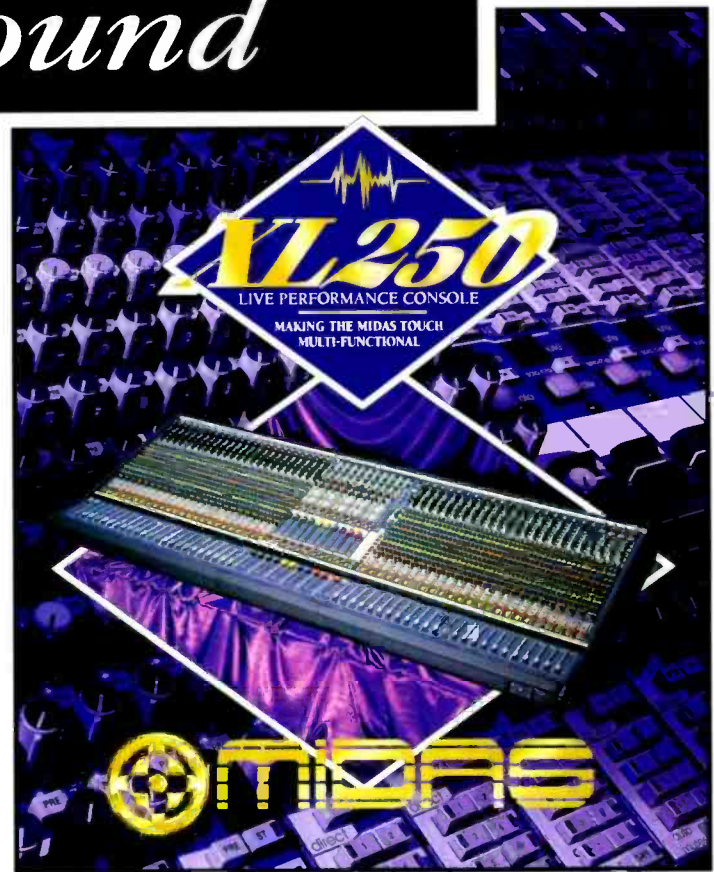
## Meyer powered

Based on its original UPA speakers, Meyer is introducing the self-powered Ultra-Series with the first products the UPA-1P and UPA-2P speakers, the USW-1P subwoofer and UM-1P stage monitor intended for small PAs in clubs, studios, churches and theatres.

Despite the inclusion of an amplifier and control electronics within the enclosure, the UPA-1P and UPA-2P are compact and lightweight and the same size, but only 10lbs heavier than the non-powered versions. The speakers have 12-inch low >>>>



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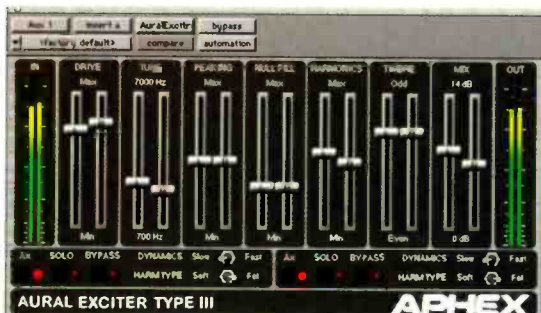
# Aphex Aural Exciter TDM Plug-in

The scope of TDM utilities continues to expand with this latest offering from Aphex. **Dave Foister** plugs in some excitement

ONE OF THE PERENNIAL JOYS of the TDM world is the sight of dyed-in-the-wool analogue companies establishing their places in the virtual studio. It was only to be expected that digital specialists would be the first to adapt to the format, but it was a sign that TDM had arrived when a click on a button could produce an image of a familiar analogue processor with all the functionality of the original coupled with its characteristic sound.

So we've seen familiar EQ and familiar dynamics: what we haven't seen until now is a process whose innate analogueness seems perhaps, even more resistant to digitisation than these—Aphex Aural Excitement. After over 20 years at the top of the enhancement tree, Aphex has put its top-of-the-line Type III excitement on a diskette in order to bring that certain something to the virtual mixing environment. The plug-in is clearly modelled closely on the 250 hardware unit, but stops short of complete on-screen emulation of the original.

Many plug-ins derived from familiar hardware processors take great pains to look just like the original, retaining their distinctive



identities. Despite its obvious merits, this approach generally entails the awkwardness of linear mouse movements controlling rotary on-screen knobs, and Aphex has decided to find a half-way stage where the look clearly incorporates the Aphex house style (rather than the anonymous generic plug-in grey), but with substantial sliders to control the various parameters.

These parameters will need no introduction to experienced Aphex users, but for the rest a word of explanation is in order. Aphex Aural Excitement works by generating musically-related harmonics and adding them to the original signal, at the same time applying frequency dependent phase shift. This only occurs above a user-tuneable frequency, and the amount and nature of the added harmonics is also adjustable. Controls are therefore provided for Tune, amount of Harmonics, the Timbre of the harmonics (variable between softer Even and harder Odd) and the Mix of the result with the original signal. As expected, these parameters interact considerably, and the whole thing is also dependent

on the level and nature of the input signal. The input level is adjustable and the resulting Drive to the processor is shown on a colourful bar meter. All of this makes it possible to achieve a wide variety of results, from very subtle filling out of the spectrum through dramatic increased presence to over-the-top grunge.

Two other sliders relate to the separation of the side-chain signal from the main path. The separation is carried out by a high-pass filter, and a PEAKING control adds additional gain in the region of the chosen cut-off frequency. This makes it possible to accentuate a particular area, but the trade-off is an increase in the amount the process nulls the frequencies just below this peak. Since there is a quite deliberate delay inherent in the harmonics-generating side-chain, a certain amount of cancellation takes place around the cut-off frequency when the harmonics are mixed with the original. This is the reason for the final control, Null Fill, which smoothes out this effect if required, reducing the perceived extra emphasis to the high frequencies.

A panel at the bottom contains a few switches, some as black push buttons with indicators and others as toggle switches. Besides the obvious Aphex in-out (obscurely labelled AX) and Bypass, these provide for Soloing the side-chain alone for detailed monitoring of the setup, and the addition of Spectral Phase Refraction, or SPIR. This quite separate process, which can be used with or without the main Aphex effect, adjusts the phase of low frequencies below 150Hz so as to make them lead the rest of the spectrum. The effect is subtle and varies considerably in its impact depending on the material: even Aphex concedes that in many cases it will make no perceptible difference, but at its best it can increase the clarity and apparent level of the bass end without actually performing any tonal adjustments at all.

Toggle switches are provided for increasing the Drive level by 12dB to compensate for low-level sources, allowing the harmonics generator to be driven properly, and selecting two Density settings for the harmonics algorithm. High models the Type III Exciter while Norm models the Type C2, a different hardware unit with a softer, less dynamic character. The whole

plug-in can be used in mono or stereo, and for stereo use a link switch gangs the two sets of controls.

The result is a comprehensive and easy-to-follow simulation of a hardware Aphex Aural Exciter, and the most important thing is that it actually sounds like the original. Achieving the distinctive range of enhancement effects, from the most delicate to the distorted, is as straightforward as it is on the 'real thing' and brings the original (and still the best) enhancement process to the TDM environment. ■

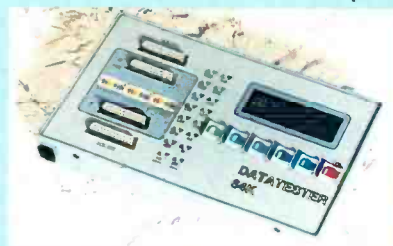
**Aphex Systems**  
11068 Randall Street, Sun Valley, CA 91352, US.  
Tel: +1 818 767 2929  
Fax: +1 818 767 2641

## NEW TECHNOLOGIES

<<<<< frequency cone drivers and a 3-inch diaphragm high-frequency compression driver, and both offer a claimed maximum SPL of 132.5dB. The coverage pattern of the UPA-1A is 100 degrees x 40° vertical that of the UPA-2P is 45° x 45°. The speakers have two channels of bi-amplification and an electronic crossover/processor card. All powered Ultra Series speakers employ limiting technology that predicts power dissipation and include Intelligent AC, a power supply that protects the amplifier and drivers by auto-selecting voltage and minimising in-rush current, filtering EMI and performing power surge protection.  
**Meyer US. Tel: +1 510 486 1166.**

### Datatester

The Datatester 64K portable data communications test set has a set of error-rate facilities together with a datascopes function. It includes a full V.24 breakout and patch



area together with optional X.21, RS422 or V.35 interface adaptors.

The device is battery-powered and rugged in construction.

**Datalines, UK. Tel: +44 1908 370011.**

### DD8 exchange

Software revision v1.50 for Akai's DD8 dubber allows direct playback of Sound Designer II takes from Mac-formatted Pro Tools disks. The process requires an OMF Composition to be created containing only the edit information from the Pro Tools session and the DD8 relates this directly to the audio takes in the Pro Tools native file format allowing the OMF Composition to be played back instantly.

Direct file exchange with other manufacturers is planned and DD1500 users will receive the same capability with their system's next software release.

**Akai, UK. Tel: +44 181 897 6388.**

### Global ISDN connectivity

Grand Central Pro file transfer software supports Windows and Mac file formats and sends and receives data on up to four B channels for high speed communication at 256kbits/s.

The software supports all common protocols including Teledisquette, Twist, Z-Modem, FTP, Leonardo Pro, 4-Sight Rapido, ID-Trans and A Copy and EuroFile Transfer ETS 300 075.

**Hermstedt, UK. Tel: +44 171 242 4060.**

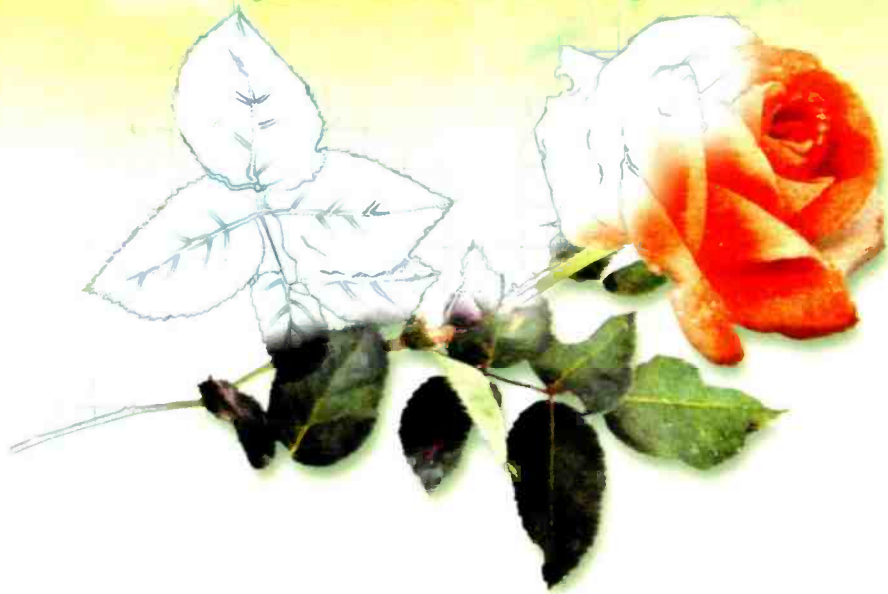
### Nagra C-PP

The Nagra C-PP digital network audio transceiver-recorder-editor incorporates many performance features of the >>>>



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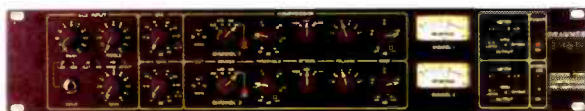


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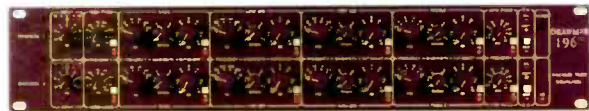


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# Focusrite d3

Focusrite's plug-in compressor-limiter shares looks and functionality with its hardware sister. **Dave Foister** investigates its performance

**T**HE TRANSITION FROM analogue to digital has rarely been accomplished more stylishly. Long acknowledged as representing the best that the analogue signal path has to offer, Focusrite has quickly established its credentials in the digital domain, both with its own digital hardware and with the TDM plug-in version of its classic Red equaliser, the d2. Now the position is to be consolidated with the addition of the d3 comp-limiter plug-in.

The d3 is also clearly intended to emulate its Red range hardware equivalent. The attention-grabbing front panels of the successful outboards are so distinctive that it would be folly not to replicate them, and that is what has unashamedly been done. Patch the d3 plug-in into a Pro Tools channel and up pops the outrageous contoured red panel complete with custom aluminium knobs and all the right legends, buttons and indicators. All that's missing is the trademark round vu meter, replaced here with LED bar-graphs.

d3 provides a combination of compressor and limiter in the same plug-in, and optimal use of available DSP is made by means of two options when launching it. One gives an either-or configuration, where only one of the components can be used at a time; a single DSP on a NuBus DSP Farm will run up to three of these, the PCI v6. The other offers both simultaneously, but only one of these can run on a NuBus chip, three on a PCI version. Running d3 in stereo ups the requirements accordingly.

Simplicity in layout and operation have always been hallmarks of the Focusrite Red range, and this too is carried over to the d3. The bare minimum of controls is provided, yet still there is a wide range of compression effects available from it. All the controls have numeric read-outs displayed beneath them, and these can have new values typed into them directly; alternatively the knobs can be 'turned' using the mouse, and in an attempt to overcome the potential awkwardness of this arrangement both vertical and horizontal movement will produce the desired effect.

Curiously, there is an input level control, which while important in the analogue environment would seem to me to be superfluous, merely playing into the hands of those who don't manage their digital headroom properly. The corresponding output level control is quite in order, however, providing gain makeup after the compression has done its business.

The compressor has the basic four controls for THRESHOLD, RATIO, ATTACK and RELEASE, and

that's it: no variable knee or any other frills. This has never reduced the appeal of Focusrite hardware, and neither does it detract from the d3. Where some compressors have automatic functions for both time constants, Focusrite generally only offer the facility on the Release, and on the d3 this remains the case, with a pushbutton to make the release time programme dependent. Attack is manual at all times, with a good long maximum of 150ms.

The limiter is simpler still, with just a

Threshold adjustment.

It takes a while to get used to the fact that the reference on these controls is digital full scale, not one of the familiar analogue reference levels; it's easy to take this on board with levels in general, but the idea that a compressor with its threshold set at 0dB is actually doing nothing is not easy to assimilate.

Both sections have individual BYPASS switches, greying out the associated graphic; if the plug-in has been installed as a simple either-or process this must be control-clicked to disable it completely before the other section can be used. Stereo installation provides a true stereo processor with shared controls.

Two meters are provided, showing output level and gain reduction; a single overall gain reduction meter is used in stereo, although the outputs are shown separately.

To complete the functionality of a full-blown hardware compressor, side chain access is provided. The input to the side-chain is selected on a drop-down menu and can be any input or bus within the Pro Tools mixer. Assigning control to this external input is achieved by means of a pushbutton, and below it is a button for monitoring the control signal so as to allow, say, its frequency response to be suitably tailored for de-essing. d3 can use Pro Tools' automation facilities to control any or all of its parameters in real time, and can also build a library of recallable settings.

And yes, it has to be said that the end result sounds like an analogue compressor, smooth and musical, hard and brutal, or punchy and present as the situation demands. We should be used to it by now, but somehow it still comes as a surprise when digital processing can do such a traditionally analogue job as effectively as this. Like so many of the more grown-up plug-ins, this is not a pale imitation of the real thing, but a highly desirable compressor in its own right, in or out of the TDM environment, and stands to enhance the credibility of the Digi screen as much as its metal counterpart does a 19-inch rack. ■



**UK: Focusrite Audio Engineering**  
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## NEW TECHNOLOGIES

AREC-C portable but in a lower priced studio unit.

It is designed around PC and Flash memory technology with a single 64Mb PC card providing more than two hours continuous mono recording. The system has no internal moving parts, and is said to be virtually maintenance free. Nondestructive editing is built in, and the unit's ISDN codec provides digital transmission while a standard 2-way analogue telephone connection is also provided. The C-PP can be programmed to receive and record files on the PC card or playback a preselected file every time a call is received.

**Nagra, US. Tel: +1 615 726 5191.**

## CP Cases

CP Cases has introduced Titan and AluLite ranges. The former represents an affordable and lightweight range of cases and containers that are moulded from polyethylene with 15% thicker corners for protection. They can be interlocked and fork lifted and have moulded tongue and groove with rubber gaskets to ensure watertight and vapourproof sealing.

AluLite cases are designed specifically for the audio-visual, film and video indus-



tries. The new design has radius edges and corners on all sides for easier handling as there are no sharp corners. The benefits include enhanced strength without weight gain despite the use of much harder and durable aircraft-grade aluminium.

**CP Cases, UK. Tel: +44 181 568 1881.**

## Beyer Sport

Beyerdynamic has released a mic in response to German broadcasting companies requests for a close talking interview mic for motor racing track-side reporting.

The M59 Sport dynamic has a stiffened diaphragm to increase intelligibility in noisy surroundings and a shock-mount capsule to eliminate handling noise.

The MC836 and MC837 shotgun mics have switchable roll-off filters. The MC836 has a lobe-cardioid polar pattern is 248mm long and weighs 116g. The lobe pattern of the longer MC837 is even more directional weighs 218g with both requiring phantom power from 11-52V.

**Beyerdynamic, UK.**  
 Tel: +44 1444 258258.



# Soho

## Digital Mixing Console



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- Multi-channel FX Rack (Reverb, Delay, Chorus, Flanging, 6/12 Band EQ, Mastering Compressor)
- 19 inch Pod – a rack unit option to house DAW controllers or outboard FX devices

Soho is the latest addition to Amek's range of fully specified digital mixing consoles. Developed specifically for audio post production applications, Soho is designed to be integrated with any existing or favoured Digital Audio Workstation. The sleek and ergonomic design and highly impressive specification makes it ideal for companies who require a cost-effective digital console, while maintaining the quality, professional image and functionality of their post production operation.

**T**HE RECIPE: take one hugely successful chart band, add established actors (Roger Moore, Richard E Grant, Barry Humphries, Richard O'Brien and George Wendt), throw in a handful of celebs (Sir Elton John, Jennifer Saunders in *Ab Fab* mode and Michael Barrymore), and a quartet of very non-PC aliens. Set the mixture mostly in London with the odd bit of exotica and make liberal use of a bus with Tardis properties. Finally mix in a documentary film crew to bind the mixture. Follow the script carefully with lots of refining, add Spice to taste and really cook the monitors. The result is more Korma than Vindaloo, but it all makes a pleasant enough confection.

*SpiceWorld* was tracklaid by Reelsound based at Pinewood Studios with Max Hoskins and Glenn Freemantle acting as joint supervising sound editors and mixed at De Lane Lea in Soho by lead mixer Peter Maxwell with Mick Boggis and practically everyone else in the company. The film was cut on Avid and tracklaid on Avid AudioVision DAWs.

Max Hoskins recorded a lot of the ADR and recalls that, 'The girls were on tour and could not come back to the UK to do the dialogue replacement, so I took a load of gear out to France and built an ADR theatre in a secret studio in Nice.

'I was worried because the girls had never done looping before and the schedule was very tight. When we arrived, there was no one to set up the gear and I really began to panic. We had a terrible night wondering whether it was ever going to work; but in the morning the studio engineers showed up around 8:30 and they had the whole thing ready to go by 9 o'clock when the first of the girls arrived. All the loops were set up in AudioVision and the girls showed up one after another so we did their individual stuff as they arrived, then the group things when they were all there. By 10pm we just had Geri to do. So in the end we managed to do what would normally be 2 1/2 days work in one long day. This was largely due to the girls being very good at looping and the instant looping and playback of the AudioVision. Doing it this way also allowed us

to have all the ADR laid in time to complete a temp dub the next day back in London.'

Others of the cast were more accustomed to the business of making films, but made greater demands on its technology.

'We did George Wendt via ISDN from the States,' Hoskins reveals. 'Normally, I advise strongly against doing more than ten loops this way because the technology is so frustratingly unreliable. You have two lines, one carries comms and time code, and the other guide track and the record source. The time code is used to drive a picture transport at the other end, a Betacam or whatever, but it's a

nightmare with different time-code standards and so on, and half the time the machine isn't up to speed in time. In this case, we did "blind looping" I just sent guide sound down the line with beeps and recorded the actors lines with the picture 8 frames out of sync to compensate for the delay to San Francisco and back and it worked extremely well.'

Other ADR was recorded by Ted Swanscott in De Lane Lea's Studio 4 which is a dedicated ADR and Foley stage. Foleys were all recorded straight into AudioVision and tweaked to fit where necessary.

Four rooms were used at Reelsound, in addition to AudioVision a Synclavier and an Emulator were used to generate effects. Freemantle also used Hyperprism for certain effects. At the premix stage picture and tracks came off AudioVision. Max Hoskins believes this is an effective way of working.

'The instant return and back into play, lets you relax and think more. A video image on a large screen makes the process far quicker and smoother than a 35mm picture; but, of course, the final mix was always checked against a print.'

Moving on to the music considerations of *SpiceWorld*, Hoskins says: 'We wanted to keep CD quality; but to exploit all the surround possibilities, and for film hard-centre vocals are essential. Virgin were great and managed to get remixes from the original masters done with separate vocals, dry and treated, backing harmonies and LCR backing music. On occasions we had 12 tracks of music that gave us more control and texture to move around the room.'

## Movie Spice

A media phenomenon pushing pop culture to its limits, the Spice Girls recently released their first movie. **Rob James** reports why *SpiceWorld* is an aural tribute to its technicians

Because of the strong music element in the film the sampling rate was kept to 44.1kHz throughout and an estimated maximum of 50 source tracks were in use at certain times. Happily, De Lane Lea had opened its new, flagship Dubbing Theatre, Studio 1 in time for posting *SpiceWorld*. The theatre is particularly large for a central London location and is indeed bigger than some multiplex screens and equipped for proper previews. Richard Paynter, managing director of De Lane Lea says there were a few teething problems but nothing major. The real problems with *SpiceWorld* were start and delivery dates which

kept changing, and continual recutting of the film right the way through the mixing process.

Studio 1 follows an interesting technological path in that all the dubbers are digital. 12 Akai DD8s, but they have chosen to partner these with an analogue desk, a huge Harrison Series Twelve. The option exists to add digital processing to the Harrison at some future date without requiring the mixers to learn a new console. With the current uncertainty about what the next standard will be, 96kHz 24-bit, or whatever, this is one way of keeping options open on the most expensive item of plant in the theatre.

The main teething problem was the discovery of low-level thumps when dropping into record on the DD8s in the week before final mixing was to commence. With the kind of SPLs encountered in mixing for SR.D or SDDS even tiny thumps could not be tolerated. Nick Church, De Lane Lea's Digital Systems Engineer comments.

'It was all fairly panicky with the new studio and continually moving goal posts from the production company,' Paynter confirms. 'Akai managed to generate virtual 36-hour days to solve the problem by using effort in the UK, Japan and the US. We identified the problem on the Tuesday of the week before we started the mix. Akai had a fix in hardware and software which we confirmed successful by the Thursday, and all the machines were modified and ready to go by Saturday.'

The problem was caused by DC offsets on the converters and is no longer an issue.

Peter Maxwell, lead mixer comments: 'It was the first job in the new theatre so we were all learning. Because the schedule was so tight Mick and I just did a couple of reels of dialogue and effects premixing and then concentrated on final mixing while everybody else fed us with premixes. Hugh Strain did dialogue mixing in Studio 2. Dave Old and Clive Pendry did effects mixing in Studios 3 and 5.'

Nick Church observed the whole process and comments that, 'The technology permitted them the luxury of not making up their minds. The technology can accommodate this; but the man hours are still needed to carry it out. These changes would have been next to impossible to do using sprocketed film.'

'All this allows the picture to be changed until an unproductively late stage in the game. With sprockets the discipline required brought a focus to the production process which now seems to have been lost, often to the detriment of the product. "Artistic" mixing time gets wasted accommodating the mechanics of recursive change. Similarly with automation there is the temptation to nibble at a scene rather than go for the whole in one which carries the danger of losing the flow of a performance and rendering things sterile.'

Church also spent an amusing afternoon recording some reaction dialogue in Scary Spice's London flat. Recorded onto a Nagra this is one of the few bits of analogue recording in the whole project.

The late changes were achieved by loading premixes from Akai into AudioVision and making the changes there. This was largely dictated by availability of people and machines and resulted in three AudioVisions playing into the final mix alongside the DD8s and the odd DR16 drafted in for the occasion. A 2.6Gb magnet-

optical and Winchester hard disks were used to move the premixes around the building.

Driving the DD8s from biphase with two projectors allows De Lane Lea to mount full-scale viewings against a 35mm print, vital in this case, because of all the late changes.

Maxwell has an interesting perspective on mixing to DD8s: 'It was great to be able to mix to digital recorders, it enabled us to mix louder. One delivery requirement was for a 6-track uncompressed mix. We had problems getting the digital mix on to mag film.'

This runs counter to the accepted wisdom that film mixers like the soft limiting effect of saturating magnetic film; but is an encouraging sign of just how well accepted digital recording is becoming in this application.

Of his first experiences with the new console Maxwell says: 'The dynamics on every strip proved very useful and the EQ is great. The music arrived across up to five or six tracks with split vocals, bass and rhythm which really lets you get some separation.'

This is evident in the final mix and is a good example of just what can be achieved in multichannel presentation. It really is no longer acceptable to provide a normal stereo mix of music for film work.'

Maxwell concludes: 'It was really a pretty conventional mix; but a huge slog due to the tight schedule and the number of recuts. In reality we did the equivalent of four weeks final mixing not to mention the versioning. In addition to the S.R.D-Dolby Stereo we also did an SDDS and various other delivery requirements. The other versions were all done on Tascam (DA-88). Our final mixes were done on to Winchester disk and printed onto MO.'

Once again, here is a film, postproduced using the 'new' technology that used the possibilities offered by this technology, not to enhance the product; but to allow the maximum FAT (Fiddling, or something rather less polite. About Time) The fact the final product is as slick as it is, is a tribute to the skills of all those involved and to the reliability of well designed processes. I used the lot, editing on Avid tracklaying on Audiovision, effects from Synclavier and Emulator, music sourced from Sony 3318 and delivered on Tascam DA-88 tapes. ISDN for some of the ADR, premixing on manual Trident analogue consoles together with an automated AMS-Neve Logic 2, all premixes recorded on to Akai DD8s, some revised in AudioVision, with a final mix on the digitally controlled analogue Harrison Series Twelve.

Production companies will always exploit to the maximum the opportunities offered by this kind of technology. In time it is to be hoped that they will learn to use the potential more wisely, to enhance product and save money through better planning; but this is not something which can be forced by the facilities houses if they wish to stay in business—networking is almost at the point where it can realistically contribute to the process. De Lane Lea and others have evolved highly sophisticated processes which still involve what is known in computing circles as 'sneakernet', the physical movement of material around the building. The next stage for large post facilities such as this must surely be intelligently implemented networking to allow data sharing. ■



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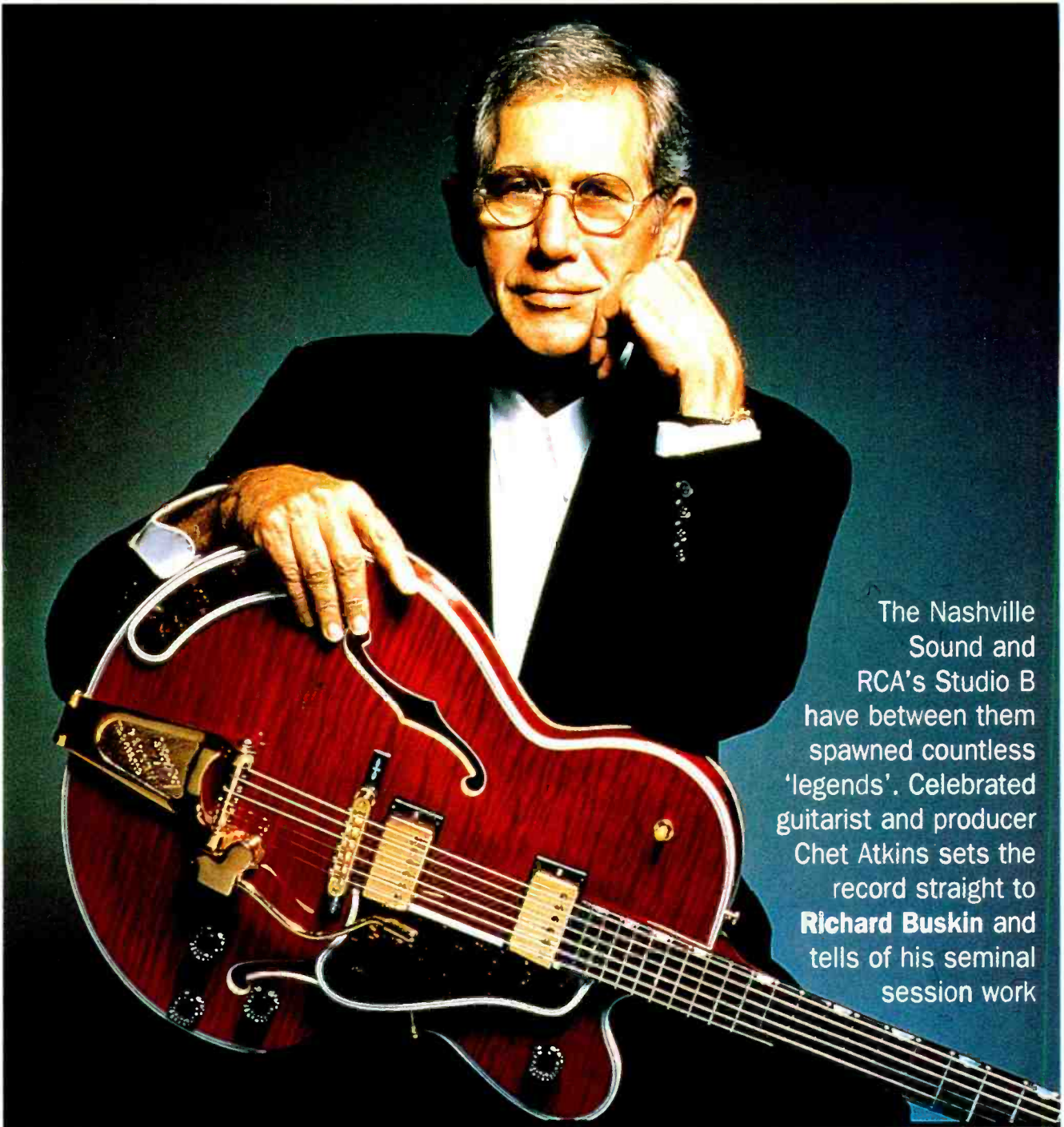
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The Nashville Sound and RCA's Studio B have between them spawned countless 'legends'. Celebrated guitarist and producer Chet Atkins sets the record straight to **Richard Buskin** and tells of his seminal session work

# Chet Atkins

NOT EVERYONE has a street named after them, but in Nashville's Music Row you can find Chet Atkins Place. That's how much the city feels that this native Tennessean has contributed to its reputation, not only in terms of country music but also with regard to its latter-day status as a major recording centre.

'The musicians all gang around and help when you make records in this town, so don't brag on me too much,' Atkins pleads modestly. Nevertheless, he really cannot play

down his achievements too much, as testified to by 77 of his own releases, the sale of around 40 million albums, the accrual of 13 Grammy Awards and so many Country Music Awards that the eligibility rules were rewritten essentially to disqualify him.

Then there are the artists who Chet Atkins has produced and/or with whom he has collaborated, ranging from Elvis Presley, The Everly Brothers, Hank Snow, Eddy Arnold, Hank Williams, Merle Travis, Les Paul, Jim

Reeves and from Dolly Parton to George Benson, Mark Knopfler, Paul McCartney and Earl Klugh. The man's effect has been enormous.

Sometimes I look at myself in the mirror and think, "How in the hell did I do that?," he admits. 'I'm from up in the Smokey Mountains, a terrible place and we almost didn't make it through the Depression, but I made a success and I don't know how the hell I did it. I hear my influence in other musicians' work and I can't believe that either. They're >>>>

«««« all over the world, and I guess it's because I was first.»

Born Chester Burton Atkins in Luttrell, Tennessee, on 20th June 1924, the man who would influence and inspire successive generations of guitarists with his clean and seemingly effortless fingering style started out playing fiddle on various radio shows around the US at the age of 17. However, influenced by the sounds of Merle Travis, George Barnes, Les Paul and Django Reinhardt (that he heard coming through the radio he himself had constructed), Atkins opted for the guitar as his instrument of choice. In 1946 he was hired by Red Foley as a touring sideman and that same year he made his first professional recordings. In 1947, he signed to RCA Victor, signalling the start of a long and mutually prosperous relationship with the noted record company.

After moving to Nashville in 1950 Atkins became a regular on the Grand Ole Opry and started to establish himself as both a session man and as a performer. He released his own



**Signed for an unprecedented \$40,000, Presley's band was built up by Atkins**

albums, contributed to recordings such as Hank Williams' 'Jambalaya' and 'Your Cheatin' Heart', and in 1956 diversified his activities by scouting new talent and producing for RCA A&R man, Steve Sholes. He'd already assisted Sholes in this capacity back in the late-1940s.

'At first I was paid \$35 a week to do the things that Mr Sholes wanted me to do around the studio,' Atkins recalls. 'He had this dream of building a studio in Nashville and having me run it, and that finally happened in about 1954. That was at 1525 McGavock Street, and we had a couple of homemade RCA recording machines, an echo chamber that consisted of a sewer pipe that went up two stories, and a Hammond spring reverb. Laurens Hammond owned the patent on the B3 until he died, so nobody could use it, but this engineer took a reverb out of a B3 and we'd run band voices through that. It was illegal, of

course, but we got a good echo sound.'

In November of 1955, RCA shelled out a then-unprecedented \$40,000 in order to sign a hot new singer by the name of Elvis Presley who was, until then, contracted to the small Sun Records label run by Sam Phillips in Memphis. Presley, of course, already had his own band: Scotty Moore on guitar (whose idol was Chet Atkins), Bill Black on bass and DJ Fontana on drums. This lineup was supplemented when Atkins added other musicians such as keyboard player Floyd Cramer, and backup singers Ben and Brock Speer and Gordon Stoker of The Jordanaires.

Elvis' first session for RCA took place at the company's Nashville studio on 10th-11th January, 1956. The songs recorded were 'I Got a Woman', 'Heartbreak Hotel', 'Money Honey', 'I'm Counting on You' and 'I Was the One'. Chet Atkins played rhythm guitar. In order to recreate the slapback echo sound that had characterised all of Elvis' Sun recordings a speaker was placed under a stairway out in the hall. Steve Sholes was determined to conform to the recipe for success and Atkins now recalls how much concern that caused.

'We were recording on those RCA machines and they ran at a different speed to the Ampex that Sun had used,' he says. 'So, we were careful about trying to recapture that Sun sound. And, of course, we didn't, but it was enough to fool the people.'

But not enough to fool all of the RCA executives in New York. Displeased that the new recordings, they initially wanted Sholes to go back to Nashville and have Elvis rerecord the material. That idea was soon vetoed, however, and following the release of 'Heartbreak Hotel' the fears were quickly forgotten.

'You know, Elvis made a hell of record,' says Atkins. 'He was a cut above anybody I've ever seen. Everything he did was different. Instead of tapping his foot he'd shake his leg and turn on the girls, and even in the studio he'd get down pretty much and give a full performance. He was not shy! He was shy in a social sort of way, but when he performed it was like, "Screw the world!" He didn't listen to any of the critics.'

At one point during that first RCA session Atkins called his wife and told her to come straight to the studio. 'I knew she'd never see anything like this again,' he recalls. 'It was so damned exciting.'

Even though the heavily reverberant sound of 'Heartbreak Hotel' is one of its most distinguishing factors, it's clear that, on the inside, this was initially regarded as a botched imitation. And one of the main reasons for this 'failure'? The impractical design of the RCA studio on McGavock Street. 'The reverb in there was no good,' asserts Chet Atkins. 'The ceiling was concave, and so when you'd hit a bass note it would go up there and roll around for days before finally coming back down. It was just a bad design. You don't need a ceiling like that.'

**I**N 1957, while at a New York airport, RCA's chief engineer, one Mr Miltonberg, drew the design for the company's Studio B on a paper napkin. Located on Nashville's Music Row, this facility is now typically referred to as 'the legendary' Studio B, but Chet Atkins doesn't quite concur with that point of view.

'It was like all studios in those days,' >>>>>



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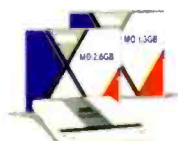
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“<<<< he says dryly. “It wasn’t worth a damn. It shouldn’t be legendary. It’s only legendary because Elvis and a lot of great artists recorded there. Mr Miltonberg designed it really badly. I remember it had the toilets around the front of the building, things like that. Miltonberg was the guy who, in New York, would take my records and dub them off on other records and they’d have distortion. He was a bad dude. I think he must be dead by now and I’m glad.”

There is nothing like being fondly remembered.

Bill Porter, an engineer from local radio station WLAC, would eventually be brought in by Atkins to revamp the acoustics, resulting in a far better overall sound. In the meantime, launched with RCA’s in-house mono equipment. Studio B upgraded to stereo 2-track in 1958 before then switching to 3-track Ampex a couple of years later.

“That’s when it became work,” Atkins

recalls. “We went to 4-track around 1962, but that didn’t last long before we got into 8-track in the mid-1960s and then 24-track later on. I’ve always said, “When I see Les Paul I’m gonna whup his ass”, because he talked Ampex into building that 8-track you know... and he’s glad to take credit for it, the old cock!”

Going back to the mid-1950s, on the strength of Elvis’ success Steve Sholes was promoted within the RCA organisation and Atkins took over the C&W roster. His first signing was Don Gibson, who recorded ‘Oh Lonesome Me’ and ‘I Can’t Stop Loving You’ at his initial RCA session having written both songs in a single afternoon.

**T**HE DEMO of “Oh Lonesome Me” had been recorded in a little room and it had this distinctive thumping bass drum sound,” Atkins recalls. “I said, “Wow, who’s playing that bass?” and Don said, “Troy Hatcher”. Well, I knew Troy, so I said, “Bring

him down here. We’ll use him on the record”. He turned up with this great big drum, it was almost like a marching drum, and so we put a mic on that—which had never been done before, as far as I know—EQ’d it so that it was real hot on the record. And hell, it was a hit all over the world, so after that I got confidence and I figured I could make a record as well as anybody else. I thought, “If I hear a song and like it then the people will easily like it”, and they did.

“In terms of recording methods, I’m a lot more technical now than I was then but in those days I still knew the difference between distortion and cleanliness. If I heard something wrong, I’d ask a lot of questions until I could dig up the problem, and that actually caused me to have a lot of enemies within the record company. I’d made some hits and they kind of resented that—“You can’t get close to the microphone; you might pop a P”. If you popped a P in those days there was a possibility it wouldn’t play on the juke box and a lot of records would be returned. I had an engineer who believed in that theory all the time, so he left. He got kind of sick of me picking on him, I guess. The next session was with Jim Reeves and he got right into the microphone and whispered the lyrics. I remember, Mr Sholes called me and said, “How did you get that sound?” And I said, “Hell, he just wanted to get up close

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Atkins has collaborated with Dolly Parton and George Benson but he’s yet to work with Kermit





**Knopfler: another guitar hero that has worked with the original guitar hero**

and inside the microphone and I let him. He did it. I didn't do it".

"You see, Jim had been a disc jockey and radio announcer, and he knew about mic technique probably more than I did. He knew how to get intimate when the mic was in front of him."

**E**VENTUALLY, Chet Atkins had so many hit records to his name, both as a producer and as an artist, that he could make considerable demands of RCA and the company would be obliged to fulfil them. Written into his contract was a proviso that the Nashville studio would get the same standard of equipment that those in New York and Hollywood had, but he's now not actually sure as to whether or not this stipulation was met to the letter.

"It probably didn't work that way but I didn't watch too closely," he says. "It was good in case I needed something. I'd say, "It's in my contract. Get me one of those". By that time, you see, I'd started hiring people to help me, because one day I went to work and at one point I looked down and my shoes didn't match. I thought, "Buddy, you've been on the job too long", and so after that I started to delegate responsibility..."

Now 73 years old and recently recovered from both lung cancer and a brain tumour, Chet Atkins is still to be found in the studio, often his own 24-track home setup. His most recent release (with Australian guitarist Tommy Emmanuel) entitled 'The Day Fingerpickers Took Over the World', was issued in March 1997. Nevertheless, he doesn't feel that recording is as much fun anymore.

"They build studios with almost complete isolation on each musician," he says. "They sit in little cages and listen on headphones. In my opinion that's not so good for the creative process. Before we used to gather around the piano. We'd all gang around Floyd Cramer and run over the tunes a few times, and the musicians would get ideas for fills or for rhythm licks, and that was more fun. I know that still goes on, but it's not the same."

The heart and the feel are everything when making a record. The sound doesn't matter

too much to me as long as you're doing something that touches your heart. I've seen guys producing and they'll work half a day trying to get a sound on one instrument, but I think that's kind of futile."

Similarly redundant is my question to Atkins about his pioneering work in the development of the famed 'Nashville Sound'. This, so I thought, comprised country music's response to the dominant chart forces of pop and rock from the late-1950s onwards by way of lush melodies filled with strings, choruses and echo. Now, Atkins has produced and or developed such acts as The Everly Brothers, Waylon Jennings, Willie Nelson, Dolly Parton, Roy Orbison, Jerry Reed and Charley Pride, yet his response pretty much puts me in my place: "There's no damned 'Nashville Sound', you know that."

I do? Just joking, Chet. Honest...

"It's the musicians who sing and play the backing, but it's always been there. People

love musicians who come from the South and play or sing with a Southern accent: harmony groups like the Jordanaires. If there was a Nashville Sound, that's what it was."

"But what about all of those strings and echo that helped popularise country music," I reiterate in a desperate (and increasingly pathetic) attempt to make my point about something that a leading authority is now informing me never existed. "Wouldn't that be the Nashville Sound?"

"Well, no, not to me," comes the patient response, "but maybe it would be to you."

"That kind of thing happened gradually," Atkins continues. "You know, with Jim Reeves we'd try different instrumentations, and if we had a hit we'd continue in that direction. Me and Owen Bradley, who was another producer out here, we were just trying to keep our jobs. I'd been fired from every damned job I ever had, so I was trying to keep from being fired by making a hit..." ■

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It began like this: in 1996, a visiting choir from Mexico had visited the studio in Suffolk, England for a couple of days' session to record their current repertoire to CD. We'd all got on well, and the CD was duly exported in time for the Christmas market in Mexico City. As they left we were invited to join them in Mexico to produce their Christmas CD in a year's time. Of course, we said, yes...! Wouldn't you?

Normally, for recording our usual fare of church and cathedral choirs we take a Soundcraft series 200B mixer, a Tascam DA-30

R-DAT recorder, and a range of mics selected from AKG 414s, 451s and so on. Then there are all the other bits and pieces that no session can proceed without—the connectors and adaptors, the mains leads and attenuators (a product of our workshop, all of these—it saves money), the mic leads and the stands. All of these would be needed in Mexico, too, unless we took a radical new look at our equipment.

It was here that Geoff Osborne, our resident designer and guru, came to the fore and accepted the challenge: a complete setup, capable of recording a session to CD quality, which would fit in my personal luggage on the daily 747 Heathrow-Mexico City flight. In a few weeks he was back, and the concept he'd produced was not what we'd expected at all—'Why not use MiniDisc, and we'll develop a mixer specially for the sessions,' he suggested. And so the die (or perhaps, the disc) was cast.

The parameters were simple and obvious. We needed something small enough to fit the demands of international air travel, but technically big enough to do the job. By now Geoff had the basic design concept for what we soon dubbed The Meximixer, 6 channels straight to stereo, with the quietest mic input stages I've ever come across. Also we decided that I'd need pre-fade, a high-pass filter, pan pot and sensitivity controls for each channel. A headphone amplifier would be essential, and it would be nice to have off-tape monitoring and line-up oscillator facilities. As I planned to take the AKG 414s and 451s phantom power would also be necessary.

But MiniDisc? Data compression is the name of the problem, and even the manufacturers themselves say that it is almost to CD quality. Could we rely on it for a job thousands of miles from home, and could we justify its use over the less portable other formats? If we were to accept the job, MiniDisc it would have to be, so we decided, somewhat tentatively, to trust to the Walkmen.

It was made clear to us by Bob, the choir administrator from Mexico, that nothing would be easily obtainable in Central Amer-



# Mexican Wave

A difficult location recording in Mexico City saw **Stewart Orr** casting MiniDisc at the centre of a custom recording setup

ica, and that we would be on our own for technical back-up. Again MiniDisc seemed ideal. Size was very much in its favour, as the machinery is so small that two would fit in a pocket together, and exhaustive tests showed us that there was no appreciable difference between them and their R-DAT equivalents. The AVC, although one of the best that we'd come across for radio reporting jobs, could easily be defeated, and the level could be set with the line-up oscillator from the mixer. Track numbers seemed to appear somewhat arbitrarily, but it was possible to make a useful cue sheet from these, and we never lost a take.

The mixer itself went through numerous development stages. The input modules (7 prototypes) ended up with rotary pots for all variable functions—there wasn't room for anything else—and the metering was done by a display of LEDs, which, although they were not the same as the PPMS on the home studio desk, were eventually found to be quite sufficient in the field. Finally Geoff added front end overload LEDs, which well proved their worth.

Then there was power supply, and a new set of problems to be overcome here. The mics demanded between 9V and 48V (thank heaven for the wide supply voltage range of the AKGs) and the desk needed  $\pm 12V$  on the supply line. The MD recorders wanted about

1.5A at around 4.5V. However, by now we were getting close to the day of the flight. The toroidal transformer in the PSU was the largest that would physically fit, but there was just not enough available current to run the MD recorders. So, with only hours to spare before leaving for Mexico, another small transformer was mounted in a die-cast box, giving 240V for the UK MiniDisc PSUs. Although a clumsy way of producing the necessary 4.5V, it gave us

UK mains at a few milliamps, which was invaluable for running a soldering iron for running repairs.

A couple of shiny flight cases are a red rag for inspectors at airports, and so the Meximixer, the microphones and all the accessories were pored over every time I embarked or landed. I was well advised earlier when it was suggested that I contact the Mexican Embassy in London for the correct documentation to get the equipment in and out of the country. This went without a hitch, as did the application for a work permit.

The recording venue was Christchurch, one of the Anglican churches in Mexico City. A modern building, there was pleasing acoustic, but all rooms were open to the roof space, so there was no separate accommodation for a control room. Also, as it was only 10 years old, there was no odd hook or nail for mic suspension, or niches left by medieval craftsman that can so often help the present-day recordist. A couple of 4-inch nails, knocked in behind an arch, and the 414s were soon suspended by a diagonal cord in just the right place—directly above the conductor's head. And that acoustic did well, too, with the mics set on fig-of-8.

And so to the sessions. At 10 o'clock the choir assembled, and within three minutes it was obvious that the noise of traffic was going to preclude any recording in >>>>

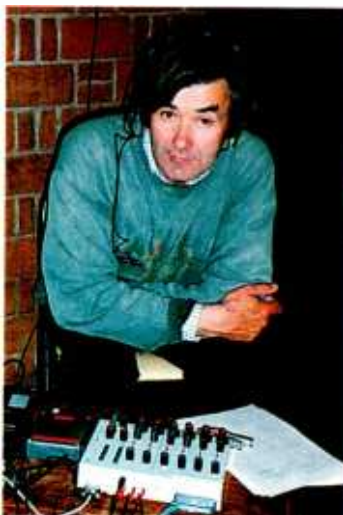




<<<< Christchurch. The problem was that there was a series of embrasures above the first set of arches, and these were open to the outside air, and thus also to all the traffic noise of Mexico City. Conductor Cristina listened to a playback, and without further comment turned back to her choir of 7-18 year olds. She told them to go home, have a good day's sleep, and return for the continuation of the sessions in 12 hours time—at 10pm.

That evening the atmosphere was electric, with the excitement of an all-night session, and also of camping out in the church. The children would bed down into sleeping bags at 6 am or so, and then parents would collect them at 8 or 9 o'clock. We'd then repeat the process for the next two nights, as well.

The Meximixer and associated equipment worked faultlessly throughout. Setting levels was easy with the 1kHz onboard tone generator in the Meximixer. It is also relatively simple to disable AVC on the MiniDiscs, which, although one of the best I've come across, particularly on an instrument so small, was definitely not required. Tests whilst the choir was warming up showed that all was well,



**A weary author with Meximixer and MD recorders**

and that the signal-to-noise was quite what we had expected—and hoped. Also, as far as we could tell, the data compression necessary to get all that information into so small a space on the disc was giving no problems.

Like all sessions, this one had its moments. On one occasion our equipment in its shiny flight cases caught the attention one of the armed guards from the Israeli Embassy next door. However our conductor Cristina went over and told him what was happening, and that we would be doing it all night for the next three days, and this satisfactorily allayed his suspicions. The result was that this was the only session to date that I have carried out under the eye of an armed guard. At regular intervals all night we saw a dark and shadowy face, rifle across the shoulder, peering through the glass, just making sure...

The sessions were carried out in a selection of different languages—English to me at the control desk, and Spanish to the choir. Then the visiting choir trainer from Norwich could manage French, but not Spanish, but with choristers who were, in the main, tri-lingual, it made life easier than it might have been.

Each morning the night's recordings were copied to audio cassette. This was so that Cris and Bob should have a complete copy for when the time for making editing decisions came. Again there was another first for me on the third night when I actually fell asleep during a take. I don't know whether the choir noticed, but it was about 4 o'clock in the morning, and I had only a few days ago flown through the time zones to Mexico from Heathrow.

No sooner than we were back home it was time for editing. Cris sent over instructions by e-mail, and I cut to her instructions. A cassette was FedExed, and a few adjustments were incorporated. It was as simple as if she had been in the next village or town in England.

So what of the quality of the MiniDisc system? I had two machines with me, so that one could break down, fail to work or mis-track. Both were run simultaneously on everything, but we need not have worried. The audio quality from the Meximixer was fine, and most impressive from the point of view of system noise, of which there appeared to be none. So, in fact the whole system worked faultlessly. I reserve my case—MiniDisc has a real place among the engineer's equipment, particularly when you're a long way from home. ■



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# Whole lotta history

Most 'historic' rock recordings fail to warrant their current level of attention. Not so those of Led Zeppelin, as **Zenon Schoepe** reports

**T**HE IDEA OF three versions of a particular song on one double CD compilation would in most cases smack of a rip off. Yet in the context of Led Zeppelin's BBC Sessions compilation, three versions of 'Communication Breakdown' recorded on the 16th, 24th and 27th June 1969 serve as a reminder of what an improvisational band Zeppelin was, and that it would play different versions of a song, all, incidentally, perfectly valid in their own right and distinct from the version that made it on to the band's first album, as a point of principle.

It's incredible that what was effectively a power trio with a singer should attempt stunts like this on so grand a scale, but then the sheer standard of musicianship is what shines through on this package which draws from all the recordings that the band made for transmission by the BBC. Whether you like the music or you don't, you have to acknowledge that Zeppelin had something all of its own and could kick up an unbelievable din when it wanted to that defined a genre and placed its members of Robert Plant, Jimmy Page, John Paul Jones and John Bonham into the

category of legends.

The material on this double-CD set came from five sets of recordings made by the band in 1969 and 1971. The *Top Gear* session in March 1969 was the first broadcast session the band ever recorded for the BBC and found them fresh from their first US tour. Chris Grant's *Tasty Pop Sundae* sessions with overdubs in June 1969 saw the band already working on its second album and was closely followed in the same month by the second John Peel *Top Gear* session that included 'What Is and What Should Never Be' and a devastating version of 'Whole Lotta Love'. June was a busy month as it also witnessed a live concert at the Playhouse Theatre, London for the BBC's *Rock Hour* transmission. >>>>

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«««« Most bootlegged of all has been the last lot of material that the band made for the broadcaster, and the originals of these are contained on the second disc. Recorded live at the Paris Theatre, London in April 1971 we are presented with an incredibly strong, yet nervous, we are told, set giving exclusive insights into the fourth album's 'Black Dog', 'Going to California' and now, momentarily, 'Stairway to Heaven', a good eight months before the album was released. Hearing that introduction, now banned from guitar shops the world over, without the slightest glimmer of recognition from the audience is a poignant moment.

What surprises me is how much like its well-known records the band sounds even in the fully live environment. You have to deduce that Zeppelin clearly had a sound of its own, and if you put them in a space with some carefully placed mics that's exactly what you would capture. A far cry from group identities that are created and crafted in the control room.

Remastering engineer for the project John Astley has no idea how the BBC Sessions were recorded and admits that he would have loved to have talked to the engineers involved. 'I am amazed at how well it was recorded and Jimmy [Page] remembers that the guy from the *Top Gear* sessions was fantastic,' he says. 'But then Jimmy always got involved with how the band sounded.'

Astley has carved himself something of a niche as a remastering specialist having undertaken the complete rejuvenation of the entire The Who collection, right back to recreating mixes from the multitracks. He has also done remastering work for ABBA, including the last album *The Visitor* which was made on 3M digital at 50kHz. Them, Level 42, and Roger Daltrey to name a few while his fully fledged production credits include *Who Are You* by The Who, *Just One Night* with Eric Clapton, and the first album for Canadian Corey Hart.

Astley is one of the increasing band of engineers excited by and investing in 24-bit 96kHz as the recording density for his archive work.

With what can be described as a 'commercialisation' of outlook at the BBC towards its catalogue of session tapes, recordings of some of the greatest names in the business are beginning to seep out.

The Led Zeppelin sessions are a case in point and originally Jimmy Page, who oversaw the compilation and mastering process, was keen to use Sonic Solutions on the project, but was convinced by Astley that his own Studio Audio & Video SADiE-based setup would amount to the same. All the work was performed at Astley's home studio and began with extensive listening to BBC-derived DAT copies of the original 1/2-inch tapes.

The plan had been to produce a 2-CD set with the second only running to 58 minutes and supplemented by an interactive segment but it soon became apparent that there was no shortage of material that could be used and it quickly became a matter of deciding on what should be left out. Thus an early 'Communication Breakdown' wasn't used, a 'What Is and What Should Never Be' was dropped from the sessions and the Playhouse concert had 'Dazed and Confused' and 'White Summer' omitted from its running order. 'What Is and What Should Never Be' and the set closing 'Communication Breakdown' were removed from the Paris Theatre show together with some chunks from the 'Whole Lotta Love' medley in order to squeeze it onto a single disc. There is nothing else of the band left in the BBC archives.

The Paris Theatre concert has existed in bootleg for years and includes between-song dialogue that has been completely removed from this official release as Plant has never been comfortable with it as he believes he sounded incredibly nervous on the night.

Less easy to remove was crowd enthusiasm according to Astley. 'There's a bloke that shouts over the introductions of some of the songs,' he explains. 'I can't believe he did it because he would have been on the broadcast. I had great fun fixing all that and particularly the front of 'Dazed and Confused' from the Paris Theatre because there was talking

and rambling all over that. You have to find little pieces that are clear and loop them.'

All CD 1 is mono while the second benefits from glorious stereo, although the running order is the same as the band recorded with only a few judicious changes made to avoid back to back versions of 'Communications Breakdown'.

Closer listening to the supplied DAT tapes that were to be worked from revealed problems. 'Originally they told me that the session tapes did not exist, but when they sent me DAT copies I realised that the whole lot was down top-wise on one side. Bill Curbishley (The Who manager, and Page, and Plant manager) phoned up and asked for the tapes in his usual persuasive way and they coughed them up,' says Astley. 'We were only allowed the tapes out of the BBC for 48 hours—I don't think anybody has had the tapes out of there before for this sort of thing.'

'I immediately banged them down from an MTR12 through a dCS and on to a Genex at 24-96 and then I worked from that.'

He adds that the tapes were in good condition and immediately performed better than the DAT copies he had been sent in the first instance. From here on in, Astley adopted an approach that he developed while working on the remastering of the 2-track masters from The Who's *Oddly and Sods*.

He's built up a processing chain that includes a stand-alone CEDAR deacker and the denoiser package built-in to the v3 SADiE and combines this with tc M5000 and Wizard, Summit and TL Audio EQ. Because the mastering wing of Metropolis studios in London also uses a SADiE system, when it comes to running a 1630 he merely pulls out a hard drive and takes it to the studios.

'I thought I'd use valves on this project as it's all a bit crunchy anyway and I thought it would help,' says Astley. 'The Summit stuff was okay, and then I plugged in the TL Audio EQ2 and both Jimmy and I loved it for the sort of top end we wanted. It's a bit noisy, but after putting everything together you can revisit the quiet sections on the >>>>>

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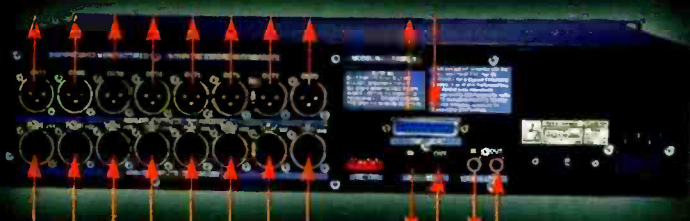
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«««« SADiE and get rid of the noise there.»

The signal chain went thus: Genex through dCS to analogue, through the analogue EQ section, through dCS A-D and into the te Electronic and then into the SADiE working at 24-bit. He monitored on Professional Monitor Company TB1s and is currently looking to move up to a mid-sized system of the same brand soon. He monitored straight out of the SADiE via external converters. 'I wouldn't use the SADiE converters,' he says. 'I've got a Prism AD121 that I only used on this project for noise shaping from 24 to 16, and I used a pair of dCS.'

'I worked in v2 on the SADiE because at the time that had waveform editing whereas v3 hadn't yet,' he continues. 'If I wanted any noise reduction, which I did use quite a lot, then I converted files to v3, processed them and then banded them back to v2.'

Astley is clearly fond of the convenience and adaptability of the Genex machine not to mention the portability of the package when combined with his dCS convertor boxes. It means he can travel with it to wherever the source material and the best playback machine reside as he did recently to Decca for John Mayall and Them projects.

'A lot of this remastering thing is about finding the right 1/2-inch machine to play the tapes back on. It's key to the whole issue,' he says. 'Polygram has asked me to go to Athens to remaster some Vangelis albums, but I just don't know what the 1/2-inch machine is going to sound like and it might be much better to bring it all back over here because I know Metropolis has a wonderful A80 for that sort of era. It's about matching heads to eras of tape and it does help if the machine is still original. When I was doing the ABBA stuff earlier this year we found an A80 that we were very happy with, and then it broke down, they wheeled in another and immediately heard a difference even though it was lined up perfectly.'

Those expecting pristine studio quality on the BBC Sessions may be disappointed as there are a number of obvious sections where the 'fly by the seat of the pants' method of

recording had run in to difficulties particularly with a band as dynamic as Zeppelin.

'The version of "Something Else" was really distorted and still is, but I de-crackled some of that,' comments Astley. 'On the Paris Theatre's "Black Dog" Plant's mic folds up on the intro and I tried to do something about that but couldn't. The funny thing about the de-crackle process is that it can change the image and balance between the instruments which we thought was down to how it was effecting the room noise. The same goes for too much te 3-band compression.'

Track consistency was an issue particularly as the *Top Gear* and *Tasty Pop* sessions were recorded in different places, but Astley says the key is in matching levels and top end responses.

'I had a real problem with bass end on the live stuff because there were obviously standing waves so I chopped the bar that it was in and just processed that, and pasted it back in with the bottom wound out of it.'

'One of the things I was worried about was that I thought we were piling on too much top end, but Jimmy liked it, and I went along with it. In his absence I had a go at remastering with a little bit less just to see what would happen, and, of course, the first thing you lose is the room and that always was vital to their sound.'

'I used very little digital EQ, it was mostly analogue EQ with the valves just beginning to glow. I'd put a smooth 15kHz across most of the top end just to bring it up to date really and I was notching some hardness out in the midrange and sometimes also adding at around 6kHz or so for cases where I felt it needed even lower top end.'

'I usually wouldn't touch the bass end until I got into the SADiE; although I rolled off digitally some very very low end on the te. That way the EQ was very much done by the time it got into the SADiE where I could address the things like the standing wave problems, noise and clicks.'

However, Astley is in no doubt about the trickiest bit of the production. 'Denoising the

violined guitar sections in "Dazed and Confused",' he states. 'If you're not careful it gets to the point where it starts to sound like mice running through your speakers - you keep asking whether that's a guitar or a denoising algorithm that you're hearing and your ears start to play tricks on you.'

'The standing wave problem was a bit of a nightmare until I hit on the solution of cutting out the offending section, EQing out the note and then pasting the crossfaded result back into the track.'

Page's contribution was solid and concentrated; he was there to take the decisions on what should be kept and what discarded, and in Astley's words 'to keep telling me that it sounded good.'

Page is said to be getting more interested in old Zeppelin catalogue and there is talk about a lot of live footage that he now believes ought to see the light of day some of which will involve mixing.

As an interesting aside, Astley did cross paths with the band many years ago as he joined Olympic studios as an assistant while the band was working on its third album there; but he adds that Page understandably didn't remember him.

He's adamant about the importance of the type of work he now specialises in and the requirement for 24-96 recording and storage. He has his own opinions on what is best.

'I think it has to be magneto-optical now because they're giving us 200-year guarantees; but the other thing is to bung the stuff straight over from the Genex to the SADiE and run off an exabyte as well.'

He believes it is an irony of life that in some years time there will be people attempting to put back together DAT masters for rerelease in the same way as he is now doing with tape, because as he claims, the shelf life of the format has become apparent.

'I'm really glad we're getting away from DATs because they were the bane of so many people's lives,' says Astley. 'For those that have had masters on DAT that have just fallen apart, it's a horrible, horrible feeling.' ■



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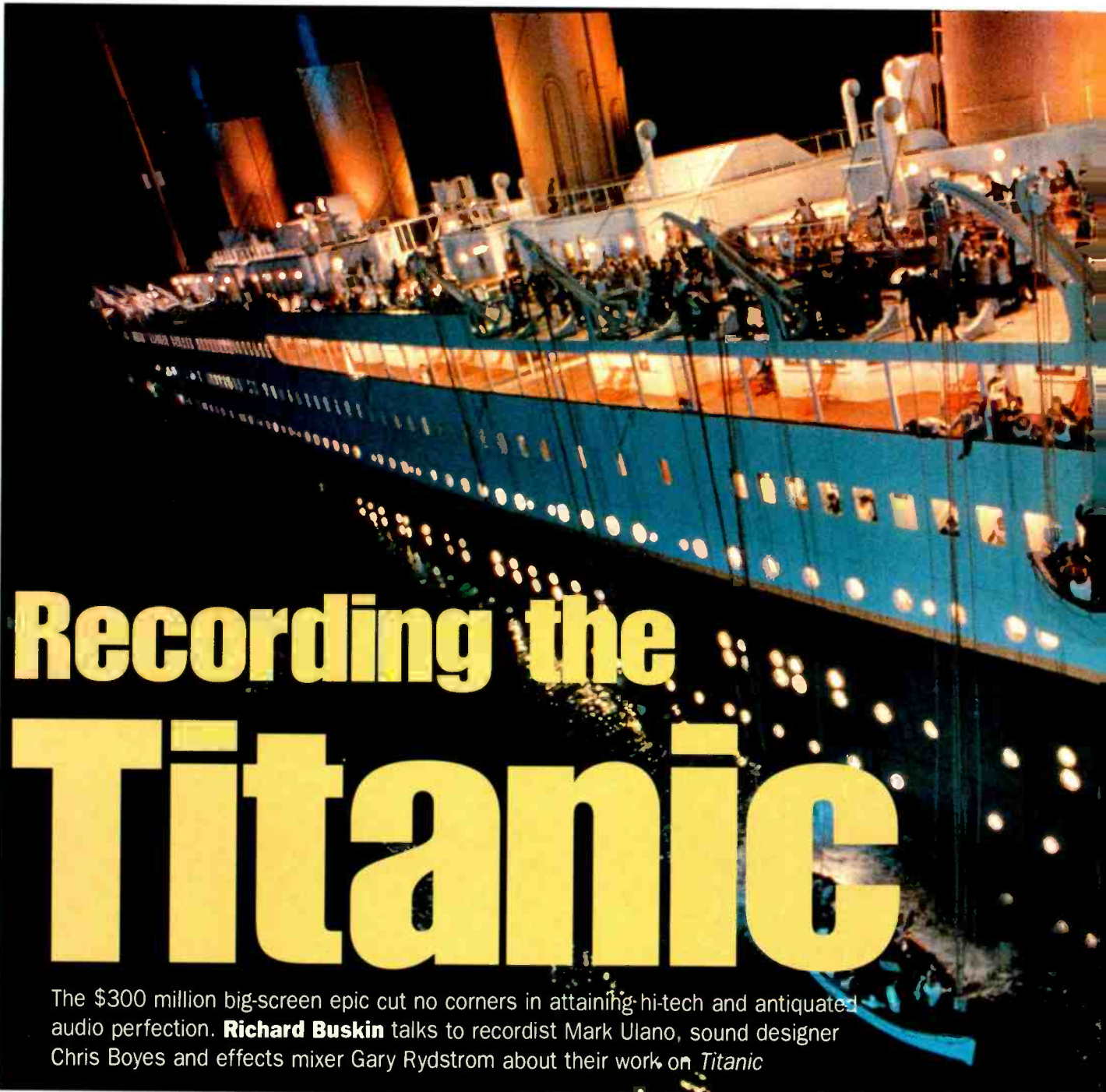
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# Recording the Titanic

The \$300 million big-screen epic cut no corners in attaining hi-tech and antiquated audio perfection. **Richard Buskin** talks to recordist Mark Ulano, sound designer Chris Boyes and effects mixer Gary Rydstrom about their work on *Titanic*

**B**ACK IN 1980 *Raise the Titanic* helped sink Lou Grade's career as a movie producer, yet still the stories surrounding one of the 20th century's most famous man-made disasters continue to fascinate moviemakers. The latest among them is James Cameron, whose record-breaking \$300 million epic, simply called *Titanic*, is, perhaps, more likely to scoop some well-deserved Oscars at this year's ceremony than quickly recoup its costs and turn in a handsome profit. Not everyone shares this opinion, however.

'In terms of what they did I think they did it cheaply,' says Mark Ulano, owner of Hollywood-based Ulano Sound Services, who worked on the production recording for the picture. 'It was not a wasteful project. We were never doing things that were extraneous or unnecessary; it was just big. This film is now enjoying incredible word of mouth, and,

what with the international distribution, I think it may well be one of the first pictures to approach a billion dollars in returns.'

We shall see. Certainly the heads of Twentieth Century Fox and Paramount Pictures, who cofinanced the project, will be keeping their beady eyes on the box office receipts. *Titanic* was the first picture to be shot at Fox's new studio facility in Rosarita Beach, a Mexican town located about 35 miles south of the US border. Thanks to the scale of this project, not to mention the size of the main set which was only fractionally smaller than the actual ship that sunk in 1912 during its maiden voyage from Southampton to New York, the Fox Baha Studios now boast the world's largest exterior water tank as well as the largest indoor one, three storeys deep, for motion picture use.

'The basic experience was one of dealing with things of enormous size,' Ulano says. 'On

a normal movie you have a grip crew of four to six men and an electrical crew of maybe the same amount; this had a grip crew of 84 men and an electrical crew of 76. That gives you some sense as to the proportion of things. It was a city.'

The sound recording was made simultaneously in both digital and analogue. For the former Ulano used Fostex PD2 and PD4 recorders, while for analogue he used a Nagra 4STC. 'This wasn't strictly for protection,' he says. 'Often there's a need for both. I think there are issues that are pro and con in both areas, and I sidestepped that debate by presenting postproduction with the two mediums to choose from.'

'There were several hero pieces of equipment that I had acquired prior to this project, but hadn't really put through their paces. To start with there were the six very expensive Audio Limited wireless microphones made in



the UK; they were unbelievably reliable and I depended on them enormously. This was the second show on which I approached things completely wireless; I'm now on my fifth one and I no longer use cables to the panel. It's an incredibly liberating way to approach a project. So, I used the six Audio Limiteds and four Electrosonics; the Electrosonics were primarily used for private line communication back to me from my boom operators, but in a pinch they would also work as body mics... I wasn't just dealing with capturing the sound; I was also dealing with the interface of communication between the director and his actors."

Being that principal filming took place by the ocean front in the winter of 1995, environmental issues were obviously a primary concern. "As far as electronics go it's a total assault situation," asserts Ulano. "There's a lot of moisture, you're in salt water, you're surrounded by salt air, and so you'd expect there

to be an enormous amount of breakdown. That, however, didn't happen. My main mixer is a Sonosax, I also used a secondary mixer made by Mackie, and a little PLZ 1402 for the communications mix. None of the boards had a problem during the entire project."

Among the other gear that impressed Mark Ulano were the Neutrik X-HD series waterproof connectors, which daily came through between 12 to 16 hours of submersion in four to ten feet of salt water with their reputation intact.

"These were a critical device for me," he says. "James Cameron really demands and needs to have a constant video assist throughout the whole show, whether it's one camera or 11 cameras filming various concurrent scenes simultaneously, and we had large distances between us and the video assist platform; you know, they'd be on barges and we'd be to one side of the tank, and so we were dealing with distances of anywhere from

300 to 1,000 feet all the time. We'd therefore go wireless to them and they would get back to us with video, but we always had to have redundancy by hardwire; that was the primary source to go to video assist for them to get our sound and for me to take back video from them, and the redundant stuff was all done through the Neutrik heavy-duty connectors. Well, never once in five months of 90-95-hour weeks did we ever have a loss of signal over any of those wires. After all, you'd think that just once a drop of salt water would get into the wrong place, but it never happened.

"In this situation it wasn't as if there was a lot of flexibility for error. I mean, we were dealing with economic pressures that amounted to \$1m or \$2m shooting days, because, as everyone knows, for the third act of the movie the front end of the ship sinks. After we'd finished all of the material leading up to the crash into the >>>>

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««««« iceberg, the main set was modified dramatically by cutting it in half and setting up the front half at a severe tilt, mounted on computer-controlled hydraulic lifters. That section of the tank was over 60 feet deep and we would sink the ship on cue in real time for a take that featured, say, 1,500 extras. So, it's a very expensive proposition if there are any mistakes, and the director depends enormously on his sound and video information.

Between 60% and 70% of the original production track ended up in the finished movie: a remarkable achievement considering the size and nature of the set, as well as the number of simultaneous shooting sequences. Most of the ADR was required for scenes taking place during the dramatic third act, when the hydraulics, machinery and water (pumped from the sea into the tank at an incredible rate) all take centre stage.

'We were very diligent and I'm happy with how much ended up in the finished show,' U'lamo says. 'The set was pretty reliable, but still there were situations where there was little that you could do. You know, we had 47 power generators there because of the lighting situation, so we're talking about a lot of juice—they would have 50 x 100-foot bounce cards floating in the air on an adjacent 150-foot-high tower crane, just to bounce light from the xenon arc across the other side of the ship. Nevertheless, if the director was doing a scene that was intimate and required control of the environment to the degree whereby he knew that he could use those tracks, it would be a priority for him to shut it down and make the environment workable.'

**T**HE DIALOGUE was still fairly noisy sometimes,' adds sound designer-rerecording mixer Gary Rydstrom. 'There was a lot of background shifting on the deck of that ship down in Mexico. I'd say that about 50% of the natural dialogue was used in the finished picture, but Tom Johnson, who mixed the dialogue, had the unenviable job of using bits and pieces of both looped and production dialogue going back and forth.' The sound designer on *Titanic* was Chris Boyes at Skywalker Sound near San Francisco, who worked on the movie from February of 1996 to October of 1997.

Gary Rydstrom, who would normally have performed this role, was busy on other projects such as Spielberg's *Lost World*, but he nevertheless still assisted with the design and later was involved with the sound effects mixing. As defined by Skywalker, Boyes' job amounted to creating any sound that required more than that which could be found in the company library. Sample: The sound of the watertight doors shutting, following the ship hitting the iceberg.

'It's a very stylised door,' he explains. 'It slides down from above almost like a guillotine and it's on a heavy geared mechanism, so there were a lot of elements in there that I wanted to ensure were just right. As the doors shut I wanted to have a sound that felt like you're really being sealed in, to some extent sort of like a classic jail door, but it needed to have a definitive impact beyond a jail door. So, initially I looked at it from three different perspectives. Firstly, I needed to have a smooth, controlled but very >>>>>



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«««« heavy rolling metallic sound, and one of the elements that I used was a processed field recording of a heavy bin sitting on a truck that was rolling on a track. Then, for the gear mechanism I recorded the rapping sound of a large bolt that I leaned gently against the turning, geared winch on an old tow truck belonging to a friend of mine. And lastly, for the shutting of the door I used a combination of the doors shutting on an old ship out in the San Francisco bay together with some jail doors. I then put all of these ingredients into the Synclavier and twisted them with a certain amount of EQ, a certain amount of pitching, and basically doing anything that I could to the sound to attain what I want. It's sort of like being a cook.

The Synclavier is one of Chris Boyes' favourite pieces of equipment, along with the Pro Tools that he has taken to using during the past year. 'It's one of those products that you can't help but love,' he asserts. 'Everyday they come out with something new. The Pro Tools and the Synclavier each do things that the other can't, so they're my two primary pieces of gear.' Elsewhere, a Studioframe was used for dialogue and a Sonic Solutions was used for the music, while the final mix took place from August through October of 1997 in Skywalker's new room that houses a Neve Capricorn and a THX sound system.

'I also work with an analogue Oram Sonics 32:8 console, together with Oram's 8-band outboard EQ and the Focusrite as a plug-in on the Pro Tools,' continues Boyes. 'Another outstanding product is the HHB Portadat, that

I use for field recording. It's great because it's built like a rock, and when you're out in the field you don't want to worry about something breaking on you. Also, in terms of the DAT recorders that are available, it has the quietest preamp and the most sensible layout of functions. So, I often take it with me everywhere I go, because you never know if you're going to hear an illusive sound somewhere that you want to capture.'

Of course, the collision with the iceberg and the prolonged sinking of the ship comprise some of the most striking visual and aural moments of the *Titanic* movie, yet for Chris Boyes the sound that he is most proud of is that of the engine with its two-storey-high piston.

**V**ISUALLY, it takes your breath away, so it had to do the same thing sonically,' he says. 'In Jim Cameron's script I read that it had to sound like a thousand men stomping their feet, and so I knew that there wasn't an English word for how large it had to be! Basically, I looked at the picture over and over again, watching the lobe on this camshaft swinging like a pendulum, and I knew that there had to be two distinct sounds for when it comes down and goes up. They'd have to have a tremendous amount of weight without a sharp attack; they had to feel smooth. So, I played around with a lot of different combinations, and I eventually came up with a mixture comprising a piston sliding within a cylinder wall for a smooth metallic scrape, a variety of large stamper machines

for the motion and for the impact, and a huge air compressor on a tug boat.

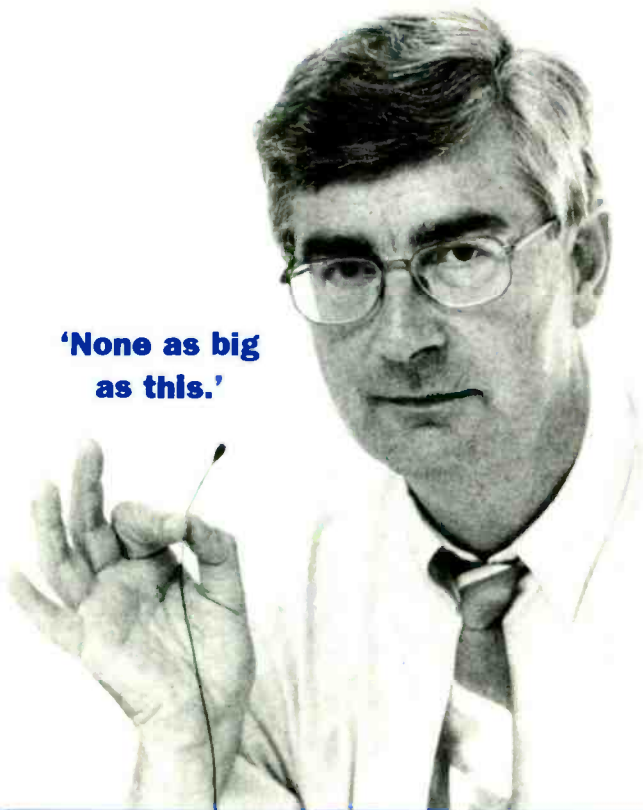
'Again, I sampled all of those ingredients into the Synclavier and played with them, but in editing them against the image I found that, while they were working sort of well, I couldn't quite control the rhythm as I wanted to. Gary [Rydstrom] and I therefore sat down and created a loop with those sounds. I could speed this up and slow it down as I wished, and I think that what you end up seeing and hearing on-screen could definitely propel the largest man-made object on Earth.'

So what about the impact with the iceberg? Not exactly an everyday event that the viewer can easily relate to. In the film we get to see and hear this from a variety of different perspectives: The large hole that is ripped in the side of the boiler room, causing water to rush in and sweep the workers there off their feet; the cascading of ice onto the upper deck; the people who are oblivious to anything having taken place; those who hear something and feel 'a shudder'—namely, the engines being thrown into reverse.

For the sound of ship against iceberg Chris Boyes recorded himself slowly cracking a large sheet of ice in Yellowstone National Park with his own body weight, together with a combination of elements such as anchors hitting steel debris, a large lead weight being swung by a crane into a debris box, cars smashing, explosions and so on. The ice cracking effect was also used along with the close-miked sound of Boyes skiing down some slopes to produce the sensation of the ice showering onto the deck...

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The rerecording mixers of *Titanic* prepare to swim in sync. Left to right: Gary Rydstrom, Chris Boyes and Gary Summers

as did several hundred pounds of block ice being thrown onto wood surfaces by the Foley crew at Paramount.

So to the water. Boyes had a 4-strong team of field recordists, one of whom ventured into the back of a sea cave where the rushing waves almost submerged him and his equipment. Water treatment and sewer treatment plants were also visited, as was a large concrete swimming pool, while an old merchant ship called the Jeremiah O'Brien came in handy for numerous of the film's elements—its engine resembled a scaled-down version of the *Titanic's*, both visually and sonically.

"We certainly had a lot of water," says Gary

Rydstrom. "The thing was to make it sound big and sound different, and also give the effect of it being in places that it shouldn't be. We made as much use as we could of the boom track, which is always nice, and of the sub woofers—probably more than on any other movie I've worked on. If nothing else, this movie is about size..."

Meanwhile, from the perspective of what's going on underwater at the start of the movie when the wreck is being explored, the viewer gets to hear things that wouldn't actually be audible down there. To that end a pair of Hydrophones were adjudged to record things a little too clearly, and so, in order to attain

the desired distorted effects, the field team resorted to the classic technique of placing condoms over their microphones.

"Safe recording," as Boyes describes it. "For me the water was one of the more difficult sound elements," he says, "because once water starts rushing in any form it's very much pink noise, and making that articulate was quite a challenge... At times the water became a character itself, one of the actors in the film, and not a good one!"

Still, perhaps the signature effect of the entire film is the groaning sound of the sinking, breaking vessel. For this, Boyes' assistant, Shannon Mills, recorded an old ship attached by chains to a pier, which made the desired straining sounds as it swayed back and forth. Boyes himself then worked with a 20-minute section of a DAT field tape, blending together all of the different metallic groans.

"I probably made 200 or 300 files which I sent off to Jim Cameron while he was cutting the picture," Boyes recalls. "He then chose the ones that he liked and cut them right in. These evolved from a ship that's starting to sink to one that's seconds from going under the Atlantic ocean. Being that this happened over the course of about an hour and a half it was important not to get too dramatic too early, so this is a real testament to how narrative and image and sonics can all come together to tell a story." ■



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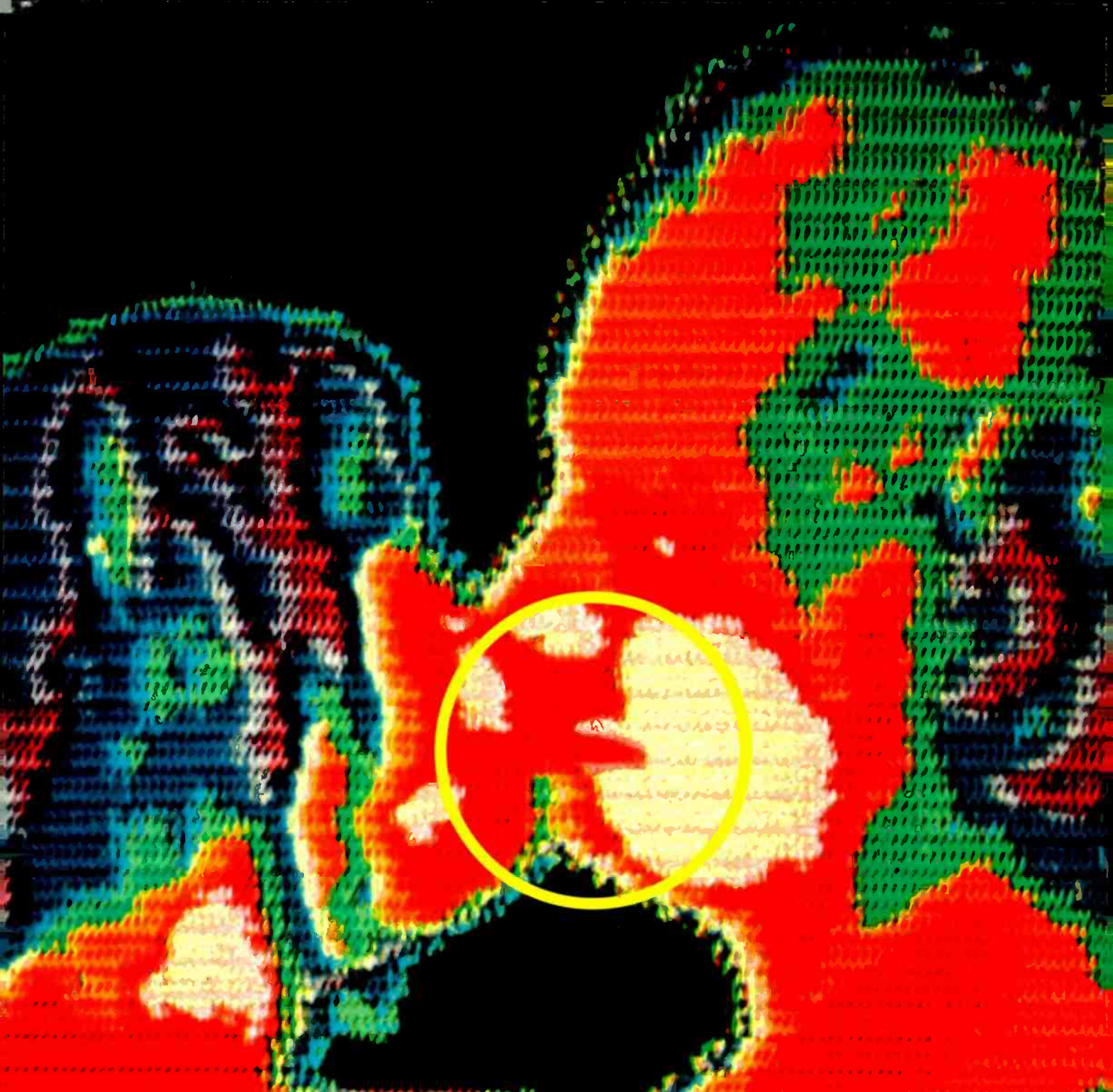
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Elevating Peter Gabriel's Writing Room to the status of major league recording studio involved a characteristic combination of necessity and instinct.

**Tim Goodyer** visits the home of the brave

**A**LTHOUGH originally built for Peter Gabriel to use as a composition room, Real World's Writing Room has found favour in a number of guises. Certainly, it has seen the conception of much of Gabriel's later work, and even the recording of some of it. *Passion*, for example, was also recorded here. But the Writing Room has also become familiar to guests of the studio's Recording Week as studio in its own right.

In order to turn it from writing to recording duties for the Recording Week, it was necessary to beg equipment from benevolent manufacturers, so when the decision was made to grant the room full 'studio status', quite a lot of kit had already been auditioned *in situ*. If this helped in the final choice of equipment, it has definitely not seen studio manager Mike Large rush into any decisions—the choice of loudspeakers, for example, was still being refined at the time of the official opening.

'We don't have plans,' asserts Large, in an attempt to rationalise the situation. 'We don't sit around in a board room with glasses of Chardonnay formulating business plans, instead it gradually dawned on us that it worked rather well as a studio.'

The penny dropped early in 1997 and signalled the search for a console suited to Gabriel's particular way of working. In this, the requirement for being able to move quickly between different ideas and projects greatly outweighed an analogue-digital debate. The nature of the building also played a large part in the studio's development: in this instance it precluded a physically large desk. The final choice was a Sony Oxford digital desk.

'We looked at just about everything and ended up with the Sony not really because it's digital,' Large explains. 'But it's an interesting thing—every time you bring up your favourite piece of analogue outboard at an insert point you become progressively more aware of the noise so you want to keep more and more stuff in the 24-bit digital domain.'

There had already been a commitment to 48-track for the room. Gabriel's latest compositions had been begun on Pro Tools and Sony 48-track digital systems, and the completed room is due to see a new album completed in due course. Additionally, the room was to conform to the blueprint laid down by the large room, in that performance and recording were to be accommodated in the same acoustic space.

With the broader aspects of the requirements decided, Real World turned to David Bell of White Mark to take care of the acoustic and technical work. 'We tend to try to avoid traditional control room designs,' says Large of Bell's brief. 'When you're trying to use >>>>>



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«««« a room as a studio and a control room. you need something that sounds natural rather than like a classic control room—it needs to be as comfortable to sing in as it is to listen in. The main thing is to get a frequency response that's as even as possible and a stereo image that's solid enough that people can confidently position things. But you have to do those things without losing the excitement of a performing space. That's as close a brief as there was.

Where the brief was vague, the practical problems were not—building a listening environment was complicated by the size and shape of the room, and by its many windows: the machine room is small and suffers restricted access; and the under-floor space normally used for wiring was conspicuous by its absence. As a result, much of the cabling is visible, the limited duct space being used to keep walkways clear. To top it all, the Real World philosophy calls for extremes of flexibility in patching and distribution.

'When the room started its existence it had a lot of timber in it and no acoustic treatment at all,' Large recalls. 'It was a great space to perform in, but in terms of what came out of the speakers, it was like a wall of sound coming from everywhere. It was impossible to talk about a stereo image, and so that was the first thing to deal with.'

'The structure of the building was a given,' offers Bell. 'It was designed like this to be the environment Peter wants to work in; we've put as much mass and absorption as we can, but it comes down to designing within the context the client wants. To have so much glass in a machine room, for example, renders it very difficult to find places to put panels—every part of this room that isn't windows is a panel.'

'The idea,' Bell continues, 'was to produce a central working space for the artist behind the engineer so that the two of them could work closely in a good listening field, and have the two "wing" spaces as musicians' performing spaces. The separate live room at the far end is to put the drums or any separate thing. The space there is harder: there's no fixed acoustic treatment in there at all.'

'Acoustically the main area is reasonably dead now. We needed to get the curved ceiling under control—it's got 22 tons of soil and grass on top—but we've got a controlled environment in the centre with some diffusion at the back. We've done our best to suppress the early reflections and our best to produce a diffuse soundfield afterwards. The same rules apply: no matter how strongly the environment has to impinge upon the acoustic design, you've got to try to do the same basic thing.'

Something else that worked well was the choreography needed to complete the wiring installation—11 wiremen spent four days in a confined space without either physical altercation or electrical mishap.

'An awful lot of the technical installation was built off-site and brought in,' Bell explains. 'Normally we like to do as much off-site as possible, but here it was complicated by the lack of duct space. We had nowhere to lose any spare cable so everything had to be done from the central patch outwards—all the remote end termination was done on site once it was loomed in. That was the only way we could get the large number of wiremen spread thinly throughout rather than on top of each other.'

The wiring is plentiful not only because of the interconnection requirements, but because of a number of 'DAT Stations' around the room. These patchbays allow access to the console and all other stations around the room so that equipment—from MIDI sequencers to DAT machines—can be set up anywhere. The flexibility endowed by this provision is not to be underestimated. >>>>





«««« 'There's a consistency of facility on each panel,' explains Bell, 'and the console patchbay is as near a standard—by standard, I mean SSL—layout as you can have. The general lines from the patch panels come in at the top, then the most likely microphone lines are above the ADCs that we decided to use as microphone inputs.'

'The unconventional array is because you can get all the inputs and outputs of the console to do anything you like. We've placed upon them a gentle functionality by where they are on the patchbay. This gives you the flexibility of the console, but it gives you a ground to experiment away from.'

Another aspect of the Sony Oxford that deviates from the norm is the earthing requirement.

'Our normal philosophy is to cut back screens at the input,' says Bell. 'You can't do that with this console because of the phantom powering, so we've had to cut back the screens at the panel dependent on their function. It wasn't something we were warned about, it just occurred to us as we were doing the job, so I don't know what other people have done about it. But maintaining that rigor throughout has produced a very quiet installation—we were very pleased when Sony said it is as quiet as any that they've done.'

One man's quiet, however, is another man's problem. 'Used to the comforting noise floor of analogue, the stark silence of the 24-bit Oxford provided cause for contemplation.'

'There is something rather comforting about nice warm noise,' Large reflects. 'I think, on balance, you are better off in a quiet environment, but sometimes it means you're judging things on how much noise they add—or not—rather than any creative quality whereas when everything was swamped with a nice -80dB hiss, you never even thought about all that stuff.'

'The real problem is delays,' Large continues. 'Every time you go through a convertor, things start time shifting. That problem doesn't go away if you have an analogue console because you still have digital tape machines and there's so much feeding stuff on and off tape with projects like Peter's, that you have to be really careful or everything starts shifting—it's by very small amounts, but it starts to change the feel of things.'

'I don't think there's been anything that we

couldn't do, but there are things that you'd do in the analogue domain without thinking, that you have to be aware of in the digital domain. If you take something out of the desk, through a load of processors, pull it back off tape and so on, the console's fine about letting you correct for it, but you have to think about it all the time—it's not something you just do. Conversely, if you fly stuff around in the analogue domain, the noise starts to build up. Digitally, moving stuff around you're free from worrying whether the noise is starting to mask your lead vocal. So it's swings and roundabouts.'

The commitment to digital is strong, however, with a Sony HR (24-bit) DASH machine already on order and Large's 'guess we'll take a look at the PCM-9000 too', but it's not unequivocal.

'When we evaluated the Sony, one of the things we did was go straight through the console—in through the converters, no EQ, no dynamics, out through the converters to the speakers—and our engineer couldn't tell the difference between that and putting mic lead between the source and the speakers. I think that's about as good as it needs to be so going to 96kHz may be gratuitous. It's not going to be long before the domestic standard is 24-bit, but there's only a point having an advantage if you can tell the difference.'

'But it wouldn't surprise me if we end up mastering on half-inch,' he continues. 'And there's a lot to be said about analogue mastering because there are still people around who can bring something magical to a project. You should never dismiss those talents.'

And talent is the key word; regardless of its technology, Real World exists to best serve the recording of music.

'Our way of working is to do things that interest us and then try to make commercial sense of them,' Large reveals. 'This felt like the right thing to do and I think it will end up a viable commercial project. That was the spirit that motivated us when we built this place.'

'Any visiting artist responds more to the enthusiasm of the people around them than to anything else. I think that there is a risk that conventional studio tend to stifle some of that. Ultimately, if you're not excited by the record you're making then you shouldn't make it. The environment has to help make it fun.' ■

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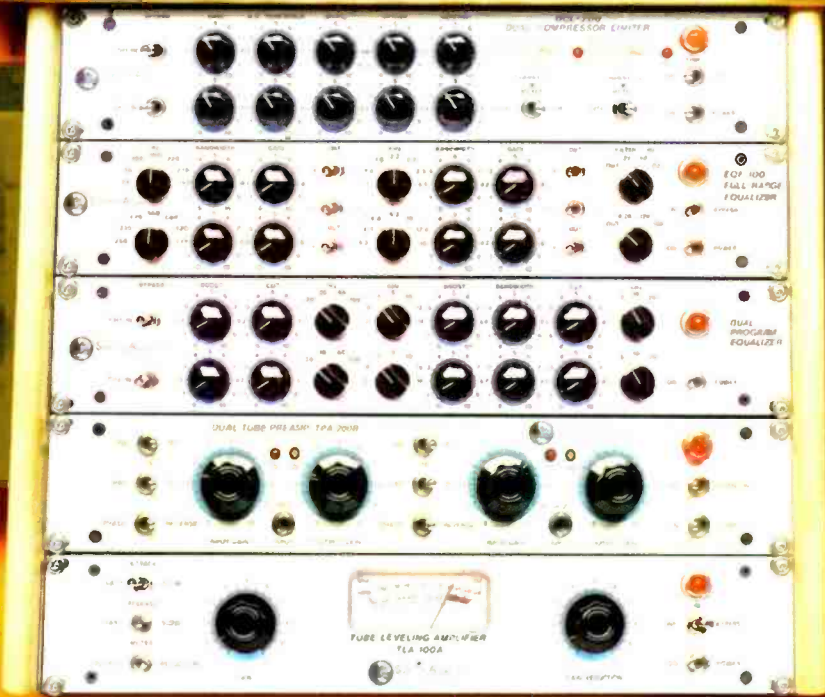
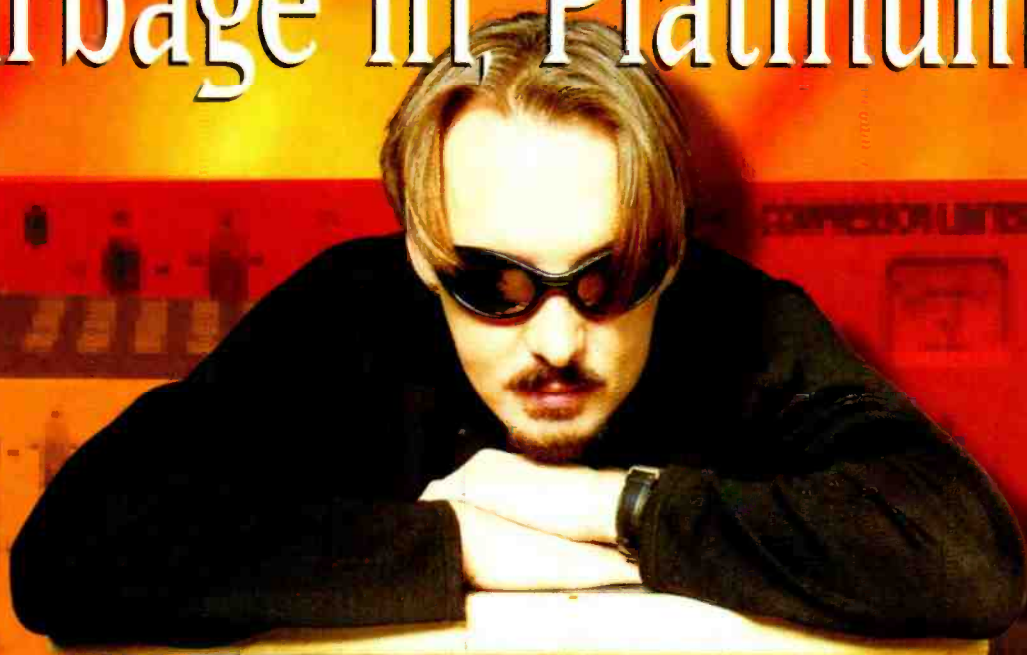
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**Butch Vig**, engineer, producer, co-owner of Smart Studios and the drummer for Garbage, relies on Summit gear for all his work. Vig engineered the group's latest platinum album, "Garbage," nominated for three Grammys this year, as well as producing albums for Smashing Pumpkins, Nirvana, Soul Asylum and Sonic Youth.

"Whether I'm working at Smart Studios or I'm on the road touring, I always use Summit tube gear. I particularly like using the DCL-200 Compressor Limiter for tracking vocals. It colors the sound very subtly, while retaining its warmth and transparency. Often I will compress a vocal performance quite a bit.

This allows me to place it exactly in the mix while maintaining a lot of presence and natural dynamics without sounding too loud. This works especially well when the mix is very dense."

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data rate but is 67% higher.

There is no doubt that higher sampling frequencies—such as 96kHz and 192kHz—give extremely linear frequency responses and approach the performance of 30ips analogue. Yet this improvement appears to have relatively little to do with the audio bandwidth. Studies showed that the main reasons are much-increased time-energy domain resolution and the progressively gentle nature of the digital filter that can be implemented when sampling at higher frequencies.

But how does it sound? Are we not reaching a point of diminishing returns?

At a recent audition, 30ips, half-inch analogue tapes were transferred using 24-bit, 192kHz convertors to digital and back to analogue. The outputs were switched blind between a direct feed off the tape and the output of the D-A. Almost everyone could easily detect the difference between the 30ips tape and the analogue-digital-analogue chain.

Bob Ludwig: 'Whatever the technology, paying close attention to how the technology is implemented is very important. An outstanding analogue stage [in an A-D] is the foundation of good digital sound. People like Pacific Microsonics and dCS know what they are doing, and the decimation filter of the Sony DSD sounds very good too'.

When the CD first arrived in the early-

**At a recent audition, 30ips, half-inch analogue tapes were transferred using 24-bit, 192kHz convertors. The outputs were switched blind between a direct feed off the tape and the output of the D-A. Almost everyone could easily detect the difference between the 30ips tape and the analogue-digital-analogue chain**

1980s, its potential for commercial success was estimated as a higher-cost, higher-quality alternative to the, then, current format, the LP, and lower on the sonic totem pole, the prerecorded cassette. Record retailers did not want to double up on the same title because carrying the additional inventory is expensive and stocking just the right item was not always an easy guess. Even with more people buying CD players, the volumes were still not interesting enough for production costs to fall to truly competitive levels. The proliferation of the personal computer in the mid 1980s to late 1980s and the CD-ROM changed all that.

With millions of PCs being sold every year,

the number of CD production facilities grew like wild fire and the cost of making CDs dropped to one tenth of what it was when it first started. Pressing and packaging cost for a CD today hovers somewhere around US\$0.70. The driving force behind the wave this time is the natural evolution to the next higher storage capacity in digital formats, one that has been somewhat controversial within audio circles, but is destined to succeed nonetheless. It is, of course, DVD.

The DVD standard offers all the trimmings: a minimum of 6 times more storage capacity than the CD, a flexible and effective architecture for implementing new features such as conditional branching and adoptive routing. The latter is good not only for movies and music, but also gives computer software developers unlimited potential in creating the next generation of software. This additional capacity and capability will most certainly win the emerging support of the ubiquitous PC industry. When PCs start to be delivered with DVD ROM drives as standard equipment by the fall of 1998, the next wave in catalogue reissues will start for the massive repertoire of recordings tucked away in every corner of the audio world. DVD box set re-issues, that is.

DVD is more likely to emerge the winner of the new media war: firstly, the cost of manufacturing DVDs will lower significantly to current CD levels because pressing plants will retool to support the volumes generated by computer software publishing reaches critical mass in late 1998 and 1999. Then, to produce, master and archive in multibit >>>>

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# Richard Dodd

Photo: Peyton Hoge Studio: Vital Recordings



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“**For music** recording I believe that analog sounds better. I prefer **BASF SM 900** maxima because it represents the best balance of virtues available in an analog tape. **SM 900** has a good tone to it and the sound sticks to it better than other tapes I've used. It's that simple.”

Grammy® winning producer/engineer Richard Dodd's credits include work with **Tom Petty**, **George Harrison**, **Bob Dylan**, **The Travelling Wilburys**, **Francis Dunnery**, and **Edwin McCain**.



SM 900 maxima is a high-output analog tape designed specifically for multi-track recording and mastering, with extra wide dynamic range, low noise and low print through.

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linear PCM and be DVD-ready requires only an upgrade to the existing A-Ds, D-As and workstation. Few other pieces of equipment in the production or postproduction chain needed to be changed or acquired. Many vendors are now offering competitive 24-96 converters and workstation software upgrades spanning a broad range of capabilities and prices. The more abundant the choices, the more likely a concept or format is to succeed—VHS-Beta and PC-Apple has taught us that.

In other words, DVD production opens up opportunities to large and small facilities alike since it does not require a wholesale change to completely proprietary hardware and software systems from a single vendor.

Toshiba and Matsushita are the major proponents of the DVD format. Combined, they are also, by far, the largest providers of OEM CD-ROM drives for PCs today. The market domination of these two companies is expected to continue when PCs shift to include DVD-ROM drives as standard equipment. Commercially, volumes build and success follows where the broadest application and acceptance takes hold. DVD will succeed due to its extraordinary potential as an intelligent medium across a broad variety of uses, in the home, in the office and in many specialised fields. It is not as risky as a single-purpose format.

For champions and cynics alike, there is really no way of predicting accurately when DVD or the next evolutionary step beyond that will happen. And there is no real need to,

For champions and cynics alike, there is really no way of predicting accurately when DVD or the next evolutionary step beyond that will happen. And there is no real need to, because it will happen. It's just a matter of when, not if

because it will happen. It's just a matter of when, not if. To make sure that your precious recordings are ready to continue producing revenues for you and your loved ones over time, the key is to incorporate an effective production and archival process to protect your investment.

Options are plentiful in the transfer and storage media as well. From open-reel tapes, encased tape cartridges such as 1630 and DAT to magneto-optical (MO) cartridges and hard drive, the choices are plenty. And the best choice, even in the most revered technical circles, have sometimes come down to personal preferences and working habits.

Ludwig archives his client's work on Nagra-D tapes in 24-bit, 96kHz format, but many studios find working with MO machines such as the Genex GX-8000 and the Sony PCM-9000 very attractive. 'With random access capability

and a medium good for 100 years, we feel pretty comfortable that the music will be on these disks for a very long time,' says David Chesky of Chesky Records in New York.

Larger record labels such as BMG and Sony are considering the E.MASS robotic system for use with tape cartridges or other forms of removable media. Warner Records are also evaluating proposals from both E.MASS and IBM. Select a medium that is most appropriate to the budget and scope of the project and you should be safe. In the words of Al McPherson, VP of Technology at Warner Records in Burbank, California, 'The most stable medium we know of now is probably the Digipress Glass Master system where a glass platter is not just done with photoresist on a substrate. The glass platter is actually physically etched with data. Glass has been proven to be stable.'

He continues, 'More importantly, choose a system that suits your purpose and just do it. Before it's too late. Pick the best method that you can use today and if the technology is better in the future, do it again then.'

It seems that the technology is getting to the point where it is no longer the issue. From a plethora of conversion technology alternatives to a wide range of media choices, it's a matter of choice, not whether it is feasible or possible.

Understand the technology and the market implications of your investment direction thoroughly. Plan your strategies carefully and implement with attention to detail. Most importantly, as the famous sports company ad says, 'Just do it!' ■



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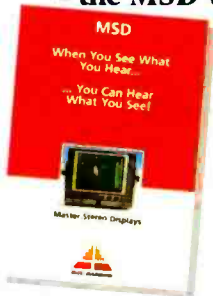


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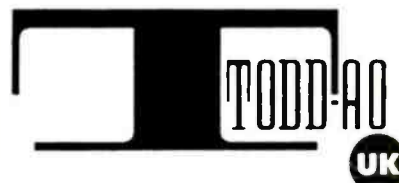


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## US: The American Macbeth

Empowered by equipment in the studio, American producers are about to empower themselves outside of it writes **Dan Daley**

LIKE OTHER ARTISTS, Producers share the same kinds of anxieties and insecurities that propel otherwise normal human beings to pursue careers in the arts. Which is another way of saying that producers are often as mad as the people they produce. The engineer-producer, however, while also sharing the neurotic genetics of artists, benefits from the stabilising influence that technology brings to the table. There is a certain serenity that comes from knowing precisely what will happen when that knob is turned exactly that much, and from having the sense of authority that enables one to reach confidently across a vast expanse of the very expensive electronic real estate and not be limited, as are many of their producer-only brethren, to the monitor volume control.

On an autumn night last year at the Nashville Ocean Way Studios, Ed Cherney took some comfort from the inherent physics of being an engineer even as he made his way verbally down a very new, very different path-leading the first US producers' association, the Music Producers Guild of America (MPGA). Cherney was in town at the behest of the local

SPARS chapter. But as familiar as the recording studio environment is to Cherney, who was profiled in these pages a couple of months ago, the mission that brought him to this one was, in a very real sense, terra incognita. Awaiting his turn to speak, Cherney seemed as nervous as a musician about to walk onto a strange stage for the first time-while the organisation had declared its manifesto at the New York AES in September, Nashville, with its dense environment of producers and engineers, was truly the Carnegie Hall debut gig for the MPGA-and for the first few moments he had a deer-in-the-headlights quality about him, a demeanour not unlike that of Wiley E Coyote upon receiving a mistaken delivery from the Acme Explosives Co. Cherney's trepidation about leading this charge was palpable much earlier; he blew off a few interviews on the subject before finally talking to me at length about it over last summer. Understandable-as commonplace and common-sensical as RePro seems to those in the UK and the European Sound Directors Association is on the Continent, the course of a producers' organisation in the States has been far bumpier; over the last few years that the idea has been

floated here it has generated as much confusion and distrust as it did curiosity amongst American producers. That an organisation ever became organised at all was based largely on Cherney's stature in the US, and his apparent prior lack of agenda outside of music, which confers on him a pristine, unpoliticised aura of genuinely good intentions and youthful optimism. It was not unlike what the first press conference of the Kennedy administration must have been like-Cherney's ingenueness, as well as his agenda, had the assembled throng of 100 or so producers, engineers and musicians rooting for him early on.

If Cherney knows where all the knobs on a console are blindfolded, then he acknowledged the need for a map on this excursion, pulling out some lengthy scribbled notes of hopeful initiatives for the organisation that, towards the end, read like an ambitious laundry list. From health insurance to airplay royalties to the status of remixers, Cherney felt compelled to lay the entire strategic imperative forth, playing not the politics of inclusion and consensus but rather the role of the penitent in the confessional-that very American 12-step jig that demands that we confront our failings before we can fix them. The recitation was several times interrupted for practical amplification by Chris Stone, who as the quintessential soldier of fortune in the studio business is perfectly cast as the Metternich-like consigliere domo to Cherney's JFK. In the end, even Cherney had to concede that most of the aspirations of the MPGA agenda were beyond

## Europe: Summits and expos

Uncertainty over surround standards confuses; while secrecy over sound shows means missed opportunities writes **Barry Fox**

AT A DVD SUMMIT held in Versailles, near Paris, early in December, Koji Hase, chairman of the DVD Forum, revealed that he would ask the ten founder members to rescind their original decision to make MPEG2 the mandatory standard for compressed audio on European PAL discs. On 5th December, the Forum met in Tokyo and voted, eight to two against Philips and Sony, to allow either MPEG2 or Dolby AC-3. Linear PCM remains an alternative option, but few discs use PCM because of bit space constraints.

Lifting the obligation to use MPEG2 for compressed stereo undermines the main reason for using MPEG2 multichannel surround; there is a saving in bit space because MPEG stereo is a kernel for MPEG surround. So the Hollywood studios, which only three months earlier had pledged in Berlin to use MPEG2 surround, are now free to use AC-3.

Philips says it supplied the necessary encoders. But the studios say the encoders were still prototypes. By the end of 1997 there was still not a single MPEG surround decoder in the shops. The company claims it 'regrets the decision' which was based on 'incorrect information', and will continue to support MPEG2 surround. Sony said in Paris that

Columbia Tristar would use 'only MPEG2'. But Sony had already told the Committee formed to co-ordinate the launch with the British Videogram Association and the European Optical Disc Organisation, that it would hedge bets by putting both AC-3 and MPEG2 surround on the same discs. MGM will use mainly AC-3 for surround. PolyGram said only MPEG2.

The good news is that all the hardware companies have now pledged that all new PAL DVD players will be dual standard, and thus able to play either AC-3 or MPEG2. The demise of a standard based on a system that is not yet ready, creates the much more workable situation in which studios use whichever standard they like, consumers do not have to know there is a difference and audio engineers judge the sound quality with their ears.

DTS confirms that none of the DVD players currently on sale can connect to a DTS decoder (such as Yamaha's) to play DTS DVDs. The standard for labeling the DTS bit

stream with headers and flags was only recently agreed.

But some new players (such as those from Panasonic) will carry a DTS logo to signify that they can connect to an out-board DTS decoder.

DTS DVD discs will have either PCM or AC-3 stereo as well as DTS. DTS bit rate runs up to 1.536 Mbit/s with different rates for different movies, but consistent rate through the movie.

Confusingly, although no current DVD player will pass the DTS DVD flags, DTS audio CDs will play on current DVD players and the CD bitstream passes unaffected to a DTS decoder.

A nice idea for an exhibition to mark a hundred years of recorded music might be to gather memorabilia such as the original mixing desk used by the Beatles at Abbey Road, and the Grundig TK-8 used in 1957 by Bob Molyneux to record John Lennon and the Quarrymen at a skiffle concert. Store classic tracks, including the Quarrymen, on

a digital server for instant access. Give people the chance to remix the original 4-track master of the 'The Hollies' 'He Ain't Heavy, He's My Brother'. Throw in interactive videos, historic clips and demonstrate Sennheiser dummy head stereo with a three-dimensional sculpture which generates live sound effects while they are heard through stereo headphones. Cater for schools with electronics ronic models, like a violin string

immediate grasp, and he perhaps felt the same sense of being overwhelmed that made him such a reluctant leader of this venture in the first place. But Cherney had put his notes away for his closing statement, one that revealed why he was here, why the artist performs. In addition to all of these things, the MPGA could, he said, '... put an end to the kind of isolated lives that producers and engineers lead'.

Outside, in the front driveway of Ocean Way on Music Row while waiting for the valets to retrieve our cars, Cherney lit a cigarette and with a combination of relief and apprehension asked me how I thought it had gone. He was genuinely anxious. He was Macbeth alone on the ramparts under a Danish moon, not MacArthur the conquering hero wading ashore for the cameras.

I don't remember exactly what I replied, but I do recall thinking that Ed Cherney doesn't need anyone to tell him when something sounds good. I drove off into the Nashville night, still the cynically uninvolved fly on the wall, as is my nature and that of my profession, headed for one of the usual watering holes where I and others would proceed to blow various types of smoke around the room as we rendered a post mortem on the evening's performance. Ed Cherney got into his rental car and drove back to his hotel, ready to leave in the morning for Los Angeles, where no one smokes any more. Ed went back to LA changed by his own words.

One month later, I quit smoking.

nodding to produce into harmonics.

EMI has been secretly staging just such an exhibition for the last six months, inside the Canary Wharf Tower in London's Docklands. I found out only from an advert which did not even give the venue. After braving the driverless Docklands Light Railway I found the show with staff jaded at the poor attendance. An entry fee of £6, and £2.50 for scrappy programme, seems a bit steep for what is after all a promo for EMI.

I learned that during the war years the British government encouraged the public to return their used shellac 78s, to be melted down for new records. 'Don't hoard old records' exhorted the poster. What a great way to sell new releases.

EMI also displays original correspondence with Dame Nellie Melba. In 1907 EMI was charging one British guinea, just over £1 sterling, for a single disc. Dame Nellie told the company to halve the price, because she was sure that more than twice as many people would buy her records. She would earn just as much, but reach a wider audience. Ninety years on the idea still makes good sense. Only two Quarrymen tracks remain. Bob Molyneux erased the rest because he wanted to record a thunder storm. Which reminds of how the BBC erased so many classic TV shows to save on the cost of new tape.

The EMI exhibition will have closed by the time you read this. So why report it? Because Music 100 was designed as a mobile show and, who knows, it may turn up somewhere else with similar low-key publicity. If so, and you find out, you'd be well advised to go and see it.

## A message from the asylum

Posturing over key control over tomorrow's broadcasting gateways grows more intense as tomorrow draws closer writes **Kevin Hilton**

IT IS SAID that fiction reflects reality—as in the new James Bond film *Tomorrow Never Dies*. In this the arch-villain is not some scarred evil genius with a liking for fluffy pussy cats. Instead, Pierce Brosnan faces up to a megalomaniac media baron, played by that fine Welsh actor Jonathan Pryce. In a time when major political and economic decisions are influenced by television, radio and newspapers, it is not insignificant that an all-powerful proprietor should be chosen as a threat to the world.

Naturally, much sport could be derived from trying to work out exactly which powerful media overlord the film makers had in mind when they created the Elliot Carver character, whose name in the original script apparently had the initials RM. There is the rumour that many were nervous about the characterisation, believing that certain figures could see a similarity and take offence. (Probably the fear was that they would take offence straight to the libel courts but would anyone own up to seeing similarities between themselves and a madman who triggers wars and the like just so his newspapers and TV networks are ahead of the competition?)

The obvious template for the new Bond villain is Rupert Murdoch. Alongside him in a line-up would be Silvio Berlusconi and Ted Turner, with Kerry Packer and others as likely suspects. But someone who should be measuring his height along with them is Bill Gates, whom journalist Neil Hickey recently wrote was striding towards 'becoming a 21st century media baron'.

While Murdoch has his television empire, much of his power and wealth comes from what are now regarded as traditional sources. Gates is of the new breed. His power and wealth have come from designing and manufacturing the tools that are now used to create today's media and will redefine it for the future. This has obviously rattled Murdoch, who told a conference in June, 'We have to stay on our feet to make sure Bill Gates doesn't erect a toll gate in every house'. Of course not, Rupe - that's what you want to do.

Analysts have dismissed the toll gate analogy, saying that it goes further than that. In effect Gates has potential control over the means by which material is created. Already he is making moves into television, having formed an alliance with NBC News in July 1996 to form MSNBC, a cable news channel with on-line access. Moving on from this, there is Web TV and the redefining of Win-

downs to cope with the interactive future. Alongside that, there is Microsoft subsidiary Softimage, whose DS workstation is looking to become a one-stop shop for video and audio production.

In many respects, Gates has outmanoeuvred Murdoch and the other, more conventional media moguls because he has made sure he has a large slice of future distribution methods. Whether this is how the future will be is another discussion because there are still doubts as to whether the Internet and associated formats have the capacity for what is generally considered as broadcasting. However, in terms of early computer access, which most broadcasters now have through Web sites, Gates has ensured that he is involved in some shape or form.

The one mogul missing from all this is Richard Branson. Sure, Virgin has an interactive TV hook-up with Cable & Wireless but the man himself appears to be more interested in chasing large amounts of fabric over deserts. Earlier in the year he was all set to take on the might of BBC Radio 1FM by arranging a merger with Capital Radio but now, as this was still under consideration by the Monopolies Commission, he changed direction faster than one of his balloons and sold Virgin Radio to his breakfast show DJ, Chris Evans. But Evans is not merely someone who plays records; he has built up from this to run his own production company and recently missed out on a bid for the last FM radio licence in London. Since then, he had spoken of buying his own radio station. And now he has, with Branson retaining a small shareholding.

After his buy-out, Evans took to playing snippets from the Fun Boy Three song *The Lunatics Have Taken Over The Asylum* on his show, either as yet another self-conscious reference to himself or as a way to pre-empt anyone else doing it. Thinking about the whole deal, his take-over of the radio station on which he works is less the mad people assuming control of the institution and more a bunch of children being put in charge of a sweet shop. This could be a good thing as it may inject the fun back into the medium but given Evans' self-indulgence, it could backfire horribly.

The self-styled 'typhoon' has shown that he can run a company but now it is a bigger proposition. In the past Evans has complained bitterly about his bosses. Now he is the boss. Hang on, does Jonathan Pryce sport a ginger wig in *Tomorrow Never Dies* or not? Just a thought.

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PROFESSIONAL DIGITAL AUDIO

# Getting the best out of digital audio tape recorders

Most people think that digital recorders either work or they don't, but it's an over-simplification that **John Watkinson** doesn't accept. Read on to make sure yours is working properly.

**T**HE BASIS of digital audio is that the conversion process turns the analogue signal into data, so that the audio recording problem becomes one of data recording. If the recording is ideal, then the sound quality is determined only by the conversion process.

It's not easy to build an accurate converter and even when it's built, it needs a suitable environment. Clean power rails and a phase-locked loop for clock recovery are vital, but are not always provided. It's not too hard to do it within a studio machine, but near impossible in a portable unit where everything must run from the same battery.

Small DAT machines often have poor converters, because the available space is limited and the power supply has to be shared with electric motors and high-speed logic. Screening between the converters and the rest of the circuitry is difficult and power-rail noise cannot effectively be decoupled. This can cause clock jitter that degrades converter performance seriously. It's not necessarily the designer's fault; the average user doesn't understand that just because a digital recorder can be miniaturised a converter can't be. Equally a digital recorder can be made for a very low price whereas an excellent converter cannot.

The situation is even worse

with digital 8-tracks based on VHS or 8mm tape cassettes. Here every penny spent on improving a converter is magnified eight-fold in the product cost. As these units are intended for the semi-professional market they have to be built to a price and this often shows in the converter quality. The result of variable converter quality is people who think recording formats have a sound quality when they don't. This is the common mistake of going from the specific to the general. It is nonsense to say, for example, 'I don't like the sound of the DAT format'. Instead, 'I don't like the sound of the Brand-x DAT machine' is quite acceptable because that doesn't preclude the Brand-y machine from sounding much better.

The solution to variable internal converters is to separate the conversion and storage functions. In this case each can be optimised for its own task. Converters can be selected for the required quality, and recorders selected for their ability to store data. Digital interchange between the two is completely lossless unless there is a defect somewhere.

Fig.1 shows how the best quality is obtained from the converters. The sampling-rate clock should be generated at the converters, either from a crystal or by phase locking to an external reference. The recorder is then

slaved or genlocked to the converter timing. This is much more accurate than trying to slave the converters to the transport clock. A data recorder will continue to work perfectly in the presence of jitter that would kill a converter, so it is better to put the timing reference where it is needed most.

Naturally, if the converters don't contain adequate phase-locked loops, this configuration is a waste of time. In this case jitter on the data cables won't be completely rejected and different cables will sound different. It's surprising how many converters sound different when a reframe is installed upstream. If this issue can't be fixed with today's converters, there seems to be little point in raising the sampling rate or the wordlength as this isn't actually increasing the information stored in the presence of sampling clock jitter.

In the real world there is no such thing as an ideal data recorder. All media suffer from defects, so that the recording itself is corrupt, and the replay process can be impaired by interference so that either way the reproduced data are not the same as the originals. This is the reason for using error correction. By adding extra bits to the recorded message it can be recovered with any desired reliability. Thus errors from the medium are quite normal,

because after correction they are gone. Difficulties only arise when the frequency of errors becomes unacceptable. Frequent errors may exceed the power of the error correcting system so that the recording process becomes compromised.

Trying to measure performance of a recorder after the error correction system is a waste of time as it has the characteristic shown in Fig.2a. As the tape or deck degrades, the correction works harder so the quality remains constant until the correction power is exceeded when the quality nose-dives. In contrast, an analogue recorder has the characteristic shown in Fig.2b where it starts to go downhill immediately but gently.

Given the characteristic of Fig.2a, the fact that a digital recorder is working doesn't tell you whether it is about to fail or whether it will run for months. We need to get at the error rate to establish the likely reliability. Measuring the absolute error rate isn't much help, as it depends on the balance of tape-head performance and correcting power the format designers assumed. For example, the old PCM-1630 CD mastering recorder had a pretty primitive error-correction system, but it worked because the U-matic tape decks were very conservative by digital standards and didn't make many errors when used with good >>>>

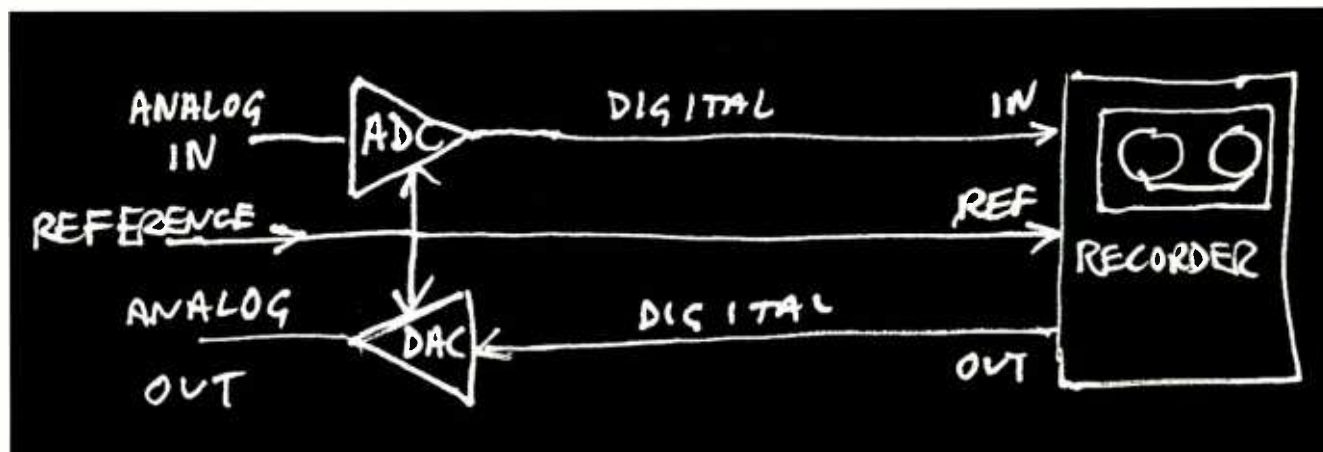
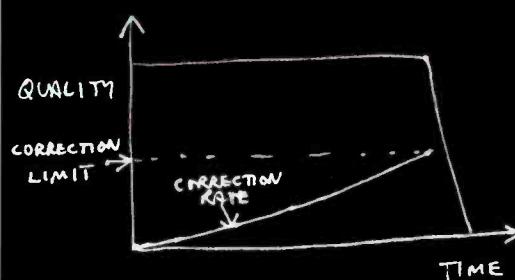


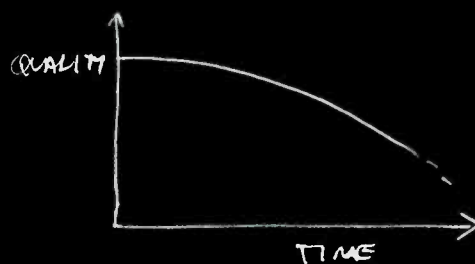
Fig.1: Slave recorder to converter clocks for best jitter performance

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a) WHEN CORRECTION RATE HITS THE LIMIT, QUALITY CRASHES



b) ANALOG RECORDER GOES DOWNHILL GRACEFULLY

**Fig.2: comparison of digital (a) and analogue (b) performance deterioration**

tape. In contrast, DAT has a massively powerful error-correcting system so that it can run on incredibly narrow tape tracks. The error correction rate that is normal in DAT would kill a 1630 dead.

Consequently, what matters is the ratio of the actual correction rate to the maximum possible correction rate. The smaller this ratio, the better the recorder is performing. A steadily increasing ratio indicates that a failure is bound to occur unless some maintenance is performed. The machine can be fixed before it goes wrong. Many professional recorders have error-rate displays so that this ratio can be monitored. I would go as far as to say that without such a display a recorder isn't really professional as users have no idea how far from failure they are working.

In order to provide graceful degradation, practical formats are designed so that data which cannot be corrected can instead be concealed. This usually interpolates the missing sample from those either side. There's a loss of quality, but in many cases it's not as bad as losing the audio altogether, especially if the machine is playing to air. Again the occurrence of an interpolation often drives an indicator in quality machines. If regular interpolations are experienced, there's a problem. In CD mastering, concealment may not be used. If an uncorrectable error is experienced, the process is stopped and the equipment is fixed.

Although error-rate displays show that there's a problem, they give no indication of the cause of the problem. You could use the analogy of a crying baby.

The trouble with error correction is that people expect too much of it. Dirk Dogbrain at Studio A buys cheap tape because he knows the error correction will fix it. Cliff

Clueless at Studio B hasn't cleaned his machines in months because the error correction means he doesn't have to. Then one day a tape from Studio A arrives at Studio B and it won't play. Naturally Studio A claims that it never has a problem and the fault must be Studio B's machines. Just as naturally Studio B says that it never has a problem and the fault must be Studio A's cheap tape. Both are comfortable with their own point of view because it means that neither of them has to learn anything or change their cosy life.

Digital audio tape recorders have heads, and heads get dirty and wear out. The first reaction to a suspected recorder problem is to clean the tape path. Tape binder is meant to stick the magnetic coating onto the tape substrate, so it's tenacious stuff and it will stick to the tape guides just as well. Digital tracks are very narrow in comparison to those of analogue machines and so accuracy of tape guidance is more important. A lump of binder stuck to a guide might not do an analogue machine much harm, but it could seriously affect the tracking on a digital machine.

Cleaning the tape path on an open-reel machine is easy, whereas access is harder with cassette-based recorders such as DAT and digital 8-tracks. In my experience, cleaning cassettes are of limited use because they primarily clean the heads but tend to ride over muck on the guides. Taking the top off the machine is tedious but allows more effective cleaning access.

Next to cleanliness, digital recorders appreciate accurate tape tension, particularly rotary-head machines. The traditional tension gauge for analogue decks is just too big to fit a cassette deck. Testi cassettes are available that incorporate a tension gauge and it's worth checking once in a while. ■



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# Two into five will go

With new delivery formats poised to create an unprecedented demand for multichannel audio, the generation of multichannel surround from 2-channel masters is going to be a hot topic. **Francis Rumsey** investigates

**M**ULTICHANNEL SURROUND SOUND is undoubtedly the way forward for professional and consumer audio. It will help to revitalise the industry in numerous ways, will improve the listening experience compared to 2-channel stereo, and provides a vehicle through which the consumer industry can sell new hardware and software. The work I shall describe here has been undertaken as part of a EUREKA research project called MEDUSA, that aims to investigate a range of aspects of multichannel surround sound. Although the formal results, including some blind listening tests, will be published at the AES in Amsterdam in May, this article is a summary of some of the practical outcomes of the first part of the 'upmixing' project. It is hoped that others will try some of the things I have tried and report the results in these pages.

The idea of synthesising centre and surround information is possibly rather distasteful to many. Some have memories of long-past stereo synthesis methods, which were noted on LPs (I think it was Decca) as 'monophonic signal artificially reprocessed to give stereo effect on stereo equipment'. Things have come a long way since then, and we now have sophisticated digital algorithms which are designed for converting signals from stereo to multichannel. I am not referring here to the rather cheesy surround 'effects' that one can find on consumer surround amplifiers, even though some of the processors I shall discuss do provide these options. Neither am I going to talk about Dolby Pro Logic surround, because that is designed specifically for decoding matrix-encoded material and does not give good results on unmatrixed 2-channel material. I am really interested in those processes which attempt to extract a centre channel and surround information from unmatrixed 2-channel programme material without adding any effects.

The reasons for considering this are numerous. First, the industry will soon need to source programme material for surround DVD and there will initially be a shortage of recordings. Some good results could be achieved quite quickly by using conventional recording techniques and processing 2-channel recordings through such algorithms. Second, the huge back catalogue will be revitalised once again if some of it can be reissued in surround format. DVDs that boast 'surround' will be more desirable than plain stereo, just as LPs that could boast 'stereo' were always considered more saleable than those that could only offer mono. Broadcast programmes created in surround will have greater overseas sales potential than 2-channel stereo, and wide screen digital TV broadcasts will be enhanced if accompanied by 5-channel sound. If surround 'upmix processors' work well then a

convincing surround effect may be achieved at reasonable cost. A substantial market may be opened up for audio postproduction facilities with the skill to reprocess recordings optimally for surround.

I am not promoting the use of upmix processors in place of discretely mixed or miked 5-channel sound. There are many things that upmix processors cannot do, particularly if you want to make much more substantial use of the rear channels for panned sources as opposed to diffuse effects. If you can generalise about these algorithms, it is to say that they mainly take the ambient or diffuse spatial information from the 2-channel original recording and use it to drive the rear loudspeakers in a 'spatialised' fashion, as well as synthesising a centre channel from the mono centre information. The result is that effects, reverberation and so forth are spread more appropriately around the listener, creating a greater sense of spaciousness and envelopment.

Some might say that the right place for such processors in the signal chain is at the consumer replay end. The consumer would then make the decisions about whether to listen to 2-channel recordings in surround, and would select the algorithm and the settings to give the desired effect. But this removes control of the sonic end-product from the programme producer and puts the onus on the consumer. Also, the only algorithms that I have found to be really satisfactory exist in extremely expensive consumer processors costing some thousands of dollars, making them unavailable to the majority.

The devices I have been working with include the Lexicon DC-1 and the Meridian 565 (both very-high-end consumer digital surround processors for home theatre and music applications), RSP Circle Surround, and a relatively unknown algorithm devised by Peter Craven & Michael Gerzon, called Quintum, that I tested in a prototype form and that I understand has been licensed to Motorola for incorporation into home-cinema television chip sets. I wanted to know what these algorithms would do to the front imaging accuracy of recordings, and what they might add to the overall spatial impression of a wide range of different types of 2-channel programme material. I also wanted to know whether listeners would prefer the upmixed version of recordings or the original stereo. What I am reporting here are my personal views after months of experimentation and listening.

The Lexicon DC-1 has numerous different modes and many of the parameters are variable. The device can be used for decoding digital surround sound from laser disks and other sources of Dolby Digital (AC-3) surround; enhanced matrix decoding of analogue Dolby Surround, with or without THX processing; it has modes for 'upmixing' unma-

trix 2-channel material (the modes I am interested in); and it has artificial reverberation effects if you want them. It also sports a large number of outputs, including up to seven main speakers and some subwoofers, although I tested all the systems in 5-channel mode without subwoofer. David Griesinger, who was instrumental in defining the algorithms used, is particularly interested in the improvements in spaciousness that can be achieved with additional loudspeakers at the sides of listeners, as well as at the rear, so the box provides for side and rear outputs if operated in 7-channel mode.

The 'upmixing' modes of the DC-1, such as Music Logic, Music Surround and TV Logic are all based on extraction of centre and

The huge back catalogue will be revitalised once again if some of it can be reissued in surround format. DVDs that boast 'surround' will be more desirable than plain stereo, just as LPs that could boast 'stereo' were always considered more saleable than those that could only offer mono

surround information from the 2-channel source in an intelligent fashion. Careful control of time constants and steering vectors is intended to ensure that the front image remains as stable as possible while adding spaciousness. Appropriate decorrelation is introduced between the rear loudspeakers to save the surround information from being effectively monophonic, and the rear loudspeakers are delayed.

The Meridian 565 has an armoury of home-cinema surround modes, similar to those of the Lexicon, but with music upmixing modes based on alternative algorithms. There is a strong link, here, with Gerzon & Craven's work, resulting in a surround implementation of the Trifield algorithm (originally a 3-channel process) and a Super-Stereo mode based on the stereo upmix mode of Ambisonic processors. There is also a home-grown Music mode. The music upmix modes of the 565 do not, to my knowledge, involve much in the way of logic-based steering. Again there are numerous variables to modify, variable delays and levels for the rear loudspeakers, equalisation for the centre channel to compensate for the difference between real and phantom >>>>

<<<< centre, and so on. A large number of analogue and digital inputs and outputs is provided.

The RSP Circle Surround process was mainly designed for 5:2:5 matrix encoding and decoding of surround material. In other words, for a 5-channel matrixed alternative to Dolby Surround (that can only handle 4:2:4). It is a steered algorithm with a dynamically-controlled centre channel that is claimed to prevent the image from collapsing into the centre, and it delivers stereo rear channels. It has two modes, Music and Video, and Wide or Normal modes for steering. Although most appropriate for matrixed signal decoding, the publicity and manuals indicate that it can also be used to unlock the surround potential inherent in many 2-channel recordings, so I considered that it would be appropriate to compare this process with others. As well as being made available in both professional and consumer forms, the Circle Surround process is being licensed for incorporation into silicon for a range of systems including in-car audio.

The Quintium algorithm was tested in a prototype DSP form, and is the only one of the systems which generated a 4-channel output (mono surround). It has the effect of 'spatialising' the front image while also extracting ambient information for the surround channel. I tested it by splitting the surrounds equally to left and right rear channels and introducing appropriate gain modification to compensate for the difference between stereo and mono surrounds.

The first two devices are equipped with a

**I reckoned, rightly or wrongly, that the strengths or weaknesses of the algorithms ought to show up in the settings that the manufacturers offered as defaults**

number of manufacturer's presets, and since this is what the majority of listeners would start with, I mainly investigated the behaviour of the devices in their default settings. The other reason for this was that I wanted to know if there was a form of upmix processing that could work reasonably well for a wide range of material, without the need to modify the settings for every item. I reckoned, rightly or wrongly, that the strengths or weaknesses of the algorithms ought to show up in the settings that the manufacturers offered as defaults. I painstakingly followed the lengthy setup and alignment procedures for all the devices, so as to ensure they were configured as intended for the loudspeaker configuration used. Most of the algorithms allow for the rear loudspeakers to be both delayed and low-pass filtered, so that the rear diffuse information does not conflict with or distract from the front images. A degree of delay enables the precedence effect to be exploited, whereby

first arrivals of sounds govern the direction from which they are perceived to come, and helps to avoid bleeding of localisable images which should come from the front into the rear channels.

**T**HE LISTENING ROOM was an ITU-R BS.1116 standard room at the BBC R&D Department, using matched Rogers LS 5/8 loudspeakers in the standard 5-channel layout. The surrounds were therefore direct radiators rather than dipoles. The programme material I used ranged widely in style and recording technique, having a representative range of sum and difference signal ratios. It included the basic classical mic techniques of coincident pair (for amplitude-based Blumlein stereo) and a tree of spaced omnis (to investigate stereo based mainly on the precedence effect); multiple-mic classical with artificial reverb; synthesised electronic music; pop and rock mixes using artificial effects; radio drama of both traditional and sci-fi styles; broadcast sport and (no, I'm not crazy!) mono speech.

All of the devices had some effect on the front image when comparing the 2-channel and 5-channel versions of the same programme, but the differences were very small on two processors (the Lexicon and the Meridian). I was listening for changes in image definition, focus, stability, width and depth, and in general the surround algorithms all had the effect of changing one or more of these elements. Most of the 565 algorithms had the effect of slightly narrowing the >>>>

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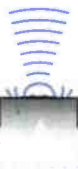
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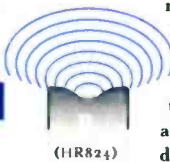
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Second, the HR824's low frequency driver is coupled to a pair of aluminum mass-loaded, acoustic-insulated 6.5-inch passive drivers. These ultra-rigid drivers eliminate problems like vent noise, power compression, and low frequency distortion — and couple much more effectively with the control room's air mass. They achieve the equivalent radiating area of a 12-inch woofer cone, allowing the HR824 to deliver FLAT response to 42Hz with a 38Hz, 3dB-down point.

Third, the woofer enclosure is air-displaced with high-density adiabatic foam. It damps internal midrange reflections so they can't bleed back through the LF trans-

ducer cone and reach your ears. The typical problem of small-monitor midrange "boxiness" is eliminated.

## A TRUE PISTONIC HIGH-FREQUENCY RADIATOR.

We scoured the earth for the finest high frequency transducers and then subjected them to rigorous evaluation. One test, scanning laser vibrometry, gives a true picture of surface vibration patterns. Two test results are shown in



The Mackie HR824 Active Monitor.  $\pm 1.5$ dB from 42 to 20kHz.

the upper right hand corner of this ad. Figure C is a conventional fabric dome tweeter in motion. You needn't be an acoustic engineer to see that the dome is NOT behaving as a true piston.

Figure D shows our High Resolution metal alloy dome at the same frequency. It acts as a rigid piston up to 22kHz, delivering pristine, uncolored treble output that reproduces exactly what you're recording.

## INDIVIDUALLY OPTIMIZED.

We precisely match each transducer's actual output via electronic adjustments. During final assembly, each HR824 is carefully hand-trimmed to  $\pm 1.5$ dB, 42Hz-20kHz. As proof, each monitor comes certified with its own serialized, guaranteed frequency response printout.

The HR824's front board has "radiused" edges to further eliminate diffraction; an "H" brace bisects the enclosure for extra rigidity.

Fig. C: Uneven fabric dome tweeter motion distorts high frequencies.



Fig. D: HR824 alloy dome's uniform, accurate pistic motion.

Mackie is one of the few active monitor manufacturers that also has experience building stand-alone professional power amps. Our HR824 employs two smaller versions of our FR Series M-1200 power amplifier — 100 watts (with 150W bursts) for high frequencies, and 150 watts (200W peak output) for low frequencies. Both amps make use of high-speed, latch-proof Fast Recovery design using extremely low negative feedback.

## TAILOR THEM TO YOUR SPACE.

Because control rooms come in all shapes, sizes and cubic volumes, each HR824 has a three-position Low Frequency Acoustic Space control. It maintains flat bass response whether you place your monitors away from walls (whole space), against the wall (half space) or in corners (quarter space). A low frequency Roll-Off switch at 80Hz lets you emulate small home stereo speakers or popular small studio monitors.

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If you've never experienced active monitors before, you're going to love the unflinching accuracy of Mackie Designs' HR824s.

If you've priced other 2-way active monitors, you're going to love the HR824's price AND its accuracy.

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HR824 Active Monitors accept balanced or unbalanced 1/4" and XLR inputs. Jacks & removable IEC

power cord face downward so that the speaker can be placed close to rear wall surfaces.

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image, but the focus and stability remained excellent. I found I could correct the slight image narrowing with the Trifield mode because (as a unique feature of its patent) it allows front-image width modification. The other modes do not allow this. Of all the processors tested, the Meridian 565 probably showed the best ability to retain focus and stability in the front image.

The Lexicon DC-1 algorithms preserved the width of the front image very well, but there was a slight reduction in focus and stability on most items. I did not find this unpleasant, though, and the depth often appeared to be enhanced. Circle Surround's Music mode was somewhat unusual, and had so much signal in the surround channels that the front image appeared to be spread around all over the place. Even when I reduced the rear channels to a level similar to the other algorithms, the effect of a much more diffuse, more spread front image remained. (This was using the Normal width mode of the device with surrounds low-pass filtered to 7kHz, and set up according to the manufacturer's recommendations.) The resulting front image, in my opinion, was not well preserved, being particularly poor and unstable on spaced mic material.

The Quintum algorithm had an unusual effect on the front image which showed up most noticeably on speech-based material. There was a distinct spreading of image sources and a significant increase in depth. Images moved from the plane of the loudspeakers to somewhere about a metre behind them, and became less easily localised. A timbral change was noted on the speech material, together with a slight 'delay' effect, but this was much less noticeable on the music material where the images simply seemed to gain more depth.

The spatial impression delivered by the algorithms varied enormously, and although somewhat dependent on the signal level in the rear speakers was, in fact, more dependent on the nature of the algorithms themselves. The Circle Surround processor produces a very 'big' surround effect that is quite impressive on some sport and pop music, as it envelops the listener and puts a lot of material into the rear channels. There is no doubt that you are listening to surround, but I found this extremely tiring after a while, although reducing the level of

the surrounds helped somewhat. On classical music material the spatial impression sounded quite unnatural and rather 'phasy'. Indeed if there is one thing that professional listeners commented on if they did not like the sound produced by these algorithms it was the 'phasy' nature of the surrounds. The Lexicon and Meridian algorithms were much more subtle and considerably more natural, although the highly critical and symmetrical characteristics of the listening room did tend to make any phasiness in the spatial impression very noticeable. The Lexicon generally puts quite a high level into the surrounds by default, but this did not distract and sounded pleasing and natural on most material. Quintum was very programme-dependent; I did not find the spatial impression very natural on speech-based material but on music it was somewhat more acceptable. The mono surround feed tended to limit the potential for envelopment and spaciousness. Spatialisation with this algorithm seems more to be related to increasing the apparent source width and depth of images than to increasing envelopment.

Some material was preferred in 2-channel form, principally because the surround version tended sometimes to have too much ambient information for the context, particularly in radio drama, which leads me to suggest that careful adjustment of the various parameters is almost certainly necessary to optimise the result for different programme material. That said, the default settings of the best devices worked moderately well for all the items. I should note here that the formal blind tests using expert listeners often indicated a strong preference for the 2-channel original over the processed version, but I am not convinced that I would get the same result with the listening public at large. I found that I adapted to the surround effect quite quickly, and came to like the best algorithms. Most listeners are fairly unfamiliar with surround sound and are steeped in the imaging characteristics of 2-channel stereo.

Of the devices I assessed, for professional applications involving conversion of ordinary 2-channel stereo to surround, I can certainly recommend both the Meridian 565 and the Lexicon DC-1 (although they are consumer devices). The price of these is well outside the purses of the average consumer and the results can be good if care is taken. ■

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# Audio on the Internet

Beyond the present frustrations of restricted bandwidth and agreed delivery formats on the internet, **Harald Popp**, of the Fraunhofer Institut sees a bright future for audio applications

**W**HILE IT IS TRUE that the use of the Internet for audio-visual applications is still in its infancy, I am nevertheless thrilled by the vision of a global information network offering access to any kind of multimedia content.

There are undeniably strong market forces pulling in this direction. In spring 1995, Progressive Networks acted as a major market-opener by releasing its first RealAudio player, which is now dominating the audio playback market on the Internet with more than 10 million copies. Today, a rapidly growing number of audio and video players has become available, and more and more web sites are offering sound or video clips. Even 2-way audio-visual communications Internet telephony or Internet video conferencing—are already in use<sup>1</sup>.

The professional applications that come into view are various.

Internet Radio, using the Internet as just another worldwide broadcasting network for the radio programmes, is a highly demanding application, as it requires the transmission of real-time data in a point-to-multipoint fashion through the network. Here, new real-time protocols (RTP, RTSP) better address the time elements of the audio and video data than the traditional data flow control of TCP. To conserve bandwidth on the backbones, multicasting IP has to be used by the routers to duplicate the audio data for the individual listeners at the last possible node.

With pay audio services, music is being sold through the Internet. The advent of electronic cashing has made the network attractive as a distribution media for the record labels. First commercial services have already started<sup>2</sup>, or are just in the market introduction phase<sup>3</sup>. Of course, the electronic distribution of songs must not violate the copyrights of the music industry: protection mechanisms (For example<sup>4</sup>) have to be applied to allow only a personal use of the downloaded song. If such services become popular, they may lead to interesting new business concepts, as people may selectively

buy the songs they really like.

Technological forces are pushing these applications as well. Advances in chip technology allow improvements in the ratio between computer performance and price. Signal processing tasks—like perceptual audio coding (see below)—have less and less impact on CPU workload, resulting in pure software solutions for audio players. High-quality low-bit-rate audio encoders typically require much more computational effort—here is the domain of digital signal processor chips, especially for real-time applications. The same is true for dedicated multimedia terminals, where you have to meet low-power, low-price, and low-package space requirements.

So, with affordable hardware-software to generate and playback audio, and adequate network protocols to transport the data, what else do we need for our Internet audio application? Well, bit-rate, of course.

Today, the average bit-rate per client is typically pretty small, ranging unpredictably between zero and the maximum of the network modem in use, due to the current payload on the network itself. Network providers

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- 8 Scalable audio oder MPEG4

may consider to improve the available bit-rate by increasing their network throughput (for example expanding their backbones), but these are significant investments that have to pay-off. Analysts expect that this will force the Internet's pricing structure to change. The most likely structure to emerge is low-cost access to basic services with usage-based charges for premium services, such as guaranteed bandwidth. The era of low-cost, unlimited Internet access will be over before the audio and video tremors in the Web die out<sup>5</sup>.

So bit-rate will remain a most valuable resource for quite some time, and advanced audio compression schemes are required for reasonable Internet applications<sup>6, 7, 8</sup>. Due to congestion of data traffic in the network, packets may get lost, and error mitigation on the receiver side becomes a very interesting issue, in order to decrease the audibility of annoying artefacts or dropouts.

Audio on the Internet has definitely become a challenging application. Although we have achieved a lot already, much more work lies ahead. In the words of Tom Petty: 'The future is wide open'. ■

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Control Room/Phones Matrix adds monitoring, mixdown & metering flexibility. Select any combination of Main Mix, Tape In and Alt 3-4 signals for routing to phones, Control Room outputs and meters. Can be used as extra monitor or headphone mix, tape monitor, or separate submix. Way cool.

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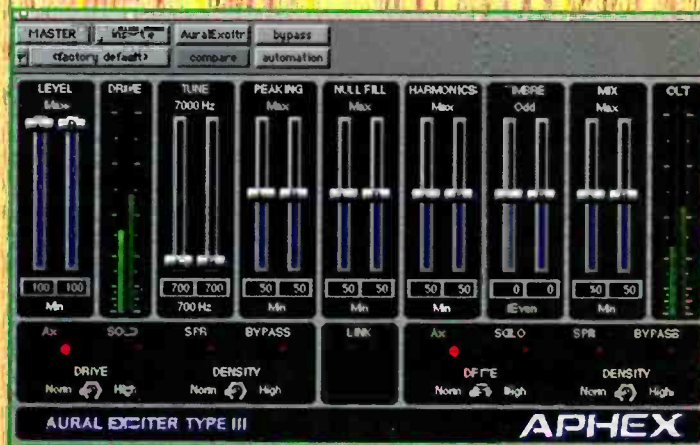
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