

OCTOBER 1995 \$5.00 £2.00

# Studio Sound

THE INTERNATIONAL TECHNICAL  
MAGAZINE FOR PRO AUDIO,  
POSTPRODUCTION & BROADCAST

WORLD EXCLUSIVE



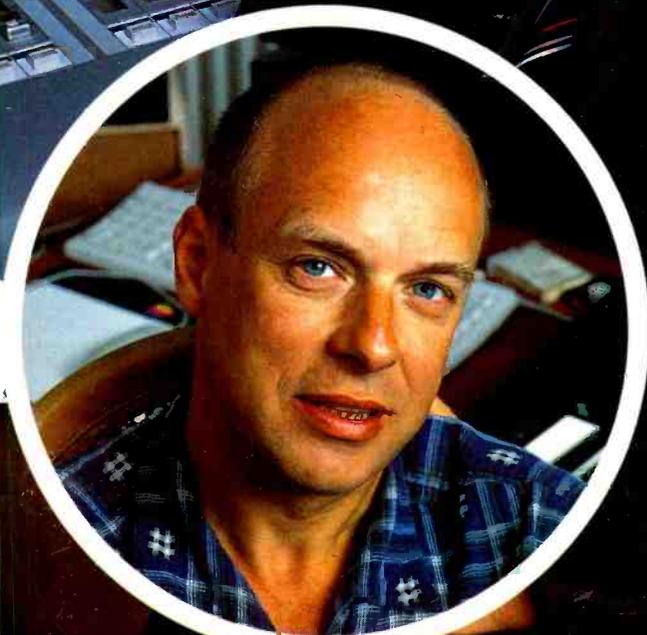
## BEATLES

Get Back to  
Abbey Road



# OXF-R3 DESK

Sony chief targets music market



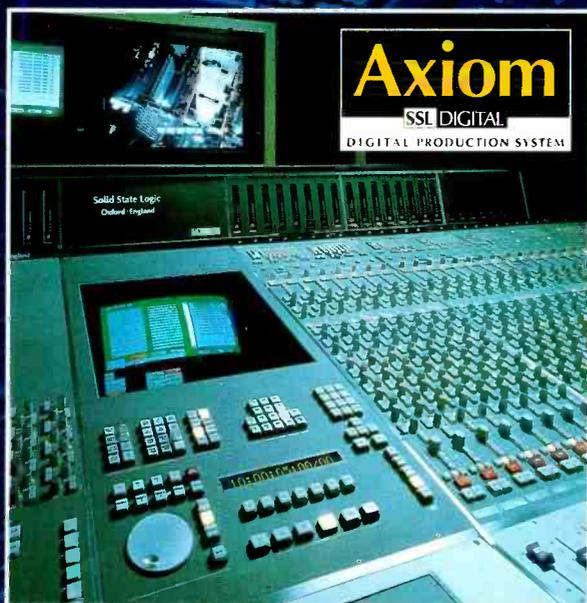
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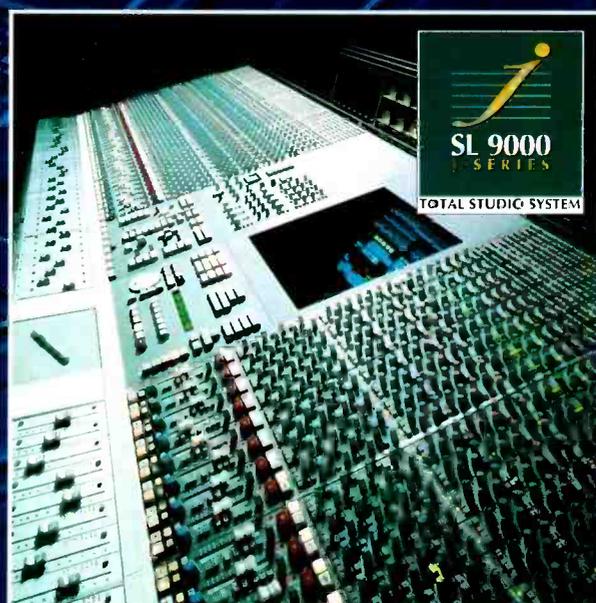
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SSL DIGITAL

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### COVER FEATURE

Sony Corporation Chairman Norio Ohga with OXF-R3 at Sony's Basingstoke demo facility in late September where the console was given its world premiere. Mr Ohga, a keen musician and opera singer was visiting the UK after conducting an orchestra in Vienna

(Exclusive pics: Chris Taylor)

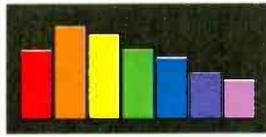
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### ENO INTERVIEW

War Zone, Bowie, U2 ... just a few of the themes Eno improvises on in an exclusive rare technical interview with **Studio Sound**

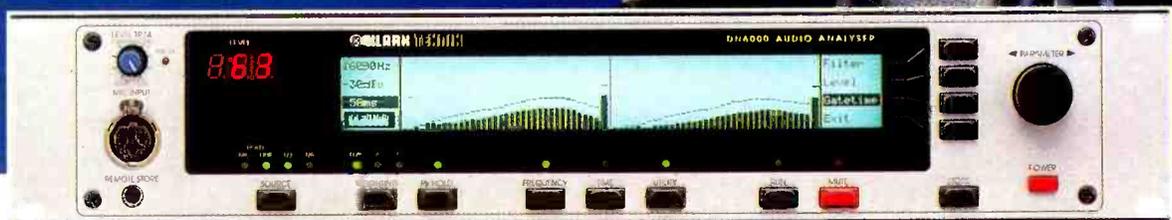


# DN6000

REAL TIME AUDIO  
SPECTRUM ANALYSER



## Sensitive audio analysis.



The new DN6000 Spectrum Analyser from Klark Teknik is sensitive enough to measure one of nature's quietest creations.

By incorporating the latest DSP technology, the DN6000 provides superb, high resolution spectrum/time analysis, plus all the flexibility, quality and reliability you expect from the world's leader in signal processing.

It performs real time 1/3 and 1/6 Octave spectrum, LET, LEQ and RT60

analysis to a resolution of 0.2dB - and incorporates microphone or line level inputs, with a 20dB trim control to allow optimum visual display.

In fact, the DN6000 is designed to conform to Type 1 specifications of IEC 804 and IEC 651 - the standards for integrating averaging sound level meters.

Thirty two memory positions are available to store spectrum analysis data and a further sixteen for LET/LEQ/RT60. Also,

accumulation of measurements can be achieved to build up a composite average. It can automatically analyse a whole evening's or even a whole week's data.

Other features include an internal signal generator, output parallel printer port and a data output port to link with the DN3600 programmable graphic equaliser, allowing auto equalisation.

For further information please contact Klark Teknik or your nearest agent.



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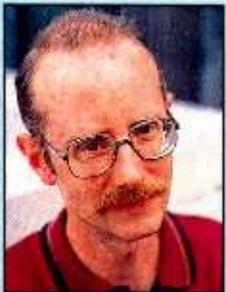
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## THIS EDITION'S CONTRIBUTORS



**PHIL WARD** has interviewed leading producers and artists for the UK's latest audio journals. After spells with the late *International Musician* and the very late *Music Technology*, he is now Editor of *Pro Sound News* Europe. He lives in London with 5,000,000 people



**DAVE FOISTER** runs the Guildhall School of Music and Drama's recording facilities in London. Involved in the music business for decades, Dave has been a *Studio Sound* contributor for nine years and reviews gear in the setting of a professional working environment



**KEITH SPENCER-ALLEN** is a leading audio journalist and consultant, ably qualified as he edited *Studio Sound* for nine years overseeing a number of 'revolutions'. He was, and still is, a practising recording engineer. Despite all this, he still hopes to get a proper job one day

# The same—but different

**I**t was like one of those nights when you dream you're dreaming. Or one of those days when you see someone else's reflection in the mirror. Although I knew the hows and whys behind the changes, exploring the latest issue of the world's best established pro-audio magazine was a disconcerting experience for me as its Editor.

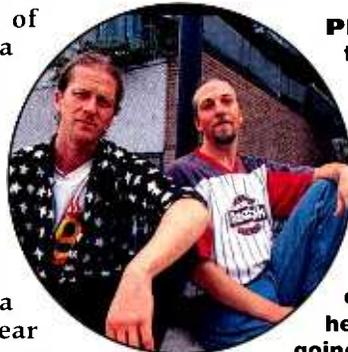
Certainly those things that mattered were there: the established standards of authority, objectivity, editorial independence... but the feel was fundamentally different. It was better. My disorientation was temporary. Leafing through the very first copy—the ink barely dry on its pages—I was forced to conclude that to experiment had been a success. New school values had triumphed over old.

It began months ago as a series of lengthy discussions conducted with a thorough cross-section of audio, video, broadcast and postproduction personnel. Through these we defined an editorial direction and style of presentation which accurately reflects the changing markets, attitudes, tastes and the future of professional audio in its many guises. We evaluated the results and conceived a plan. As a logical exercise it was near faultless but as a practical exercise it was a white-water ride. Quite apart from the chaos inherent in redesigning any magazine, we were constantly aware that we were dealing with an institution which has helped define an industry and guided peoples' careers for some 36 years. It was exhilarating but —and possibly because—it carried undertones of heresy.

Now it's your turn. Some of you will recognise the impact of your own suggestions; others will be seeing the changes for the first time. Either way, you can decide whether or not this issue of *Studio Sound* explores renewed depths of instructional article, offers a genuinely international spread of columns, and some truly sensational exclusive features. I am confident that you will not be disappointed.

Of course, to maintain the standard of this issue—and there is much more to come in future issues—it has been necessary to expand the *Studio Sound* team. A select few names will join those who are already familiar to you, among them that of Executive Editor Nick Smith. Nick's okay but he could do with a haircut.

Nick—you're on...



**I** arrived safe in the knowledge that we had the best team for the job and set about building a magazine that reflects not only the excitement that fuels the pro-audio game, but also my own love for all things musical (and my Jazzmaster!).

So here it is, the new style *Studio Sound*, packed with some of the most exciting stories around. Read it, and if you like it let us know. But more importantly, if you don't like it get on the phone right now.

In closing, can I just say that I wanted to wrap this up with another clever and witty reference to the Rolling Stones, but as you can see, when it comes to puns, 'I can't get no satisfaction'

editor

executive editor

**The OXF-R3 Digital Mixing Console.**

**It speaks for itself.**

**We simply invite you to listen.**



**SONY**

# Soundbite

special report from **The IBC**

## Opportunities for others

**THE ABSENCE** of Sony, Panasonic and the other big broadcast specialists at September's IBC convention in Amsterdam, Holland left the way open for both younger broadcasting names and the computer companies that are crossing over, challenging for dominance with exhibits of equal stature.

All the computer companies that have moved into broadcast have done so in collaboration with specialist partners. Silicon Graphics is no exception. Among those using the Silicon platform is Sonic Solutions, which itself has found new partners, entering into a strategic OEM deal with graphics hard-software specialist Discreet Logic. Under the arrangement, Sonic will supply its digital-audio technology for Discreet's special visual effects, editing-and postproduction-systems.

'Discreet is using our engine and integrating it into their solution, giving them high-end audio for their products,' said Bert Tellegen, Managing Director of Sonic Europe.

In the past few years, graphics companies have seen the need to include audio on their systems, but this has usually been a concession in the



Carl Lewis courtesy of Discreet Logic's FLAME: now linked with Sonic Solutions in a OEM deal

form of four or eight channels bolted on. This is now seen as not enough. D-Vision Systems is offering real-time digital-audio recording on its range of PC-based nonlinear editing systems, creating a virtual mixer within the devices. 'It's not designed as a DAW,' explained Peter Ennis, Head of Sales, Europe, Africa and the Middle East, 'but it gives enough functionality. A lot of audio-for-video is done in the edit suite.'

Another company to realise

the new for dedicated audio is Avid, which has created an audio division with Digidesign, which merged with Avid earlier in the year. Showing at IBC '95 was Release v3.5 of the AudioVision series of DAWs, offering editing and processing to sync-locked, full-resolution digital pictures. The range is also now available on the Apple PowerMac platform, while other new features include clip-based 4-band parametric EQ, and interactive dynamics and pitch changing.

An upcoming feature will be implementation of Jeff Bloom's VocALign voice-replacement system, moving the AudioVision into ADR and Foley work. Another imminent feature is a more general one; the implementation of OMF 2.0, which, said Avid's Chief Audio Editor Mack Leathurby: 'Is setting guide-lines for different platforms. There are about 40 different companies

that we can work with in the audio industry.'

**THE ISSUE** of open formats between DAWs was addressed by a number of manufacturers at IBC. Digital Audio Research's OMR 8 open-media recorder features such networking and data-exchange capabilities, allowing the interchange of audio information and EDLs with other workstations and nonlinear video-editing machines. This also means that audio reels can be derived from non-DAR equipment, including the Lightworks Video Editor. Also on display were the latest upgrades to the Sabre Plus edit console, including optical-disc operation and increased processing power.

Networking also features on the latest version of the Fairlight MFX3, which, with its v12.2 software, now offers time compression and expansion, with varispeed and pitch shift. All work is clip-based, using 40-bit floating-point DSP technology developed by Analog Devices. A brand new product is the Dali-2T, a 2-track editing and mastering device aimed at production and audio sweetening applications. Director of European Operations

### THE NEW LOOK

Studio Sound magazine is the result of the first major redesign in over a decade and the first part of a major strategy to redefine Studio Sound as the only truly international pro-audio, broadcast and postpro magazine.

Recent additions to the editorial team are Executive Editor Nick Smith and Editorial Secretary Debbie Harris—both from Miller Freeman Technical, a division of parent company Miller Freeman. Pictured above: Nick Smith (Executive Editor), Tim Goodyer (Editor), Steve Haysom (Publisher), Debbie Harris (Editorial Secretary), Joe Hosken (Publishing Editor).



Nick Cook explained that Dali could be either run with a multitrack machine or dumped onto DAT or CD-ROM. Dali was still in prototype form but is due to start shipping in October. Scheduled for the New York AES is a digital console, designed as a tactile surface for the MFx3, with a digital dubber slated for launch in the first quarter of next year, possibly around NAB '96.

Studio Audio had plenty to show this year, with the main focus going on the Octavia modular digital-editing system, which is aimed at postproduction and multitrack work. A system can be built up from one or more Octavias, each giving eight channels of audio input and output. Included as standard are 20-bit sigma-delta A-D and D-A converters, with full AES-EBU interfaces on those ins and outs. Networking is handled by the Tentacle bus, which can give up to 280 channels of audio transfer between Octavia units.

At the core of Octavia is SADI3 software, which also features on Studio Audio's SADI E DAW. French manufacturer Digigram launched three new Xtrack workstations, all based around MPEG audio compression, allowing a micro computer to work as a DAW, working with at least 16-tracks on just a 1Gb hard disk. The Xtrack S11 is the range's entry point, starting with two inputs and two outputs, working in analogue only (an optional AES-EBU digital input-output module is available). Top of the range is the studio-based S9, featuring two inputs and two outputs, which can be either analogue or digital. It can mix up to 16 mono MPEG audio tracks on the two outputs in real time and can be extended up to eight inputs-eight outputs in incremental 2-channel steps. The S80 is described by the company as 'a great novelty', offering the audio quality of the S9 in a compact form with eight balanced analogue outputs. Xtrack units can also now be linked to a CD-ROM drive,



**Soundcraft DC2020 can accommodate all surround formats**

giving instantaneous selection and processing of audio CD tracks; PCX boards handle playback through direct SCSI transfer.

Although IBC is heavily orientated towards TV and postproduction, audio-for-picture and radio do get a look in. Signal processing specialist Orban featured its DSE 7000 DAW, aimed at radio production. Now working with v5.1 software, the 7000 is aimed at the editing of commercial, announcement and news reports. The company also introduced the 8208 digital stereo encoder, which can be used in both conventional analogue situations or the latest digital transmission networks.

Digital has already a strong grip on radio, with DAWs, MiniDisc and the various replacements for conventional analogue cart machines. Now it is starting to move onto the mixing console, as was seen on the Audix Broadcast stand, which introduced the latest in its MXT range, the 1500. This is an analogue desk using digital signal processing in the main signal path to give the highest dynamic signal control. The next in



**Ablex MXT 1500 console from Audix Broadcast**

the range, the 1600, will be a completely digital mixer.

Audio Design showed the DMM1 mini-mixer, which is due to be fully available from October. Aimed at video, telecine, postproduction and dubbing, the DMM1 has two AES-EBU inputs, which are handled as four mono channels within the mixer. These are then mixed to a stereo master AES output, also routed separately to four post-fader outputs.

While the DMM1 is obviously modest in its intentions, the Graham-Patten D-ESAM 200 digital edit-suite audio mixer has more pretensions, offering eight inputs and analogue outputs. Sample rate converters deal with asynchronous sources, including CD players and DAT machines. Other features include G-P's Virtual Machine concept, 12 long-throw input faders, full 4-channel metering and monitoring, 4-channel edit-preview switcher, 3-band parametric EQ and a GPI control interface.

The increasing demand for surround sound material has led to the increase in specialist postproduction consoles. Soundcraft is one of the leaders in this field, working in conjunction with Magtrax.

The latest desk from this collaboration is the DC2020 Surround, featuring a central touchscreen control panel dealing with console automation, machine control and project management. The master section contains the surround mixing and panning controls, including dual joystick LCRS panners. Also new on the stand was the B800 TV, radio and OB production console.

**Report by Kevin Hilton and Zenon Schoepe**

◆ Euphonix revealed a broadcast B variant of its CS2000 digitally controlled analogue deskfitted with fault-tolerant power supplies, audio router interfaces, mix-minus busing and multiple studio comms. Desks have been installed in three CBS trucks, three at Radio Quebec, seven at Channel 7 in Australia, two at NRK and one each at Chinese TV and France 2.

The company also announced that it has just filed a registration document with the US Securities and Exchange Commission for a public share offering of 1.875 million shares. Two thirds of these will be newly issued stock with the other third being sold by existing shareholders.

TimeLine added the Peavey Electronics MediaMatrix sound card to its StudioFrame DAW and announced sales to Studio Babelsberg Berlin (two), De Lane Lea London and UK freelancers Rodney Glenn and Peter Joly.

The Peavey card was designed originally for the architectural acoustics market and has been installed at a number of prestigious sound-reinforcement sites including Disney theme parks using software based audio processing devices for mixing, dynamics processors, routers, signal generators, delay lines, distribution amps, crossovers, filters and metering. MediaMatrix replaces StudioFrame's StudioCAD which was a more basic fixed mixer in comparison to the completely configurable building blocks approach of the new card to 24-channel mixing.

MediaMatrix was developed for pro-audio and musical instrument manufacturer Peavey by ex-Waveframe employees and was designed to be bus-compatible with Studioframe.





Smart moves—a second Uptown automation system now installed

## Uptown move at top alternative studio

**SMART STUDIOS**, in Boulder, Colorado, whose client list reads like a 'Who's Who' of alternative music, recently added its second Uptown 990 system moving-fader automation package.

The studio is currently hosting a session by Garbage, whose members include Butch Vig, Steve Marker and Doug Erikson all top producers in their own right, and partners at Smart Studios.

The Russ-Berger-designed facility features two completely independent studios within the same building. Studio A, used predominantly for tracking and recording, features a 56-channel Trident 80 Series B that was retrofitted with a 32-channel Uptown 990 System in late-February of this year. The mixing room, Studio B, is home to a customised 56-channel Harrison desk with full 990 System automation added in 1990.

High-profile acts to work at Smart Studios is to include Nirvana, Sonic Youth, U2 and Nine Inch Nails.

**RE-PRO**, the UK-based Guild of Recording Producers, Directors and Engineers, has announced that it is to set up Re-Pro International, an umbrella body designed to service producer and engineer organisations throughout the world. The official launch will take place at the AES Convention in New York where Re-Pro Vice Chairman Peter Filleul will encourage producers to set up their own home-based organisation.

A open forum meeting is to be held shortly after the convention's keynote opening address by Phil Ramone. Leading producers, produce managers and industry pundits from both the USA and Europe will set out their views on how studio producers should be paid in the future in the light of changing laws and means of distributing recorded product.

One of the key issues that concerns studio producers in many countries is the right to a share of performance-royalty distribution. Robin Millar, Chairman of Re-Pro, believes that 'the role of the record producer is arguably the most important in the recording process. It is our job to turn star quality into stardom, and talent into commercial product. Studio producers must be able to react to global trends that affect their

profession, or risk staying hungry when slices of the performance pie are shared out.'

In the US broadcasters have never paid a fee to play recorded works over the air (and this will continue to be the case), but the country's new Performance Act

will entitle performers to a payment for transmissions over new digital carriers such as satellite and fibre circuits. Re-Pro believes it is important that American producers band together in order to collectively negotiate for the same right to a share of this performance royalty that is enjoyed by their counterparts in some other countries—not only for their benefit but also to strengthen the case in territories where this is not yet the case.

'The Americans, and any other producer organisations, can have access to our experience in trying to acquire performance revenues for producers,' explains Filleul. 'What we have learned and what we have created so far will be made available to them through Re-Pro International, in the hope that we too will ultimately benefit from their experiences.' Since the 'summit' meeting at AES Paris, Re-Pro has added the Italian Producers Association and the Chinese Association of Recording Engineers (CARE) to the five European organisations with which it already has affiliations. **Bill Foster**

**PLASA (UK), VPLT (Germany) and ESTA (US and Canada) have announced the formation of the World Entertainment Technology Federation (WETF). Following the already close working relationship between these three major trade associations, agreement has been reached to work together in the areas of technical standards, trading methods, training and education, and enhancing the prospects for industry growth internationally.**

**The leaders of the three organisations will hold regular meetings in conjunction with major industry trade shows.**

**WETF will establish a structure for the coordination of entertainment industry technical standards. This formalises the cooperation which currently exists between the three organisations. These efforts include: control protocols; truss and rigging; and fog and smoke. PLASA, VPLT and ESTA are currently reviewing their international membership structures to bring the benefits of the Federation to their members and to promote membership on an international level.**

**For further information contact:**

**PLASA. Tel: +44 1323 410335.**

**Fax: +44 1323 646905.**

**VPLT. Tel: +49 511 3730277.**

**Fax: +49 511 3730423.**

**ESTA. Tel: +1 212 244 1505.**

**Fax: +1 212 244 1502.**

**TWENTY YEARS** on, American outboard experts Apex are celebrating not only a lengthy spell in the business but a long series of recognised patents. Kicking off with the Aural Exciter in 1975, Apex then embraced recording, broadcast and sound reinforcement markets with units such as the Dominator, Compellor and Digicoder.

Most recently, the company has returned to valve technology—in line with much of the recording industry—but has, typically, added its own slant in the form of its low-voltage Tubessence circuitry. Apex Systems, US Tel: +1 818 767 2929.

**FOLLOWING THE UNTIMELY** death of founder Dave Harrison, London's Intimate Studios has installed an 80-channel Series 12, fully automated recording console.

Described as a mixture of traditional and layered design, the new console incorporates economy of space, fully dynamic automation (including patching to outboard equipment) and extensive expandability. Intimate's desk presently offers 80 input-channels, 260 automated inputs on mixdown, gating and compression on all channels and 24 remote mic preamps. Intimate Studios. Tel: +44 171 702 0789.

**hdCD HARMONY** has arrived through an agreement made between Philips and Sony, and the Toshiba-Time-Warner-backed SD Alliance to combine their technical resources.

The new format was proposed by Philips and Sony as a way to avert yet another costly format battle—the likes of which has cost both parties dearly in the past. The suggestion was put to the various members of the Alliance during August, and proposes two bonded 0.6mm substrates (as used in the Super Density format) combined with the more robust EFM+ 8/16 coding scheme employed by Philips-Sony's MultiMedia CD.

While this news will, for the moment, have little impact on the standard audio CD—for which provision has been made in both the MMCD and SD formats—the compromise deal is likely to please computer manufacturers who see the additional capacity and far higher data-transfer rates offered by hdCD as a significant step forward for the multimedia CD-ROM market but who have been concerned that SD's 8/15 encoding did not offer sufficient error protection.

A joint statement issued by the principal members of the SD Alliance in Tokyo on September 15th said '...considering the computer companies' request to enhance the reliability in the worst case, we have reviewed the possibility of changing the current 8/15 modulation method of the SD format to the 8/16 method, which will set aside one bit for reliability improvement and, in turn, decrease the capacity from 5GB to 4.7GB per side and sacrifice the extra capacity retained for the movie application.'

'The victor is the consumer,' commented Taizo Nishimuro, Executive Vice President of the Toshiba Corporation, after the announcement. **Bill Foster**

# MIX TO THE FUTURE



Digital audio has just taken a major step forward. Actually, make that a leap. At 44.1 or 48KHz sampling rates, the new Pioneer D-9601 is already amongst the best featured, highly engineered, and great sounding professional mastering DAT recorders that money can buy. But that is, quite literally, only half of the story. Switch to 88.2 or 96KHz Hi-Sampling and the sonic improvements are astonishing, adding depth to the sound stage, definition to fast staccato sounds and, dare we say, an almost "analogue" fullness to low and mid-range tones.

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What's more, the D-9601 will faithfully sample rate convert your HS DAT recordings back to 44.1 or 48KHz. So not only will your masters display superior fidelity on the advanced music and video formats currently being developed, they will also remain reassuringly compatible with the CD, MiniDisc and LaserDisc formats of today. And with two D-9601s, you can even make 44.1 and 48 KHz double speed copies via the AES/EBU digital I/O. The Pioneer D-9601 is the future of DAT. See it at an HHB DAT Centre today.

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| KLOTZ          | CD Players          | MiniDiscs              | Stools             |
| KOSS           | CD-R                | MiniDisc Recorders     | Strato Rack        |
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Studio Sound



# EMC: who's really afraid now?

The dust of EMC compliance settles on improved equipment performance

**B**efore long, the new EMC regulations take effect under which electrical equipment has to minimise its generation of, and susceptibility to, electromagnetic interference. Such legislation is, in principle, necessary and timely and I cannot see how any other viewpoint is consistent with a professional attitude.

Many years ago the only significant source of electromagnetic interference was your sister's hairdrier spoiling the TV picture. In those simple days, EMC was a non-event. Then came the explosion in electronics, fuelled by the low cost of large-scale integration. The number of electronic devices in everyday life increased enormously and with it the possibility of interference. More importantly, the consequences of interference became more serious. The odd crackling radio caused no more than temporary irritation, but now interference to electronic systems can cause injury or financial loss.

For various reasons the electronics industry has failed to keep its house in order. Subsequently there have been some spectacular failures which have rightly raised the eyebrows of the authorities and have also led to the current legislation.

Legislators cannot be expected to understand electronics in great depth and as a result the proposed legislation is, in a very small number of cases, unrealistic. In my view this represents a small imperfection in a vital contribution to a safer world. Such imperfections can be sorted out in due course.

There has been a lot of hand-wringing and protest, particularly from some audio-equipment manufacturers. Some of their claims are bizarre, with suggestions that the proposed legislation makes it impossible to achieve high fidelity and so on. In fact, nothing could be further from the truth. These views have no technical merit and the opposite is actually the case. It is my experience that audio equipment which is designed to be EMC compliant can actually sound better and save time in

use, therefore costing less to run.

A corollary of this view is that really high-quality equipment will need little modification to meet the new requirements. I suspect that some of the less sound opinions were only aired in a futile attempt to stave off the inevitable.

The greatest howls came from the high-end, hi-fi planet where the laws of physics do not appear to apply. Strangely, in high-end, the ratio of selling price-to-component cost is so great that the reduction in margin, due to extra parts required for compliance, is negligible. Fewer, if any protests, came from the mass producers although to them the cost of compliance is proportionately greater. They know that all regulations of this kind affect their competitors by the same amount and the relative position *quo* is left the same.

There are several cases which support this point of view. I learned at school that professional audio equipment used balanced connections to avoid noise pick up. It was just a matter of connecting up an audio system and it would work. Of course, in the real world, it doesn't work; it hums, the lighting dimmers make it buzz and the loudspeakers reproduce the local taxis. You then spend a small age fixing the system and opine that balanced audio isn't as good as people say. Off come safety earths to reduce the hum and you wince at the shocks you get from leaky transformers when you forget to put them back later.

**THE TRUTH** of the matter is that there is nothing wrong with balanced audio, provided it is properly implemented. If the equipment meets EMC regulations it will work when connected up and save a lot of time and money. In a lot of audio equipment, especially that using printed-circuit mounting connectors, Pin 1 of the XLR is not connected to chassis as it should be, but is connected to circuit common. Currents induced in the screen, which should be shunted harmlessly to chassis, end up flowing in the circuitry and raise voltages due to common impedances. The result is hum and a mechanism whereby external RF can bypass the screening of the chassis and enter the

circuitry. This is simply poor engineering. The cure for both problems is the same. Interestingly enough, if the system is tested for RF rejection the common impedance path would be revealed. Fixing that would also fix the hum. This illustrates my point that EMC compliance enhances the product.

A similar situation arises with power amplifiers. With modern semiconductors the distortion performance of power amplifiers is increasingly a function of layout. This is particularly true in Class B where heavy half-wave currents flow. If there are any common impedance paths in the amplifier circuitry, the high currents will raise voltages which may be added to the signal voltage, resulting in distortion. Consequently, good engineering practice will eliminate common impedances from the design. In addition to reducing distortion, this approach also minimises hum due to power-supply ripple and buzz due to the short conduction angle of the bridge rectifier. The signal-to-noise ratio benefits accordingly. That same approach will almost automatically render the amplifier less liable to interference from RF picked up on the input or speaker leads. A small number of extra components which only function at RF will finish the job.

EMC is not a subject to be feared, instead it is a tangible way of enhancing the quality of audio products. Rather than finding ways of avoiding the issue, a far better approach is use EMC theory as a way of weeding out inferior designs and profit from the consequences. In fact all of the necessary theory is well established, having been perfected in other industries, and documentation is not hard to come by. For example, the June issue of the *AES Journal* ought to be permanently installed on your bedside table; mine is.



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# Sound joins film arsenal



Like the junk culture that inspires them, really loud explosions transcend all linguistic barriers writes **DAN DALEY**

**A**merica's Marketing Machine is now up against an economically robust Second World that redefines the term 'juggernaut' and against whom we have little to respond with other than a trigger-happy Marlboro Man avidly hooking Asian kids on even shorter lifespans.

The Machine is nervous and geared up like never before. That it has less and less to actually sell is almost immaterial. The predominant product under this mythical rubric is the most intangible of all: American films. And sound—Big Sound—has become the latest element of the Hollywood arsenal.

Audio, the eternal step-child of the film and broadcast business, has taken on a new importance in the last several years. This is partially to keep pace with consumer electronics advances. But it's increasingly apparent that audio has become an area that still retains some headroom for film-makers in search of bombast. Short of true 3-D (those red-and-green cardboard glasses were destined never to catch on) or the capital-intense IMAX cinemas-in-the-round, Hollywood is running desperately short of visual pyrotechnics. Each new production has to take an increasingly lethargic and numbed audience to an ever-higher plane of awe and wonderment in order to get them into theatres and away from rental stores and other competition for their entertainment dollar, like their families. To this end, the audio departments of film studios are operating on a scale never before seen.

It is reasonable to speculate that Hollywood's now-voracious appetite for larger-than-life sound has driven the upper end of the digital-audio-workstation market almost single-handedly. You simply don't make films without them anymore. You need the ready accessibility to libraries that they offer and their ability to combine existing sounds into new ones to stave off the audio ennui that comes with that staple of Hollywood: repetition. There is a limited number of ways to visually portray an exploding car or crashing aircraft; there are potentially unlimited ways you can make them sound, digitally. And this approach applies across the spectrum; the gunshots in Oliver Stone's *JFK* took weeks to record, combine, edit, re-edit and layback. Those three shots (or four, depending upon your personal level of conspiracy paranoia) were critical to the plot, and they got the audio they deserved. In spades.

**NOW, ALL THIS** is a good thing, right? It's certainly driven the pro-audio business to new heights of technology and revenues, and in the process created new niches in the industry, such as the relatively new screen credit of Sound Designer. But in a larger context, enhanced audio has become an accomplice to Hollywood in what could end up being yet another example of an American industry shooting itself in the foot. The overall quality of the content of films made in the US has gone down proportionally to the percentage of profits that a Hollywood film makes from overseas reruns—the market that increasingly rescues cinematic bombs. Arnold Schwarzenegger is perhaps the perfect example: his films require little in the way of credible plot or challenging dialogue—much of which hinges on catch phrases like 'I'll be back' (or 'Bach,' as he

intones)—but do require more and more in the way of audio and other pyrotechnics.

Narrative is comprised of exploding vehicles and flying bullets, all now nicely buttressed by better (or at least louder) 6-channel audio. Who needs a script, particularly when more and more of your profit comes from non-English-speaking markets? The reported \$172 million budget of Kevin Costner's *Waterworld*, which opened to dismal reviews in the States, is almost certain to make back its cost and then some when foreign sales are in. That's been the case for all but the worst US-made cinematic stinkers. The film certainly has great audio. But do we care what it says?

Suspiciously, Roger Ebert, a widely syndicated US televised film critic, once complained publicly that he found contemporary film dialogue unintelligible. Not unintelligent, but unintelligible. He can't hear what the onscreen performers are saying for the sound of the rest of the film. (I ran into him in La Guardia Airport last year and he confirmed the sentiment.)

**SOUND EFFECTS** and design have become tantamount to the script in many Hollywood productions, and with ever-increasing reliance on foreign sales, some might say that sound is now often paramount to dialogue. And that's sound that is added in postproduction, sound that is just a little bit less—but significantly—integral to the production itself. There is an irony here in that Hong Kong's films have virtually all their audio—including dialogue—dubbed in post, even for first-run markets like Taiwan and mainland China. In this sense, every version of the film is just that: a version, not an original. This might be one of the secrets to Hong Kong's fast-rising cinematic star, one that Hollywood is just catching up with. A really, really good, loud, extended explosion transcends linguistic barriers. It also helps cut down on the expense of hiring writers and looping.

America makes a lot of good films. Unfortunately, for every chance that a company like Miramax takes on films like *Kids* there are two dozen mega-budget knock-offs that can literally be shot from the film's 5-page treatment and whose viability domestically and overseas is assured by lots of good-sounding explosions and a couple of actors-of-the-moment. The audio component of film is simply doing its job, artfully and with the unstoppable compunction of the science upon which it is based, and in doing so contributes blithely to both the good films and the bad ones. So there is no indictment of film audio implicit here, just as there is none for stunt coordinators, DPs or lighting designers. What's needed, though, is an awareness that audio, like its brethren arts and sciences before it, has become a key component in the marketing of films, which starts long before a foot of film ever rolls. And with marketing today the key determinant of whether a film gets made at all, this is a valuable insight.

The unexamined life is, indeed, not worth living. 

Audio, like its brethren arts and sciences before it, has become a key component in the marketing of films, which starts long before a foot of film ever rolls

# Over the Rainbow



Sony tries to keep its secrets to itself; Philips announces the music format for all formats writes **BARRY FOX**

**L**ondon TV news station ITN announced it would be first in Europe to buy Sony's digital system. The way the announcement was made was more interesting than the announcement itself.

Weekly magazines receive news announcements early to meet deadlines for publication at around the same time as national daily newspapers. Monthly magazines like *Studio Sound* get them earlier. The advance information is embargoed. Any journalist or magazine that breaks an embargo, and publishes ahead of the official announcement, very quickly gets blacklisted.

But computer companies work in a different way. They reveal information about new products to the press months ahead of launch, in strict confidence. I always refuse these offers of confidential disclosure. Why should I play the guinea pig or unpaid consultant? It can also be very restricting. There are worrying signs that this practice is spreading into the professional and broadcast field and it needs to be stopped.

Recently, Sony in Weybridge and ITN in London sent out joint invitations to a conference staged to announce their electronic newsroom deal. I was one of many journalists who asked for advance information, so that I could meet magazine deadlines. Sony referred me to an outside PR company who faxed me the most extraordinary sheet of legal gobbledegook. I had to sign this before they would send me a press release. It turned out to say little more than we already knew about the deal. But by then I had signed the legally binding document.

Rainbow is a new name coined by Philips to signify a disc which bridges all the CD standards, Red, Green, Yellow, Blue and Orange.

Both Sony and ITN admitted later that they had not seen the draconian text, titled 'Proprietary Rights and Non Disclosure Agreement', before it went out to the press. The document had apparently been drafted for the computer industry, but jiggered to suit the broadcast world.

When the document was translated into plain English it meant that if I wrote in advance about the event, I would have to get written permission from Sony before handing in my words to the Editor. Then I would have to get written permission before anyone in the office passed it to anyone else, including the printing press staff. Would ITN let its own reporters sign such a restrictive agreement when working on a news story? Of course not. Let's hope no other company makes the same mistake.

**IT WOULD BE** nice if record companies could produce just one version of every new CD, that would play on all the different kinds of playback platform; Mac or Windows PC, with or without MPEG digital video decoder, or CD-i player, or audio CD player.

This is what Philips promise from Rainbow CD, the 'revolutionary new multimedia music format', which is intended to reduce the number of different versions of a CD that retailers have to handle.

Rainbow is a new name coined by Philips to signify a disc which bridges all the CD standards, Red, Green, Yellow, Blue and Orange. Finding someone inside Philips who fully understands the situation was not an easy task,

but we got there in the end.

There are three ways of mixing media on a CD. Option one is the 'multisession' or 'Track One' solution as per the *Blue Book* standard. *Red Book* audio is put on the first track or session of the disc, immediately after the TOC.

All the computer information is put in later session tracks, and indexed only to *Orange Book* standard. So only a multisession CD-ROM drive can read it. An audio CD player ignores the computer data.

But Philips' own CD-i players will not play *Blue Book* discs. The CD-i player needs to see a burst of CD-i program code at the start of a disc. If it sees audio instead, it treats the disc as an audio CD and ignores any computer data that follows. Philips is modifying the next generation of CD-i players, but these will not reach the market until 1996.

A personal computer cannot read *Blue Book* discs with a CD-ROM drive unless it has been programmed with 'driver' software. Currently PC owners must load this driver for themselves, perhaps from a second CD which is given away with the music CD. The new Windows 95 operating system should put *Blue Book* drivers onto a PC as standard. But, despite Microsoft's overblown hype, the world will not immediately become a Windows 95 paradise. Many existing PCs will need hardware upgrades, or more likely replacement, to run the new operating system.

Also, for reasons which Philips do not yet fully understand, CD-ROM drives made by NEC will not work with *Blue Book* discs. Philips estimate that at least 20% of the ROM drives now in PCs are made by NEC.

The second option is to use a system called Track Zero. The Table of Contents, which normally lasts only a few seconds, is greatly extended to hold all the CD-ROM data. This option is also blocked because some PC-ROM drives, including NEC's, refuse to read extra data from the TOC. This leaves only the third option, originally known as Track Two, and now catch-named Rainbow CD. And this is being used for the first major multimode release, *Doors and Windows* by the Cranberries. It is a joint release from Island and Philips.

The computer data goes into the first session or track 1. The audio then follows in tracks 2, 3, 4 and so on.

Existing CD-i players and ROM drives should go to the computer data and play it as intended. A CD audio player goes first to Track 1 and starts trying in vain to play the computer data. Some audio players automatically mute their output to protect the loudspeakers. Others (for example, Philips' own CD-840) fail to mute and feed square-wave noise to the loudspeakers. A few may generate a quick burst of data noise before muting. Or they auto-advance to the next track. It's suck it and see.

As a result the Cranberries disc carries a damage warning on the label and there are spoken damage warnings on Track 1 before the square-wave noise blasts out.

This will not phase computer buffs, but ordinary folk who buy the disc will be completely befuddled by the warnings, by hearing nasty noises or seeing their CD player start playing without making any sound.

One final point: different people use the names Track 1 and Track 2 to mean different things, depending on whether they are defining where the audio or data goes. It is far less confusing to talk about Rainbow (which puts computer data ahead of the audio) and *Blue Book* (which puts computer data after the audio).

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# RNMP

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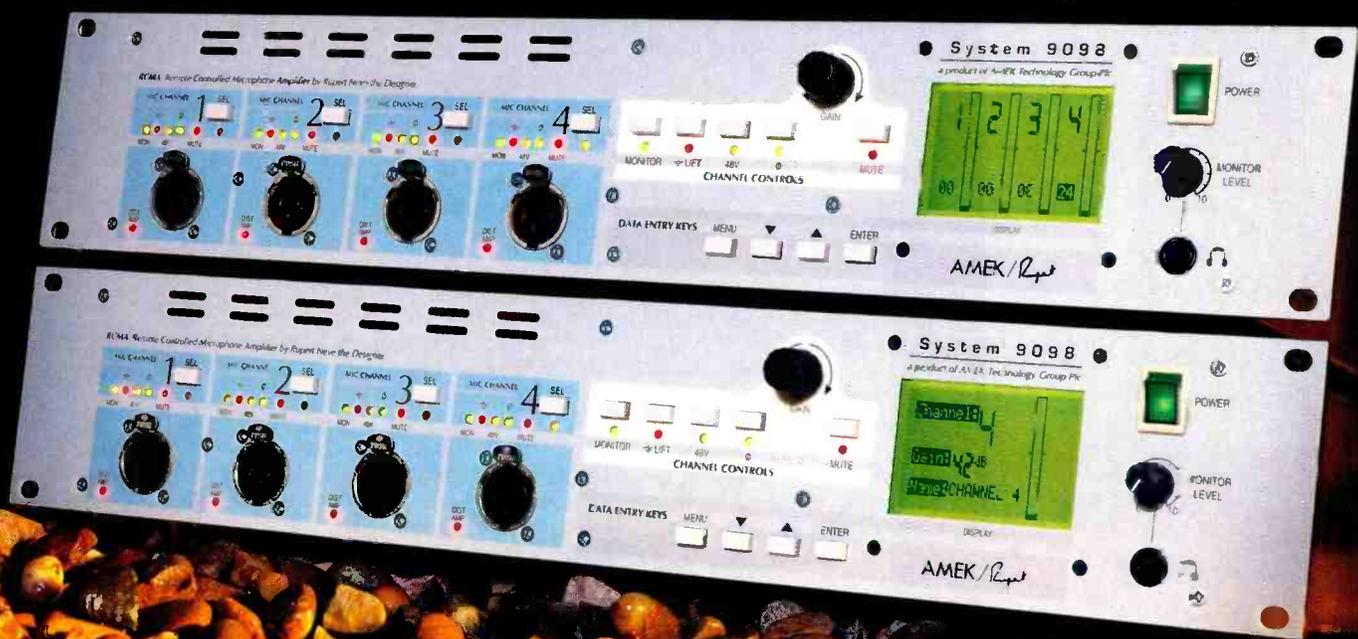


The need for excellent microphone signal quality in contemporary audio production has never been greater. Although the audio path may be fully digitized, the microphone remains the primary interface between the signal path and the real world.

A microphone cannot feed long lines without signal degradation; lengths in the order of 25 metres can degrade performance audibly and even in a normal recording studio, cable runs are often greater than this. Critical importance therefore attaches to the performance of the microphone amplifier, whether its output is in the original analogue form or converted to digital.

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# Rising in the East



Cultural diversity plus social harmony and technological reality equals commercial opportunity writes **JIM JAMES**

**A**sia is brimming with the latest technological gadgetry and fashion icons from around the world. It is a place of immense diversity and dynamism, in which fortunes and new social orders are being created. For the professional audio-industry manufacturer it presents opportunities and challenges at every level—with each aspect undergoing fundamental change.

The population of Asia—including Japan and China—is believed to be in the region of 3bn, with the majority between the ages of between 15 and 30. These young people are at a crossroads in which the Confucian ethics of thrift and hard work meet the soundbite culture of instant gratification.

The emerging middle class in the more developed countries such as Singapore and Thailand, are purchasing Rolex watches, Ray Ban sunglasses and Gucci handbags as signs of their new-found wealth. Above all this stands the worldwide symbol of social mobility, the car, especially the German car. To drive a 190 Mercedes Benz in Singapore, for example, costs in excess of US\$260,000 yet it is here that there is the highest number of Mercedes per capita in the world. Long-term investment in the Marque and proven product quality make this the most sought after carriage and wheels in Asia.

The acquisition of western icons should not, however, be misinterpreted as the abandonment of indigenous values.

During August, the Chinese lit ceremonial fires in the street outside my office to ward off bad spirits; noodles are not being usurped carte blanche by Cornflakes and Big Macs.

Not, historically, the first to invent electronic technology, Asians are quick to acquire it, and in the telecommunications field this is certainly true, with Western brands such as Motorola manufactured in the region. There

are some 22 million pager users in Asia, of which I am one, with subscriber growth of approximately 40% p a. The growth of digital cellular phones is of similar proportions, with the thrift-conscious Chinese buying a pager to receive calls and a phone to reply as it saves on roam charges.

For entertainment, people, here, love to watch moving images on the screen. The Asia Pacific region was estimated to have 320.3 million television sets in 1992, a significant 37% of the world's total but representing penetration of only one in 17 homes. As the population grows wealthier, the thirst for more pulp fiction will drive Asians on to purchase an estimated 135 million more sets by the turn of the century.

Some of these may be the new Samsung karaoke TV set with 256 music titles pre-installed. Introduced to cater to the burgeoning home entertainment market, it is a product which I suspect will not be a big export product to Europe. However, it demonstrates both the value of the market and the flexibility of manufacturing capability in the region.

This growth in communications and entertainment technology products has been matched by the race to provide the channels for people to watch. There are some 160 stations, the ownership of which lies in the bands of three basic

groups: governments (the Television Corporation of Singapore); Asian businessmen like the Siam Commercial Bank (Infotainment Channel); and multinationals (MTV Asia, Star V, ESPN Asia). Each of them is battling to win the ratings war.

The people who ultimately subsidise this expansion are the consumers and the advertisers. Television advertising revenues in Asia grew by 4.9% from 1982–1993 to total US\$18.9bn in 1993, about as much as the entire American advertising market, so the stakes are high and competition intense.

**THE MUSIC INDUSTRY** supports over 100 labels, both Asian offices of majors such as PolyGram and local companies like Bakery music, managing local and international artists. The key problems for the label companies here are copyright infringements and excess duplication which some organisation are trying to conquer by lobbying and installing their own pressing plants.

With sales of CDs and cassettes in the region during 1994, excluding Japan, worth an estimated US\$2,655,000,000 retailers like Virgin and Tower Records are competing for floorspace and airtime in every capital in Asia. Music from artists such as Vanessa Mae and Indo Pop star, Peter Tan, complete with Wet Wet Wet and Kenny G for chart positions. The surge in popularity of local acts is stimulating a demand for world-class studios to be built in Asia—no longer is it believed that artist have to record in LA or Tokyo.

Broadcasting the music is the ever-multiplying number of radio stations throughout the region. The absolute number is difficult to determine, as like so many things in Asia the growth is so rapid that reliable data is hard to find. Indonesia, for example, had at last count over 670 stations ranging from small private outfits to Government installations.

One general characteristic of contracts with broadcast stations seems to be the requirement for turnkey installations, as there is a lack of specialist knowledge within the organisation themselves. One example of this is the recent contract for Siemens TS which was commissioned to install 49 stations in Indonesia including continuity studios, production suites, master controls rooms, editing suites and OB vans.

Audio and video programme facilities and transmission systems are at the heart of the opportunity for hardware manufacturers and software designers. As with the wholesale embrace of digital, cellular, personal communications, there is a skipping of much of the analogue evolutionary path, fast-forwarding to completely integrated digital studios and broadcast stations.

As Khaw Boon Wan, Chairman of Singapore Cable Vision, stated on the announcement of a drive to cable 750,000 homes by 1998: 'As latecomers we have the option to adopt the latest technology with greater capabilities and at lower cost.'

In this statement is the confidence which is felt within the Asian business community that it can take the best of Western technology and pass over the rest. Western manufacturers continue to design brilliant innovative products, only to find them disassembled, rebuild, repackaged and returned *en masse*.

There is an acknowledgement in Asia that some products from the West are superior, but being from the West cannot in itself be the proposition. It is only those companies that have invested in engineering the product, marketing the brand, and managing the channels of distribution who will generate a sustained appetite for their products in the region. S

The absolute number of radio stations here is difficult to determine, as like so many things in Asia the growth is so rapid that reliable data is hard to find

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# review

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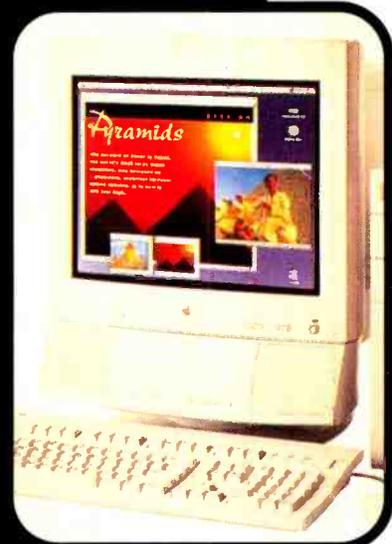
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REVIEW

# Sony OXF-R3 console

Perfect in principle, problematic in practice, the digital-audio desk remains controversial kit. Sony takes up the challenge—**PATRICK STAPLEY** reports

**AS FAR AS** manufacturers are concerned, the buyers in the music recording studios are a conservative bunch. Compared with their postproduction and broadcast cousins, they are cautious to embrace cutting-edge technology, and have a tendency to sit on the fence waiting until they can see what their neighbours are doing.

An area in which this trait has been particularly prevalent is in the acceptance of digital consoles. You only have to look at sales patterns over recent years to see that music studios are not interested in digital desks—the sectors that have adopted the technology are postproduction and broadcast rather than music.

Is the problem simply finance? Well, even though they may already own digital multitracks and are prepared to invest in high-end consoles, the preference is for analogue rather than digital. The real problem is more deeply rooted and centres around a product's commercial pulling power.

As we all know, consoles are fashionable items and can act as a draw or a drag depending on current trends and client perception. To a large extent, purchase decisions are customer led and few studios will risk investing in equipment unless they are convinced it has client-appeal.

Inevitably,

this creates a vicious circle—studios buy what they feel their customers appear to want, while the customers themselves don't get a chance to try anything new because the studios decline to take risks.

Taking all this in to account, it could be considered rash in the extreme to launch a top-end digital console at the music recording market. But this is exactly what Sony has done with its new OXF-R3 desk, confidently claiming that it is the first viable digital mixer for music recording.

'We believe the desk offers a new approach to working in the digital domain that will appeal strongly to music studios,' says Sony Pro-Audio Product Manager Andrew Hingley. 'Our goal has been to offer all the advantages of working digitally but at the same time to allow the recording engineer to operate instinctively and creatively. We also believe that the timing is right for a desk of this type—there are signs that things

**'We believe the desk offers a new approach to working in the digital domain that will appeal strongly to music studios'**

are changing and some music studios are doing the old-fashioned thing of buying equipment simply because they believe in it.'

**THE OXF-R3** console has been in development for seven years as a joint project between the Oxford team (responsible for the design and creative side) and the Atsugi factory team in Japan (responsible for production).

Some of the key figures involved in the Oxford team, all of whom were formerly with SSL, include Project Manager Rod Densham, Design Manager and console design specialist John East, Chief Consultant Engineer Peter Easty, analogue-digital conversion expert Paul Frindle, operational and system specialist Simon Harrison, and Software Manager William Kentish.

Perhaps not surprisingly, given the design team's background, a great deal of importance has been attached to ergonomics, and the product certainly benefits from being simple to use and fast to operate. As Andrew Hingley

points out, a prime design consideration was to maximise the operational advantages that digital has to offer and hence avoid creating an analogue lookalike. In this respect, the 'Oxford' console not only looks quite different from other digital desks but is also operationally unique in many ways.

A crucial element in achieving this has been the development of a proprietary, high-speed, 32-bit ASIC that is used in a large array to control signal processing.

In parallel with the ASIC development, the Oxford team also spent considerable time devising software to allow console design via a high-level graphical input. The system works as a kind of electronic schematic, automatically translating graphical designs to microcode. This means that console designers do not have to be software engineers to develop a digital console—a big plus point for traditional-audio people.

The fact that this system also enables the console to be easily modified to suit user requirements is viewed as a major selling aid. However, the likelihood is that the initial production models will be supplied in a standard format to allow the console to become established first.

The control surface also allows a degree of customisation, as it employs a modular architecture. However, it should be stressed that it has not been designed in the 'pick and mix' sense. Another important design consideration was that the control surface should be compact. As a result, the standard console measures 1m x 2.5m. To give an idea of how compact this is in terms of functionality, John East estimates that if

Detail of input channel and inserts control panel





the console had been built conventionally it would measure at least 2m by 10m

'Having decided that we wanted to increase what the current range of high-end music recording consoles can do, we wanted to do it in a way that avoided designing an enormous control surface,' says East. 'The only way to achieve this was obviously to take the assignable route but we really wanted to make assignability a great benefit. We didn't, for example, want to adopt the channel-strip concept with resettable controls which we believe is a compromise—what we have chosen to call reluctant assignability, if you like, that tries to offer the best of both worlds but struggles to keep what was there before.'

'We wanted to give much more than was available before, so the only way was to go for a really positive assignable approach. In other words, to attack assignability and make it really good to use.'

Although the console has taken some steps away from what its designers refer to as 'people's comfort zone', a lot of effort has gone into making the system familiar and approachable.

'The whole principle has been one of operational familiarity,' states Sony Product Manager Geoff Calver, 'It was essential for us that freelance engineers should be able to get on board as quickly as possible. We certainly wanted to avoid the situation where the studio owner and

his staff turn into this elite club who are the only people able to drive the thing! We're pretty confident from our beta-testing experience that a competent engineer will be able to sit down with the system and do useful work within 30 minutes.'

The console has been designed to allow all controls to be in easy reach of the engineer. As with other digital desks there is no direct relationship with the number of channels in the system and the control surface, so the very smallest control surface could operate with the largest DSP configuration. Future DSP expansion has also been carefully allowed for, and control panels such as the Dynamics Section have been designed with multi-functionality in mind. This section already controls delay and is likely to offer reverb, effects and even psychoacoustic processing in the future.

A strong philosophy among the Oxford team is that the console should offer a truly creative platform giving the engineer the ability to experiment with new ideas and explore new techniques.

'What we would very much like to

occur in the future is to recreate something that was around years ago where certain studios had an expertise that was down to the people in the building,' says East. 'What's happened over the years is that everyone's using the same equipment and nobody has an edge in the same way. By offering real DSP flexibility we hope to be able to change that.'

In the OXF-R3 Sony has adopted a fundamentally different approach to the control surface

**THE FIRST THING** that strikes you about the desk is that it looks very different to other designs. At first glance you could be forgiven for thinking this was a video rather than an audio console. The inclusion of integrated colour TFT screens and blocks of control panels, along with the unusual styling with its cut-away faders, large control knobs with internally-mounted LEDs and chunky buttons makes the whole appearance very individual. Also what a Sony representative referred to as the 'lights per dollar ratio' is impressive, making up for any disappointments people may feel over the compact size of the control surface.

The standard console has been laid out into three main operational sections; two of which are identical and deal with channel functions, while the third centrally placed section deals with session management, master functions and so on.

Being scalable, there are a wide range of configurations, but a typical desk would offer 48 channel-faders controlling 120 channels (the console is capable of controlling up to 256 channels), 32 mic amps, 56 A-Ds, 32 D-As, 16 I-O pairs (AES-EBU or SDIF2), and 48 multitrack I-O via MADI.

The control surface connects to the

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Close up of area of control surface covering EQ, dynamics, channel flow and multitrack

processor rack via a single high-speed ethernet cable, and the processor connects to analogue and digital I-O racks via MADI. Mic amps are remote to the console allowing them to be placed as near to the source as possible.

Two types of proprietary 20-bit A-D converter have been developed for the console. The first is optimised for microphone inputs and has an integrated mic amp, while the second is designed for line level signals. In a similar way there are two D-As—one type for mastering and monitoring outputs, and another for interfacing to external equipment.

**CHANNELS ARE** divided into two types—Full Channels which incorporate input and multitrack return paths analogous to a conventional in-line channel, and Stereo Return Channels which act as inputs only and are designed for use as effects returns or MIDI instrument inputs. The numbers of each type of channel are software defined.

Each of the two channel sections has 24 linear motor-faders which can be separately assigned to control any level function in the console from two paging panels. So for example the left bank of faders could control Channels 1–24 while the right bank controls 25–48, or the left could be used for channels while the right deals with monitors in a split console sense.

More unusual functions, such as auxiliary send levels, can be controlled from faders with direct interaction between the fader and the auxiliary control panel. Apart from the visual advantage that faders offer over knobs, a great advantage here is that monitor mixes can be copied to create an instant foldback mix. This can then be modified very quickly, and instinctively, saving the engineer a great deal of setup time. The fader paging system offers an enormous degree of flexibility and ease of access potentially enabling the operator to work in many different ways.

With this degree of flexibility, it is essential that the operator has clear visual feedback of what is being controlled, and this is achieved by placing electronic scribble strips above and below the fader to confirm the current paging selection.

Also associated with each fader are SOLO (SIP, AFL or PFL depending on master selection) and CUT buttons. Placed above this is a Pan control, SEND and RETURN switches for monitoring, and a RECORD switch for track arming. The Pan knob

can perform additional functions and a Select To Pans Panel provides a choice of assignment.

Being closely associated with the fader, this is convenient for quickly accessing a function across all channel. For example, it could control input gain during recording, act as a monitor level pot during overdubs, control an auxiliary send, or act as a group trim—the choice

is extensive and provision has also been made for user setups to be configured.

As this definable control works simultaneously with other controls, it allows two functions, that might otherwise have to be adjusted in two passes, to be addressed at the same time; something that is not always possible with assignable technology. Again to make life easier, a source display is included along with AFL and CUT buttons; in the default panning mode the CUT button acts as a PAN IN-OUT switch.

As with other digitally controlled systems, the console makes use of an ACCESS key placed below each fader. This assigns the channel to the various processing panels in each channel section—as there are two identical channel sections this means that two channels may be adjusted simultaneously from left and right sides of the console—however, this is probably only of real benefit where the desk is being operated by more than one person.

When the ACCESS key is selected, the signal path for the Accessed channel will be displayed in a Signal Flow Panel containing eight windows showing how the path has been configured from input to output. Using these windows it is possible to easily reconfigure the path removing or adding elements, changing the order in which processing appears, moving insert points, and so on. Again the philosophy has been to give the user maximum flexibility but in a way that is both easy to comprehend and easy to achieve.

Also controlled from this area is input selection between Mic, Line and Multitrack, with Gain and Phase Reverse working independently for each source. As with all level functions, input gain may also be directly controlled from the faders—by assigning Input Gain from the Fader Paging panel. source as possible before conversion takes place.

**THE CHANNEL SECTIONS** each have two large assignable panels dedicated to processing—one controlling equalisation, the other controlling dynamics, delay and future DSP functions as mentioned earlier.

The equaliser is a 5-band, fully parametric design offering 20Hz–20kHz with  $\pm 20$ dB adjustment and generous control over Q. A separate high and low-filter section with adjustable slope (0–36dB/octave) can be used independently, and placed in a different part of the signal path to the equaliser.

As far as performance is concerned the equaliser has a definite analogue feel about it, and this positive attribute is largely due to the way the controls utilise real-time computation rather than relying on lookup tables—a unique feature built into the design of the ASIC. This produces an extremely high precision response providing continuous controls with 1,000 positions and marries together action and reaction times perfectly. There is no perception of discontinuity or lag which can often be present in digital controls.

Another benefit is that the Gain controls can be scaled so that instead of providing a range of  $\pm 20\text{dB}$  they could be set to  $\pm 5\text{dB}$  thus offering much greater resolution without suffering any jumps or glitches. The actual effect of equalisation is also more like analogue, and much more responsive than some other digital systems where one has to add masses of gain before hearing noticeable results.

All bands have separate In-Out switching, and the LF and HF bands are switchable between bell and shelf. An additional Overshoot mode is available in shelf operation which allows the frequencies just below the set shelving frequency to be boosted or cut using the Q control.

A neat facility incorporated into the equaliser is the A-B function that allows two EQ settings to be set up for the same channel and toggled between. Apart from being useful for making instant comparisons, it can also be used as an automated mix facility.

As EQ adjustments are being made a real-time plot of the curve will be drawn on the corresponding TFT screen. The display also shows all the parameter values for the current setting. Each block of eight channels has a TFT screen associated with it which will provide various information depending on the function currently being adjusted.

The Dynamics section offers the usual expander, gate, compressor and limiter functions, and includes dedicated gain reduction metering for each (this is also duplicated in each of the channel meters). The panel has been divided into two operational areas. The first has 12 Selector Blocks which display all the available functions and includes IN-OUT and ACCESS keys for each. An Accessed function, say GATING, is then controlled from six definable knobs and six switches, each of which has an 8-character display showing the parameter it's controlling. As with the equaliser, a graphical representation of the processing and parameter values for each function are displayed.

Although the four dynamic-control processes operate completely separately, they actually take effect together at a single point in the audio path, which as mentioned can be determined by the operator. This situation may change in the



Colour TFT screen showing multitrack assignments

future and the Oxford team is looking at the possibility of staggering the processing so, for example, a compressor could be placed after a gate and so on.

Also controlled from this area is delay, and up to 500ms is available. This can be used in two ways, either to delay the channel relative to others or mixed with the direct signal to produce effects. Other functions will be added to Selector Blocks when they become available—the latest addition being Side Chain EQ.

On the subject of delay, the console's system delay (the time taken for the signal to travel from mic to headphones) is under 2.5ms, which should be perfectly acceptable for overdubbing. In fact the Oxford team has conducted a series of tests with session musicians, which they say proves conclusively that this amount of delay has no adverse effects over foldback monitoring and musicians timing.

However, to compensate for delays caused by inserting external equipment, the console includes a self-analysis mode whereby it measures the insert delay and automatically time aligns all the other channels to compensate for it—this facility is a mix feature and would obviously not be used during overdubbing.

**THE CONSOLE HAS** 24 auxiliary buses which are accessed by the channel from another assignable panel. This contains 24 send-level knobs with associated ON-OFF switches and display windows showing the number of the send or a name entered by the user. Apart from individual Pre-Post Fader switching, each send may also be positioned at any point in the signal path relating to the eight block signal flow—so for example Send 1 could be sourced directly after the channel input, while Send 24 could be sourced post EQ but pre Dynamics. Provision is also made for stereo feeds, with sends being linked in pairs so that one knob controls level while the other governs pan.

As stated earlier, aux sends can additionally be controlled from the faders or pan knobs. This enables the engineer to view and control all the contributions from the channels to a chosen aux bus, as well as having access to all 24 sends on a single channel basis.

For routing signals to other console buses, there is an assignable Routing Module. From here access is provided to the multitrack buses via 48 routing keys which can be switched to feed an additional 48 tracks, thus accommodating 96-track operation. Also from here the channel can route to the console's 16 stereo subgroups, and the main stereo bus. Routing information for all channels is displayed on the TFT screens (each showing eight channels) and the screens themselves can provide an alternative method of routing using the console's two

**'Our goal has been to offer all the advantages of working digitally but at the same time allow the recording engineer to operate instinctively and creatively'**

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# SONY OXF-R3

built-in trackballs as controllers.

Being designed for high-end recording studios, the console has been equipped with multiformat buses to allow for the increasing amount of sound-for-picture work being undertaken. At the top of the routing panel are eight additional routing buttons—L, LC, C, RC, R, LS, RS, and SUB. These rather ingeniously can have multitrack routing keys assigned to them so that the engineer no longer has to remember which multitrack output is supplying which destination.

For multiformat monitoring, the first eight stereo subgroups can be switched to multiformat mode and configured from the centre of the console. Full surround panning is controlled from an additional module.

**THE CENTRAL AREA** includes all the master, monitoring, communications, and session management systems. It also has a TFT screen which is used for displaying information for console setup/housekeeping, automation, machine control and so on. As with the channel sections the screen is not designed as a control area for regularly used functions, and these have all been given hard controls.

Also included is a hidden QWERTY keyboard, concealed beneath the front buffer directly below the 16 Stereo Subgroup faders, which is used mainly for naming Cues, Control Windows, Tracksheets, writing note pages and so on. Without going into too much detail I will mention some of the main features and more unusual facilities.

Aux Masters, Foldback Groups (4), Stereo Subgroups and the Main Stereo Fader all have Access keys allowing processing to be added, so for example EQ could be added to an aux bus and dynamics inserted across the main stereo output. The Subgroups can be controlled either from the 16 central group faders or from a bank of rotary controls. This arrangement allows simultaneous access to the subs, if the group faders are being used as VCA-style masters or to control Aux Master levels. The Stereo Subgroups can be routed to the main output, multitrack buses, or to separate console outputs, and as mentioned the first eight can be configured for multiformat monitoring.

Three control-room monitor systems are catered for. The level of the second and third follow the main speakers with trim controls allowing for smooth switchovers. Up to 28 external stereo sources can be attached to the console, and monitored either separately or additively depending on mode. These can also be separately switched through to the two Studio Loudspeaker circuits.

Comprehensive talkback facilities offer dedicated sends to the four Foldback Groups and separate access to the two Studio LS systems. Additionally, there are six TALKBACK keys that can have destinations assigned to them to suit the user, and provision is made for setting-up talkback groups. Two Listen Mic circuits are also included.

A 20Hz–20kHz oscillator is provided with pink noise. Setup is screen-based allowing it to be calibrated to suit the application. Apart from selection to the main and group outputs, the



**The system not only has the potential to make the job of engineering quicker and easier, but it also offers the flexibility for engineers to work in many different ways, maximising creativity and promoting individuality**

oscillator may also be individually inserted into each auxiliary and subgroup path via local push-buttons, offering a useful check facility. Rather sensibly the console will not normally allow tone to be fed to any auxiliary that is assigned to a Foldback Group—a feature that will be appreciated by any musician who has been deafened by a 1kHz tone inadvertently blasted into the cans.

Another safety feature is a Lock key that prevents oscillator or talkback selection going to the main outputs, as well as inhibiting routing changes. The user may also assign lock-out functions to follow red light switching.

Channel Solo modes and switching characteristic (momentary or intercanceling) are selectable, and solo buttons can be set to activate the Access function connecting channels to processing. Access may also be set up to operate from fader touch.

**AS WOULD BE** expected, the console comes fully equipped with dynamic and snapshot automation. All controls, apart from the obvious ones, have been automated; automation is not restricted as a mix-only function, and an important design philosophy of the console is that it should be available and useful during all stages of production.

Once again, the emphasis has been on simplicity of operation and avoiding cluttering the console with controls and indicators. One of the ways this has been achieved is by the crafty

design of the faders and knobs, which each include an integrated switching mechanism to enable status changes. For example, a fader can be switched from rehearse to write by simply pressing a recessed button in the fader head; similarly a knob can be dropped in and out of record by pressing down on the knob itself.

Each fader has associated READY ABSOLUTE and READY TRIM buttons that allow status to be locally primed, while the knobs can be individually armed by interacting with central controls. Small LED indicators are supplied for each type of control providing a clear indication of current status. The system, which is in the final stages of completion, offers a range of crossfade times to return controls to previously recorded positions and includes familiar modes such as Absolute, Trim, Disconnect, Auto-Take and Glide. Full off-line editing facilities are provided allowing mixes to be merged, and dynamic data to be moved, rewritten or copied.

Machine control may be configured to provide control of up to 16 external machines, and predictably the desk is well equipped to deal with Sony Dash machines—full transport functions allowing the PCM-3348 or PCM-3324S to be remotely controlled.

Familiar terminology is also used for locating multitrack Cue points, with Go To, Cycle, and Play functions being used to control machines. Cues are named and listed in a scrolling display.

**WHEN SSL** produced its first console back in the 1970s, there was the feeling that here was a product designed by engineers for engineers. The OXF-R3 gives that same impression, which considering the background and pedigree of its design team may not be entirely surprising.

The system not only has the potential to make the job of engineering quicker and easier, but it also offers the flexibility for engineers to work in many different ways, maximising creativity and promoting individuality. With careful consideration given to future developments and system expansion, the desk is well placed to forge a pioneering path and offer many exciting possibilities to tomorrow's studio.

Although definitely not trying to mimic an analogue console, the Oxford manages to retain familiarity, helping to make the analogue to digital transition that much easier. Simple but important details, such as the high resolution of its controls, not only give it a more solid and dependable feel, but should help seasoned analogue users feel more at home.

It only remains to be seen how music studios will react to a digital desk that has been specially designed with their needs in mind. The OXF-R3 becomes commercially available early next year, and hopefully it will inspire a long overdue turning point in attitude—it most certainly deserves to.

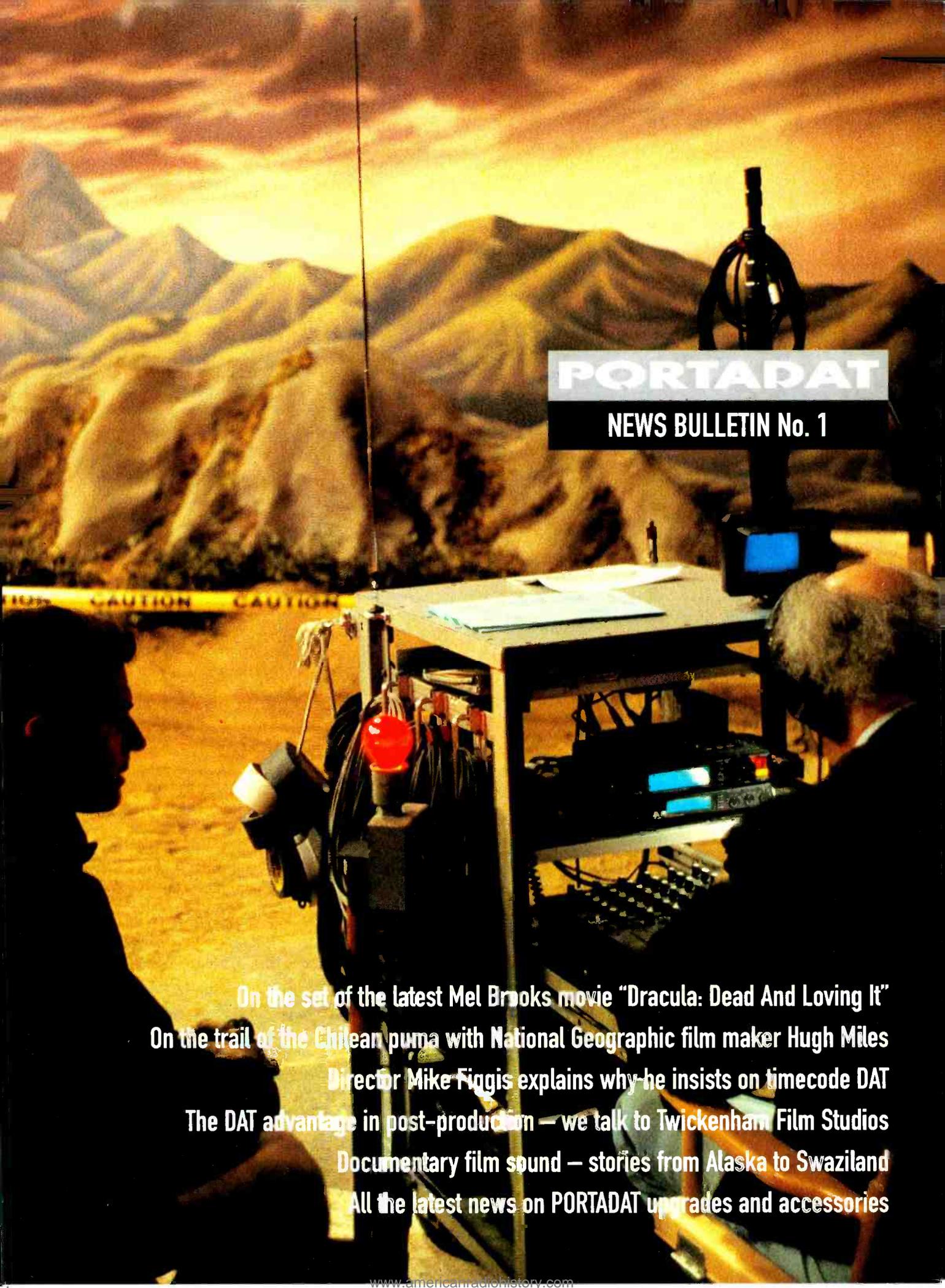
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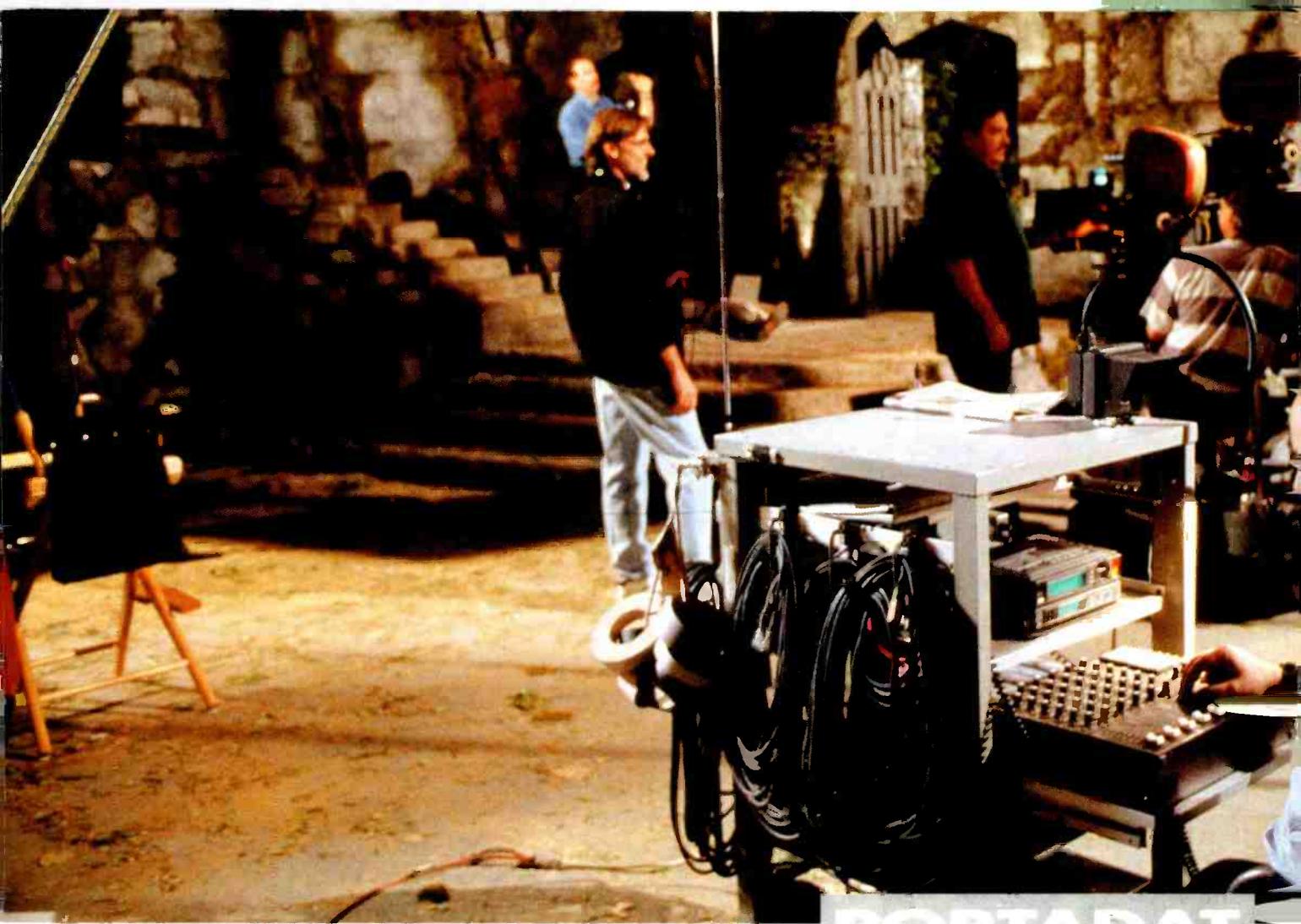
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# PORTADAT

NEWS BULLETIN No. 1

On the set of the latest Mel Brooks movie "Dracula: Dead And Loving It"  
On the trail of the Chilean puma with National Geographic film maker Hugh Miles  
Director Mike Figgis explains why he insists on timecode DAT  
The DAT advantage in post-production — we talk to Twickenham Film Studios  
Documentary film sound — stories from Alaska to Swaziland  
All the latest news on PORTADAT upgrades and accessories



PORTADAT

# PORTADAT IN HOLLYWOOD

Jeff Wexler, a veteran of Hollywood's location sound fraternity, has so far racked up 20 film credits with DAT. Since switching from analogue quarter-inch to digital he has used several DAT machines, working on a series of films that includes 'Mr. Saturday Night', 'City Slickers', 'The Natural', and 'Ghost'. "I think I've tried just about every portable DAT," he says, "and the PORTADAT is definitely my machine of choice."

Currently at work on Mel Brooks' "Dracula: Dead and Loving It" – being shot on a huge sound stage at Culver Studios – Jeff Wexler is a firm believer that a recorder should require as little attention as possible. "I don't like to focus on the tape machine. Its role is to record the output of my mixer as faithfully as possible, so I can concentrate on more important things – getting the best production sound I possibly can."

Jeff's basic approach is to keep things

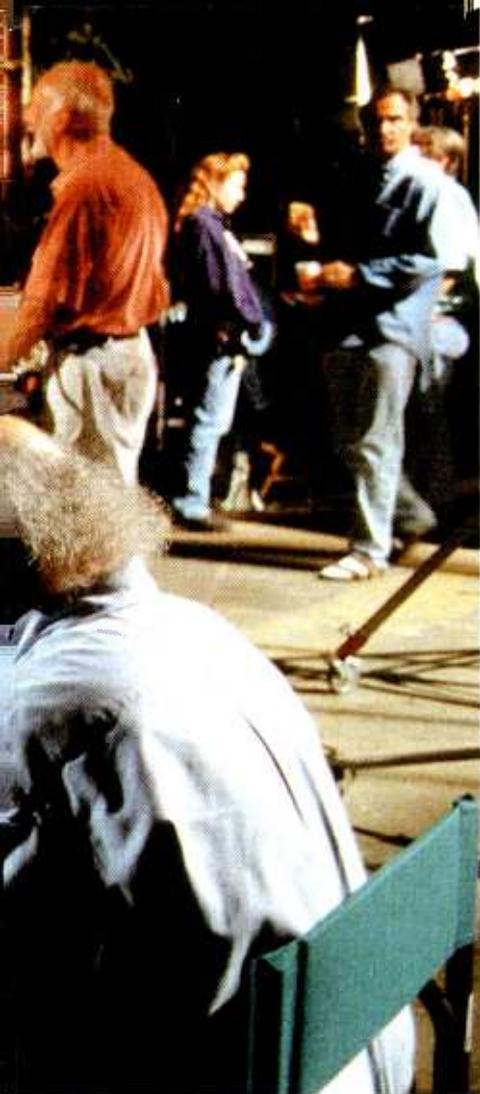
simple. "I'll use only one mic on a boom if I can get away with it, two if necessary. Sometimes I have to use radio mics, but I prefer not to." He uses the left channel of his PDR1000TC to record a mono mix, with the second track free for either an alternate mix or pick-up, or effects.

"Not everybody realises that 99% of motion picture location sound is recorded in mono. It's *mixed* in stereo, but if you start with a stereo dialogue track it can make it almost

impossible to create a sensible stereo image that matches the picture edits."

## What makes a good DAT machine?

As a professional working on big-budget productions, Jeff puts reliability and straightforward operation at the top of his list of priorities. "The most important thing is that a machine is solid, reliable, and starts recording as soon as you press record rather than thinking about it for a few seconds."



Jeff Wexler on the set of "Dracula: Dead & Loving It" at Culver Studios

At one time a user of the Sony TCD-D10 Pro II, Jeff felt that his ideal machine would combine the operational simplicity and reliability of that machine with some important pro features that it lacked, such as a 4-head transport for off-tape monitoring. "The PORTADAT felt right immediately. When I press record I know it'll go straight into record, the control layout is nice and uncluttered, and the display and metering are very clear. And on the timecode controls, for example, the assignment of functions to hard and soft switches is just right."

## RADIO UPDATE

After exhaustive tests on a series of DAT portables, Spanish radio broadcaster Radio Nacional De Espana has specified 13 PORTADAT PDR1000s for use in ENG and general audio acquisition applications.



The timecode equipped PORTADAT PDR1000TC

As a rule, a single DAT122 cassette lasts for a whole day's shoot. "I usually use a reference of -18dB for levels – equivalent to 0VU when we transfer – which gives me good dynamic range, with enough headroom for safety." His Cooper Sound mixer has limiters on each channel, which are set to come in about 1 or 2dB before the mic pre-amps start to clip. "I've never had any problems with levels. Never a hint of digital overload." The only other dynamic processing is a little 'manual' compression. "I just ride the gain to even out levels. Although you want good dynamics, you can't quite use real-world dynamic range on screen."

In Jeff's view, DAT's accuracy as a recording medium represents a crucial advantage over analogue, but still more important is the absence of any print-through problems. "That's something that isn't often discussed, but it is traditionally a problem in film sound – albeit more for the sound editors than the production mixer. When you have screams and gunshots, perhaps followed by a whisper, you quite often find that the louder signals print through."

Keep it sweet and simple: the PDR1000TC shares Jeff's sound trolley with a high-quality Cooper Sound mixer

Jeff is a firm believer in the value of production sound over Automatic Dialogue Replacement. "I really think that capturing a performance on the day gives a far better result than using ADR. The whole process is about telling a story as well as you possibly can, and there's no substitute for a good performance on the day."



Among the more common mistakes in film sound is varying the 'perspective' too much between different shots. "There's always a temptation to bring the mic as close as you can," explains Jeff, "but the best place for the mic is not always just out of shot. If you work like that all the time then the ambience changes too much between a close-up and a medium or long shot in a scene, and it's disturbing for the listener. You have to be careful not to move the mic too much, basically."

The last thing you want to worry about is, of course, equipment reliability, and with experience that includes years of working with analogue quarter-inch, as well as the emergence and maturing of digital technology, Jeff is well-placed to comment on the subject. His confidence in the PDR1000TC is such that he no longer uses a second DAT recorder to make back-ups. "When I first used DAT it was very much a new technology for motion picture sound, and I continued to back up to my Nagra. After three films I switched over to using a second DAT machine, so I'd have a safety copy on DAT; but now that I've got the PORTADAT, I don't need a back up."

# ON THE TRAIL OF THE MOUNTAIN LION

## DAT meets the big cats high in Chile's Paine mountains

Film and TV are famously collaborative media. A movie may announce itself as "A Film By...", but even a director who writes his own scripts and appears in his own work must acknowledge the huge contribution of other actors, a producer, editor, and so on. The field of wildlife documentary, however, is one where it seems an individual can still make a personal film, where the responsibility for everything that ends up on screen is very much in the hands of one man.



PORTADAT PDR1000

Hugh Miles is just such a man, an ex-BBC cameraman who pursued his early ambition to make nature documentaries. While the name may be new to you, you've probably seen a good deal of his work, which includes such acclaimed programs as 'Flight Of The Condor', and 'Kingdom Of The Ice Bear'. Over the last 18 months he has spent weeks on end high in the Paine Mountains of Chile, hoping to capture the first film of the local population of pumas, with only a camera, his assistant Donny, and a PORTADAT for company.

"No-one's ever filmed these cats in the wild before" explains Hugh. National Geographic are funding the film – a major undertaking by wildlife documentary standards – and it should appear on TV in 1996.



Hugh appears to favour cold, desolate places for his work. He is also currently working on a project in Newfoundland, and plans to return to the arctic to make another film about polar bears.

Hugh and Donny must be mobile and self-reliant, making ruggedness and portability essential for whatever equipment they choose. Ultimately, however, the important thing is finding the subject of the film. "If you can't do that, you're stuffed" he says. Pumas are particularly elusive. Even in a mountain environment with precious little cover, they can disappear very easily. "They just slip past us - and we're good at spotting animals" notes Hugh.

Hugh's answer to the animal's elusiveness was to 'habituate' a cat, by finding one which used a particular cave regularly, and simply sitting in full view until he won a measure of acceptance. "After 2 or 3 months she would walk by, and even sleep, within 20 feet of me. I called her Penny, after an old girlfriend." Hugh could now wait by Penny's cave, knowing that he would stand a good chance of being able to film her at that spot.

The puma's in Chile's Paine National Park are elusive subjects, even for an experienced nature cameraman



But a good deal of tracking was still required, to film more of the animals' behaviour. "They cover so much ground - it's very hard work keeping up with them. I really didn't fancy carrying my Nagra around - the PORTADAT is so light, you can just sling it in the back of a rucksack and go."

Hugh's unit is a PDR1000. "Timecode isn't really that important in this application. When we do shoot sync sound, we just clap or hit a rock, and we never have a problem syncing up when we track-lay."

Most filming is mute, though occasionally a radio mic will be set up where Hugh expects an animal to appear - by a kill, for example. The emphasis on location audio, however, is recording stereo atmospheres.

"As the seasons change in the film, we need to have the right atmospheres" explains Hugh. "When spring comes, for example, you get such a lot of birdsong, in contrast to the stillness of winter, and I want to make something of that with the soundtrack."

"Sound is incredibly important in wildlife films. You can create tension just by having animal alarm calls, without using music or narration. It can often be quite subliminal - the audience is only just aware of the air of tension - but it works very well. Also, you can pre-empt cuts by introducing a noise as an animal turns its head, perhaps, so you can create a lot of the story through the soundtrack. You really do need a high quality stereo recorder, and of course one that goes where you go. Unlike most portables, the PORTADAT really is up to the job."

Apart from the PORTADAT's unique advantages, the compact size of the DAT medium also helps. "The fact that you can get more than 2 hours on one small, DAT122 cassette, rather than 20 minutes on a big reel, is a real boon. For wildlife it's absolutely ideal, and makes the whole system wonderfully portable."

For a man who has worked in -48°C, the conditions in Chile were relatively mild, though perhaps not by most people's

standards. "It was basically cold and windy much of the time - down to about -12°. The main problem was the wind, which tends to blow dust everywhere, and graunch up camera lenses and so on. On one occasion it was measured as 149km/h - you can't even stand up in that, and we just didn't bother going out that day. But when it comes to dealing with everyday wind and wet, we just kept everything covered as best we could, and got on with it. We only once had any hint of a problem with the PORTADAT, when I brought it into the warm tent out of the cold, and we got some condensation on the heads. The dew warning light came on, and I just sealed it in a plastic bag with some silica gel. Within 10 minutes it was fine."

## Thanks for your pictures!

Thanks to all our customers who sent us photographs of their PORTADATs in use on location. If you'd like to be considered for inclusion in the next PORTADAT News Bulletin, send your pictures to:  
**Steve Angel, HHB Communications,  
73-75 Scrubs Lane,  
London NW10 6QU, UK.**



Mike Figgis, Director, 'Leaving Las Vegas'



## TIMECODE DAT IN ACTION ON 'LEAVING LAS VEGAS'

For director Mike Figgis, timecode DAT means easier production and a better result.

Mike Figgis is one of the elite band of British directors to have made it in Hollywood. Very much a hands-on director, Figgis keeps in touch with the nuts and bolts of film-making, and as an accomplished musician and composer, he takes a particular interest in sound. His latest feature – 'Leaving Las Vegas', starring Nicholas Cage – was, like his last three pictures, shot on timecode DAT.

"I am actually very fond of analogue sound," he confesses, "but by using good technicians and the right mics, you avoid the kind of brittle sound that has given digital a bad name – just as anyone who knows their stuff can light video to look like film. I'm very open to new ideas if they bring benefits."

As post-production moves away from traditional mag tape-based technology to digital

audio workstations, Mike feels that the benefits offered by timecode DAT over analogue are overwhelming.

"With traditional methods, by the time you get to the optical track of a print, you've done so many transfers that it probably doesn't matter what you used on the shoot. But for this picture, all the post-production has been done on AudioFile, and we can stay digital right up until the optical stage – that for me is when DAT really comes into its own. We have a genuine first-generation optical soundtrack, and it sounds fantastic."

Conditions were rarely ideal from the point of view of sound recordist Pawel Wdowczak. "When we were shooting on the street in Las Vegas" explains Mike, "we had no control over the traffic. Between one take and the next the lights might change, and all of a sudden there's more traffic noise. But despite the fact that we were mixing everything live – a mixture of radio mics, plus booms and poles – the location sound

was fine, and we needed hardly any ADR work. In fact the post-production people [Hackenbacker in Soho] said they thought the sound was 'miraculous'."

DAT cannot solve all sound problems, however, and there is one aspect of film sound that still drives Figgis "round the bend" – transferring material from a 24fps film format to a 25fps video format. "The problem is that so often a soundtrack ends up getting slightly speeded up in the transfer, and everything rises in pitch. Voices tend to lose a flattering resonance, and a score that sounds great in C minor may sound wrong in C# minor. We can put a man on the moon," he sighs, "but we still can't fix this one..."

Nigel Heath, Supervising Sound Editor on 'Leaving Las Vegas', has this to say about DAT.

"DAT's great advantage as a recording medium is that it gives you a very honest record of the output of the sound guys' mixer. On 'Leaving Las Vegas' the sound mixing was incredibly good, and it was quite remarkable, for example, how few of Nicholas Cage's lines required re-dubbing.

"The real differences for me are firstly that auto-conforming from an EDL is so quick and easy utilising machine control, and secondly that you can carry 40 tapes along to a session in a briefcase. That makes life much easier."



# THE ULTIMATE TEST?

There's only one DAT recorder approved for use in the rough and tumble of UK military aircraft – a PDR1000TC that's used and abused by the Defence Research Agency.

Most people involved with location sound recording have their horror stories – you expect you and your equipment to get drenched, frozen, beaten and baked. But at least one PORTADAT is operating in an even less forgiving environment – the cockpits and cabins of UK military aircraft.



“Everything we do” says a member of the noise & vibration trials team, “is aimed at making aircraft as comfortable as possible for the crew.” Or indeed safe. One recent assignment involved recording sound inside a Sea King helicopter, in flight, with a machine gun firing through the helicopter's open doorway. Typical SPLs in such situations are sufficient to cause permanent hearing damage in under a minute. The helmets issued to flight crews do a good job of cutting out high-frequency noise, but low-frequency noise is more of a problem. The DRA's solution is an active noise reduction system, currently undergoing testing, that feeds phase-reversed audio into the pilot's headphones to reduce LF noise, and consequently cut overall noise levels at the ear by up to 20dB. “You do get thrown around quite a lot – you don't get



PDR1000TC – ‘Flight Cleared’ by the DRA

any warning if the pilot suddenly decides he has to drop a couple of hundred feet” says a team member.

The services may not worry about bruising their passengers, but they do worry about the ruggedness of whatever equipment is allowed on board their planes. Only items that have been formally ‘Flight Cleared’ are permitted. “The problem is that if anything, even a screw, gets loose and falls off in flight, the RAF will ground the plane until they find it” explains the DRA. Some pieces of equipment require modification, but the PORTADAT's solid construction ensured that it passed first time.

## TECHNICAL SUPPORT YOU CAN RELY ON

HHB's new technical support is everything you'd expect of the world's leading independent supplier of DAT technology.

Having played a pivotal role in establishing DAT as international industry standard, HHB has acquired an unrivalled level of expertise in the development, application and maintenance of DAT technology. At the centre of an international service network is a new, 2000 sq ft technical facility in London, England, equipped with Audio Precision test systems, analogue and digital oscilloscopes and 12 DAT machines to allow proper cross-machine compatibility checking. All PORTADATs are fully tested before being delivered to international distributors and dealers, and all technical updates and service bulletins are coordinated and issued from here. Distributors are chosen carefully for their ability to provide local PORTADAT users with a fully professional technical back-up.



The new HHB Technical Facility

In the USA, PORTADAT service is handled by NXT Generation. The New Jersey based DAT service specialists were appointed by HHB's US distributor, Independent Audio, following a thorough inspection of their impressive facility and detailed interviews and training with staff.

### Maintenance Tips

Any DAT recorder in daily use should be serviced twice a year and checked for head

wear, pinchroller deformation, accumulation of foreign matter, sticking brakes and the stiffening of lubrication of the mechanical parts. As for ongoing maintenance, head cleaning tapes are a mixed blessing. They are abrasive, and will therefore produce head wear. If you do use a head cleaner, it's important to only run the tape for 5 seconds or so each time, and of course never to rewind and use it again.



## PORTADAT

Sound recordist Ian McLaggan (left), free of the familiar umbilical link to camera

While separate sound recording has never been challenged in the world of film, the availability of a stereo recording facility on location video equipment has meant that for most broadcast TV productions, both sound and picture are recorded on the same Beta SP camera. But the availability of reliable, portable location timecode DAT recorders, notably the HHB PORTADAT, has led to a move back towards separate sound recording for projects shot on Beta.

# JUST WHAT THE DOCTOR ORDERED

Like so many recent documentaries and dramas, the British TV documentary "The Other Peak Practice" abandoned Beta's sound tracks in favour of separate sound recording on a PDR1000TC – with benefits for both sound and picture.

## WHY FILM POST-PRODUCTION LOVES TIMECODE DAT

# THE DIGITAL EDGE

The top of the UK's film post-production sector seems as good a place as any to take a look at the place of timecode DAT in the film industry. And, from Twickenham Film Studios, the word is good. Dean Humphreys, as a senior re-recording mixer, has seen any number of major films pass through Twickenham. One of the more recent blockbusters to pass his way was 'Judge Dredd' and, as we spoke, rushes for 'Death Fish'/'Fierce Creatures' (the sort-of-but-not-really-sequel to 'A Fish Called Wanda') and 'Mission: Impossible' were coming in. All three movies were shot on timecode DAT.

"As a dubbing mixer, I do hear a difference between DAT and analogue. My feeling is that most of the time digital is better – it

sounds sharper and more detailed, and that gives DAT an edge.

"On a practical level, it's undoubtedly more flexible in the field, and the old chestnut about DATs being easy to lose is nonsense. In 5 or 6 years of dealing with DATs we've never misplaced one – though 1/4" tapes have gone missing in transit. The law of averages says it will happen one day, but it's just not true to say that they're easily lost."

Twickenham has invested heavily in digital post-production technology, most notably in several DAR SoundStations and Tascam DA88s. "Everything is quicker and easier – working during a session, turnaround between sessions or reels, and you don't degrade your sound quality by going



One such project, recently aired on the British commercial TV channel Carlton, was 'The Other Peak Practice', a 12-part documentary about a rural doctor's surgery. The program was shot over several months with two sound recordists, John Curtis and Ian McLaggan, each handling around half of the work. Using a PDR1000TC, they were able to operate quite independently of the camera operator, unhindered by an awkward umbilical cable.

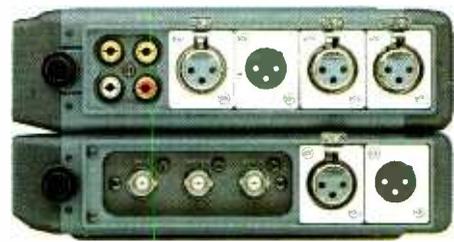
"It meant that I can turn over whenever there's something going on that we may want, and put myself wherever I'll get the best sound," explains John. "With fly-on-the-wall documentaries like this you don't usually get a second chance, so it's important not to miss anything." For this reason, the ability to start recording with just a single key press was very welcome.

Some of the consultations that the crew filmed could be quite lengthy, and separate recording allowed John to capture sound as

a new Beta tape was loaded – the break could then be covered by a cut-away in the edit. Maintaining sync was a simple matter of jamming the PORTADAT to the camera, which provided the master clock, whenever a Beta cassette was changed.

The camera's own mic was used to record a guide audio track, which was kept up until the dubbing stage, when the DAT tracks were brought back in. Off-line editing was carried out on an Avid workstation, at EditWorks in Leeds, with the on-line edit, colour grading and dubbing taking place at Yorkshire TV.

"The fact that the PORTADAT is so small and light meant that I could make the most of freedom from the camera," says John. "I like to be able to move to where the sound is without being hindered by an umbilical cable." As he points out, without this freedom of movement it is often necessary to use radio mics, which can throw up a new set of problems. "I just don't like them.



PDR1000TC side panel

It's so hard to avoid noise from clothing, and then there's the chance of interference. On top of that the capsules tend to be relatively cheap – a £200 radio mic capsule is never going to sound as good as a £3000 mic on a pole."

"Last but not least, recording digitally rather than on the analogue Beta tracks means that you can copy the tape as many times as you like, without the loss of quality that inevitably comes with an analogue copy. As post-production is always digital now, that means that you can maintain the quality you get on location right through to your final mix."

through several generations of dubs onto 35mm mag tape. And if you're going to post-produce digitally, it makes sense to record digitally."

Tracing back the source of the 'Death Fish' tapes to recordist Chris Munro, artistic as well as technical considerations come into

play. "John Cleese believes strongly that you shouldn't post-sync dialogue for comedy" he says, "which makes it more important to get it right on the day. And if you're using DAT plus a digital editing system, the location sound is the same generation as the music and effects, which invariably come off a digital medium at the dub, so everything sits together better in the mix." Another advantage identified by Chris is the fact that with digital recording and editing, it's much easier for the dubbing mixer to, for example, boost the high frequencies in dialogue to deal with slight muffling caused by clothes around radio mics, without boosting the head noise that would be present in an analogue signal path.

The transfer bay at Twickenham houses both Nagra-T and timecode DAT recorders. When transferring rushes to Beta SP, the main difference is one of time and convenience. "DAT is just quicker" says Dean. "You don't have to worry about line-up tones, you just go."

Time savings in auto-conforming are even more significant, though the benefit is an

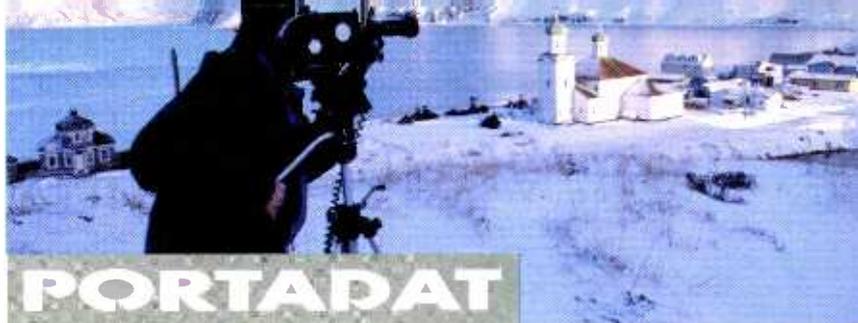
unexpected one to the outsider: "If you consider a 10-reel (90 minute) film, it might take about a day to auto-conform if you've used timecode DAT, as opposed to two, maybe two and a half days for analogue with timecode. What actually happens is not that the film gets produced any quicker, but the dialogue editor does have a lot more time to hone the original dialogue track before the mix – you get a head start, and the end result is a better soundtrack."

The film industry tends to be conservative when it comes to audio technology, however, and with the amount of money riding on even a relatively low-budget film, it's easy to see why 'if it ain't broke don't fix it' is the prevailing attitude. Dean, however, insists that there really is only one way of working in today's film industry. "Some people don't realise that they will actually get a better result, not just because their post-production is digital and they can keep first-generation location sound right the way through, but because their editors will be able to spend more time working creatively on the soundtrack rather than just cutting it together."



Dean Humphreys at Twickenham Film Studios: "Everything is quicker and easier with digital."

# NORTHERN EXPOSURE



**Alaskan blizzards and a generous coating of fish oil are all part of a day's work for independent film-maker Braden King and his PORTADAT.**

When independent film-maker Braden King was planning 'Dutch Harbor', a documentary about fishing communities in Alaska, he knew that conditions would be tough on both personnel and equipment. Shooting on trawlers and in fish processing plants, reliability and portability were at a premium. "I had no interest in taking along a reel-to-reel," he says drily. Dryness, however, was a condition rarely experienced during shooting.

"We had very high winds combined with snow – even blizzard conditions. It was quite a challenge to keep everything dry. The worst environment, however, was a fish processing

plant, where there were very high levels of oily humidity created by the combination of fish oil and processing equipment. Everything is constantly sprayed down in order to reduce the risk of contamination. We even lost one of our light meters to the humidity – and that's supposed to be a totally sealed unit."

The PDR1000TC, however, kept going. "I checked it at the end of every day, and couldn't find any evidence that it was affected by those conditions. Perhaps fish oil is a good lubricant for DAT recorders. I was also worried that we might get problems caused by condensation when we moved from a cold exterior to a warm house or boat galley, but nothing of the sort ever happened."

As the crew hiked up mountains and clambered over boat rails, they often had cause to thank the compact size of the PORTADAT.

"It also means you can put interviewees at ease, where they might be intimidated by a bigger machine. Besides the sync sound, I also conducted hours of audio-only interviews with local people. Using start IDs to mark sections as I went along made the process of going through them later an awful lot easier."

As an independent film-maker, the affordability of the PORTADAT also appealed to Braden. "In the end it was the obvious choice, and it performed every bit as well as I expected. But you know there's also something on a philosophical level that is appealing about DAT. I've always had this feeling that film, and analogue audio, are inherently low-tech, that there was a better way of doing things. It'll be a while before we can replace film, because even a single frame can store so much information. At least we're taking that step forward with audio."

## BBC RADIO The world's biggest PORTADAT user



**Gerry Glancy (right), Head of BBC Outside Broadcast receiving the first of more than 50 PORTADATs from HHB's Brian Binding**

After buying the very first PORTADAT ever produced, BBC Radio has continued to specify the recorder in ever increasing numbers and is today the world's largest single user of PORTADATs. For HHB's Broadcast Sales Manager Brian Binding, it was particularly fitting that the BBC should be the first customer, as input from a number of BBC Radio engineers, producers and staff – among them Gerry Glancy (pictured left), Head of BBC Radio Outside Broadcast – had been invaluable during the PORTADAT's development.

"The PORTADAT is everything we asked for" commented Gerry following trials of the first machine. "It's small and light, it gives us 2 hours of recording time and, most importantly, its 4 head design provides us with the confidence monitoring that is so vital for our kind of work."

# WIRELESS IN WALES

Ever at the cutting edge of television sound technology, **Barrie White** explains why wireless timecode transmission is so useful.

Barrie White, well-known in the UK broadcast community both for his extensive work on, so it seems, almost any production shot in Wales, and for his contributions to Line Up magazine, has recently taken to using a radio link with his PDR1000TC. It is not, however, audio that is being transmitted, but timecode. "I'm using hardware purpose built by Jim McAlister at Black Box Video" he explains. "It means I can work without an awkward umbilical cable to the camera on a Beta SP shoot. I'm more portable, and can just go off and record atmospheres, on drama or documentary, for example, without any hassle."

One recent project involved working at the open-air International Storytelling Festival at the picturesque St Donat's Castle, for a program for BBC Wales, with both Barrie and a Beta SP camera operator having to work around the reclining bodies of a large audience. Barrie set up radio mics for the performers, and then retreated out of sight, with both audio and timecode links handled by radio equipment. "It's so much easier

for both myself and the cameraman to concentrate on getting our own work right, and move wherever we want, if we're not connected by an umbilical cable" explains Barrie. Besides allowing a higher quality result than Beta's standard audio tracks allow, Barrie contends that shooting audio separately actually makes post-production easier. "The Beta audio tracks would generally be lifted off the Beta tapes in post-production – this way saves the time spent in that stage, and the results are superior. I think some people just don't know how easy it is to use timecode DAT with Beta SP, and what a difference it can make."

Besides its value as a recorder on both film and video shoots, the PDR1000TC is also often useful for playback of pre-recorded material for performers to mime to, often a requirement of music programs that Barrie works on. "Timecode might not seem very important in that application, but by feeding the PDR's timecode into the camera you can save a lot of time in editing, and that means cheaper post-production."

## GETTING THE MOST FROM YOUR PORTADAT

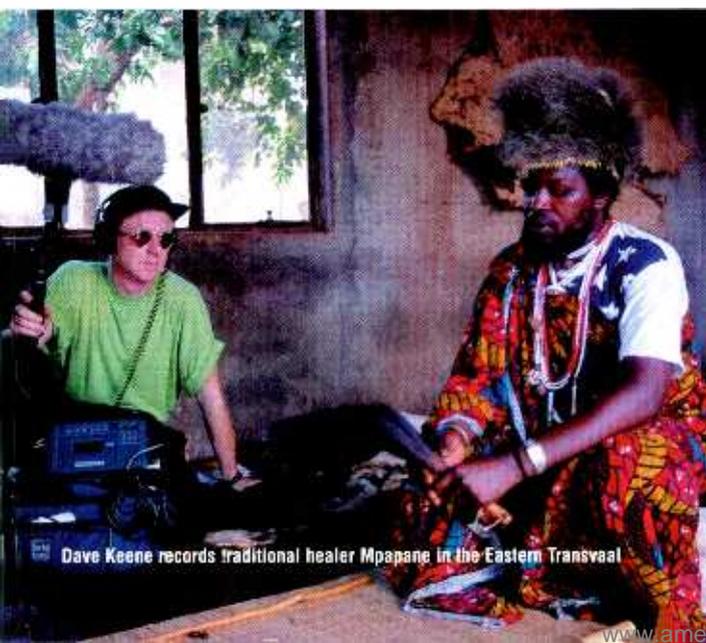
Sound recordist Tim White (Cutting Edge, QED, and numerous other documentaries for British television) offers up a few hints and tips from the field.

Though the battery life of the PDR is good, I always use both the standard internal battery plus an NP1B – the standard camcorder pack – for external power. As the NP1B runs down, the machine automatically switches to internal power, and there's absolutely no glitch in the changeover. With 2 hours from the internal battery and 3 from the NP1B, I get a full day's work without having to change a battery.

In heavy rain I often put clingfilm over the top of the machine. The PORTADAT runs cool so heat isn't a problem, and with a 92 minute cassette you don't need to worry about access to the transport that often. The last time I had to do that was on a 'QED' shoot, in torrential, horizontal rain. I kept the machine as dry as I could, but it's always going to get damp in those circumstances. It didn't seem to make any difference.

I always submit my DATs along with a sound report sheet in a large envelope. With DAT cassettes being so small, it makes them a lot harder to lose.

# TALES FROM THE TRANSVAAL



*During a month of filming for the BBC's 'Under The Sun' series in the Mbuzini region of Eastern Transvaal, sound recordist Dave Keene found his PORTADAT was coveted as much by the film's subject, a sangoma (traditional healer and diviner) called Mpanane, as by Dave himself. "He loved listening to music played by his children – he has over 60, by 14 wives - which I recorded on the PORTADAT during the shoot. The sad thing is that he was very concerned that the traditional music he grew up with is disappearing. I only hope that the cassette copies of the music I left him might help keep it alive."*

# PDR1000 TIMECODE UPGRADE



Following the launch of the PORTADAT PDR1000 and PDR1000TC, it became clear that many customers wanted an upgrade path from the standard PDR1000 to the timecode - equipped PDR1000TC. Following an intensive R&D effort, this is now available – no mean feat, as the differences between the machines consist of more than just the addition of timecode hardware.

For many sound recordists, it means that their system can now adapt to their

requirements – rather than commit to a PDR1000TC, they can buy the PDR1000, and upgrade if and when they need timecode. As feedback from our customers tells us, a good many PDR1000 owners are now in this position, driven by an increased demand for timecode DAT from production companies.

The upgrade is in every sense a complete one, and there are no hardware or software differences between an 'original' PDR1000TC, and an upgraded PDR1000.

That means the unit will record free run timecode, record run timecode, time of day, slave to external timecode, and jam sync to external timecode. All standard SMPTE/EBU frame rates are supported. Flexible user bit facilities include the ability to record incoming timecode in user bits while the PDR1000TC outputs it's own timecode.

The upgrade is available from September 1995, and can be carried out by HHB or by authorised service centres.

## INTERNAL TIMECODE BACKUP MODIFICATION

A minor modification has been introduced to the design of the PDR1000TC which allows the unit to retain free-running timecode when powered down to change a battery. Previously the timecode would stop and re-start at zero. All PDR1000TCs now include this feature, and any

unmodified PDR1000TCs can be brought up to spec by HHB or an authorised service centre free of charge. Another minor modification is that the end of tape search function is now quicker, and does not rewind the tape fully before locating, thereby saving battery life as well as time.

# HHB ADVANCED MEDIA PRODUCTS



HHB Advanced Media Products

The choice of recording media is an important one – and when it comes to DAT tape there's none better than HHB Advanced Media Products DAT cassettes. In the independent testing of 7 leading DAT tape brands, HHB DAT Tape demonstrated consistently low block error rates and superior archiving stability. Tapes are available in 15, 30, 48, 62, 92, and 122 minute lengths.

Also available is a the DDS90M, optimised for the requirements of bulk data storage. While this tape is not recommended for audio mastering purposes, it can be used in the PORTADAT as a 180 minute audio recording tape in applications where long, continuous recording is of primary importance.

The Advanced Media Products range also includes a high performance, 680MB / 74 minute CD-R disc, the HHB CDR74, capable of recording at all speeds from 1X to 6X.

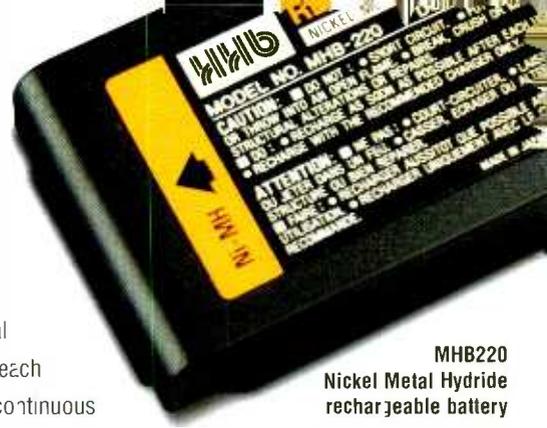
# PORTADAT POWER

Accessories for the PORTADAT now include a 4-bay fast charger that will keep you in batteries wherever you go.



MCA1000 4 bay charger, DCP1000 vehicle power cable and RB110 2 bay charger

There are several PORTADAT battery and power accessories, covering a wide range of professional requirements. The basic kit, as provided with every PORTADAT, consists of a 2-bay RB110 battery charger, and a rechargeable MHB220 Nickel Metal Hydride cell that is less susceptible to 'memory effect' problems than standard NiCad



MHB220 Nickel Metal Hydride rechargeable battery

rechargeables. Additional MHB220s are available, each providing two hours of continuous operation for your PORTADAT PDR1000 from a two hour charge from the RB110. The RB110 will also deliver 12V DC power for your PORTADAT, and one of the bays provides a 'refresh' capability to discharge batteries fully before recharging, to ensure optimum life and performance.

A new 4-bay fast charger, the MCA1000, is also now available, which can refresh and/or charge up to 4 batteries simultaneously. This should keep even the most demanding of users going. The MCA1000's international power supply will accept any AC input from 90 to 270V, and it can also be run off 12V DC power. Finally, the DCP1000 adaptor allows a PORTADAT to be powered via a vehicle cigarette lighter.

## REMOTE CONTROL

Two remote control connectors are available for the PORTADAT, one with a 1m moulded cable, and one without. These are provided, with full wiring instructions for remote operation, for applications such as industrial and environmental noise and vibration analysis, where some form of automatic operation is required. A typical use might be

an investigation by environmental health officials into complaints about noise. By setting up a PDR1000, linked via a customised remote connection to a noise level meter, the PORTADAT can be left at a suitable monitoring location for some time, recording only when noise exceeds a pre-set limit.

## THE PROTECTION RACKET

Whether you need a lightweight yet tough over-the-shoulder bag to protect your PORTADAT on location, or a solid aluminum case, HHB has the answer.

Optional Portabrace and Aluminum PORTADAT cases



Built specifically for HHB by K&H products – a familiar name in the sound recording community – Portabrace cases allow the PORTADAT user to carry and protect his machine in the field. The sturdy fabric construction provides physical protection, and several side pockets and bags are provided for accessories and leads. Access to all controls and connectors is straightforward, and these openings can be easily re-sealed with zips and velcro fasteners. Dedicated Portabrace cases are available for both the PDR1000 and the PDR1000TC.

For a higher degree of physical protection in transit, a stylish 'Halliburton' aluminum hard case is now available. With its deep-drawn aluminum shell, the case not only looks great, but will stand up to heavy impacts – high-density foam protects the contents – and adds relatively little to the weight of the PORTADAT itself.



# TECHNICAL DATA

## PDR1000



### AUDIO PERFORMANCE

Frequency Response . . . . . 20Hz - 20KHz +/- 1dB  
 Signal-To-Noise-Ratio . . . . . 90dB (Line Input)  
 THD + Noise . . . . . <0.015% (20Hz - 22KHz)  
 Wow and Flutter . . . . . Below measurable limits

### ANALOGUE INPUTS (2 X XLR3-F)

Microphone Input . . . . . -66dBu, impedance >10KΩ  
 Line Input . . . . . 0dBu, impedance = 47KΩ  
 (Figures quoted are to achieve a recorded -12dBFS with record gain at max)

### ANALOGUE OUTPUTS

Line Output (2 x Phono/RCA Sockets) . . . 2Vrms max, load impedance >10KΩ  
 Headphone Output (6.3mm Stereo Jack) . . . 12.5mW + 12.5mW. EIAJ 32Ω

### DIGITAL I/O

AES/EBU In (XLR-3F) . . . . . 3-10V pp per IEC958 Type 1 standard  
 AES/EBU Out (XLR-3M) . . . . . 5V pp per IEC958 Type 1 standard  
 SPDIF In (Phono/RCA Socket) . . . . . 0.5V pp 75Ω per IEC958 Type 2 standard  
 SPDIF Out (Phono/RCA Socket) . . . . . 0.5V pp 75Ω per IEC958 Type 2 standard

### POWERING

External DC Input (XLR-4M) . . . . . 12V DC. 9W (10-14V DC)  
 MHB220 Rechargeable Battery . . . . . 6V. 2400mAh Nickel Metal Hydride pack  
 RB110 AC Adaptor . . . . . 100-240V AC. 18W  
 Operating Time . . . . . 2 hrs using MHB220 rechargeable pack after 2 hr charge  
 (Record mode, without phantom powering or display backlight)

### ADDITIONAL FEATURES

Phantom Powering . . . . . 48V, 7mA max  
 Microphone High Pass Filter . . . . . 100Hz, 6dB per octave approx  
 Limiter . . . . . Operating threshold -3dB approx  
 Monitor Speaker . . . . . 50mW  
 Remote Control . . . . . Allows control of: Play, Stop, Record, Pause, Fast Fwd, Rewind, Skip Back, Skip Forward functions

### PHYSICAL

External Dimensions . . . . . 240(W) x 55(H) x 177(D) mm (9.5 x 2.1 x 7.0 ins)  
 Weight (without battery) . . . . . 1620g (3.6 lbs)  
 Weight (with battery) . . . . . 1940g (4.3 lbs)

## PDR1000TC



### TIMECODE

Standards Supported . . . . . 24, 25, 29.97NDF, 29.97DF, 30 FPS  
 per EBU and SMPTE standards

Tape Format . . . . . Conforms to IEC 461  
 Compatible Nominal Sample Frequencies . . . . . 48KHz, 44.1KHz

### EXTERNAL SYNCHRONISATION

Video . . . . . Composite video (PAL, NTSC, SECAM) +/- 0.1%  
 Field Sync . . . . . 48/50/59.94/60Hz +/- 0.1%  
 Word Sync . . . . . 48/44.1KHz +/- 0.1%

### INPUTS AND OUTPUTS

Timecode Input (XLR-3F) . . . . . 0.2-18V pp, impedance 8KΩ  
 Timecode Output (XLR-3M) . . . . . 2.2V pp, impedance 600Ω  
 Video/Word Sync Input (BNC) . . . Video Sync, 1-4V pp, Word Sync, TTL level

Video/Word Sync Through (BNC) . . . . . Connected in parallel to above  
 Use for loop through or 75Ω term

Word Sync Output (BNC) . . . . . TTL level output, 75Ω

### POWERING

External DC Input (XLR-4M) . . . . . 12V DC, 12W (10-14V DC)  
 MHB220 Rechargeable Battery . . . . . 6V. 2400mAh Nickel Metal Hydride pack  
 RB110 AC Adaptor . . . . . 100-240V AC, 18W  
 Operating Time . . . . . 1.5 hrs using MHB220 rechargeable pack after 2 hr charge  
 (Record mode, without phantom powering or display backlight)

### PHYSICAL

External Dimensions . . . . . 240(W) x 95(H) x 177(D) mm (9.5 x 3.7 x 7.0 ins)  
 Weight (without battery) . . . . . 2280g (5 lbs)  
 Weight (with battery) . . . . . 2600g (5.7 lbs)

## ACCESSORIES

### SUPPLIED ACCESSORIES (PDR1000 AND PDR1000TC)

1 x . . . . . Carrying Case  
 1 x . . . . . MHB220 Rechargeable Nickel Metal Hydride battery pack  
 1 x . . . . . RB110 12v DC power supply / 2 bay charger  
 1 x . . . . . HHB DAT15 DAT tape  
 1 x . . . . . Operating Instructions

### OPTIONAL ACCESSORIES

AR1000 . . . . . Portabrace case for PDR1000  
 AR1000TC . . . . . Portabrace for PDR1000TC  
 MHB220 . . . . . Additional rechargeable NiMH battery pack  
 RB110 . . . . . Additional 12v DC power supply / 2 bay charger

DGP1000 . . . . . 10V-40V vehicle power cable (connects to cigar lighter)  
 MBC1000 . . . . . Vehicle powered 2 bay fast charger  
 MCA1000 . . . . . AC/DC powered 4 bay fast charger  
 RCC1000 . . . . . Remote control connector  
 PDRSERV . . . . . PDR1000 service manual  
 PDRTCSERV . . . . . PDR1000TC service manual  
 PDRSHIRT . . . . . PORTADAT Polo Shirt

HHB DAT15, DAT30, DAT48, DAT62, DAT92, DAT122, DDS90M . . . DAT Tape  
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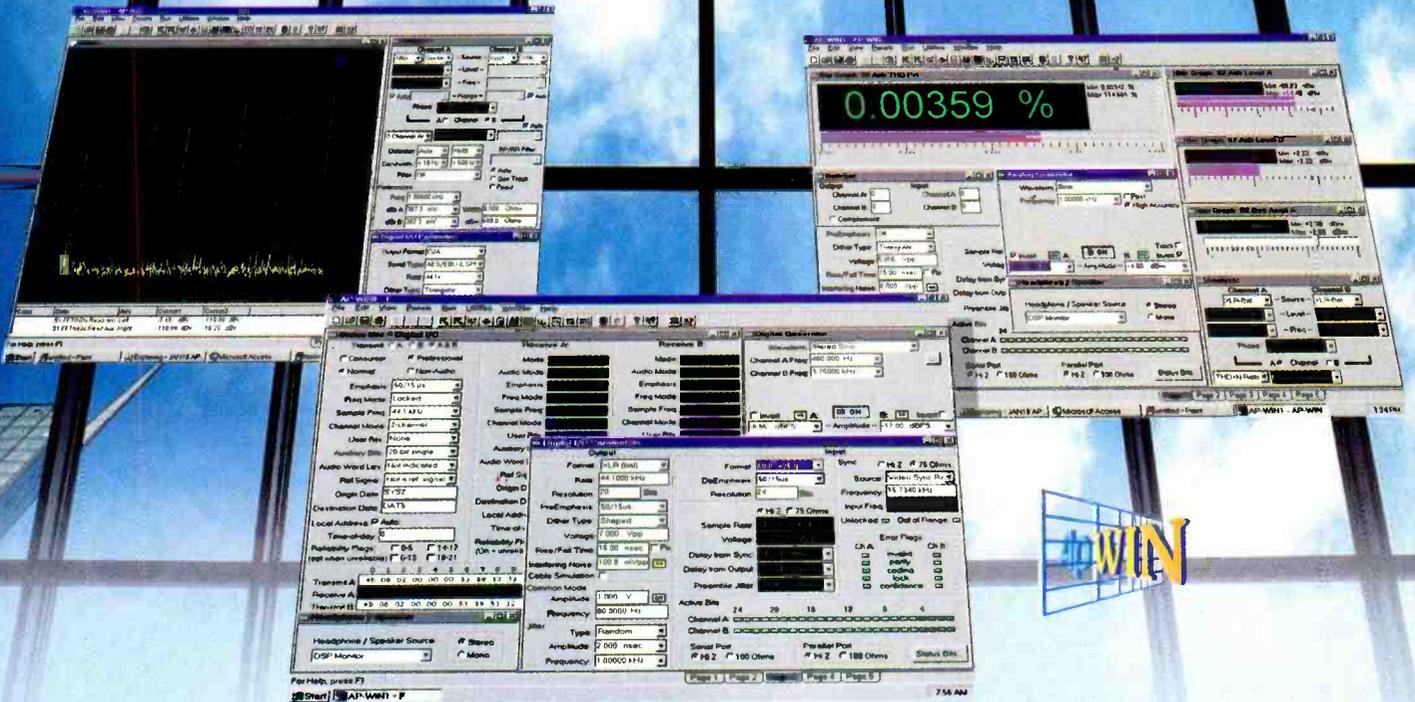
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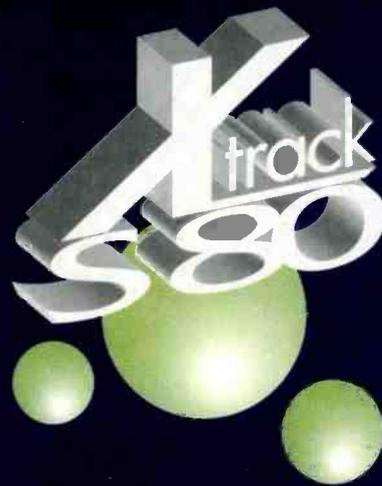


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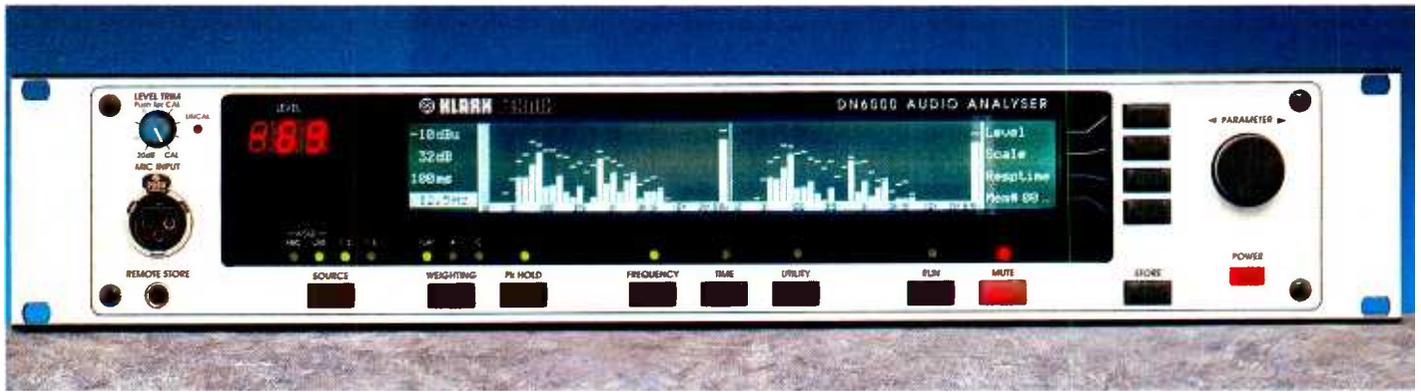
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# Klark Teknik DN6000

Klark Teknik's new audio signal analyser is intended to set a new measurement standard. **DAVE FOISTER** asks if it measures up to KT's reputation

**KLARK TEKNIK HAS** made a successful business out of tweaking our audio signals and then telling us what we have ended up with. Its graphic equalisers are industry standards, its straightforward delay lines are industry standards, and its DN60 analyser is an industry standard. Such is the height of the company's profile that a photograph of a single Klark Teknik knob on the front cover of the 1988 APRS Show issue of *Studio Sound* was instantly recognisable, and made the cover quite a talking point. So, too, with the display on the new DN6000 audio analyser, featured, albeit with its colour changed, on July's *Studio Sound* and, again, readily identifiable.

The DN6000 remains recognisable as being from the Klark Teknik stable, but makes a major departure from its predecessor, the DN60, in the sophisticated nature of its display. Gone are the columns of red LEDs showing the signal spectrum, and in their place is a very large, very bright backlit LCD screen, offering all the flexibility for graphics, text and control that the technology can provide. Behind the screen is a 2U-high box containing a wide selection of measurement tools, each in turn with a substantial amount of control offered over the way it takes those measurements. Two measurement inputs are provided, as the spectrum analyser can display both at once, along with an output for a selection of internally generated test signals.

The unit powers up out of the box in Spectrum Analyser mode, perhaps the most familiar function of such a unit. A single push-button cycles through the possibilities of sixth-octave mono, third-octave mono, and the aforementioned third-octave stereo, and the display appears immediately as a real time spectrum analysis, with soft keys

beside the screen to adjust the measurement and display parameters. The screen is one of the clearest such displays I have seen, with a particularly marked distinction between the black graphics and the almost white background. This is visible, and legible, from a considerable distance, and seems to be more tolerant of the angle of view than most displays. Brightness, contrast and black-white reversal are all adjustable among the unit's utilities, and such is the brightness and clarity of the display that most will, I am sure, elect to either back off the brightness a little or don a pair of shades.

**FAMILIAR CONTROLS ARE** provided for setting the display parameters themselves, the first of which sets the reference level for measurement. This reference will be shown on the screen as a dotted line some way below the top on production versions, although on the beta review unit it lies at the extreme top. Obviously, any internal clipping will affect the calculations for the entire spectrum, so the DN6000 flashes

pushed in, and further assumes, in the case of direct microphone readings, that the correct reference microphone is being used—either a specially calibrated KT model or a selected B&K 4006. Given a correctly calibrated microphone, resulting levels will be shown in dB SPL, and the unit then meets the relevant IEC specifications for a Type 1 sound level meter.

The DN6000's microphone input is on the front panel, phantom-powered on an XLR, making it possible to use any microphone with it. Although spectrum analysis readings will obviously be affected by the frequency response of the microphone and absolute levels affected by its sensitivity, some of the other measurements, such as reverberation time, will give acceptable results with any good quality microphone—a useful bonus if the purchase of the special measurement models cannot be justified.

Many measurements are made much simpler by the use of the DN6000's own test signal generator, largely because its operation is coordinated with the generation of the display trace. The generator

## Many measurements are made much simpler by the use of the DN6000's own test signal generator

a warning across the spectrum columns when it occurs. Level readings of the individual frequency bins, selected by a wheel-driven cursor, and of the column marked 'All Hertz' at the right-hand end of the window are displayed on a 3-character numeric window next to the main screen, and will be shown in terms of the chosen reference level. This assumes that the unit's only rotary control, the INPUT TRIM knob, is disabled by being

output appears on a single rear-panel XLR, with its level controllable from the utilities menu. Several types of signal are offered, covering a wide range of requirements, the most basic being a variable frequency sine wave. A useful facility is a timed gate on the output, turning the generator on when the MUTE button is released and off again after a predetermined time—anything from 100ms to 10s. It even manages to switch

**Standard issue—the latest in a line of industry-standard equipment from KT**

on and off at zero crossing points, vital for accurate measurements. Pink noise is the second possibility, with the option of octave or third-octave filtering; strangely, differences in the filter-frequency setting are only heard when the generator is switched off and back on, making it less easy than it might be to set it up, although the selected values are always visible on the display. The noise generator, too, has the timed gating function.

The third output option is a sine wave frequency sweep, with its start and end points fully user-selectable and therefore able to sweep down as well as up over a user-definable range. Used with the spectrum-analyser screen, the sweep produces a frequency-response plot automatically, holding it on the screen and even muting the analyser input at the end of the sweep to keep the display clean. The use of a system like this for frequency response measurements is simplicity itself; I well remember the complications involved in making such measurements on chart recorders with synchronised sweep oscillators, and while I know things have moved on a lot since then, nothing could be easier than the procedure offered by the DN6000.

**THE INPUT FILTER** has a choice of A and C weightings as well as flat, and the Frequency-Analysis mode's response time is adjustable, with nine different times provided. Three of these correspond to IEC standards for various applications—Fast, Slow and Impulse. Peak Hold is provided, and can be toggled on and off the display while remaining in memory.

The Frequency-Analysis mode has 32 memories available, into which the current screen can be stored at the touch of the STORE button, memory locations being automatically incremented in the process. This can also be carried out from a remote footswitch, and once data is in the memory it can be recalled at will, and even compared with the live display. The Compare mode splits each column in half vertically, interleaving the two sets of data, and although the designers are considering another way of showing the two signals, I found the existing display quite clear.

The memories can also be used to accumulate a series of readings, with each new measurement being averaged with the existing data and the display showing how many readings have been entered. Up to 99 accumulations are possible in each memory. Any of the unit's readings—live, stored or accumulated—can be scanned with the cursor to show the level and frequency of each column, and the vertical scale of the display is always adjustable 6dB–60dB, even after storage.

With a time scale variable over an enormous range across the window, anything in the time domain from system delay to Leq and Let can be measured, and a choice of triggering methods applies to the various options. One mutes the test-signal output when measurement begins, while the other triggers measurement following the end of an overload condition. The first is

the time interval contained in the selected column.

Let is calculated in a similar way, with the cursor selecting a point on the display and the read-out showing both the time up to that point and the Let up to the end of the chosen column. Again, the huge time capacity of the memory makes it easy to achieve meaningful readings over whatever period is required. All the DN6000's measurements can be printed directly from a parallel port on the rear panel, and these two time-related measurements can also generate tables of all their values to be printed. As the DN6000 I had was a beta version, the print function was not yet implemented, so I cannot comment on the layout of the resulting printouts.

**TIME DOMAIN RESULTS** have their own 16 memories, independent of the frequency-analysis memories which retain their contents during time measurements. Again, memories can be overwritten or accumulated and compared with other results.

The palette of functions offered by the DN6000 would appear to make it much more useful tool than would be suggested either by its name or by what has gone before. It has become an instrument capable of performing a large number of useful measurements, not only on the nature of a given signal but on individual items of equipment, complete systems, the general behaviour of a space and more besides. Its controls are logically laid out and labelled, and its display is clear and controllable. It is easy to master, easy to interpret, and powerful enough to deal with a huge range of measurement tasks of the kind encountered frequently in our work. Klark Teknik is used to setting industry standards, and I believe the DN6000 is destined to become another. 

## Reverberation time measurements could not be easier, with no messing about setting up complicated arrays of equipment

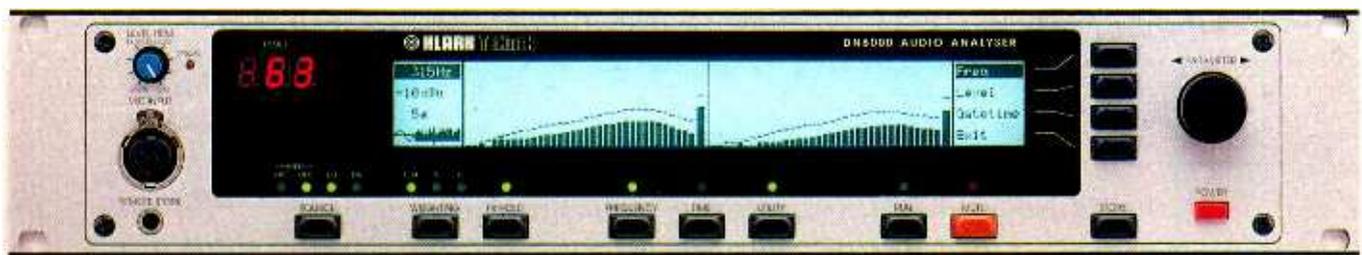
useful when measurements are being taken in a room with a sound system installed, while the second allows reverberation-time measurements to be fired by a loud external stimulus such as a gun shot, and follows the method used in the earlier RT60 reverberation time analyser. Either way, reverberation time measurements could not be easier, with no messing about setting up complicated arrays of equipment. A useful feature of the reverb-time function is the ability to highlight a smooth area of the trace with the cursor and have the DN6000 extrapolate the rest of the reverb decay, avoiding problems caused by dominant early reflections and high ambient noise.

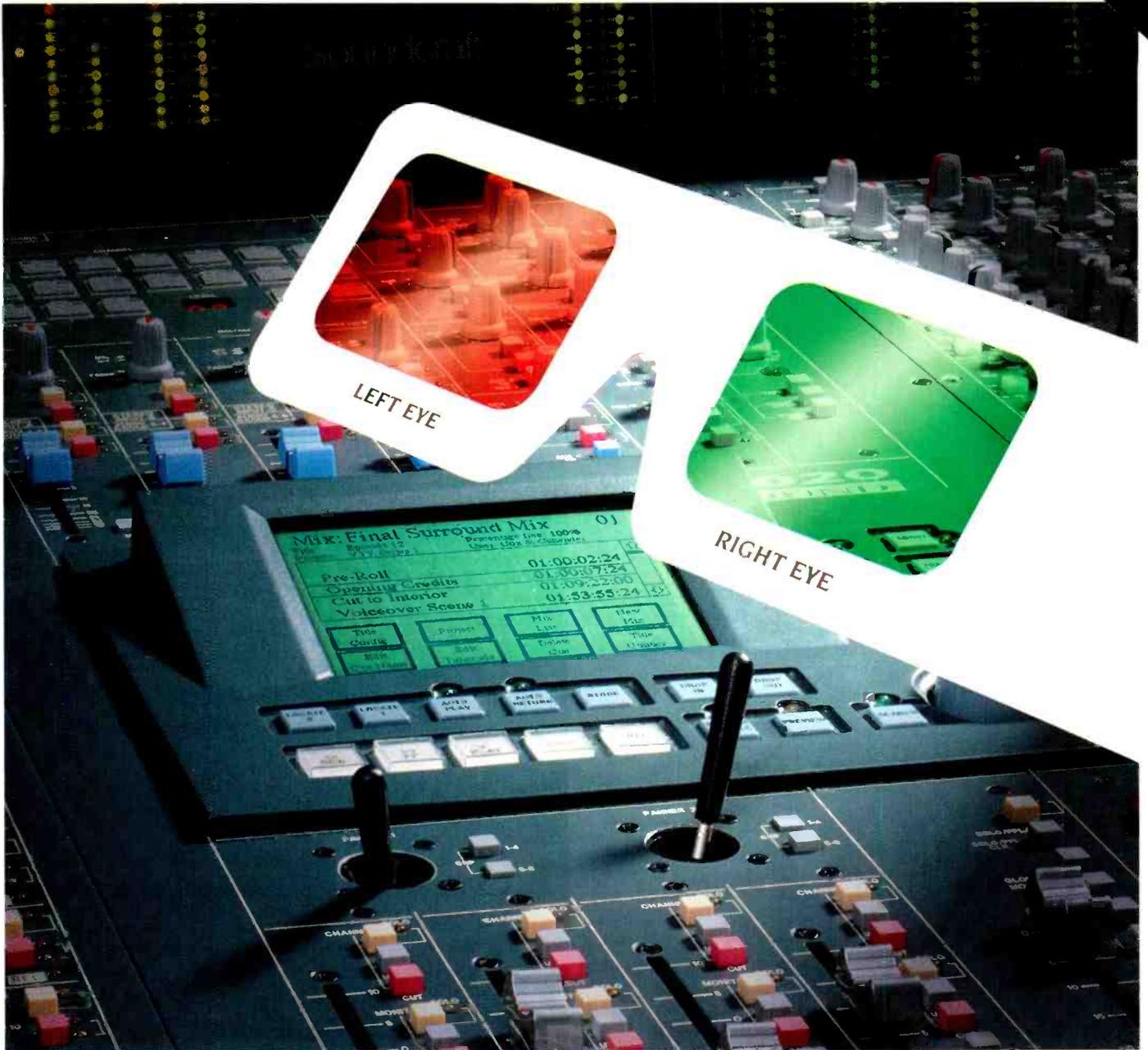
Measurement of Leq (equivalent continuous sound pressure level) and Let (sound exposure level) is just as straightforward. For the first, the cursor is used to select a particular column on the screen; the status display then shows the time from the start of measurement to that point, and the numerical display shows the Leq for

The DN6000 has a bright backlit LCD screen which facilitates graphics and text displays

### CONTACTS

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# Genex Research GX2000

Building a magneto-optical audio recorder is a bold move for a new company; building it to meet classical recording requirements is bolder still, writes **DAVE FOISTER**

**GENEX RESEARCH IS** a very small company established less than a year ago to produce one specific product dedicated to one specific market. That market is straight-to-stereo classical music recording, and that product is the GX2000 magneto-optical disk recorder. Genex' founder members comprise the former R&D department from a major recording organisation, and they have applied both their design skills and experience of the special requirements of a classical recording session to the production of a quite unique piece of equipment.

It seems as though magneto-optical disks have been with us as audio storage devices for ever, but it really is not that long since Akai intrigued the world with its DD1000, apparently defying the known limitations of the medium with fast access times. Augan and Sony are now well known for their use of the medium in various applications, but the principal use of M-O technology has remained the editing and mastering sector. Certainly in the early days, the disks themselves were seen as too expensive to be used as an acquisition medium, but now the ever-tumbling price, though still high, may be seen as justified by the random access facilities they afford—given a sufficiently attractive machine in which to use them. In the early days, too, the 650Mb capacity was very much a limiting factor, and even though the constraints have been eased by the introduction of the 1.3Gb disk and the imminent appearance of the 2.6Gb version, recording capacity per buck is still an issue to be addressed if the medium is to be used as a primary recording format.

The extent to which Genex Research understands the market is indicated by the extent to which these issues are considered, and by the unashamedly specialised features the unit carries. The GX2000 is quite simply a recorder—no editing features are implemented yet,

and when they are, they will be limited in scope with no attempt made to compete with established editing systems. The machine even looks more like a recorder than most, with its dominant row of illuminated transport buttons and metering-and-display panels. The presence of conventional transport controls, including fast wind, may seem a little odd on a random-access machine, but the advantages of instant familiarity are clear.

Setup and operation of the machine is about as straightforward as it could be, with all variable parameters controlled from a single-level menu on the large green display. This is where things like sample rates, time-code rates, synchronisation and input selection are set, using a fast combination of selection buttons and the jog-shuttle wheel. The current status of most parameters is indicated on a large labelled matrix of LEDs below the disk slot. Once set up, the machine can be treated like any other recorder, but with powerful extra features

**Conventional transport controls...may seem a little odd on a random-access machine, but the advantages of instant familiarity are clear**

designed to streamline the typical session.

The first such feature is the ability to capture cue points on-the-fly for later location, and to have them automatically labelled. Seven different label types are available, and while they come factory set as Takes, Notes, False Starts and so on, all the names are user-definable. The labels are accessed directly from the number keys during record, so that hitting Button 1 will add a Take label, numbered consecutively from the last take. A remarkable twist to this, and one which sums up how much practical experience the designers have of this machine's functions, is the possibility of setting up any of the label types as

Retro, to cope with things like false starts. It works like this: the musicians start playing, so you hit the TAKE button to mark the take as, say, Take 37. Two bars later they stop and restart—what on a paper log would simply be written down as an F/S and thought no more about. On the GX2000, if the FALSE START button is pressed as they restart, the point marked Take 37 becomes marked as F/S and the new starting point is automatically labelled Take 37 instead. Then, when the artist comes in to check progress, nobody has to listen to a series of embarrassing, time-wasting false starts before each take. I regard this as a PNI (Pretty Neat Idea).

This small, but practical point, is an indicator of the whole approach of the machine, which is not simply to save time but to make sessions smoother and less likely to have the flow interrupted. The nature of the technology is such that the cue points defined by the labels can be accessed immediately, with no spooling whatever, which means that when the artist comes in to listen, one take or one section can be compared with another instantly, without the off-putting delays tape causes. He or she

can then return to the studio more quickly in order to carry on recording before the atmosphere is lost. Everyone knows the importance of keeping a session moving, keeping everybody motivated, and never giving the artist the feeling that the machinery is somehow getting in the way of the playing; Genex clearly knows this too, and the GX2000 is the closest I have seen to being the ideal, transparent, session recorder.

## THE AUDIO CAPABILITIES

are, of course, of equally vital importance, and Genex' approach there, too, is individual and thoughtful. The standard machine comes only with digital in and out—AES-EBU only on the review machine—on the basis that the kind of people who are likely to buy it will already have their own preferred converters. Onboard converters will be available, but Genex sees them as backup to outboard units. The recorder is, however, 24-bit capable in and out, with dithering down to as few bits as required. Twenty-bit and 24-bit recording obviously use far more of the disk space, giving running times per side which can seem a little short,

**GX2000—Note the use of tape-machine style transport controls**



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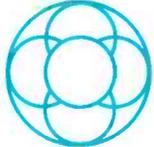


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Rear panel detail of the GX2000

49 minutes at 20 bits, for instance, but here the guys at Genex have stuck their necks out and implemented a facility which had to come sooner or later, the only surprise is that it has taken this long.

**DATA PACKING HAS** been commonplace for computer files for years, and only recently (December 1994) Barry Fox in these pages commented on the fact that such lossless packing was not yet being applied to audio. When you pack a text file on a computer—or any other type of file for that matter—you know that what you get back when you unpack it will be identical to the original in every way: no words spelt wrongly, no commands corrupted. Why, then, should it not be possible to do the same with a file full of numbers which happen to represent audio? This is what Genex has done, in the face of an industry which seems to find it hard to differentiate between the packing they have been using quite happily on their computers for ages and the data-compression techniques which are known to have audible trade-offs.

The mathematical details of what Genex has done were not divulged to me, but on the kind of classical music I was working with, with its wide dynamic range and hence long periods of low levels, it increased the available recording time to about an hour and a quarter, 20-bit, 44.1kHz. At no time was I aware of the packing making any difference to the audio, unlike the various compression systems I have heard. The only drawback seems to be that the disk space saved by the technique depends on the nature of the audio involved, much as a file-packing routine will achieve different reduction ratios depending on the contents of the files. This makes it impossible to know at the start of the session, or even at the start of a take, precisely how much space you have available, but since it always seems to be substantially more than in the unpacked state, this is a minor quibble. For those who cannot bring themselves yet to trust such an idea, the system can be disabled and normal predictable linear recording used. I would challenge them, however, based on what I have heard from the GX2000, to prove a difference.

The recording system incorporates automatic data verification, and the presence of even a single error during recording or playback is indicated by a front-panel LED. Shuttling and cue-review functions are operated by a wheel and a pair of buttons respectively, with the output consisting of a smooth continuous series

of one-second bursts of the audio, quite sufficient to find an approximate place. A jog or scrub function will eventually be implemented along with the editing controls.

Although the GX2000 is designed to be perfectly useable as a stand-alone machine, slicker control is offered by a Windows software package, allowing full access to the machine via RS232. This gives control of up to eight recorders, duplicating all the front-panel controls, displays, metering and adding sophisticated handling of data concerning the recorded disk and session notes. Information about individual disks can be stored on the optical disks themselves, and additional Project Lists allow collections of such information to be stored on the computer, complete with a set of notes about the project right down to a field for the budget number! Transport functions, cue-label triggering and short cuts to some of the remote software's functions can be assigned to hot keys as required, and diagnostics are included for checking the RS232 communications to and from the recorders, which for the purposes of the remote are identified simply by their serial numbers.

Recognising that the basic editing facilities, when in place, will be no more than the icing on the cake, Genex is looking to provide interfaces to existing editing platforms—SADiE and Sonic Solutions are under discussion at the moment—to enable data transfer into the editor at faster than real time.

The kind of specialisation offered by the GX2000 is becoming an increasing rarity, as the diversification forced on many studios in turn forces most equipment to be a jack of all trades and

master of as many as it can manage. When I was first confronted by the machine I began by wondering, quite simply, 'why?' The advantages, to those who spend their time recording large numbers of takes of stereo material which need to be checked, catalogued and compared, quickly became apparent when held up alongside even the fastest, most sophisticated, tape-based recorders. If your line of work doesn't involve such activities, you will find little of interest in the GX2000; if it does, get hold of one immediately and see what it can do for you, your clients, the musicians, and everybody's stress levels.

**At no time was I aware of the packing making any difference to audio, unlike the various compression systems I have heard**

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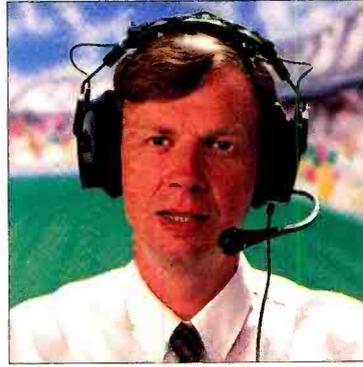
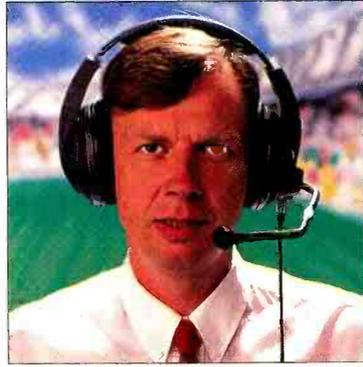
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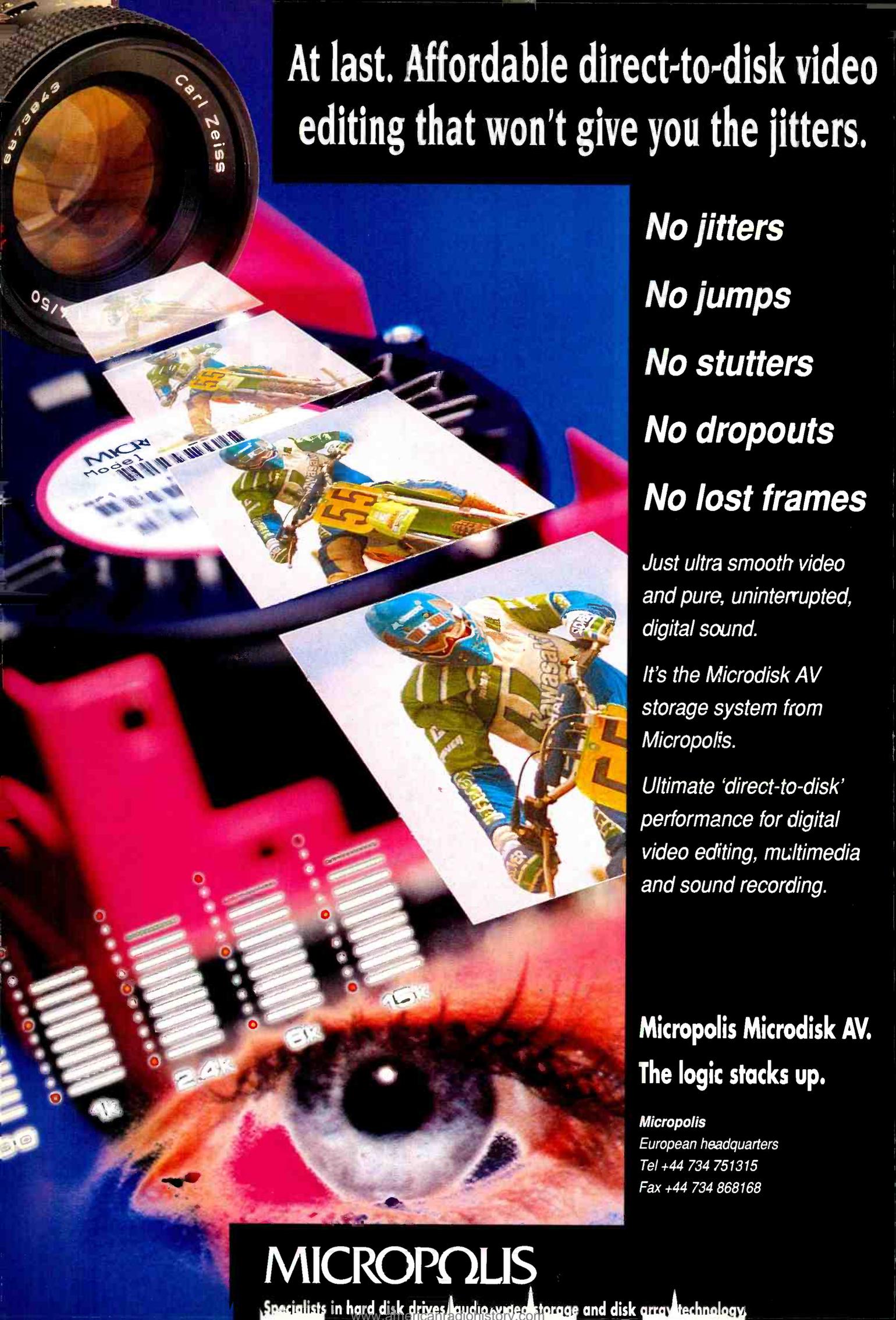
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# TL Audio VI-1

Having established itself in valve outboard, TL Audio is taking valve technology into new areas. This 8-channel interface offers to temper the edge of digital multitracks as **ZENON SCOEPE** reports

**HAVING PLAYED** a major role in making valve outboard equipment affordable enough for the masses, TL Audio has begun to investigate new opportunities for valve technology. The latest of these ideas is the VI-1 valve interface, which is essentially an 8-channel 'audio thru' box that inserts a valve into a signal chain. The unit provides each of eight independent channels with a single-stage, unity gain, ECC83/12AX7 tube 'detour'.

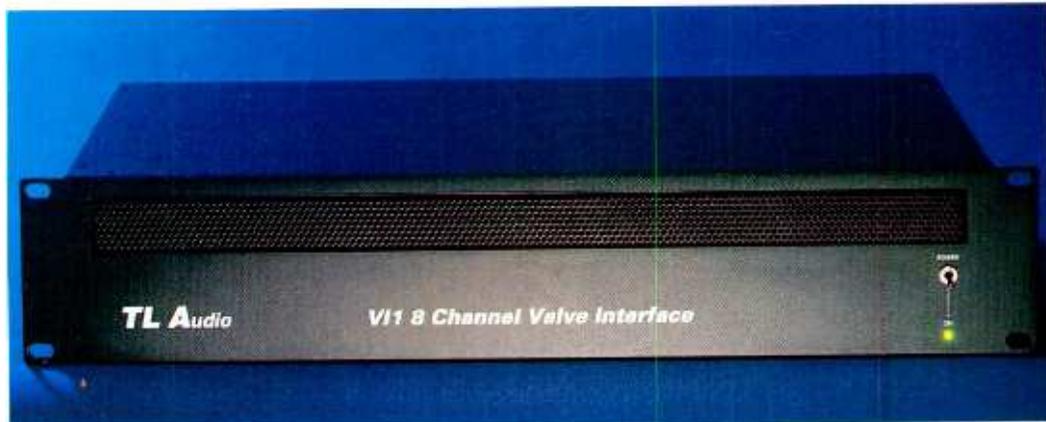
Aside from a power switch with LED on the front panel and a grill behind which the tubes glow, there is very little to say about the features of this unit. The eight inputs and outputs are on balanced jacks mounted on the rear panel and while the unit is shipped set up for +4dB operation, all inputs and outputs can be internally jumpered for -10dB. Given the lack of any other things to play with, panel-mounted switches would have been welcome as the jumpering procedure is hardly convenient—especially if you want to use the unit with different sources.

The premise for the VI-1 is that it is inserted in-line to and from modular digital 8-track recorders to counter what the information leaflet describes as 'that cold digital sound'. Of course, its applications extend beyond DA-88s and ADATs and any similarly afflicted hard disk system—DAT or CD can benefit from a touch of tube. There is also the enormous scope for incorporating this box into analogue setups.

What you do with it is patch it onto anything and see if you like the result. It certainly affects the sound, rounding off in the mid range, smoothing out of the HF and adding a tad more wallop in the low end, none of which are unpleasant. As to whether it sounds valve like depends to a great extent on your experience and appreciation of valves. Part of the charm of valve outboard for me is such devices can be wound up or down in a way that varies the operation on the valve—from 'is it on?' all the way up to 'blimey, wind it back a bit mate'.

Because this box is preset, you are stuck with what you are given. I would say that TL Audio intend the VI-1 to operate near the 'blimey' level, but then that is the purpose of the unit.

You can strap it over inserts, groups, mixes and individual channels with good effect and if you regularly master to analogue and then transfer to DAT, then you could do worse than hang this in



between the analogue and digital stages. In all cases, the signal is not compromised but subtly processed. The noise performance is excellent.

When appraising a unit like this, you become aware that you may be operating dangerously close to the realm of the Emperor's clothes and you cannot help but imagine the repercussions if you were to dare to admit that you could not hear a difference. Or worse still, if you concluded that you really didn't like the sound of a piece of valve gear.

Valves have got their public relations exercise sorted and you would be hard pushed to find anyone actually say

**Modest visuals belie the appeal of a valve interface**

*The VI-1 does a good job of imparting a character that I would say is in line with people's impression of valve gear*

anything bad about them as doing so would imply that they're obviously aurally challenged and uncouth in their tastes. Indeed, it is strange to consider that not very long ago this moral high ground was occupied by individuals who could nod knowledgeably in appreciation of digital sources and swear by the crispness and clarity of digital sound over the muddiness that we had somehow managed to live with for so many years previous. That, however, is part of the charm of this business along with knowledge that there will always be a continuous stream of sound 'enhancement' devices. The truth of the matter is that there is no wrong or right, and all

such boxes and devices are only tools to achieve an end.

The VI-1 does a good job of imparting a character that I would say is in line with peoples' impression of valve gear. If you tracklay with it and then mix through it, the cumulative effect of the unit's processing gives a milder and mellow sound. Whether or not the effect is blatant enough for everyone after just a single pass through the VI-1 is a matter of individual preference. You can, however, hear a difference after a single pass—an A-B comparison readily shows a reduction of stridency.

**IN THE CONTEXT** of use with digital multitracks, I would say that the VI-1's strength lies in using it selectively on certain tracks.

The VI-1 is inexpensive but is still likely to be classified as an 'exotic extra' since, for a little bit more cash, you can stretch to one of TL Audio's other boxes on which you can crank up the gain to vary the amount of tube processing.

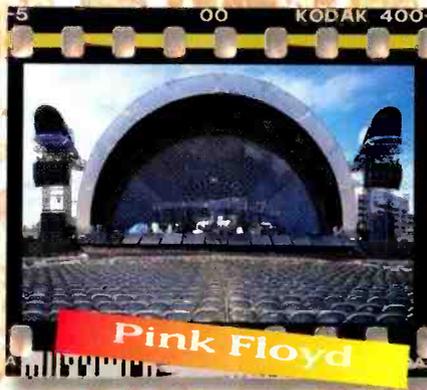
Above all else the VI-1 is a good idea and if you do use a lot of digital gear or don't have any valve gear already, then it would be wise to investigate it. 

## CONTACTS

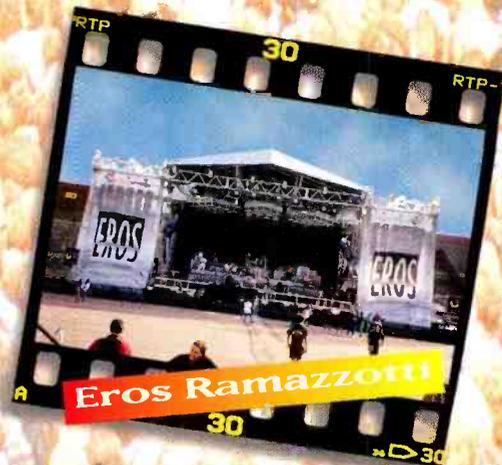
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# Synchro Arts VocALign

The early 1980s saw digital-processing techniques applied to revoicing film soundtracks with limited success. In the mid 1990s **KEITH SPENCER-ALLEN** sees the technology come of age

**UNIQUE AUDIO** technologies are scarce. Usually, once one manufacturer comes out with a good idea, it is only one software release from being everybody else's good idea too. There are exceptions which commercial interests and technology keep exclusive.

But circumstances change. What was seen as processing intensive a few years ago is now within the capabilities of less costly workstations. With the technology barrier removed, there only remains that of the commercial desire to make a process more available. There have been several examples already this year but VocALign is undoubtedly the most interesting so far.

As you may deduce from its name, VocALign was originally developed for speech work in Automatic Dialogue Replacement systems for film and video postproduction. While this may remain VocALign's initial attraction, it is not restricted to voice work—almost any audio signal can be treated.

In simple terms, the software automatically aligns two differing audio signals in time. One is selected as the guide and the second signal is automatically manipulated in time until it matches as closely as possible to the original signal. This covers far more than just the start and end points; gaps, peaks and dips throughout the signal are brought into alignment.

VocALign is produced by Synchro Arts, a new UK company formed by Jeff Bloom, the man largely responsible for the development of this technology and part of the teams behind its earlier commercial incarnations. The first version of the software will be launched in October to run on Digidesign's Pro Tools system. This is to be followed by a version for Avid's AudioVision system.

Having been familiar with the technology for some years, I was invited to see the almost complete software running with Pro Tools and to try some processing tasks. The program was actually only lacking some work on the interface, allowing the buttons to become active rather than relying on key strokes—all the signal processing was fully active.

When running Pro Tools on a PowerPC, VocALign runs on the host machine using the computer's processing capabilities. It does not require any additional hardware nor does it need to use any of Pro Tools' DSP capabilities. With

68040 series machines, the same software will look for DSP or a floating-point processor to use. For this demo the computer was a Mac 7100/80 PowerPC.

Synchro Arts has worked hard to integrate the communications to Pro Tools so that the two programs complement each other in operation. VocALign is called up as a single window that sits in the corner of the screen and this is the only mode required to operate the full program.

VocALign is actually a very simple program to use but the function of some of the buttons may be confusing at first. If you were to be looking over the shoulder of an experienced user aligning standard dialogue, what you would see is them selecting the guide-track region, importing it to VocALign; selecting the replacement track, importing it to VocALign; selecting Edit, checking the alignment of the waveforms visually, exporting the aligned replacement to Pro Tools and playing it out. The time that the process takes depends on the length of the region selected, but it would seem feasible for all the above to be completed in about 30 seconds for a 6-second section of track. Synchro Arts suggests a potential time saving of 95% and this is probably not far wrong.

The easiest way to describe the full operation and features is to work through a processing example such as the replacement of a noisy location guide voice with a clean studio recording. Both tracks must be recorded into Pro Tools before the start of processing. Earlier implementations of this software required a partial manual alignment of the tracks before processing, whereas now the replacement can be recorded anywhere on Pro Tools and it makes no difference to the alignment.

Frequently, the guide recording is a long and continuous track while the replacement track comes in little sections. So, firstly, the region of the guide track to be used must be selected in the standard Pro Tools window by highlighting the waveform display. A macro key combination then prompts the user to name that audio section and then exports it to VocALign where it appears in the Guide window as a waveform with the name alongside.

The Replacement section is then located in the Pro Tools window, selected and exported to VocALign with a different macro key command that displays the

selected waveform and generated region name in the Dub windows of VocALign. All the information is now present in VocALign to complete the processing.

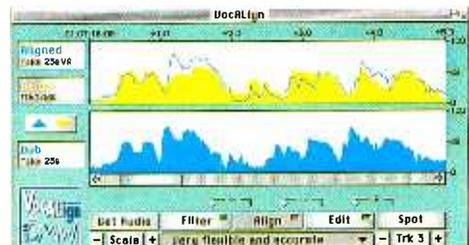
If, under pressure of work, you mistakenly get your Guide and Dub mixed up, there is a button that swaps them around. Should you decide that you may have not selected exactly the right regions to import into VocALign, it is possible to pull on the ends of the waveform window with the cursor and increase or decrease the amount of audio selected without having to return to Pro Tools and reselect a region. Further operational aids include the ability to alter the visual scale of the waveforms such as when investigating a problem area and the ability to scroll along the waveforms. The amount of time in the waveform windows is indicated by a time-code value that is pulled from the start of the guide track and then seconds are indicated across the window from that point.

**THE NEXT STEP** is to select Filter. Internally, the Guide and Dub tracks are then analysed in four, single-octave filter bands for energy content in 1/100th second slices. When the filtering is complete, it is possible to display any one of the filter waveforms in the windows to compare them should you wish. In my session, a six-second track took about three seconds to filter both guide and dub. When processing of any function is completed, a light on the FUNCTION button turns from green to red. Should you at any time alter the region to be processed, even after partial processing, those lights return to green indicating reprocessing is needed.

Part of the cleverness of the system is its ability to extract a guide track even



**Synchro Arts'**  
**Jeff Bloom,**  
**VocAlign**  
**developer**



when a lot of noise is present. There is a noise-compensation procedure that assumes that a constant sound with no identifiable peaks is a noise and ignores it looking for information in other filter bands.

The next step is Align, which is probably the most sophisticated part of the whole process. Internally, the filtering information from the guide and dub are compared. Complex calculations are then made as to what changes have to be made to the dub to make it line up with the guide; which sections to stretch and which to compress in time. This process creates a nonlinear 'path' that maps the dub track onto the guide.

Alignment is incredibly quick—my six-second example was virtually instantaneously processed. When completed, a line representation of the aligned dub waveform is overlaid on the guide waveform. This allows you to check if the peaks and troughs line up. If they do, then the next step is to select Edit. This initiates the processing necessary to apply the path created by the alignment procedure to the dub signal, editing out sections and repeating others.

The last stage of the process brings us to Spot. This returns the newly aligned dub signal to Pro Tools, onto a predetermined track in the correct time-code position against the guide track.

Operation complete.

With experience it is likely that you will not go through the individual stages above, one step at a time, but select Edit or Spot which will also include all preceding processes.

Should the dub waveform not align well with the guide waveform, there are further options. If there are misalignments throughout the length of the region, then different settings of the alignment controls can be used to adjust 'time stiffness'. There will be about half a dozen options with descriptive names such as 'High Flexibility' and

'Maximum Expansion' that will vary the amounts of compression and expansion allowed to help pull the signal in. An experienced user will be able to alternate between the various settings and check again in seconds.

If the error is in a small section, it could be that the dub is so different that the alignment algorithm applied to the overall region is not right. In this case, it is probably best to complete the processing and export the whole section to Pro Tools and then bring the troublesome area back.

Solving many problems is down to operational experience.

In one dialogue-replacement test there was a long pause in a phrase in the middle of the dub. The setting that pulled the rest of the phrase into line would not touch this section. Generally VocAlign will not compress or stretch by more than 2:1 as it may start to sound unacceptable. Some slightly more extreme settings in the align-

ment, however, pulled it in.

Dialogue-replacement systems have been used quite extensively in foreign dialogue dubbing where the guide and dub voices may be in different languages. There is no way that such a different track could be made to fit with the guide dialogue, but it is possible to optimise fit between the two tracks so that pauses and emphases may be tied together. We had no access to foreign dialogue for this session but Jeff Bloom put on an all-electronic exhibition to make the point. The PowerPC used for the demo was carrying software that can read and speak written text—albeit in a rather detached manner. A few lines of a Marx Brothers script was keyed into a WP file for the software to voice. This was then used as replacement dialogue for Groucho's voice which became the guide track.

Just as with foreign dialogue, there was little relationship between the guide and dub—the computer reading the text did not understand the dialogue and certainly would not have a delivery anything like Groucho! The surprising thing was how close the timing was over much of the speech—inflection no—timing yes. A little bit of fun to make a point.

So far I have only covered the abilities of manipulating speech for post work but vocal manipulation could have many musical applications such as tightening double tracks, backing voices and almost any double-tracked sound.

There may be uses in replacing musical parts—either live-recording repair work or changing the sound of an existing instrument. The musician could play along with the original as closely as possible and then let VocAlign do the rest. I tried an experiment with a bass drum. From a sample CD I loaded about half a dozen completely different bass drum sounds onto Pro Tools in a random pattern. While playing this back I attempted to tap a microphone in sync with these drum beats. Because of the random nature of the guide, I was always at least half a second late. Both tracks were processed in VocAlign and it pulled all the mic taps into very tight alignment with the bass drum beats.

Listening carefully I realised that I should also have tried to have matched the length of the sounds more closely as the aligned replacement mic taps were decaying faster than normal when the guide bass drum beat was dry and very short. To rectify this I could have returned to the some of the other alignment settings that would have allowed a different result.

Undertaking such a replacement of a drum across a 3-minute track could take half an hour or so on a workstation and proportionately more for longer tracks. VocAlign would appear to be capable of doing the same task in seconds.

The possibilities offered by VocAlign seem to increase as a function of the time spent working with it.

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"Soundscape does offer everything that you could want from a professional quality hard disk recording system ... it is cheaper, more powerful and more stable than many similar systems. But most of all it is so easy to use, allowing you to concentrate on the music."

Philip Moore. *Australian Digital Mar '95*

"Having used Soundscape for three months in post producing audio for corporate programmes mastered on Betacam SP, it is now unthinkable to return to the old way of working ... Soundscape is reliable, simple to learn, easy to use and produces very high quality results."

Nic Blinston. *Business Video Mar '95*

"Soundscape could well find its way replacing the analog tape recorder up and down the country ... a welcome addition to any studio set up for the sheer freedom it offers when it comes to laying tracks down quickly and easily in order to make the most of that creative muse."

Bob Walder. *Music Technology Jul '93*

"I've been playing around with Soundscape's hard disk recorder this week and feel almost as though I've had a religious experience."

Brian Heywood. *MIDI Monitor Issue 11*

"I wanted to really check out the vari sync mode. I slowed the video down to a crawl, Cubase locked in and the sequenced music was playing slowly ... a bit faster ... and ... yes the Soundscape synced up and was recording. The SSHDR1 has lots of features, creative usage of available power, sounds great, syncs great, straightforward, easy to use and expandable."

John Zulaikha. *Connections Feb '95*

"The next stage of the Digital Revolution starts here."

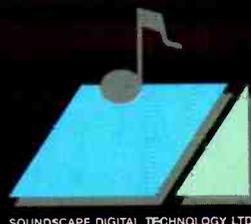
Bob Walder. *Home and Studio Recording Jul '93*

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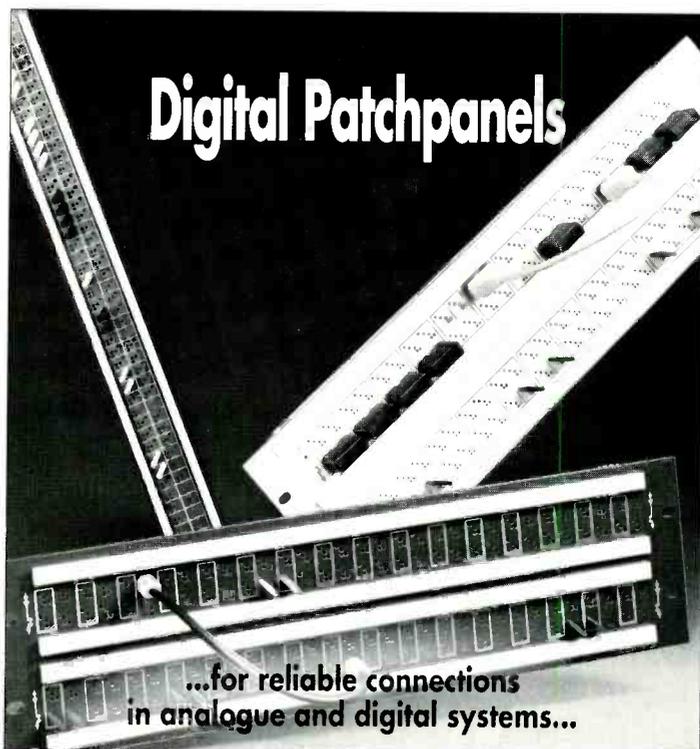
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# Apple Mac 7200, 7500 and 8500

Three new Macintoshes threaten to change the place of the computer in the recording studio.

**MARTIN POLON** brings hot news from their launch at MacWorld in Boston USA

**THE RECENT RELEASE** at MacWorld, Boston, of a new family of computers has proven that the American Apple Computer concern has been listening closely to the requirements of the audio community.

The new Macintosh computers promise to be the most potent audio-visual platforms yet seen either in Macintosh or in PC-Windows. Utilising 100MHz Power PC chips as the CPU speed minimum, the new 7200, 7500 and 8500 machines represent a family of machines with the following enhanced audio and video features:

Power PC processor speeds of 75MHz, 90MHz, 100MHz or 120MHz will be available on multimedia-ready machines. Some of these can carry even faster Power PC CPUs. The various chip and machine options operate anywhere from 25% to 75% faster than comparable Pentium chips operating at the same speeds with the same applications.

The new Macs are compatible with MPEG, JPEG, ISDN and MIDI applications and plug-in hardware boards. Future machines will, in certain configurations, have compression algorithms on plug-in boards installed by Apple. MIDI is supported and is part of the audio features of Quicktime software that is standard with all Macintosh computers. ISDN boards are already available for the existing NuBus Macs and PCI versions of these cards are expected soon.

Enhanced hardware architecture has been adopted to deliver improved (44.1kHz) audio with new internal hardware and software—one of the major design considerations of the new machines was to improve the audio quality.

All of the machines will accommodate up to three of the computer-industry standard Peripheral Component Interconnect (PCI) 2.0 compliant devices. The 7200, 7500 and 8500 have three slots dedicated to this purpose. From an audio applications point-of-view, the relative demise of the old Apple NuBus will cause short term availability problems, as PCI audio cards await third-party developer support. But, the presence of a united PC and Macintosh user-base almost guarantees a larger number of options as well as lower prices for the new cards.

The use of a 'Fast SCSI' internal



hard-disk transfer system eliminates what has been a major speed problem with most, if not all, computers. The speed advantages of fast drives mounted internally were lost in moving data from the drive to the CPU. This, coupled with either 500Mb or 1Gb (2Gb hard drives in the top-end model 8500) fast hard drives means laying audio 'tracks' will be enhanced by the processor speed, the Fast SCSI transfer speed and the hard-disk drive speed. With 1Gb of drive space, two tracks of uncompressed 16-bit stereo can be recorded for one and a half hours.

Internal computer support for the large data files inherent in audio and video recording and manipulation has been increased on the new machines and in the revised operating system from the multigigabyte range to the low multi-terabyte range.

A revised operating system, Macintosh OS v7.5.2, has been optimised to provide the maximum advantage for the audio and video end-user. The system will manage the increased number of storage capacity and transfer options in 'native' application mode so that all of the speed advantages in the new hardware are not lost by having to run code in emulation. Speaking of emulation, a new dynamic recompiler emulator will run all existing Mac software used in audio and other applications at a far greater speed than the previous emulator offered with the first Macintosh Power PCs.

In 1996, the Power PC consortium will supply chips that meet the CHRP

(Converged Hardware Reference Platform) specifications. This means that the computer you buy from Apple or other vendors signatory to the new CHRP technologies and to the Macintosh operating system such as IBM, will be multi-platform and can run in native configuration the current and future Mac operating systems, IBM's OS2 Warp, Microsoft's Windows NT, a version of UNIX, Solaris and several other workstation software.

Perhaps most exciting, in the very near future (1996-97), enhanced Power PC chips labelled as the 604e and the 603e will offer operating speeds approaching or slightly in excess of 150MHz. These chips, will be produced at the Austin, Texas plant owned by the Power PC trioka—Apple, IBM and Motorola—and will 'plug in' to the top-end machines, replacing the existing processors. They will also increase internal caching, thus speeding up emulation of older Macintosh software. The 604e is intended for desktop platforms while the energy-reduced 603e will be used in portable machines. Beyond these advances, Apple are already working on 200MHz computing platforms.

Another interesting development for the future is that there will be a Power PC 615 chip engineered by IBM, which will have both the CHRP specifications and a full pin-compatible Pentium option. In addition to all of the other options offered by CHRP, the entire range of Windows software will be available to run with the 615 chip. This chip will appear on machines made by Apple as well as by other vendors.

The options offered by these machines, could establish new categories of small studio operability. The savvy studio operator will turn Macs, low-end audio software, outboard, monitors and a DAT recorder into a business opportunity. The dedicated classical or folk recordist will take a portable computer, tube mic preamps and high-quality mics to a festival or performance and secure a recording ready for editing on computer and release as an audiophile CD capable of satisfying a discerning audience.

With these opportunities in mind, it is clear that these machines finally offer the speed and power necessary to record multitrack audio on a computer.

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# New technologies

In this month's product preview **Studio Sound** goes in search of the latest launches.

**DAVE FOISTER** reveals the best on offer, from CD-Rs to monitor speakers

### Fairlight Dali-2T

Fairlight brought the latest workstation to IBC Amsterdam: the 2-track Dali-2T. The unit was originally created to provide a cost-effective platform for Fairlight's Timeflex software for time compression, varipitch and varispeed operations. It also incorporates several other functions including real-time, 4-band, parametric EQ; a 4-stage, digital, dynamic-range processor; 2-track editing with adjustable crossfades; level management and PQ encoding for CD mastering, making it suitable for 2-track sweetening, editing and mastering applications in music, broadcast and advertising facilities.

◆ Fairlight ESP, Australia.

Tel: +61 2 975 1230.

◆ Fairlight ESP, US.

Tel: +1 213 460 4884.

◆ Fairlight ESP, UK.

Tel: +44 171 267 3323.

### Fostex PD-4 portable time-code DAT

Fostex' new portable DAT machine is now available following its launch at the European AES. The PD-4 sets out to incorporate all the prerequisites of location recording: it features confidence monitoring from the 4-head transport, full time-code implementation, jam synchro-nisation and two-way powering. Of particular interest is an onboard 3-channel mixer where each channel features line-mic

switching, a pad, phantom power and variable HPF, with simple LCR routing and individual level controls via an overall master.

◆ Fostex Corporation, Japan.

Tel: +81 425 45 611.

◆ Fostex Corporation, America.

Tel: +1 310 921 1112.

◆ SCV, UK. Tel: +44 171 923 1892.

### Sony Spresca 920 CD-R

Sony has joined the CD-R battle with the Spresca 920, a recordable CD-ROM drive that is the first offering in a new line of branded CD-R products. The 920 is presently Windows-based for the PC, with a Macintosh version to be released shortly, and an external version, the Spresca 9211, is also available. The kit comprises a compact CD-R drive, fitting

First seen at the European AES show, the new portable DAT machine from Fostex is now available worldwide

in a standard 5/4-inch bay, and Corel CD Creator software. This package helps produce audio and data CDs by using a Disc Wizard feature, a step-by-step CD creation guide, and can also enable development of many other applications including hard-disk archiving, training, publications and databases for distribution on CD-ROM.

Sony's system is one of the first to implement the 'Packet Recording' method as described in the *Orange Book*, overcoming some of the limitations of the Disc at Once or Track at Once systems normally used with CD-R. Packet Recording allows the writing of data blocks ranging from 56kb to 1Mb and up to 9500 writes to the recordable medium. The 290 supports 'almost all the functions of the *Orange Book*, and also implements Multivolume and Kodak Multisession writing methods so that it can read and record formats like Kodak Photo-CD.

◆ Sony Computer Peripherals and Components, UK. Tel: +44 1932 816000.

### Nady wireless ear-monitoring systems

Nady Systems, famed for wireless microphone systems, is to introduce two new wireless stereo ear-monitoring systems at the AES. The SEM-6000 VHF and SEM-7000 UHF systems are designed particularly for live-concert use, and applications in theatre, film and video production.

Both systems include a 1U-high transmitter with two independent stereo broadcasting channels. On the 7000, each transmitting channel offers four switchable UHF frequencies, while the SEM-6000 offers two channels. The corresponding bodypack receivers are the SEM-6R VHF and SEM-7R UHF, and



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Deltron Components Ltd., Atlas Works, Atlas Road, London NW10 6DN

# PRODUCT PREVIEW

📺 Nady's claimed operating range is 250 feet in adverse conditions and up to 1000 feet line of sight.

◆ Nady, US. Tel: +1 510 652 2411.

## CEDAR Auto De-Hiss

CEDAR Audio is further capitalising on the power of their new ProDSP-R20 processor board to launch Auto De-Hiss, a PC software package with just three controls that according to CEDAR automatically removes noise without side-effects and improves on the performance of the DH-1 stand-alone De-Hisser module.

In line with all CEDAR's other processes, Auto De-Hiss, following on from the established HISS-2 software, has full 20-bit input and output capability and operates entirely in real time.

◆ CEDAR Audio, UK. Tel: +44 1223 464117.

◆ Independent Audio, US.

Tel: +1 207 773 2424.

◆ DW Productions, Australia.

Tel: +61 2 9904 0344.

## Sony DARS-116 Hi-8

Sony's commitment to the modular, digital multitrack format established by Tascam is underlined by the launch of the DARS-116 cassettes designed specifically for that purpose. The formulation combines Sony's evaporated metal tape technology with the newly developed Diamond Like Carbon protective coating, intended to enhance both durability and data integrity. DLC was first seen on Sony's Hi-8 Editor video tapes.

The new tapes have a playing time of 116



Sony supports DA-88 format through new Hi-8 tape



minutes and come in a sturdy album case with handy colour-coded audio labels.

◆ Sony Broadcast and Professional, UK.

Tel: +44 1932 816000.

## Miles Technology MTI-3 TriSonic Imager

The MTI-3 from Miles Technology uses a patent-pending electro acoustic imaging process to reproduce conventional 2-channel stereo audio through three loudspeakers. The TriSonic Imaging process takes centre-panned sounds, such as lead vocals or kick drum, and places them on a centre loudspeaker, leaving the rest of the mix untouched in stereo on the outer pair. Miles claims a vastly increased optimum stereo listening area, as well as exceptional vocal intelligibility, and further suggest that more output power, more headroom and less distortion will result.

No special encoding is required for operation of the system, which adds no equalisation or dynamic modification, but is claimed to be a linear, high-fidelity process. User optimisation of the results is possible by means of several front-panel controls, and two surround outputs are provided for ambience extraction. Another proprietary design, a SpreadSound function, allows mono sources to be enhanced and made to sound 'bigger'.

◆ Miles Technology, US. Tel: +1 616 683 4400.

## BSS multimedia interactive catalogue now on disk

BSS Audio has launched a new multimedia interactive product catalogue. Available in both Windows and Mac formats, the single 3 1/2-inch diskette holds photographs, descriptions and technical specifications of all the signal-processing products in BSS's range.

Data and photographs can be printed out at a single keystroke. BSS also has its own Bulletin Board for file exchange, with areas for Sales and Technical matters, including software downloading and questions.

To add to their electronic availability BSS also has a presence on the CompuServe network and is constructing a World Wide Web site.



## Crossover appeal from Hot House SDX

◆ BSS Audio, UK.

Tel: +44 1707 660667. Bulletin board

Tel: +44 1707 660872.

E-mail: 100046.3321 @compuserve.com.

## Hot House SDX Audiophile Electronic Crossover

Designed to be used with the established Hot House High Output Series monitors, the latest introduction from Hot House alongside its range of MOSFET amplifiers is the SDX crossover. In a single rackspace, it offers 2 or 3-way stereo, 4 or 5-way mono and discrete 4-channel biamp operation. Each output incorporates a limiter, 2-band parametric EQ, low frequency contour and infra-sonic or all-pass filters, and ultra-high frequency or constant-directivity compensation circuits. Insert points are standard.

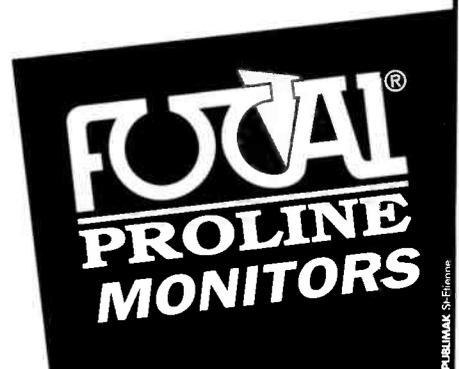
◆ Hot House, US. Tel: +1 914 691 6077.

## Soundmaster ION RADAR integration

Soundmaster's Integrated Operations Nucleus studio (ION) operating environment now features full integration for the Otari RADAR digital hard-disk recorder. Communications via its proprietary protocol, ION controls all RADAR functions, including Cut, Copy, Paste, Undo and full 24-track arming, using the same user-interface that already exists for other equipment such as the Tascam DA-88. Features of the system

# E = MC 26

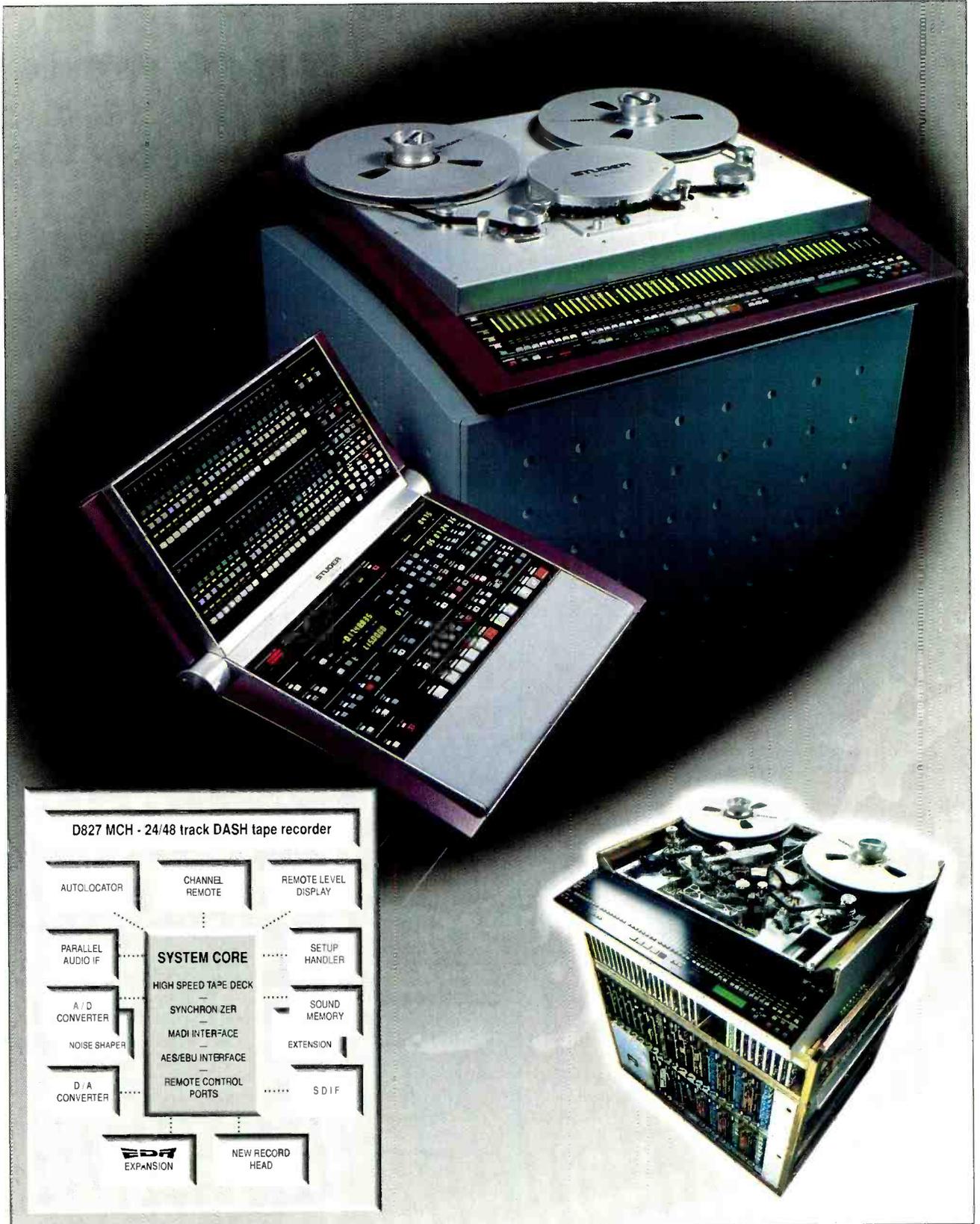
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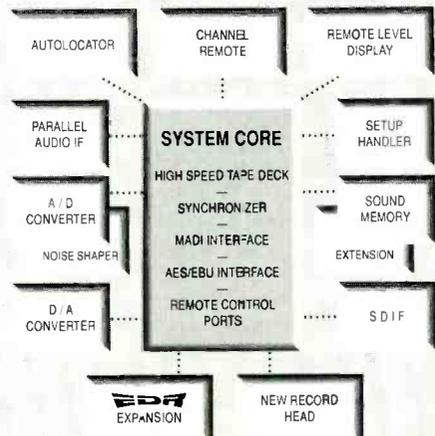
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## PRODUCT PREVIEW

include tape-like remote audio-scrubbing; EDL control for automated track laying; fast synchronisation including the ability to lock backwards; and time compression and expansion via Soundmaster's Smart Sync feature in real time. The ION environment allows RADAR to be used in tandem with multitracks, VTRs, DAT, film dubbers, projectors, consoles and outboards to provide capabilities normally associated with DAWs.

◆ Soundmaster Group, Canada.  
Tel: +1 416 741 7057.

### B&W 600 Series

Improved production techniques have allowed B&W to produce a mainstream range of loudspeakers using Kevlar midrange cones, previously restricted to top-of-the-range models. B&W has been using Kevlar as a cone material since 1975 for its properties for reducing mid-range coloration, and now are able to introduce the 600 Series of seven models, the most expensive of which is still under £1,000 (UK).

Models range from the DM601 two-way

compact monitor, with a 165mm Kevlar bass-midrange driver and a 26mm magnetic-fluid-cooled aluminium-domed tweeter, to the floor-standing DM604, a 3-way monitor incorporating a dedicated 180mm Kevlar midrange driver housed in its own sub-enclosure, alongside two 180mm Cobex bass drivers for extended bass and improved power handling characteristics. The range also includes a centre channel A-V monitor, the CC6, and an active subwoofer, the 100-Watt MOSFET AS6 with its 300mm driver, but a novel inclusion is a THX approved dipole, with two HF drivers configured in opposite polarity to create the side-positioned surround effect.

◆ B&W, UK. Tel: +44 1903 750750.

### Pioneer high sampling DAT

Now available from Pioneer is the D-9601 96kHz DAT recorder. The machine doubles both the linear tape-speed and the drum rotational-speed to give sampling rates of 88.2kHz and 96kHz in order to raise the HF response and the effects of



High quality, low-cost loudspeakers from B&W

filtering by an octave. It can also record at the standard 44.1kHz and 48kHz rates. It will operate with either its own or suitable outboard A-D converters, and can down-convert its output to standard rates via AES-EBU if required. A hidden extra is the ability to copy (using two D-9601s) conventional DAT recordings at double speed.

◆ Pioneer High Fidelity, UK.  
Tel: +44 1753 789789.

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**OKTAVA MK011** The perfect general purpose mic, neutral in tone and extremely high in quality, this mic is useful in all areas of studio work and great in live situations. Although it's a true condenser it costs less than most budget back electrets and it sounds infinitely superior. £160+VAT

**NEVATON CMC51** The latest recruit to the Russian forces, has a gold plated diaphragm and switchable patterns, is extremely accurate and has an incredibly low noise floor. The build quality alone would lead most to believe the mic was at least twice the price. £500+VAT



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## IN BRIEF

### The Great Little Valve EQ

Following its debut at Audio Technology 95, The Great Little Valve Company has announced the first sale of their all-valve stereo equaliser. The design provides 10-band EQ in a split-channel format, together with 3-way selectable threshold LF and HF shelving. The overall frequency response is quoted as flat from 5Hz to 60kHz, and a dynamic range of over 100dB is claimed, 'putting to rest, once and for all, the assumption that valves are intrinsically noisy'. Each unit is individually hand built to order.

◆ The Great Little Valve Company, UK.  
Tel: +44 181 992 7728.

### Studer M-0 recorder

The D424-2 has been announced by Studer as the first of a range of magneto-optical recorders. The D424-2 is a 19-inch, 3U-high stereo recorder capable of storing 87 minutes of uncompressed 16-bit audio or over an hour of uncompressed 20-bit audio on a single 5 1/4-inch disc. Additionally, the D424-2 offers 18-bit and 24-bit linear recording options (optional ISO-MPEG and AC2 reduction available), nondestructive editing, built-in SMPTE synchronisation, 9-pin or RS422 remote control and tape-machine-style operation.

◆ Studer, Switzerland. Tel: +41 1 870 7511.

### The Sounds of Sumatra

An unusual newcomer to the sample and sound effects libraries is a series of recordings of naturally occurring sounds from around the world produced by Natural Sound Source. The first CD released is *The Sounds of Sumatra*, a compilation of original recordings made on and around the Indonesian island. The CD has been produced with both the general public and the recording and broadcasting industries in mind, and contains 32 tracks between five seconds and 10 minutes in length. Twenty-seven are stereo, and the sounds can be used either in their raw state as atmospheres or as individual sounds to be sampled.

◆ Natural Sound Source, UK. Tel: +44 115 962 4755.

### Mark of the Unicorn Windows releases

Mark of the Unicorn has available Windows versions of some of its established software packages. The Unisyn patch editor-librarian is an integrated editor, librarian and database environment with support for 215 MIDI devices, randomising and morphing functions and performance snapshots that save entire studio configurations. The award-winning *Freestyle* is composition-based sequencing package with instant music notation specifically designed from a songwriters point of view rather than to emulate recording studio hardware operation.

◆ Mark of the Unicorn, US. Tel: +1 617 576 2760.

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PREVIEW

# Console Bricks

Crookwood is to introduce its digitally-controlled analogue Console Bricks concept at November's AES. **KEITH SPENCER-ALLEN** reports

**IF YOU'RE** part of a company whose first product is a high quality mic preamplifier built in the form of a Paint Pot, you clearly have a different approach to design. For some months Crookwood has been hinting at a developing concept for a mixing console that reflects changes in the studio business; a way of satisfying the demanding user while keeping business in-business. The heart of the proposal is modularity but in a manner different to anything seen so far. Console Bricks will have their first public showing at the New York AES.

The technology at the heart of the system is digitally-controlled analogue. Crookwood's Crispin Herrod-Taylor, an ex-SSL and Focusrite designer, holds the view that most of the DCA consoles of the mid-eighties failed because analogue technology was either not ready or very expensive. Ironically, a decade later, the digital era has driven analogue development and there are now a wider choice of cost effective analogue control elements and DCA is a very realistic technology which can support a high quality audio signal path.

Console Bricks takes the basic audio building blocks of any console—Gain Buffers, Equalisers, Dynamics and Signal Routers—and following the customer's specification, these standard Eurocard Bricks are assembled in 19-inch rack(s) and wired accordingly. This creates what is effectively a custom console but by using standard modules costs are kept down with only the wiring being custom. To the user the control surface is the heart of a console and Crookwood have applied the custom approach here as well. DCA allows the use of assignability but the degree is largely specified by the user with benefits in size and cost resulting from greater implementation. The control surface is assembled from standard control panels, the number of which, and the positioning, is also variable. At present there are about eight different panels available. The complete system is under computer control with communications between it, the control surface and the bricks on a proprietary, bidirectional serial link.

**TEN YEARS AGO** assignability worried many users but we have learnt better means of making it work. Crookwood's philosophy is to have a mix of permanent panels for things that are used regularly and assignable panels for those used seldom. Integral to this is an approach known as Views, logical groupings of input or monitor channels such as all percussion tracks or vocal tracks. The channel facilities are accessed by recalling a

View which lays the channels across the fader modules. The number of channels immediately accessible is limited by the number of fader modules installed—each module holding 10 P&G belt faders. A greater number of channels can be accessed by scrolling, paged left or right or by a find command. The fader LCD module above details full information about the channels on view including processing, grouping, aux levels and routing details.

Above the fader sits a SELECT button which activates all the facilities that have been assigned to this channel. Part of the Bricks design philosophy allows for the user to install only what is needed. Therefore it may be that a 48-channel mixer only really needs 24 dynamics cards and a cost saving gained. The dynamics can then be allocated to channels as needed.

Central to the control of the console is the assignment panel which is used for selecting the active Views, for recalling preset and a host of other central functions such as interrogating the routing to identify, for example channels which are using Aux Send 6 or the ability to normal the console by recalling a preset View.

**THE MONITOR MODULE** controls control-room monitors, master solo and talkback functions. Precisely how these functions operate can be set through OBJECT ACCESS buttons that cause the LCD to display options which can then be assigned to the QUICK ACCESS button.

Automation will initially be snapshot with full dynamic automation to follow. All console data-storage will held in flash memory which may then be dumped onto diskette or via MIDI as sample information or Sys-Ex blocks.

The console architecture can support up to 256 channels with 4-band, fully parametric EQ, dynamics and so on, and the user can specify what system of console they wish; that is inline, split and so on; or use the basic building blocks to construct more specialist designs such as ADR or film mixing. Updating, changing or expanding facilities will be relatively easy with additional racks, controllers and software. Machine control options are currently being considered but will most likely link in with an existing package.

The Console Brick approach offers a unique approach to console design that creates a flexibility and cost-effectiveness that would seem to offer real advantages for any facility not sure what they will require of a console in three years time—and who does.

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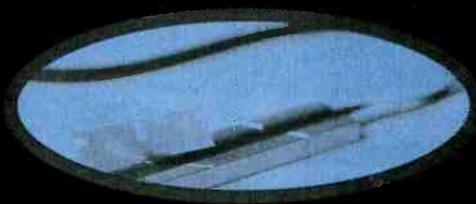
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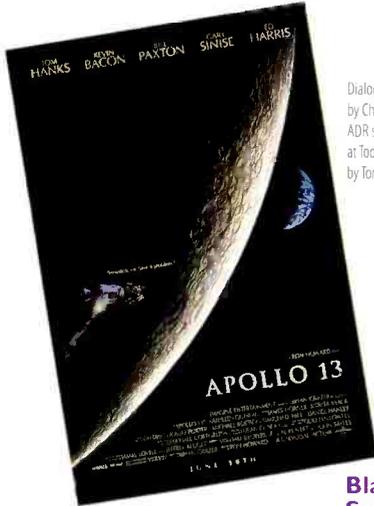
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## BEATLES EXCLUSIVE

The Beatles are back at Abbey Road—complete with John Lennon.

**PATRICK STAPLEY** reports exclusively for **Studio Sound** on the music set to be the biggest news since The Beatles split

### THE BEATLES

Twenty-five years after their last session at Abbey Road, The Beatles are back at the studios where they recorded

almost all of their music. Over recent months, the world's most famous recording studio has welcomed back its most famous clients—Paul, George and Ringo along with Producer George Martin and Engineer Geoff Emerick.

In a shroud of secrecy, where studio staff have been threatened with dismissal if they so much as mention 'The Beatles' Project', preparation is underway for the release of a series of CDs that will not only contain previously unreleased Beatles' songs, but also two newly-recorded tracks that, amazingly, feature all four members.

Since the beginning of this year, George Martin with the help of Abbey Road Engineer and Beatles expert Allan Rouse, has trawled the studio's archives searching for suitable material. Approximately 400 tapes (2-track, 4-track and 8-track) from the EMI vaults and about half as many again from external sources have been listened to.

'It's been a long haul,' confirms Martin.

George Martin too admits that he'd forgotten about some of the old material: 'I'd certainly forgotten all about 'Leave My Kitten Alone' which is very good. It's quite well known because it's been bootlegged, but I hadn't heard it for years and years. There were also some interesting little demos and things that I'd quite forgotten about, which will be on the albums.'

An exciting discovery was a 30-year-old track written by George Harrison called 'You Know What to Do'. Feared lost many years ago, it turned up inside an unlabelled tape box.

'It's not the greatest thing that George ever wrote,' remarks McCartney, 'but I believe there will be a bunch of people interested in hearing a Beatles' track from 30 years ago that no one to this day has ever heard. Using an archeological analogy, if you find a little Egyptian pot, it doesn't have to be the greatest Egyptian pot, the fact that it is Egyptian is enough.'

The archive material is being treated in two ways; where material exists only on 2-track, it is being directly transferred with the help of Sonic Solutions NoNoise processing to gently remove tape hiss.



# Get back to Abbey Road

'We've covered every bit of recording we ever did all those years ago, listening to every take and every track of every take. It's been fascinating, traumatic, beautiful, sad, all kinds of emotions—we've literally been reliving our lives.'

The surviving Beatles have collectively returned to Abbey Road on a number of occasions during the year, sifting through material with Martin, helping to choose what should go on the albums. According to Paul McCartney, it's been a strange but enjoyable experience.

'It's quite weird sitting in Abbey Road's Number Two studio, where we always worked, listening to what we did when we were 20,' he says. 'But it's exciting as well. It's like being archaeologists finding tracks that we didn't remember recording, uncovering songs that we didn't want or thought weren't good enough at the time. But now, of course, after 30 years they don't seem too bad at all.'

Where songs are on multitrack they are being remixed, and this is where Geoff Emerick, who engineered the largest proportion of The Beatles' records, comes in.

George Martin was insistent that not only should he get the old team back together again, but also the equipment: 'I said to Rupert Perry at EMI before we started the project that I wanted to make the mixing as authentic as possible. I said "Look you've got a vintage producer and a vintage engineer, so you're going to need some vintage equipment to go with it." I didn't want to do it on a modern desk.

**TO PUT THOSE OLD** 4-track tapes through an SSL would do things to them that they were never intended for, so I was pretty adamant that we should try and get a desk from that period. It wasn't actually possible to get one from the sixties, but we did get one from about 1970 which would have been used at the end of The Beatles

period, and it definitely had the right character about it.'

The desk was an original EMI TG 8-track console, one of the first transistorised consoles to be installed at Abbey Road, and was hired for the project from Producer and ex-Abbey Road Engineer Jeff Jarratt. This along with various vintage outboard, was temporarily installed in Abbey Road's Penthouse Studio where rather ironically it ousted an AMS Neve Capricorn.

'Although it wasn't a tube console, the old EMI desk really lent itself to the job and really suited the tapes,' says Emerick. 'For outboard we basically used what we would have used then, which wasn't a great deal—Fairchild limiters, and some extra EMI EQ units. Anything else like ADT (Automatic Double Tracking) or phasing we did in the old-fashioned way using tape machines.'

'I've personally tried to keep things as



APRIL 1995 PHOTO BY REX USA INC. (COPYRIGHT APPLE CORP. LIMITED)

authentic as possible, right down to the way EQ would have been used,' he continues. 'There have been a couple of occasions where I tried adding a little high top, but each time I've taken it off again because it sounded wrong and put things out of balance. The EQ we used in those days was pretty basic it was just top and bass, and the top end probably peaked at around 5k.'

**THE ONLY MODERN** equipment used were the speakers—Emerick mixing exclusively on Meyer FD-1 nearfields. Multitrack tape machines were all old Studer A80s, and the songs were mastered to A80 1/2-inch. Reinstating original valve tape machines was considered both unnecessary and a logistical nightmare.

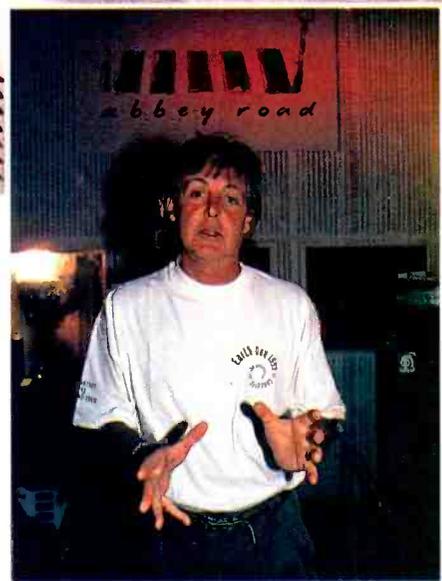
As far as reverb was concerned, George Martin was equally insistent that he didn't want to use any digital reverb or echo plates. 'I wanted an echo chamber like we used to use,' he had said earlier, 'which, of course, the studio no longer had.'

This turned out to be untrue, as an old chamber had been used to store echo plates. Fortunately, this was the No 2 chamber that would originally have been

**'It's spooky to hear John sing lead, but it's beautiful. It's the impossible but one way or another we pulled it off'** PAUL McCARTNEY

hooked up to Studio 2. However, all that remained was four walls—the rest had to be reinstated by Abbey Road's engineers from memory as best they could.

'Putting back amps, speakers and mics wasn't too much of a problem because we still had quite a lot of the stuff here,' explains Allan Rouse. 'The main difficulty was replacing the old glazed sewage pipes that acted as acoustic reflectors and gave the chamber its characteristic sound. In the end we managed to locate some that were the same size but they weren't glazed and didn't produce the same effect, so we ended up painting them with a high gloss finish and also tiling some of the chamber, which got us back close to the original.'



ABBAY ROAD 1995. PHOTO: REX FEATURES

'The decay time was probably a fraction shorter,' says Emerick, 'but the overall quality was exactly the same. It gives a colour to the vocals which is unique—it's that old EMI Number Two sound. We also used the old STEED echo which is basically a tape delay into the chamber, and we used varispeed to recreate the head gap that would have existed on the old BTR tape machines.'

As far as the original master tapes were concerned, their condition was remarkable

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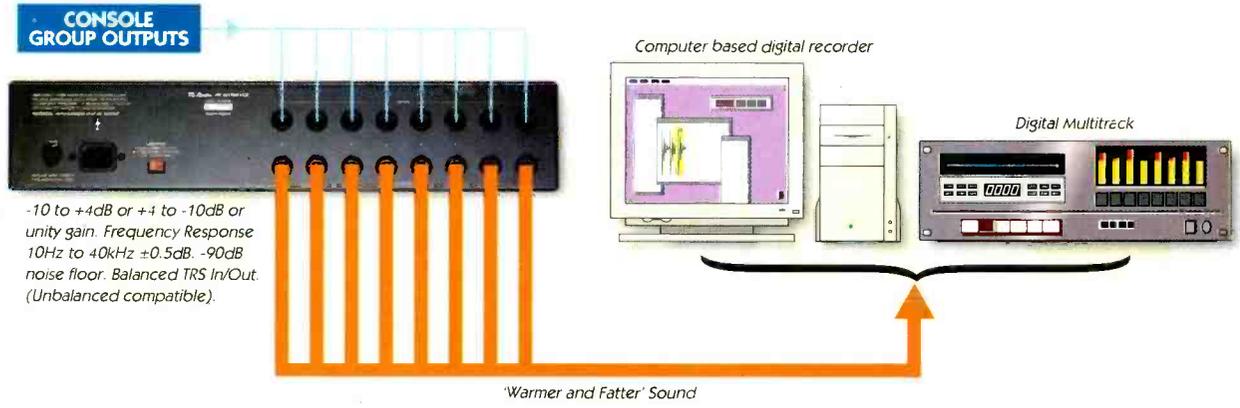
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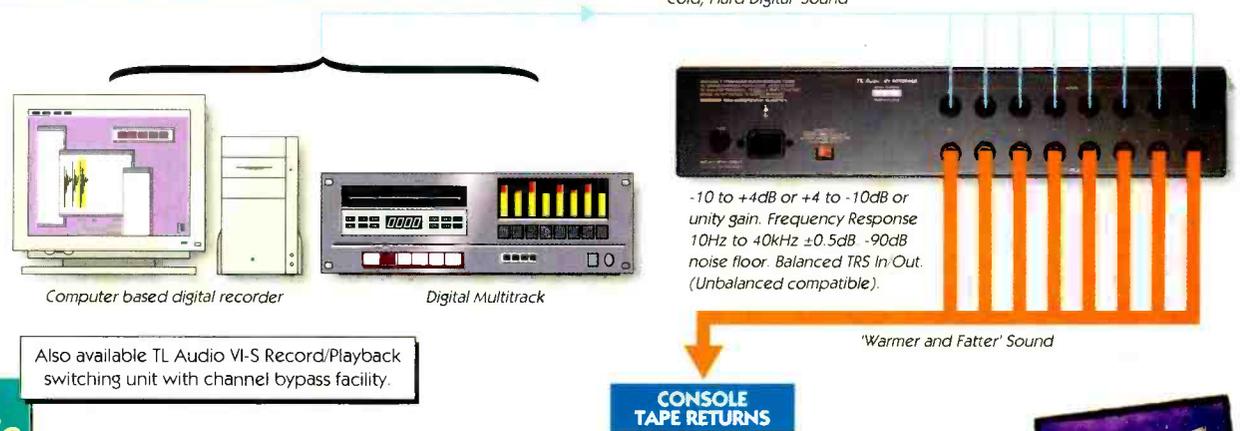
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## 'WARMER & FATTER' MIXING



## BEATLES EXCLUSIVE

and Emerick was astonished that they played so well after so many years. 'The masters are in amazing condition—there's no shedding, sticky edits or anything. It is incredible to think that some of these haven't been out of their boxes, basically, for 30-odd years, and they play absolutely perfectly. It certainly says something for EMI tape!

'Because we were using 1-inch 4-track in the early days, the width of the tape means the quality is excellent with virtually no noise. Also because we were using all tube equipment, the sound is really incredible. By modern day standards the actual quality of the bass and drums and things is wonderful, and I don't think you'd be able to match it today.'

**WORKING ON OLD MATERIAL** again was a bizarre experience for Emerick, who confesses that it was difficult at times to become detached from it.

'It was really strange to hear all those old tapes again with my announcements on them and all the studio chat,' he comments, 'it took me right back to the sessions. It was actually quite a shock to be mixing all this classic stuff again, and I found it quite difficult to divorce myself from what they are. It's a bit like going into Tutankhamen's tomb and being overawed by all these priceless treasures, and feeling nervous to touch them. It's really weird.'

Wherever possible, things have been left as they were recorded, 'unvarnished' as George Martin refers to it. But on one or two occasions Martin admits that he has 'played God' and altered things, but purely to give people something more interesting to listen to.

'With 'Day in The Life', for example, there's a wonderful, wonderful version that John does—it's either Take 1 or Take 2—where he's not trying, he's just singing for himself and it's absolutely lovely—the John that I knew so well. The only problem is that there's no vocal for the middle eight, the "Got up, got out of bed, dragged a comb

across my head..." section. But luckily I came across a remix that we did of the middle with Paul singing which I was able to edit in. The track is completely different from the 'Day in The Life' on *Sgt Pepper*, but it's worth hearing and I believe we were justified in doing it that way.'

Generally, mixes have been reasonably quick, probably taking no longer than they did originally—the earlier 4-track recordings being the fastest.

'I'd say we're mixing quickly,' says Martin. 'Of course you have to remember that the way we used to record in those days, we actually shaped the mix as we recorded it. It wasn't a case of laying down tracks and assembling them later, we used to record pretty well live, and it's not so much a mixing job as toning. Some of the later songs though are more complicated and on one mix, where we had originally bounced between 4-track machines, I reassembled all the tracks, which came to 16, and that took about a day.'

George Martin is keen that the new albums should give a real impression of what it was like being in the studio with The Beatles, and has

### ANTHOLOGY

The reunion has been a direct result of the forthcoming Beatles Anthology documentary, to be screened on worldwide television from November. Five years in the making, the series charts The Beatles' career from birth to breakup and features extensive unseen footage collected from all over the world. All three members have been closely involved in the project, and according to an Apple spokesman have 'got very hands-on' and provided many hours of interviews. 'It's really our version of what The Beatles were all about,' says Ringo, 'giving individual perspectives including John's.'

To accompany the programmes, EMI is releasing three double CDs containing a mixture of forgotten material, different versions of well-known songs, demos, studio out-takes, live recordings, broadcasts, home recordings and so on. This definitive collection of unreleased Beatles material, will also include the two new songs, 'Free as a Bird' and 'Real Love', which are to be separately released as singles. The first being premiered on American television when the series starts on 19th November.

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included bits and pieces of talking before and after takes, some false starts and so on. 'I decided we should be lifting the lid on the boys and let people hear how they were in the studio rather than just hearing the finished, polished production. Some of the highlights for me are the silly little things where they're just being themselves breaking into laughter or kidding each other—it's just like being there again!'

**MARTIN AND EMERICK** still have work to do, and expect to be busy until the end of the year. The CDs will run in chronological order and the first pair (the early days to 1965), are now ready for November release. Each pair will contain roughly 50 songs.

The new tracks are both ballads written by John Lennon that were supplied by Yoko Ono on a mono cassette demo. Recorded in New York, they feature Lennon singing and playing piano and form the base over which the other Beatles worked. Amazingly, the first track, 'Free As A Bird', was completed nearly two years ago with very little information leaking out to the press. The second track, 'Real Love' was recorded in February this year.

Both tracks were recorded and mixed at Paul McCartney's private studio in East Sussex. Again, Geoff Emerick was the engineer but a new figure, Jeff Lynne was called in to co produce the project.

'They were the strangest sessions really,' recalls Lynne. 'They were the only sessions I've ever done where the chat in between takes was so good that I didn't want to start recording again. There were all these fabulous anecdotes—"remember this and remember that"—and then one of them would laugh and say, "Well, what about you, you bugger!"'

'But the thing that really surprised me was how quickly they came together. As soon as they started bashing away it was there—something magical happened when

they played together that made this sound or this feel which is them and is quite untouchable.'

Prior to recording, some work was done to clean up the Lennon cassette, although at this stage it's not clear what processes were used except that they were digital. The two tracks were then transferred to analogue 24-track.

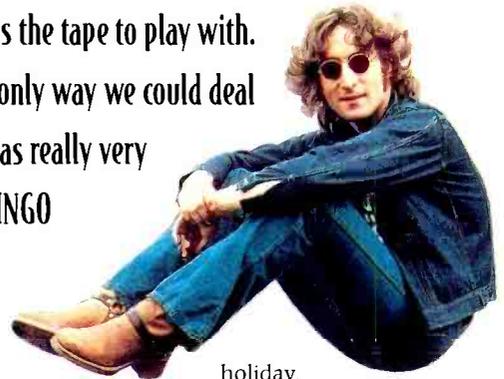
'The quality was never really a problem,' says Emerick. 'I just looked upon it as John saying put an effect on my voice to make it sound like this. It actually sounded like one of those John Lennon vocal sounds with a little bit of wow and flutter and stuff like that. The balance between vocals and piano also worked out okay. There were a few occasions, though, where we had to adjust timing, and this was simply done by flying the tape back in.'

'Having John playing piano as well as singing was a great thing,' adds Lynne. 'It kept the integrity and made the whole thing a real performance rather than just having this voice appear out of nowhere.'

Apart from the technical aspects of posthumously reuniting Lennon with the other Beatles, there were also emotional ones to consider. According to Ringo a little mental deception was required to keep spirits high.

'We just pretended that he'd gone on

'We pretended he'd gone on holiday ... and had left us the tape to play with. That was the only way we could deal with it ... it was really very emotional' RINGO



holiday, or out for tea and

had left us the tape to play with. That was the only way we could deal with it and get over the hurdle, because it was really very emotional.'

Although the sessions weren't treated in the same way as mixing the archive material, some vintage equipment was used by Emerick including Fairchild limiters and Neumann U47 valve mics for vocals. Original instruments were also used including a violin bass and Ludwig drum kit. Each song was recorded over a four day period and mixed in a couple of days.

The fact that the three Beatles were back in the studio again for the first time in a quarter century, might easily have inspired other material to have been recorded, but apparently this didn't happen even though it was discussed.

Paul McCartney: 'Even though we talked about it, it seemed more natural with John there. People can't say "Well, there's only three of you," or "You should get Julian or Sean in." This way we can say, "Look, it is The Beatles, whether you like it or not, it actually is The Beatles on record—through the wonders of technology!"'

So what of the finished results? Perhaps the best person to be judge of that is George Martin who gives the tracks his full approval. 'They sound like The Beatles as though John were back here now, and are more contemporary than the old recordings.'

The Beatles themselves are said to be delighted with the results, and according to McCartney, when Ringo first heard the finished mixes, he exclaimed: 'It sounds like the bloody Beatles!'

'Normally I don't show off about songs beforehand,' says McCartney, 'but I must say they are two real cool tracks. It's spooky to hear John sing lead but it's beautiful. It's the impossible but one way or another we pulled it off. It was a joyful experience. It was magic.'

And the magic may continue. Apparently there is another song on the Lennon tape, which must fuel speculation that a third new Beatles single could be in the offing.

**Right: Detail of the refurbished N°2 echo chamber. Below: George Martin and Geoff Emerick at the vintage EMI TG console (Abbey Road '95)**



DIGITAL AUDIO RESEARCH



# SOUNDSTATION GOLD

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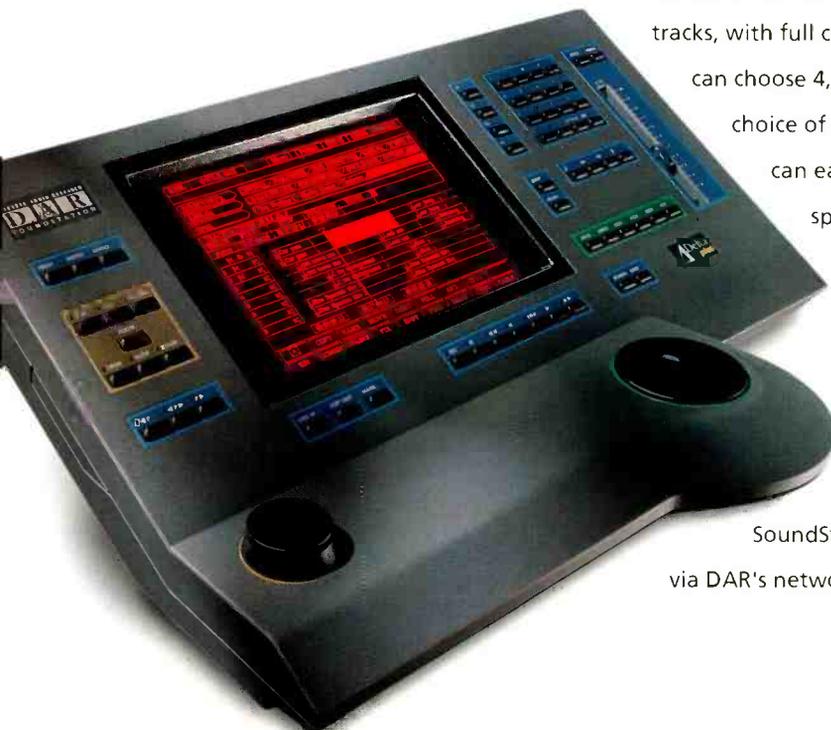
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	Sabre Plus	Delta	Sigma	SoundStation Gold
Upgrade to SoundStation Gold	-	●	●	n/a
AudioServer support	●	●	●	●
Touch-screen interface	-	●	●	●
Segment-based gain control	●	●	●	●
Segment-based EQ control	●	-	●	●
Continuous track-based automation	-	-	-	●
Fader surface controller	-	-	-	●
Maximum track time	13hrs	26hrs	26hrs	26hrs

## DIGITAL AUDIO RESEARCH



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INTERVIEW

# Ambient



# Reflections

Widely regarded as the most creative and influential producer of his, or any other generation, Brian Eno grants **Studio Sound** a rare technical interview, where he muses on everything, from his involvement in War Child to the latest Bowie and U2 albums. **PHIL WARD** was the lucky scribe

**'IT MIGHT** as well be a hamburger,' says Brian Eno, Record Producer extraordinaire and self-professed 'non-boffin'. He's referring, of course, to his DX7. It sits among the collection of tools that makes up his audio sketchpad in the West London office of his company, Opal, and the remark is typical. His respect for audio technology is wilfully limited, and his views on most studio practices are among the most challenging you will ever encounter.

Despite having a few favourite bits of gear that accompany him to most sessions, he's not inclined to marvel at the power of machines. In fact, he sees the record producer as a navigator through the infinite choices equipment presents, and beyond that, as someone who can put the exercise of making a record

into its wider cultural context. To create the philosophical agenda to which his artists can work, his own terms of reference are, ironically, encyclopaedic. But that, no doubt, is why artists of the calibre of U2 and David Bowie—both recent clients—are happy to hire him.

Eno's assistant Andrew Burdon has constructed wheeled cabinets for every item in the studio. Far from Star Trek-style wall-to-wall electronics, Eno's setup resembles a small corner in IKEA, and can be easily transported anywhere. It represents a design philosophy that seems likely to be repeated in a project underway to build a music therapy complex, community centre and recording studio in war-torn Bosnia, an extension of Eno's close involvement with

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## INTERVIEW

the charity War Child. Practicality is one consideration, but the idea of a modular, moveable recording kit also corresponds to Eno's notion of any space being a potential recording space, and his dismissal of the concept of a sacrosanct acoustic interior, where ambience must be artificially created according to a fixed set of rules.

**'I'M ACTUALLY** very much in favour of small, portable facilities,' he says. 'So, instead of having a dedicated studio within the site in Mostar, we'll have something like I've got here, which is all on wheels. This is my new idea; for the last couple of years I've had everything built on wheels, because it takes me a long time to get my angles right in relation to the light and everything. Instead of investing a lot of money in one big multitrack studio, why not have two mobile studios within the building, so if something interesting is happening in one of the rooms—say someone is teaching a group of five people and they would like to record—instead of them having to decamp into the studio and set everything up again, you bring the studio to them. My ideal would be to have a situation where you just stick one plug in.'

**'If something interesting is happening in one of the rooms...instead of having to decamp into the studio and set everything up again, you bring the studio to them'**

He cites ADATs as the likely format, running to a maximum of about 16 tracks. But while smaller, modular technology has arguably contributed to the demise of major institutions like The Manor, Eno still sees an important role for the traditional, commercial facility.

'Certainly, what people are gaining at being able to work at home with little studios like this, is the ability to cheaply explore a lot of options. What you lose through that way of working is the quality of rapport that a good player has with their instrument. One of my running arguments with manufacturers in general is that their whole emphasis is towards increasing options within the



### WORKING WITH U2

The U2 sessions for the latest album took place in a warehouse space they recently discovered in the centre of Dublin. Eno's impressions?

'It's lovely, it's right on the river. At the moment they've got an Amek desk in there, but they're replacing it this month with a classic Neve. There's nothing particularly special, it's just a great spot. It's only been operating since May. I'm sure they'll do most of their recording there from now on. It's very comfortable for them, and one of the good things about it is a very large lounge, which as I said is really important because it means that people can sit and listen to something else. You can if you want pipe through what's going on in the control room, but you can also escape that. And there's a good room upstairs for meals and guests and so on. I'd say about 60% of the building is not functioning studio space—but it's very functional space.'

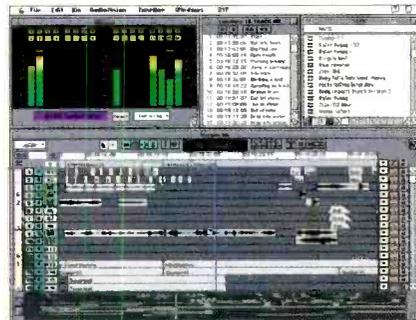
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'I've just been doing a song with U2 which was a very good example of this. It is a very dense-sounding piece, and one day we had a beautiful mix of the backing track, so we just mixed it to two tracks of the multitrack. I've always loved doing this, because then, when you come back to that tape, you just put up two tracks and you get on with your work. And if there's something wrong—like there's not enough of something—you've still got it on the tape adjacently, to put up if you need to. If there's too much of it, you can put it up out of phase and it cancels. The value of that is you've then eliminated a whole number of options so you can focus your attention somewhere else. There are two interesting areas to focus on: what do I do on top of this or with this? Then, when you've got a whole track there, you start doing treatments of the whole track. That is something that very rarely gets done, because normally people just don't know what the track is until the day of mixing. It's frightening that people throw on overdubs and bits and pieces, and then on the day of mixing they think "now, what are we actually trying to do here?" Well, that's already too late. You don't have time to

I can to establish the cultural territory. Where are we culturally? What are we trying to be? What books? What films? OK, if this is where we are, then we are not going to do that or that. What are the things that we're not going to do? Let's just get them out of the way and narrow the field a little bit.

**'YOU KNOW,** the reason that records take 10 fucking years to make now is because people don't do that to begin with. They mostly don't have pre written material when they come into the studio, so they've got a double problem. They throw themselves into this sea of possibilities, and they have no coast to look at, no stars to orient by, and they haven't yet learnt how to use the ship. They toss around on the waves for months and months. So more and more, I think, wherever you can limit options, do so. Or wherever it's prudent to—obviously you don't want to create a situation where you stop all creativity. But you want to create a situation where there's a meaningful amount of attention on something, rather than a small amount of attention on everything.

'I think one of the things people expect of me when I work with them is that I will work out where the project is in terms of where it belongs in psycho cultural space, if you like. The second thing is purely technical. Yes, we could have all these possibilities and yes, we could explore them all—but let's not. Let's decide not to—for no reason, it can be a completely arbitrary decision. Let's decide to use just one guitar sound!

Is that the producer's decision?

'No decisions are irrevocably anyone's, in 🖱️

engaged or not there—not just hanging around and thinking "Oh, I suppose I'd better say something, because otherwise people will think I'm useless"

'What I now want from studios is the sitting-around room; the control room, which should be the biggest; and the studio room. Lately I've been working in bigger studios because I've been doing more improvising with people. After working with this desktop stuff, improvisation is so much fun. The chaos of having five people in a room playing is thrilling. There's nothing chaotic about just working at a desk. I mean, for a start you're sitting down. I often work standing up because I think that as soon as you stand up you engage the rest of your body. I have this thing that the body is the large brain. When you're sitting at a Mac and only your eyes and your right hand are being used, that's awful. It's so stultifying.'

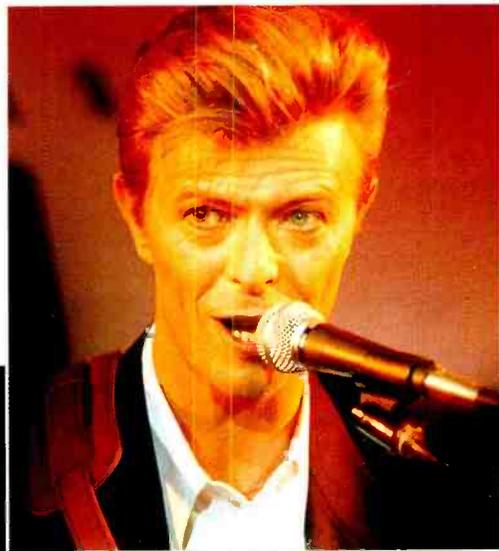
**THE MATERIAL** that Eno works on so fruitfully, despite this sense of confinement, often generates ideas that he might take into a studio when producing another act. His solo experiments are, of course, legion. But his sonic presence can be felt directly on any album he produces. One reason for this, is his habit of taking DATs and DX7 cartridges into a session—but never computer data. He encourages commitment to tape as early as possible, and, surprisingly, shuns the possibilities for endless reinterpretation that computers provide.

'What I'm more and more inclined to do is to limit options,' he says. 'One of the reasons for destroying programs—I never keep sequences—is so that there isn't the choice of going back to them. What you've got is the DAT, you've got that or nothing,

have any relationship with what you're doing like that.'

Ironically, having to commit to tape was a limitation of the recording process that computer technology was supposed to solve. But in spite of a decade of being sold the idea of limitless options meaning limitless creativity, Eno is like many other producers in holding firm to the principle of capturing and printing a performance. For him, though, this step has a much wider significance.

'I sometimes enjoy the freedom of digital methods. But I think one of my jobs as a producer is to focus attention—or, I could say, to limit options. They both mean the same thing. I do that by trying as much as



#### WORKING WITH BOWIE

David Bowie's *Outside* was mostly recorded at Mountain Studios in Switzerland. The producer speaks:

'There is no recreational area, which is a very serious matter, and no windows. It's at lake level, right on the shore. The control room is separate from the studio, and you have to go upstairs to the studio. And it's built onto the side of a casino.

'Our techniques changed from track to track. A lot of it is live improvisation, then sometimes with additions on top, and on some tracks I'm playing everything. There are a number of co-compositions between David and I where I played nearly everything. I think he had one or two things written in advance, but I tried to persuade him not to pay any attention to them! I wanted to start from scratch, and that's pretty much what we did. They were improvisations, although conceptually they were quite structured. That is to say, they weren't structured in terms of "you play this, I'll play that, you play a G and I'll go to D", but more in terms of what kind of attitudes people should take towards what they were doing.'

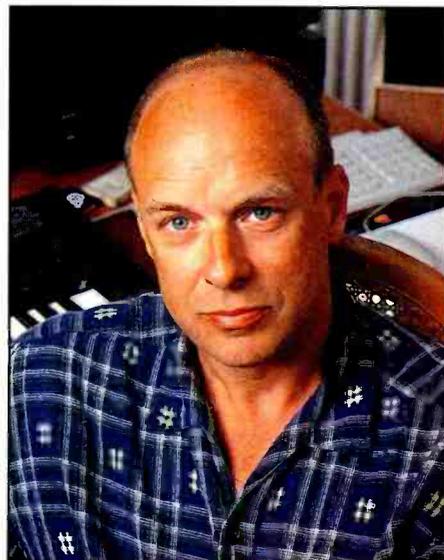
most situations. But I think one of the things that people expect of me when I work with them is that I will do things like that, or suggest things like that. I have no pride about those suggestions; if it turns out a week later that somebody says "you know I'd really love to use a different sound," well, fine, it really doesn't matter. It doesn't matter which areas of the world you decide to regard as fixed. You could invent the whole history of recording every time you went into the studio—but you wouldn't get very far!

The role of the producer, according to Eno, is somewhere between the dictator and the mediator:

'Usually what people are practising is not democracy,' he believes, 'but cowardice and good manners. Nobody wants to step on so-and-so's toes, so nobody wants to say anything. The valuable idea of democracy is that if there

are five people in the room and one of them feels very strongly about something, you can trust that the strength of their feelings indicates that there is something behind it. My feeling about a good democratic relationship is the notion that it's a shifting leadership. It's not: "we all lead together all the time". It's: "we all have sufficient trust in one another to believe that if someone feels strongly then we let them lead for that period of time". And this is what typically happens: somebody will say: "no, I really think we should do it this way", and I'll say: "OK, let's try it, let's see what happens"

'Normally I don't stay with the project for the whole time. I deliberately keep out so I can come back in and hear things with fresh ears. Some things will seem completely obvious to me straight away. Like: "that doesn't work", "that works brilliantly", "this is confused". I can very



'You get all the complexity of one sound, all its cultural resonances, and then you stick it with all the complexity and cultural resonances of another'

quickly, within an hour's listening, set up an agenda which says, "this we must talk about philosophically", "we have to look at that structurally", "we have to look at this in terms of whether it's going anyway like the direction of the rest of the record". I set agendas like that, to the extent that I will say that I want to take control of this song for, say, half a day. For half a day I'll say what to do and we'll see if it works. Sometimes it doesn't. And, of course, any other participant can take the same role.

'It's very good if you can be in a working relationship with people and you can say "OK, I tried it and it doesn't work". And they say "Yep, fine". Fortunately most of the relationships I'm in are like that. You have to have the respect for people that say "look, you're grown up, you can take an option and not pretend that it's interesting when it isn't"

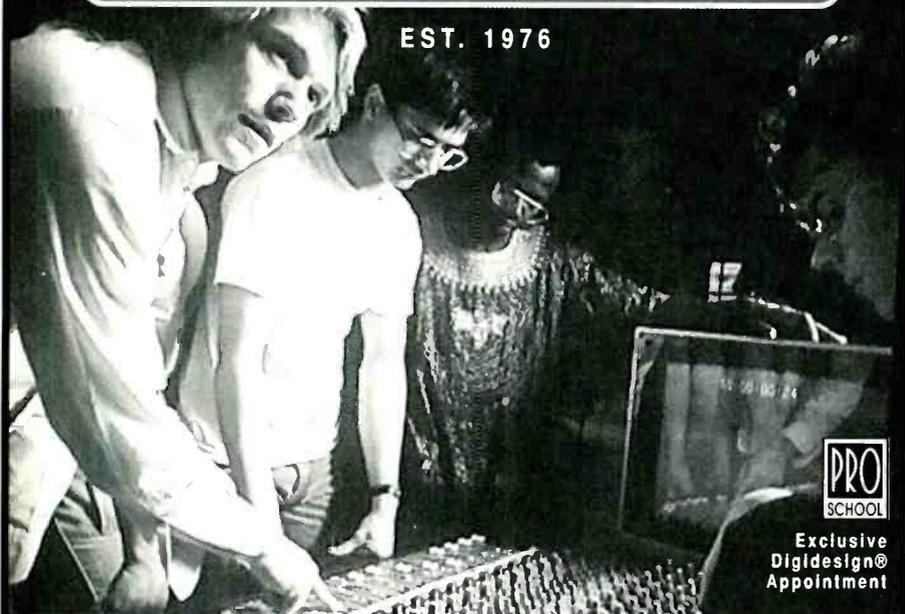
**ECONOMY OF** method means a lot to Eno. Like his compact, portable workstation, his mind is streamlined and multitasking, so there's not much room for pointless wiring. Whether or not his ideas can be applied to every situation, the truth is that, where they have, some of the most groundbreaking sessions in the history of recording have resulted. Whatever the secret, it may be simpler than it sounds.

I admire people like Howie B who turn up with their record collections and they don't bring a single instrument with them. They just patch together other bits of music. This is so intelligent. You get all the complexity of one sound, all its cultural resonances, and then you stick it with all the complexity and cultural resonances of another. I really admire economy more than anything else: elegant ways of making big things happen—which is the opposite of what normally happens in a studio, where you have clumsy ways of making small things happen. S

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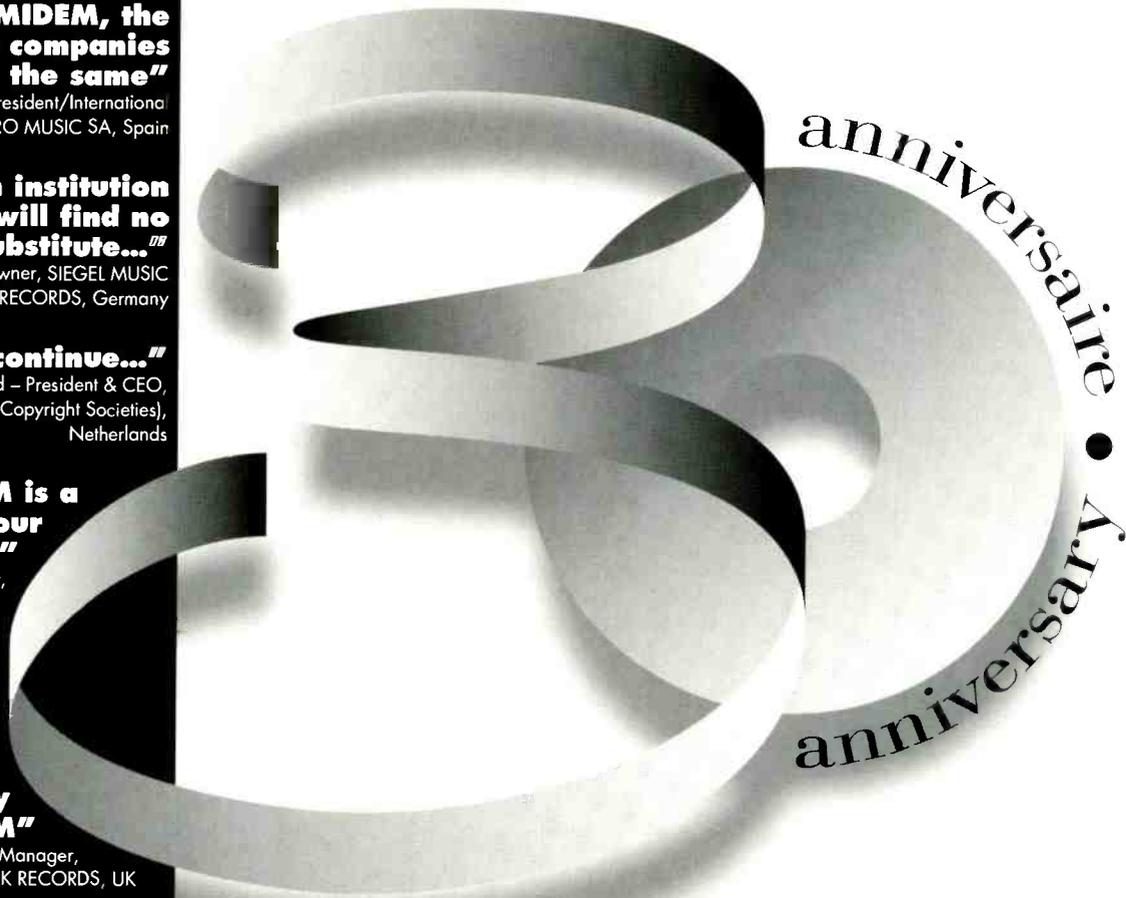
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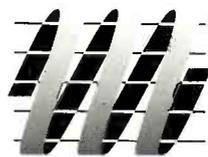
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# Producing

There are no laws for creating production soundtracks.

**KEITH SPENCER-ALLEN** steps on to the set and into the future with blockbuster movie *Judge Dredd*

**JUDGE DREDD** is the law. It is also one of the biggest action movies of this year—the kind of production that everyone assumes is totally constructed in postproduction with the original sound being used purely as a guide. Everyone would be right if it wasn't for the fact that Director Danny Cannon hates to use post-sync techniques.

Mega-City One, the year 2115 AD, the setting for *Judge Dredd*. The Earth has been virtually destroyed by earthquakes, fires and floods with only a few cities remaining. Civilisation is on the verge of collapse and violence is rife. In desperation, the judiciary is merged with the police to create a hybrid of judge, jury and executioner. The top secret Janus Project creates two men using the DNA make-up of the great minds of justice. One becomes Judge Dredd, the perfect lawman; the other, Rico, the absolute criminal. Rico wants control of Mega-City One by any means possible, Dredd intends to stop him.

'I don't normally like doing films like this,' asserts Production Sound Mixer Chris Munro. Instead, he favours dialogue-orientated films but *Judge Dredd's* Director elevated the importance of the production track and offered a challenge Munro accepted.

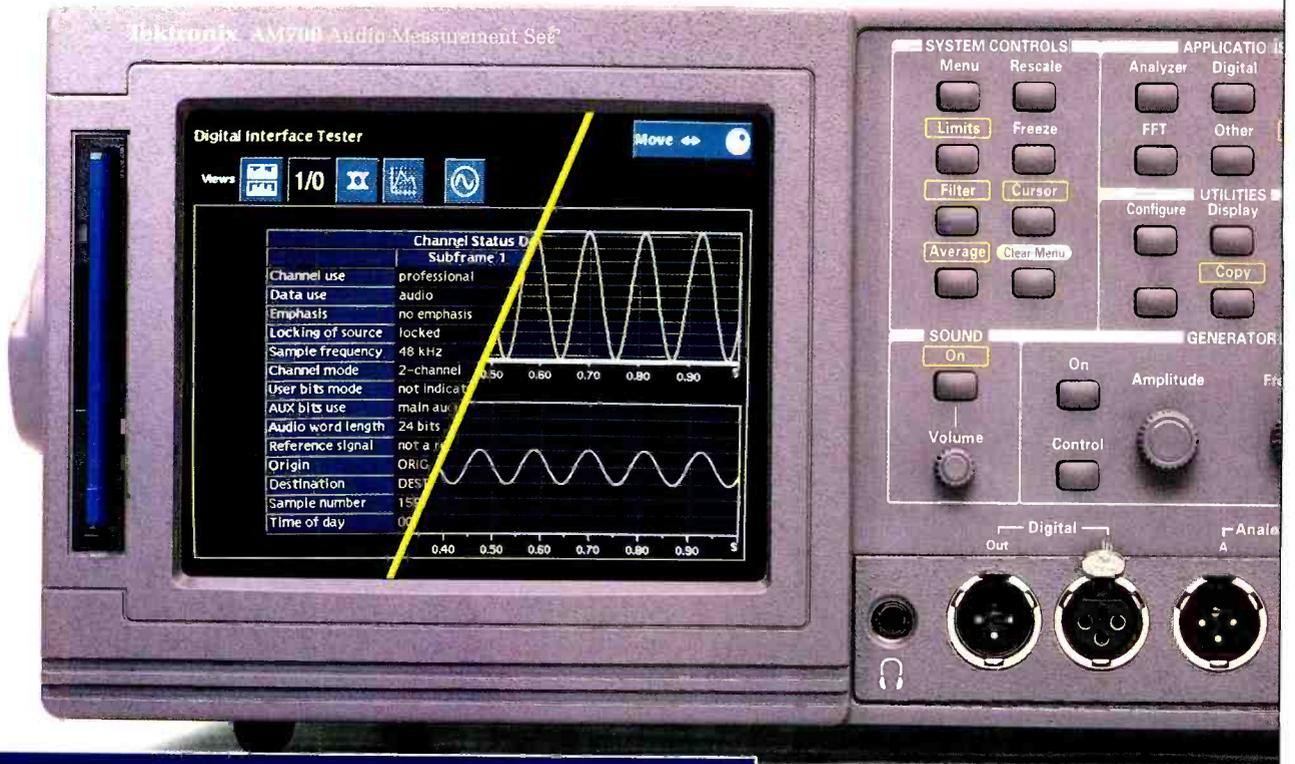
'A lot of the old school used to feel that they could actually improve the actor's performance in post sync,' he comments. 'But five months after shooting the actor hasn't got the same feeling. Even using devices like WordFit to tighten the sync doesn't really alter the fact that it sounds unnatural. All the perspectives sound too much the same, too close and too controlled.'

'A good soundtrack is one that you don't comment on. Even if someone seeing the movie comments that the soundtrack is good, it



# JUDGE DREDD

## 'I am the law'



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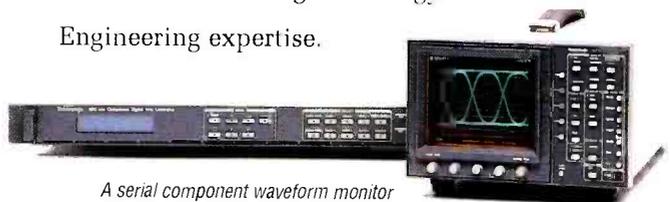
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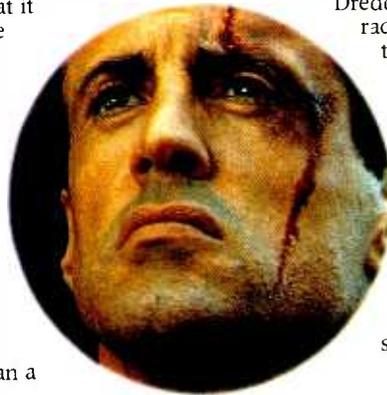
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It probably means that it has detracted from the picture rather than complemented it. If the sound is too good, better, different or just away from natural, you immediately seem to inform the audience that this isn't quite right. The average audience will probably interpret this as a bad acting performance rather than a sound problem. Younger film makers seem to be aware of this and are increasingly going for direct sound!

Unfortunately, this approach does not mean that directors are likely to be any more sympathetic to sound problems on the set. The requirement, therefore, is greater forward planning and attention to detail—talking to the set builders, special effects and the costume designers. For example, Munro arranged with Special Effects Supervisor Joss Williams to knock holes in some of the sets so that noisy compressors could be positioned off the stage. Working with costume designer Emma Porteous, a belt pack was added as a part of



**'Even if someone seeing the movie comments that the soundtrack is good, it probably means that it has detracted from the picture rather than complemented it'**

Dredd's uniform to house a radio mic transmitter so that it could always be in place causing minimal disruption if it was decided to use radio. 'On the set, it is everyone for themselves,' Munro observes, 'but I feel confident about pushing for certain things when I know that I have the director's support'

**SHOOTING TOOK** place over a 19-week period at Shepperton Studios, South West of London with the majority of postproduction work taking place in the US. The sound crew included Boom Operator Colin Wood who has worked closely with Munro for ten years, and assistant Andrew Griffiths who also boom op'd when two were needed.

The main recording machine was a Fostex PD2 portable DAT with a Sony TCD10 for DAT backups. Munro has worked digitally for many years having

## THE CURSED EARTH

A totally different problem hit *Judge Dredd* on one set referred to as 'The Cursed Earth'. The set was just coal dust and, although all the sound equipment was off the set, coal dust got into the Stellavox mixer and had to be literally washed out and the faders replaced. The PD2, however, seals up well and was immune to problems.

Being shot on sound stages there was little need for ambience pickup except for the gun shots which used real guns with big charges. These were recorded in stereo. Dialogues are all shot mono but mics may be kept on separate tracks. Radio mics would go on a separate track to boom mics. The camera positioning was also relevant such as when there are two shooting the same scene—one wide and one close—different perspective miking would be placed on separate tracks.

There has been much comment recently about the value of using DAT for recording production sound with one argument suggesting that the digital medium just means that you record more location noise in better fidelity, while with analogue tape much of this noise is lost in the general tape noise and is therefore perceived to be lower. Not surprisingly, Chris Munro does not agree.

'If you believe that DAT gives problems that analogue doesn't, then simply take your DAT recording and copy it to analogue and see if the noise problem really goes away. Of course it doesn't, unless you drop the record level so low that it really is masked by the tape noise.'

'With DAT you have to use your experience as to how much of the dynamic range to use. If you are foolish about it or want to use the whole available range from whisper to shout on the same track, you'll be in trouble. My memories of analogue include frequently having to ask actors to speak up, which I didn't like doing as it compromised their performance. I am able to accept much more with digital recording.'



## POSTPRODUCTION

As soon as a flying motorbike scene was over the actors were brought to a nearby office where the scene was replayed ... the actors redid their lines to the video guide track as instant ADR

started experimenting with DAT on *The Russia House*. He recorded *Robin Hood: Prince of Thieves* totally on DAT with analogue Nagra backup, and after that he stopped running the Nagra at all.

The PD2 sits on a trolley with a Stellavox mixer powered by a large battery sitting underneath. While on the trolley there are no powering problems. Off the trolley, the PD2 like all portable DAT machines, gets through batteries quite frequently but Munro does not see this as an issue.

'Working with analogue recorders you had to change tape reels every 12 minutes', he explains. 'With a DAT recorder the tape lasts all day, and I have a pocket full of batteries which I replace every hour. Changing batteries is quicker than loading 1/4-inch tape.'

The move to DAT meant looking more closely at mics. He had been using AKG 460s and they were quite quiet anyway so



was the more recent favourite AKG 747. He also returned to his Sennheiser 816s as they are 12V T-powered and are far less prone to on-set interference than phantom powered designs. As a result, he makes it quite clear that any replacement mixer for the ageing Stellavox will have to have T-powering. For radio-mic work a few Audio RMS2000s were used. They fitted the requirements of being small and belt-mountable but were only used when wired mics were not possible to use.

**JUDGE DREDD**, played by Sylvester Stallone, is a larger than life character and to capture that aspect he was always close miked. This will help the dubbing mixer to keep the voice up front in the mix and for it to sound predominant. There are also a number of robots and computers with voices that have important roles in the movie. A computer called Central is heavily featured and there are several scenes where actors have to interact with the computer's 'voice'. To make this situation a little more realistic the voice of the actor who is the computer was treated with a small amount of pitch shifting to add the feel of a machine. Although this went to tape, so did a clean feed of the untreated voice so that this effect did not commit anyone to any processing later in the production process.

Some of the action presented significant sound problems, particularly the flying motorbike sequences. The bikes are shot against a green screen, all under motion control while wind machines blast air over them to create the flying effect. There was little hope of getting direct sound here. The tight costumes prevented close mics but a guide track of some description was needed. A mic was wrapped in the foam sponge that is used for make-up and then placed in a sheltered position. At least a rough guide track was obtained.

**CHRIS MUNRO** set up a basic ADR operation in a nearby office, and hung a storage cupboard with blankets. As soon as a flying motorbike scene had finished shooting, the actors were brought over to this room where a copy of the video assist of the just-shot scene was replayed on a monitor and the actors redid their lines to the video guide track as instant ADR. The guide track and the replacement track were recorded on the Sony TCD10 DAT as wild tracks. This is then transferred digitally to the PD2 with internally-generated time code, removed from the

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ADV 473

Location DAT—Sony's TCD-D10



original. So should these wild tracks be placed in the cutting copy, they would carry their time code with them.

Autoconform would then automatically conform these wildtracks rather than the original tracks. It was considered that these tracks would have an important role, at least for the cutting copy—clean dialogue rather than inaudible. Actor Rob Schneider spends much of the sequence screaming and it is very unlikely that he could ever recreate that months later in ADR sessions.

**THE DIALOGUE TRACK** threw up other problems. Some sections of the film had to be shot at different frame rates. To speed the action Director

Danny Cannon had chosen to shoot some scenes at lower rates such as 22.5fps and even 20fps. Traditionally, film-makers have tried to avoid dialogue when filming at nonstandard rates for obvious reasons but a further complication meant that pitch shifts in dialogue really needed to be tackled during production rather than pitch shifting in postproduction.

'Many of the sets used fluorescent lighting and large numbers of video screens', says Schneider. 'Shooting at 24 frames was creating flicker and so it was increased to 25 frames. Effectively when you transfer out at regular speed that slows the sound by 4%, dropping the pitch. This had an extreme effect on

the voices of certain key actors and we felt that it needed to be addressed for the sake of the production.'

Overnight, after shooting, the DATs were taken to Twickenham Studios where the digital tracks were loaded into a DAR SoundStation. The audio was stretched to fit the slower replay of the

25fps picture at 24fps but with the dialogue pitch kept as spoken.

This track could then be transferred the following morning at 24 frames but with the dialogue now at the original spoken pitch.

Similar techniques were used on the lower frame rate filming. According to Chris Munro very few people were aware of what the sound

crew were doing to correct what would have otherwise been an annoyance that would have been passed onto the US postproduction people as a problem.

With post duties due to be handled in the States, Munro opted to use 30-frame, nondrop time code on the Fostex PD2. There was no other time code used in the production process so he was able to arrange this to suit his operation.

'This allowed me to use Record Run time code where the Fostex jams to the previous time code giving the illusion of continuous shooting,' he says. 'You also don't need the 10 seconds of run-up before the slate which is very disruptive when shooting.'

The audio was stretched to fit the slower replay... but with the dialogue pitch kept as spoken.

This track could then be transferred the following morning... but with the dialogue now at the original spoken pitch

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# The Sega sound

From little boy's games to big boy's toys; computer games bridge the gap between audio and interactive video. **TIM FROST** goes behind the screens at Sega's European production centre

**IT STARTED LIFE** as incidental music with an uncanny ability to irritate parents but it has become the soundtrack to a generation of high-tech kids. Originally played over computer sound-chips with a limited range of sounds, computer-games music has moved into a second phase. Games producers and musicians are taking a more creative and adventurous approach to the music and effects—producers, like 'The Fat Man' George Sanger, have begun to make the most of the sounds modern computer and console games can deliver. And the horizons are broadening further with CD-based games, in which the soundtrack can be a mix of real and

sound studio, Gail Cooper, claimed that the introduction of 32-bit games prompted Sega to set up the facility as an effective way of developing games and building up the background experience needed to move the game-making techniques forward. With little experience in sound, the Sega management brought Cooper and the musicians in and gave them a free hand.

'Sound was something they were not very clear about,' she says. 'There was a feeling that they could get one musician in who could do everything for them, although they soon realised that it was all a great deal more complicated than that.'

They took me on and told me to go away and have a think about what we would need to do the work, so we went to the APRS Show and had a good look at what would work! The original brief was to create an A-V system on which Cooper could import, edit and prepare audio and audio-video clips—either animation or video—for building into the games. The system is centred on a Soundcraft DC2000 desk with a mix of DAT, Beta SP, a number of outboard effects and gates feeding into Digidesign's Pro Tools. This all runs on a large Macintosh system, currently a 950, which also deals with the image processing using Adobe Premier.

The rooms themselves are not terribly exciting, being essentially office spaces with additional soundproofing. This may change in the future as the facility expands, with the possibility of creating a single-floor complex of three studios sometime in the future.

The A-V work for a game is split into several distinct sections. First there is the music which accompanies the main body of the game. The console games rely mainly on free-running, looped music lines that last two to three minutes. The themes change with each game level, and for the 16-bit generation of games, these are read from MIDI files stored within the games cartridge and played out through an onboard synthesis chip.

The first stage of 16-bit games music is handled by creating and editing pure MIDI files. The 32-bit cartridge games offer more flexibility since they include a certain amount of programmable memory that is used to hold audio samples. These samples are generally used for 'real' instrument sounds, although the memory can also be used to store spoken announcements and effects linked to events within the game. As with movies, games are dubbed for foreign languages. Responsibility for all European language speech clips are rests with the London centre.

The current generation of CD-based games extends the range of both audio and video possibilities as the high capacity of the disc medium means that a wider mix of samples, special effects and speech, can be added along with recorded music. As well as the audio segments, a CD game can also deliver FMV (Full Motion Video) Quicktime-based animation and video clips that can be incorporated into the game—hence the inclusion of VHS, Beta SP and Premier systems in the A-V studio.

## ONE MAJOR DIFFERENCE

between preparing audio for games and for other media such as video, is the limited capacity or limited data handling of the games system. On a games cartridge, storage space is the limiting factor; with CD systems, it is the data transfer rate. In both cases, Cooper has to devise the best way of keeping the audio quality as high as possible.

'What determines the audio quality is the memory space in the game,' she confirms. 'The musicians are given an amount of memory to work with, then the programmer sits down with the musician and the artist, and works out how much memory can be given to each. It's all a trade-off.'

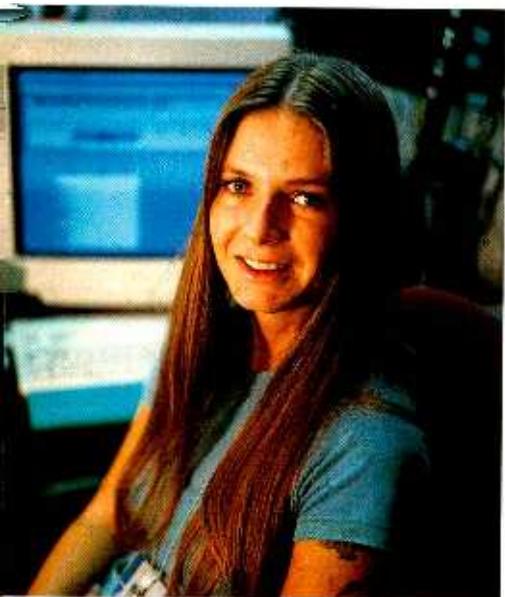
'The graphics always come first, then the FMV sequences. Then they want absolutely brilliant sounds and effects.'

The audio file format is .WAV. The sound is imported into Pro Tools at a 'suitable' sampling rate—this could be anything from 5kHz upwards.

'It is all straightforward until you get to the Cinepaking,' explains Cooper, 'because of the data-access rate on playback, which gives you trade-offs with image resolution against the audio quality. If you don't get it right, the video gets jerky because the system is trying to get the audio through at the same time. We have found that an audio data rate of 8-bit mono sampled at 32kHz is a good general target to aim for.'

Individual images for the FMV sections are created as Tiff or Targa files on Silicon Graphics computers by the designers. Cooper imports these from the local-area network that runs throughout the building. These files go on her own hard disks, (several gigabytes in total) from there she compiles them into a Quicktime movie and then dubs on the sound effects and soundtrack elements.

The Sega Saturn games console is already using Q-Sound for enhanced spatial effects and there is a certain amount of interest in using Dolby Surround, especially for games aimed at the more adult market where the players are likely to be interested in home cinema systems. Since the games have a stereo soundtrack, working in Dolby Surround presents little in the way of distribution problems. The decision to go to Surround could come either from the game's



Gail Cooper in Sega's A-V edit suite

PHOTOS BY CHRIS TAYLOR

synthesised sounds.

Market leader Sega is in no doubt as to the importance of sound in console games. Consequently, it has set up three production facilities that include music sections: one in the US, one in Japan and, most recently, one in London serving Europe.

The European centre is tucked away a little distance from Sega's high-profile main offices and houses games development teams, graphic artists and the three music-sound rooms. These comprise individual MIDI rooms for two in-house musicians—Adam Salkeld and Richard Jacques—and an A-V edit suite run by Gail Cooper, who previously worked for Philips on CD-i games including 7th Guest. While looking over the facility in an attempt to establish exactly what constitutes a games

producers or from Cooper.

'I don't know what the ideas are for the games being worked on at the moment,' she admits. 'The plans for the music happen at the later stages—the producers could come to us and ask for Surround or if it is a game that I think could take advantage of Surround, then I go to them and say "We could do this for the game".' At this point, Cooper intends to have her Soundcraft DC2020 desk expanded out of the game's budget.

So far the DC2000's automation has helped with a variety of new work—for example, the preparation of short promo videos to be used in store or at presentations.

'If I am doing presentations for the games, the artists first create a little movie and I do the dubbing and run it up to Betacam,' Cooper explains. 'We weren't originally set up for that and Premiere really is for making Quicktime movies rather than this sort of video work, so now I am looking at an Avid and other video systems. The original idea was to create the movie from the stills supplied by the graphics people, but that has widened considerably since.'

'We could now look at a video edit suite, which means buying another video machine and an edit controller, but I'm not really keen to go that route. I've now seen a demo on the Avid system, and the next stage is to go down to Avid with a Saturn and loads of movies and tapes and see whether it works for what we are doing.'

**THE MIDI ROOMS** seem to be already equipped for the duration, with a smattering of what Senior Musician Adam Salkeld describes as 'industry standard' equipment—Akai samplers, Pro Tools, Drawmers, Lexicons, a Mackie 32:8:2 desk.

Salkeld either works with MIDI to drive the console's synthesis chip directly, or

**Since the majority of games playing is through the television, he has to ensure that the sound works on a 3-inch speaker as well as a hi-fi system**

digitally records complete tracks for inclusion as .WAV files. He is in no doubt which is preferable

'Our preference is to use the .WAV files. The 32X synth chip has 512k of ROM space that you can fit your MIDI file and samples into, so you can go beyond using a General MIDI set. You can download music and sound-effects samples into ROM and these can be loaded in whenever you have a bit of time. That is normally at the beginning of a [game] level, so you can have different sounds for different stages.'

These samples are music and sound effects, both created and mixed by Salkeld. Since the majority of games playing is

through the television, he has to ensure that the sound works on a 3-inch speaker as well as a hi-fi system.

'Sound effects take a long time to get right because you have to get them to sound right when you've sample them down and then played them back on a TV!'

Since the soundtrack is one of the last elements in producing a game, the pressure is on the sound and music people to deliver quickly. Few, if any, games are developed on schedule and there is frequently little leeway on release dates.

'Games soundtracks are not like film music where it is all synced up,' says Salkeld. 'It is normally two or three minutes of music looped, so getting the mood of the level is important. At least you don't need to wait to see a final version of everything that is going in the game. The important things I need to know are how long is the demo mode and is there anything that has to be synched, or is it all free running?'

The rise of sampled and CD-Audio soundtrack elements means that Salkeld will be adding more in the way of traditional rock instrumentation—like guitar—to the music tracks. Rock music is becoming more prevalent in the games world, because of the sampling and audio capability of CD games. Because of the free-running nature of the music soundtrack, it is possible to localise the music in the same way the spoken words are redubbed for different languages. The other in-house musician, Richard Jacques, works in the second well-equipped, but somewhat smaller, MIDI room.



**Central to syncing games video to quality audio is the Soundcraft 2020 console**

'CD audio gives us a lot more flexibility both in the music and the ability to change the music to suit different countries. One of the games I'm working on wants a European techno-dance feel which won't really migrate to the US and Japan—so there they will use their own music tracks. And it works the other way; if we get a US game with a music track that doesn't really work for Europe, we can localise the music here as well as the speech and the on-screen text.'

**GAMES BUDGETS ARE** already in the millions with development times of a year or more. The changes that enable increased use of samples and CD-Audio means that games are no longer restricted by simplistic technology of the 16-bit format. The future promises surround sound, 'real' audio, more video and audio-for-video. But, as Adams points out, it is enthusiasm for a particular project that will make the difference between a so-so game with a so-so soundtrack and an excellent one. 'The games is becoming more important. The console market and PC games are taking off and budgets are getting bigger and bigger. When I joined I never really thought the general standard of games music was that good, it was too kind of jolly and all sounded the same.'

'That is all changing. You can get inspired by the game; and when you are working with a whole bunch of people on a game, you want to do your best for them. Everyone wants to be part of that one game—that Sonic—something that lifts the whole operation to another level.'

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# The real thing

Peter Gabriel's Real World Recording Week is the international focus of ethnic music. It's also a hit with the producers as **PHIL WARD** explains

**AT THE REAL WORLD** Recording Week, whole albums are made in a matter of hours. During this time, the studio complex is booked out to Real World Records, an independent label next door to the studio in the west of England. Rather than travelling the globe, the event gathers in one place all the talent needed to practically double the label's catalogue of ethnic music and bold collaborations.

It's a neat move, and it provides the Western contingent of producers with something of a busman's holiday. Shacked up in and around the verdant village of Box in Wiltshire, with a distinct festival atmosphere drifting across from Lulu's 24-hour makeshift café, most visiting alumni think they've died and

gone to fader heaven. Take John Leckie for example. He recorded an album here at the last Recording Week in 1992 with Ashkabad from Turkmenistan. It took two days. It was an experience he enjoyed so much there was no keeping him away this time. 'It's the music,' he beams, 'and the attitude of everyone here. Quite a lot of things happen socially. People sit down for lunch together and discuss

instruments from anywhere in the world, and somehow—between the producers, the engineers and the staff here at Real World—a space is found, and a time is booked for a session. But someone has to have an idea—it's not just jamming.'

Unlike most transglobal recording projects, in which somebody selects in advance a favoured and familiar cultural source, the Recording Week allows accidents to happen. For example, Leckie was recording Abdelli, from Algeria. In walks Hungarian singer Martá Sebestyén, who has a song in mind. Consequently, a Hungarian song is backed by an Algerian band with a British producer at the helm. None of them have ever met before.

'This is probably the only place in the world,' Leckie continues, 'where master musicians from Algeria, Egypt, Madagascar—the real cream from whichever country—are readily available for sessions. The sarod is not a sample; the actual musician is willing to play on your track. Sometimes you've only got 15 minutes to do it, but that gives it a wonderful energy. Most albums I make take four or five months.'

With a little postproduction and no arguments over 'theft' of ethnic sources, the albums pile up. Real World sorts out all the publishing, with help from the producers whose duty it is, partly, to log exactly how a track is made.

The technology used is state-of-the-art, but intended to be transparent. Whether digital or analogue, the machines are entered into the service of capturing what is going on in a myriad of spaces.





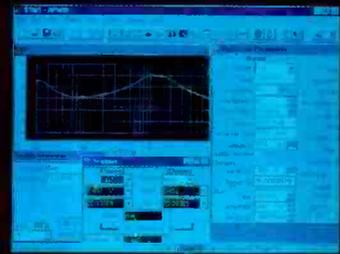
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# RECORDING WEEK

**The inner sanctum:  
Peter Gabriel's Writing room**

much going on minute-by-minute spontaneity is everything. The material tends not to get processed or transferred. If it's happening out on the lawn, that's the ambience. There's no need to make it sound like it was recorded anywhere else.

'With binaural, the balance that you get is where you stand. Instead of faders, the balance between original signal and reverb, say, is how close you're standing to the singer. It's very intuitive. You generally have to EQ the recording a little bit afterwards, though, taking out mid-range and adding bottom and top to compensate for the frequency response of the microphones—as opposed to the frequency response of your ears.'

Studio Manager Owen Leech oversees the mammoth operation necessary to ensure that enough equipment is available throughout the site.

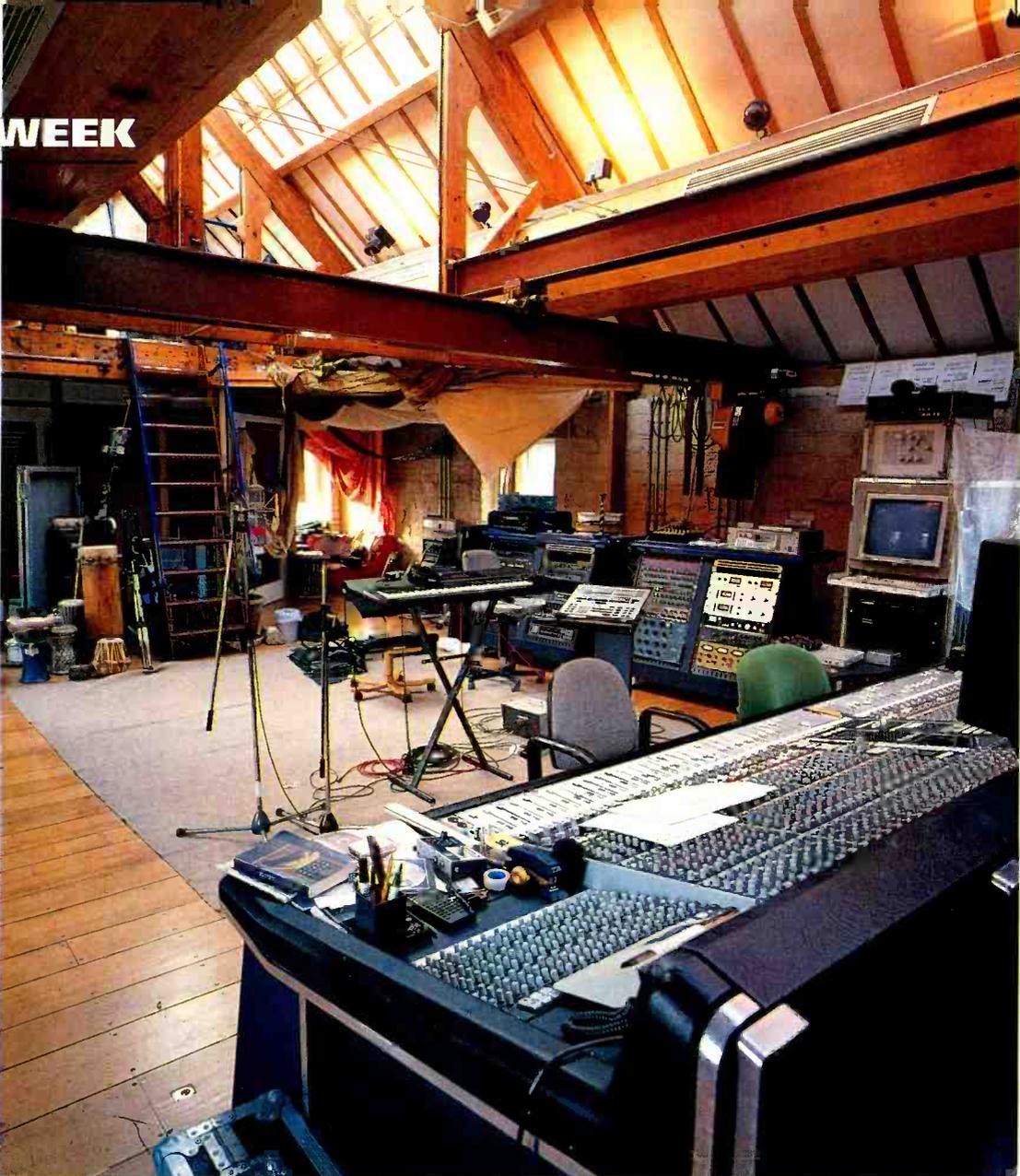
**'WE PREPARE** for months ahead. We normally run three studios; this week it's eight or nine. We've been churning out leads for weeks, and sourcing microphones from all over the place. AKG and B&K have both been very helpful, and the hire companies are very supportive. We need all the help we can get. All these albums are basically very low budget.

'Requirements constantly change throughout the week, but one rule is that each studio has its own box of mics—that's what you get, stick to it.'

'We record a lot of live sessions in the big control room [Real World is unique in having no separation between control room and live area]. And with U Srinivas playing dawn ragas, it's pretty much round the clock.'

Shifts are drawn up for maintenance, tape op'ing and engineering, and Leech insists that the Week engenders as much excitement as fatigue.

'We equip each room with a producer, an engineer and an assistant, plus equipment, and that tends to stay pretty stable throughout the week. We've also whipped the table-tennis gear out of the recreation room and fitted it with Michael Brook's Allen & Heath desk and ADATs.'



**'I think we've ended up with 13 different recording environments this year. It's important to get as full a technical specification as possible for each artist well in advance. We learned a lot from the last event three years ago, which was pretty chaotic to say the least'**

**SUE COULSON**

Leckie, this year, used three ADATs chained together to record Abdelli—then, typically, lost two of them. 'Somebody borrowed them, so now I need two more to finish what I was doing. I think they're available for half an hour tonight. That's what it's like here. If something's impossible, you're told it's impossible. But things get sorted out in the end.'

Probably by Sue Coulson. She and her maintenance crew, Geoff Price and Nigel Bayliss, have a hectic week, even with an expanded posse of work-experienced technical hands for the duration.

'I have this enormous planner stuck on

the wall,' says Coulson, 'which I need to get my head around which equipment is required by which artist, when and where. There's a lot of liaising with Real World Records beforehand to plan distribution, but it always expands a little, shall we say.'

'We try to allow for the unexpected guests, who always turn up. But there is a limit. I think we've ended up with 13 different recording environments this year. It's important to get as full a technical specification as possible for each artist well in advance. We learned a lot from the last event three years ago, which was pretty chaotic to say the least.'

Tape formats are also chosen before anyone arrives, so unless you bring your own machines there are no options. 'It makes life easier,' says Coulson. 'Stuff gets moved from room to room, and you need everything compatible when it comes to mixing. This year we picked 996 tape running at 15ips, but some people have brought their own ADATs. The Writing Room setup is Peter's portable recording studio, which is three ADATs.'

**PETER GABRIEL**, founder of Real World Studios, spends most of the time at the top of the main building in the rarefied atmosphere of his Work Room. Occasionally he descends among those gathered, and clearly draws as much inspiration as he shares, inviting a succession of musicians to contribute

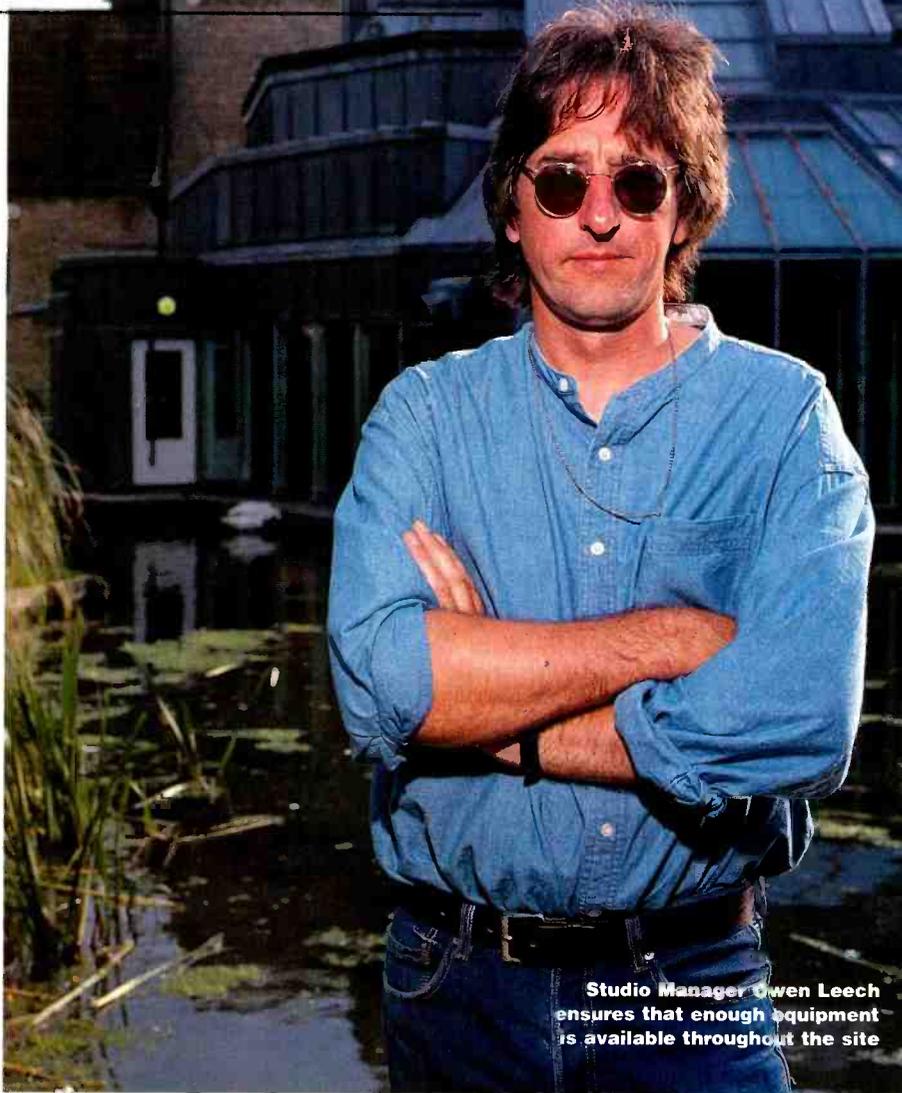




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**Studio Manager Owen Leech ensures that enough equipment is available throughout the site**

**'We prepare for months ahead. We normally run three studios; this week it's eight or nine. We've been churning out leads for weeks, and sourcing microphones from all over the place. AKG and B&K have both been very helpful, and the hire companies are very supportive'**

**OWEN LEECH**

Tie-lines also contribute to the common cause. When Manu Katché set up his drums in the Work Room for a Gabriel session, John Leckie seized the opportunity to have him play on his Electro Strings session. This session, literally, was up the garden path in the Writing Room.

'Rather than move the kit,' says Coulson, 'we patched the two areas through our central network system. Playback of the strings from the ADATs came down a stereo pair to the Work Room, where Manu monitored on headphones and played along. The microphones on his kit were simultaneously fed down another stereo pair back to the Writing Room, where the kit was recorded onto ADAT. We didn't have to move anything.'

**AND AFTER THE event?** All the main rooms have either *Pro Tools* or *SADiE*.

'Most editing is done here,' Coulson reveals. 'People come back to do it, but it can take a long time for some projects to actually get finished. In 1993 we had a Mix Week rather than a Recording Week to clear some of the backlog.'

Whether mixing or recording, Real World's unique experiment culminates in some extraordinary albums, for the making of which all passports are torn up and used as mulch. As Kenyan singer Ayub Ogada says of the cultural meld, 'Nothing is pure.' Except for the joy of recording. 

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 sounds and styles to his own project—a collaboration-in-progress with World Party's Karl Wallinger entitled *Big Blue Ball*. The project was begun in 1991, and as a result Gabriel is sticking to the formats then used.

'It's all on a Mitsubishi 32-track digital and a Studer 24-track analogue,' Coulson explains. 'The 2-inch machine is running 456 tape at 30ips. Because it's an A820 he can have the two separate line-ups on the same tape machine and switch between them, making it compatible with any other room.'

# MACKIE RE-DEFINES THE 8-BUS CONSOLE. MORE FEATURES. MORE HEADROOM. LESS NOISE.

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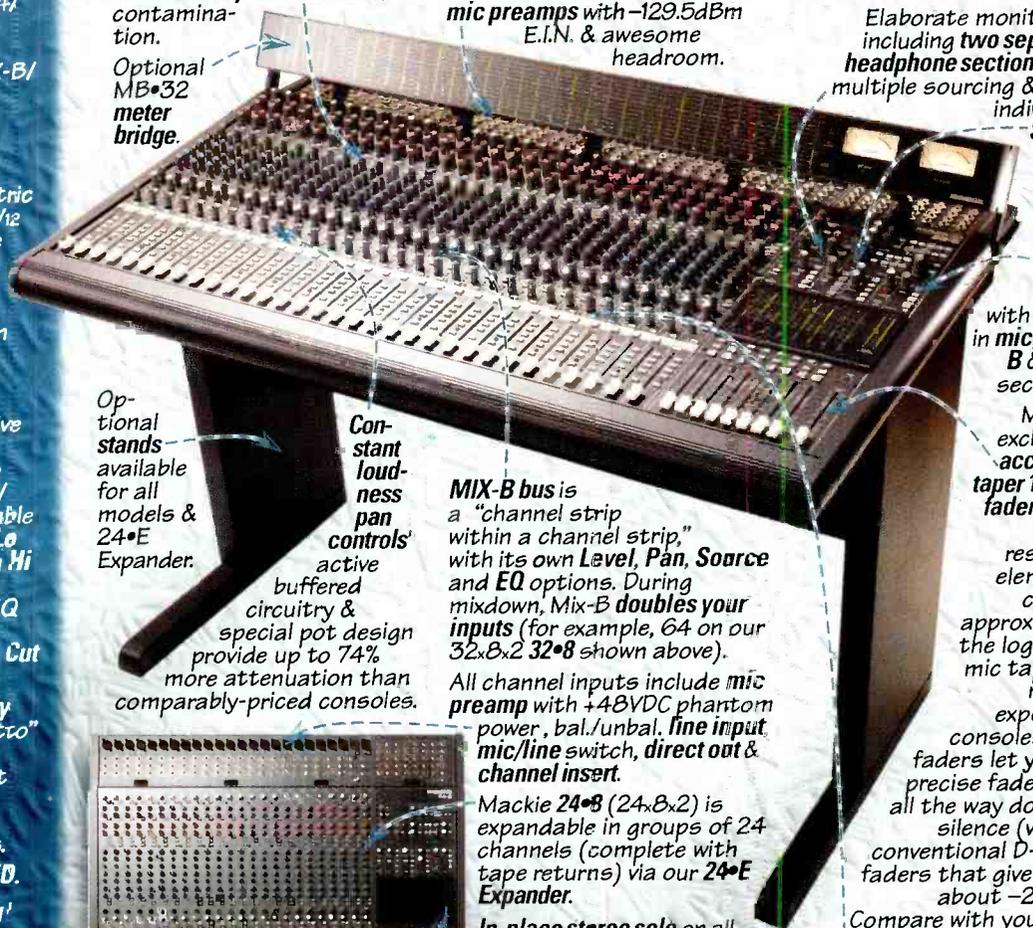
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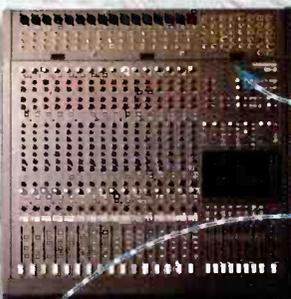
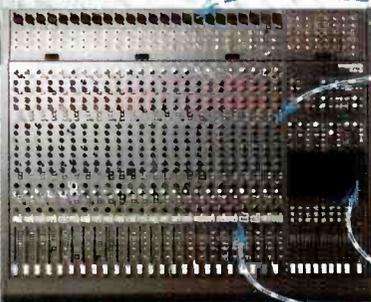
MIX-B bus is a "channel strip within a channel strip," with its own Level, Pan, Source and EQ options. During mixdown, Mix-B doubles your inputs (for example, 64 on our 32•8x2 32•8 shown above).

All channel inputs include mic preamp with +48VDC phantom power, bal./unbal. line input mic/line switch, direct out & channel insert.

Mackie 24•8 (24•8x2) is expandable in groups of 24 channels (complete with tape returns) via our 24•E Expander.

In-place stereo solo on all three console models lets you solo any channel(s) to the main L/R LED meters at the touch of a button. All solo assignments in true stereo perspective even if you have a source panned hard right & an effect panned hard left.

Mackie 16•8 (16•8x2) is perfect for video post and scoring applications. Tape returns are switchable between "pro" +4dBu & "semi-pro" -10dBV operating levels.



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# The cable

**TIM FROST** looks at the technology and the policies behind Music Choice Europe, and asks whether the station threatens conventional radio and music retail channels.



# conspiracy

**THE NUMBER** of radio stations transmitted over the airwaves is set to soar. National broadcasters like the BBC and Radio France have looked to satellite channels to address listeners outside their normal transmission areas—both to evangelise for their countries excellent radio services, and to offer a service to expatriate communities around the world. Concurrently, there is a new generation of satellite-cable 'radio' stations who aim to deliver music matched more closely to specific household preferences. And just around the corner is the advent of DAB (Digital Audio Broadcasting).

Already getting established in America, satellite and cable radio are breaking into European market. The first to appear was DMX which uses analogue satellite channels to transmit throughout Europe. These transmissions can be picked up in the normal way alongside satellite video channels by a domestic satellite dish and then decoded using an additional decoder box. More recently, Music Choice Europe, backed by a consortium that includes Warners and Sony has started transmitting over 50 channels of music from technical headquarters based at NTL, the UK's Independent TV and Radio centre.

MCE indicates one of the directions that music distribution is likely to go—music 'by subscription' will challenge music 'by purchase'. MCE maintains a delicate balance between the technical, marketing and political possibilities to ensure that the service is supported by music copyright owners and is something the listener wants. All this must be achieved while cracking the technical problems of storing and transmitting the huge amount of material needed for 1,300 hours of music transmission a day, and monitoring this emerging technology for indications of future development.

With each channel dedicated to a fairly narrow band of programming, Music Choice Europe is targeting both domestic and commercial users. The general principle is to deliver the sort of music people want, in high-quality stereo, on-tap 24 hours a day—and no DJs. If you want to know the name of a track, a home-decoder box displays track and artist details via an LCD.

Initially, MCE is being distributed on cable in frequency slots between other video and telecoms services. While satellite holds a higher potential audience, cable is currently delivering to substantially more homes throughout Europe—some 40 million across nine countries compared to satellite's 15 million.

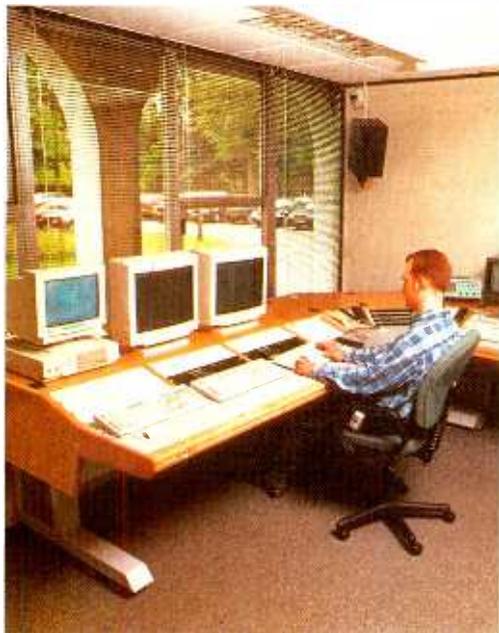
MCE uses 256kbit/s MPEG audio encoding to deliver the channels which are extracted from the cable datastream and decoded in the

**The heart of Music Choice Europe's delivery system—55 channels of music are broadcast from these Pentium PC-controlled hard-disk players**

home by a separate tuner box. The electronics for this job will be integrated into the subscriber's cable box in the next generation of hardware that handles digital, rather than analogue, signals. The number of homes currently linked up to the system is small but the MCE people are confident that cable is a valuable interim medium while they wait for digital satellite services to appear in Europe—at which point MCE will be integrated into the services being beamed into homes. The logic of waiting for digital satellite is strengthened by the news that with the launch of direct-to home digital satellite in the US, the American side of the company picked up nearly half-a-million subscribers almost overnight.

With the whole project absorbing some \$10m (US) of investment capital, the payout system is impressive. Operations Manager Nic Thorley went through the process of finding, storing and playing out music on a massive scale—an exercise which starts with the choice of music for





**MCE's operations centre gives confirmation of all critical system status data**

each of the channels.

'We have a team of 44 music consultants, specialists in their areas, who select the tracks and then feed the data into our office,' he explains. 'The data includes descriptions of the tracks which we enter into the Selector system which uses that information to create the schedules, more or less automatically themeing the programmes for different parts of the day.'

Once chosen, the CDs are taken to MCE's Winchester technical site and the process of transferring to the storage-playout system begins. On the face of it, the process seems rather convoluted but each stage is designed to reduce storage space and make the transmission system as bullet-proof as possible.

A CD track is first transferred to CD-R (as a direct digital PCM copy) so that a single custom disc can replace a large number of CD albums. The sheer number of tracks being transferred made MCE the largest consumer of blank CD-R media in the country.

'It is important that we keep our material in a form that is bit-for-bit the same as the original source,' says Thorley. 'The system has been built to use hybrid compression but we haven't used those systems so far. We are looking to employ a compression system, similar to that used for compressing computer files, in the near future. This is not Musicam or anything like that, because it is completely lossless.'

CD tracks are generally copied at two or four times real time. The copying process

is monitored for errors and then a bit-by-bit comparison of the original and the copy is made, as a final check. If the original was a 'good' CD then copy is normally perfect, but some CDs will not run correctly at high speed, and these are copied in real time, which normally resolves the problem.

During the transfer to hard disk, the music programming is data-compressed and the text data is added alongside. In its most basic form, this data carries the track name and artist details, but can also include promotional messages detailing latest releases or tours, which can all be read on the LCD screen on the user's decoder system. On playout, the files are data decompressed and then audio-data compressed, currently using Dolby AC-1, for uplinking the signal to the satellite.

All the channel bitstreams are modulated together into a single carrier and then beamed up from NTL's satellite dish farm.

The CD-Rs are then loaded into the first part of the playout system, one of 22 Pioneer CD juke boxes, each with a 500-disc capacity. These boxes are fitted with four quad-speed CD transports so each juke box is capable of picking and playing out tracks at a rate of nearly 16 times real-time. In three of the juke boxes one of the players has been replaced by a CD-Recorder, so more CD-Rs can be automatically recorded from material already in the system.

**THE NEXT STAGE** in the playout route involves Pentium PCs fitted with 2Gb hard-disks that are assigned to each of the 55 music channels. The Selector music computer chooses the tracks literally hours before they are needed and instructions are sent to the juke box to find and play the track into the hard-disk for that particular channel. In this way, the channel's forthcoming six hours of music are stored and played out sequentially.

This two-stage approach protects the system from downtime. The juke box can make several attempts to play a CD if it is proving difficult, without upsetting the playout schedule. If the CD is completely unplayable, the engineers can be alerted in time to solve the problem. The same applies to a malfunctioning juke box—in the unlikely event of one failing, there is time to transfer the disc caddies to another machine. Each channel uses a pair of hard disks so that, should one fail, there is a buffer to allow the failed disk to be replaced and reloaded with the lost tracks.

With uninterruptible power supplies (UPSs) and built-in redundancy at every stage, the only way for someone to take MCE off the air is to shoot down the Intelsat 601 satellite which is currently used to transmit the signal to cable



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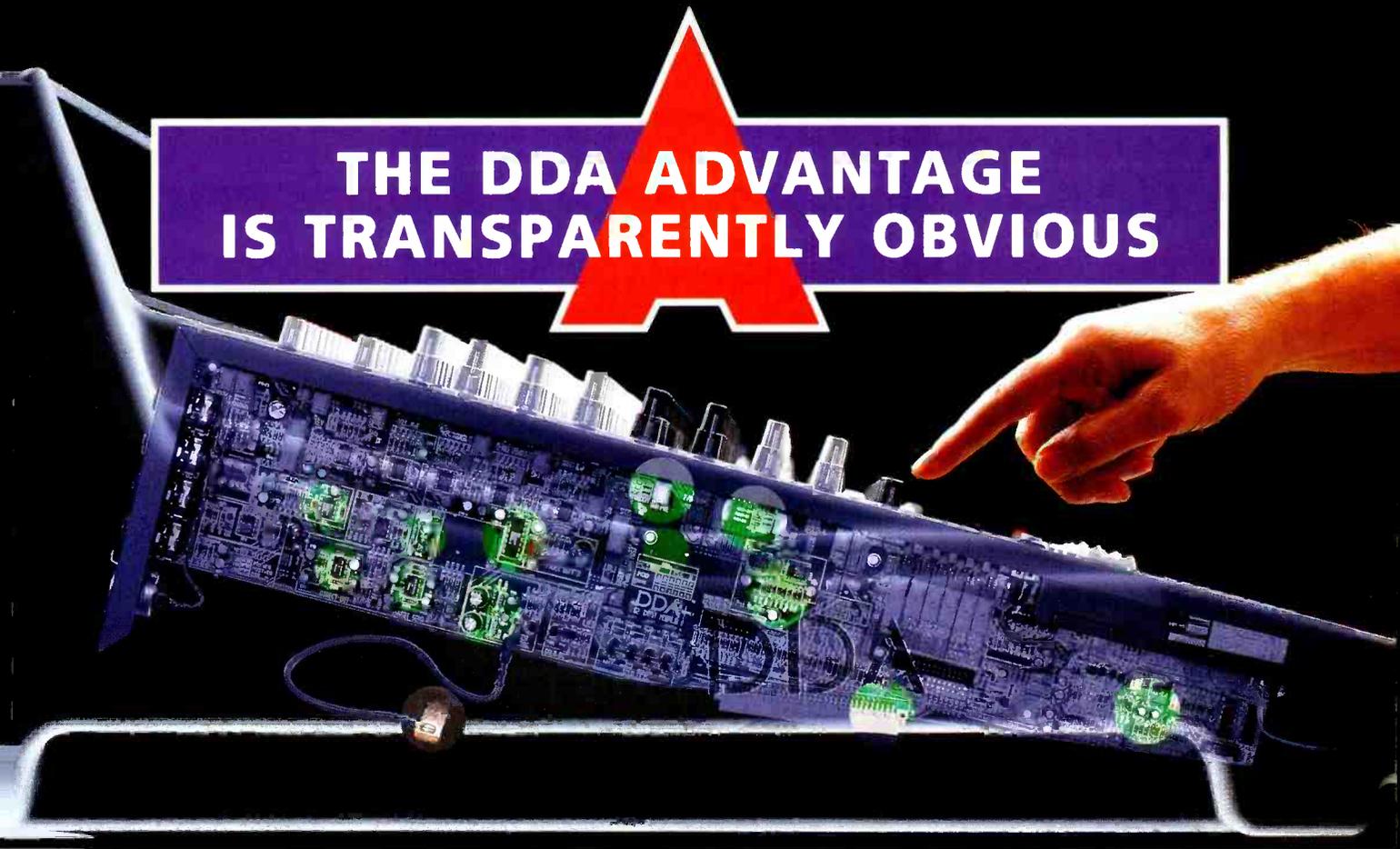
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### MUSIC FOR BUSINESS

With so many channels available, some can be dedicated to closed systems such as background music for shops and other commercial buildings. An agreement made in June with AEI Music Network paves the way to the introduction of four pan-European Music Choice music and two advertising/messaging channels being developed especially for business use which can also include promotional messages. These will be transmitted on Eutelsat II F3.

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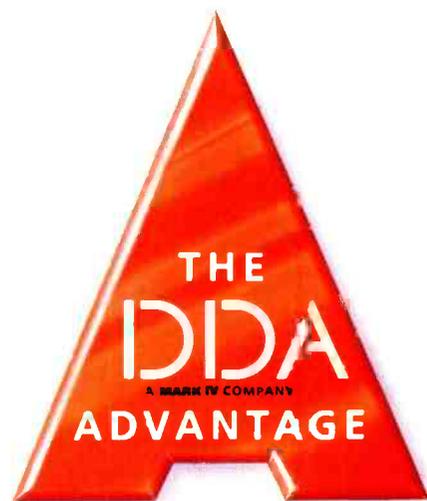
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operators throughout Europe.

At the other end of the transmission chain, the cable operator receives the datastream on relatively standard commercial satellite receiving equipment and this is transcoded back into its separate channels which are then pumped down the cable distribution system direct to the home. The intention is to separate the storage-playout system from the delivery format and the mechanics of the system appear to work well. The signal is currently delivered to the home using cable but there is no reason that it cannot be carried on a digital satellite direct-to-home system such as those proposed by Filmnet, Premier and BSkyB or on the terrestrial DAB services being proposed across Europe.

It is at this point that questions arise on the nature of this form of music broadcasting. Is it in direct competition with radio or is it a foot in the door for direct-to-home music

sales? What about the structure of MCE itself—with backers including Sony and Warner, is it being used as a promotional medium by these companies to push their own music titles? Thorley is used to fielding somewhat charged queries on these issues but contends that neither are supported by the available evidence.

'There are significant differences between what a local or national radio station should provide and what we provide,' he asserts. 'We see this as quite different to radio; people are paying for it and there are no commercials or DJs. We can be catering for niche markets that no radio station is properly covering and we can offer more of a choice than any station can match.'

'Having said that, one of the applications that is close to music-on-demand is digital-audio broadcasting. We could be a content-provider for a DAB service and we are talking to several major organisations

## MUSIC TYPES

MCE's channels are divided up by generic music types. A representative cross-section of the channels gives an indication of the sort of services they supply.

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who are getting involved in DAB. In a DAB service, you might want ten channels of music of a particular type and we could supply the music content for these companies directly from here as part of their complete DAB package to the user.'

Thorley also says the company's 'editorial' stance is quite independent of the connection with Sony and Warner.

'WHEN WE FIRST started, it was an obvious question and we have been at great pains to dissuade people from that suspicion as we take music from 150 different record labels. We are very keen to maintain our independent status and part of that is to negotiate the rights for ourselves and distance ourselves from being an offshoot of Sony-Warner.'

'When our output has been researched, people have found that out of total output, Sony and Warner are slightly less well represented, so actually we are doing our shareholders out of a little of their money.'

Another concern is that MCE is offering a backdoor method of selling music directly to the home. Although technically possible, using the system to buy a track or an album would be a contentious issue. Generally the music sales routes have a long way to go before the industry would like to look seriously at this option.

'I think we are a long way from downloading an album,' Thorley counters. 'The record companies would look a bit askance at that and it would bring us in direct competition with the retail stores, so I think we are a long way from that at this moment. Although if the people who own the music are happy with idea in principle, that, then, it is something we could do sometime in the future. Technically we could do it, but we are specifically not looking at it.'

Right now, MCE operators are anticipating a three or four-year period in which to develop their business to its break-even point. Beyond this, it is going to be their ability to predict the future, rather than their technical skills, that is going to define the difference between success and failure. ☺

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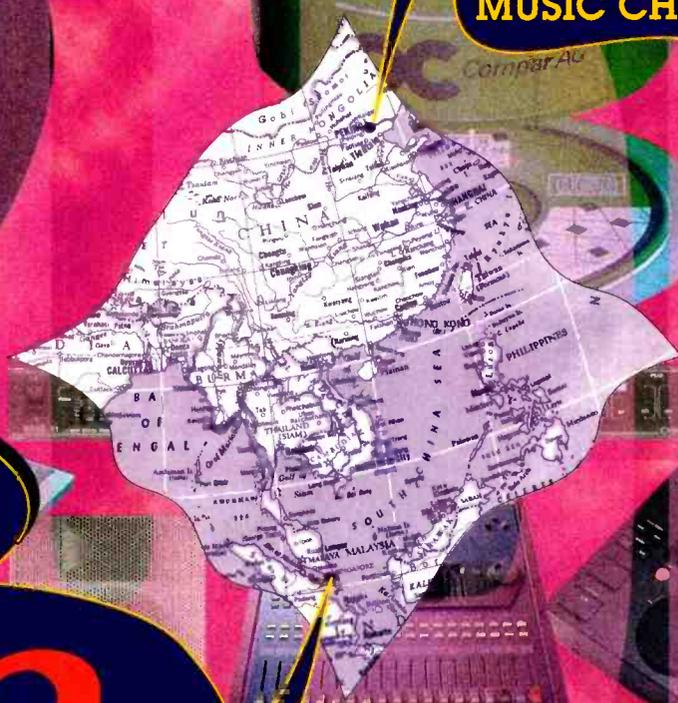
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# The unseen adversary

Holding its ground against television, the radio industry now needs to reconcile internal conflicts writes **KEVIN HILTON**

**A**t the moment we are seeing new challengers to the position of radio in Europe, the US, and beyond, all of which are based around emergent technologies. These are the threats stations still have to fight against, perhaps their most deadly enemy—the radio industry itself.

Most radio markets around the world are starting to show some distinct similarities, with the growth of private radio on mainland Europe, the strength of PBS in the States challenging the long established private stations there, and the proliferation of commercial services in the UK.

It was not until the early 1970s that the UK first experienced domestic, legal independent local radio (ILR). In many ways, ILR embodied the free enterprise spirit, and the network grew in the heady days of the 1980s, with some stations making large profits and growing in size, with the dominant companies starting to acquire the smaller, weaker ones. The effect was to make the phrase 'independent local radio' a misnomer: it was no longer independent because a handful of groups owned several stations; it wasn't local anymore, it was regional; and although the medium remained the same, some of the groups took advantage of cross-media ownership and were also involved in television and publishing.

Prior to ILR, the BBC had introduced its own local network, emphasising the news and views of a particular area. Tight budgets and the constraints of needle-time gave us something that, in certain areas, is still parodied for its high speech content, much of it very parochial in nature.

Despite this, 'BBC local radio' is still a phrase to make the heart sink. My *Studio Sound* colleague Barry Fox has pointed out that, due to lack of money, the network offered easy pickings for anyone who wanted to plug their particular 'product', be it a book, record or TV programme. He concluded that it would be the BBC's 'own stupid fault' if it lost its local frequencies to the commercial sector, which has been

crying out for more capacity in an increasingly crowded spectrum.

The freeing-up of the 105MHz–108MHz band of the FM spectrum has brought the opportunity for real community radio, although the Radio Authority compromised here and is looking to license a number of regional and metropolitan services. This process is starting now, giving very localised areas the chance for its own radio service. Again, there will be casualties, some of them very early on in the process, but with the use of increasingly more affordable equipment, made possible by the dismantling of higher technical standards, small-scale operators finally have the opportunity to do what they have been demanding for many years—broadcast to their specific community.

Those gearing up for this can take some solace from a recent survey carried out by Gallup on behalf of business information company, Key Note, which reports that only 41% of a thousand people questioned said that they preferred to watch TV than listen to the radio. Perhaps, surprisingly, the top choice was speech-based radio, with pop music polling only 30%, and of that figure, golden oldie stations (largely set up so that operations with split frequencies could hang onto their AM bands) had the edge over contemporary music.

Of the stand-off between commercial and public services, over a quarter of those surveyed thought that the BBC had lost its way, with a further 20% feeling that the Beeb catered for too limited an audience. This comes as no surprise, looking at the rough time BBC national and local radio has had of late, especially with Radio 1 FM losing listeners to its commercial rivals.

The survey also reports that 31% of the poll thought that radio DJs were too egoistical, with many listeners forced to retune or switch. Given that newer stations like Virgin and Heart are employing the American style of 'continual music sweeps' (blocks of tracks uninterrupted by speech), perhaps the next logical step is being offered by satellite and cable service like MC Europe and DMX. Both began in the States, and have now started European

services, MC opening a dedicated base in the UK, while DMX has opted to relay programmes from its Denver HQ via Intelsat and Astra.

These services give multiple channels, each specifically programmed for a distinct audience, and relying on digital compression techniques too. In the USA DMX has begun using Dolby AC-3 coding for its direct-to-home service, while MC Europe stores its play-list on CD-ROM. Both services are commercial-free and do not use DJs or presenters.

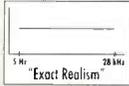
But both MC Europe and DMX do not see their subscription-only services as replacements for radio, merely as a different kind of music provider. Radio itself is now ready to make the next leap: the BBC turned on its DAB service at the end of September, with the White Paper opening the way for the commercial sector to take advantage of multiplexing.

In the US, the AM waveband is also being used for stereo digital services, although a Canadian consortium has cast doubt on the technical merits of both this and the FM technology. In Europe, the EBU has established the EuroDAB Forum, bringing together representatives from Belgium, Denmark, France, Germany, The Netherlands, Poland, Spain, Sweden, Switzerland and the UK, plus the EC, consumer electronics groups, the European Digital Radio project and the Community Radio Association.

Through such new techniques, radio has the opportunity to grow and develop, but to do this successfully, it must decide carefully how to do it. It may be holding its own against television, but increased competition is coming within its own sector. To survive, operators have to offer a unique selection of services, otherwise any potential radio revolution could be seriously devalued by a lack of imagination and foresight.

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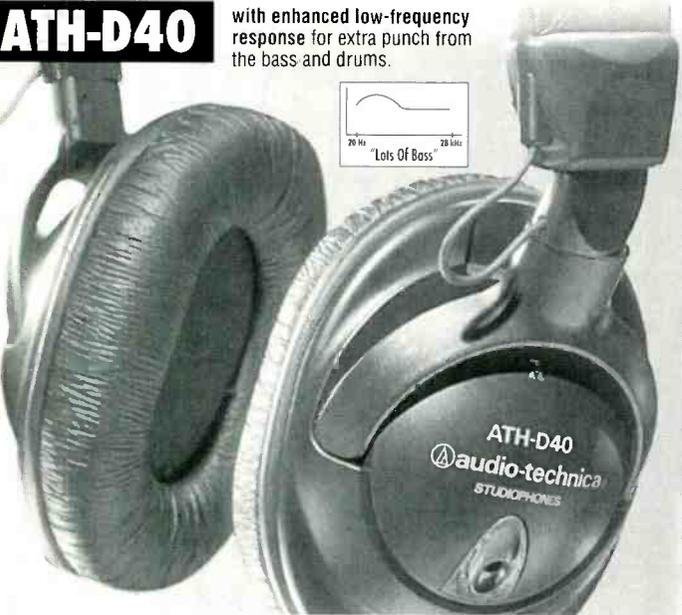
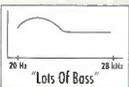
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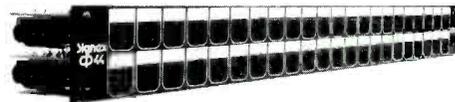
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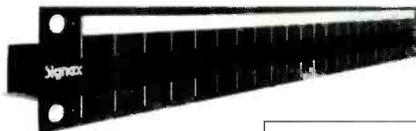
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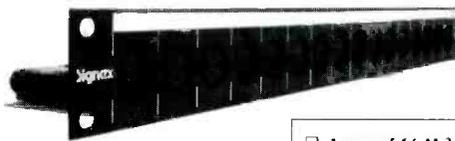
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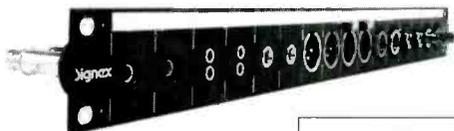
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# Net business

The Internet is now a powerful communication, marketing and research tool for businesses.

**SIMON TRASK** offers some pointers for establishing an effective net presence and reveals what cyberspace has to offer the audio industry

**BEYOND THE HYPE**, hope and hysteria that has characterised mainstream media coverage of the Internet during the past year, one fact is apparent: the net is becoming a powerful medium for business. The new frontier that is cyberspace is spawning its very own virtual goldrush, with businesses large and small staking their claim to riches by opening up their own World Wide Web sites. Commercial traffic on the net now exceeds the more traditional academic and research traffic, and is only set to grow as companies and customers alike increasingly realise the value of net communication, and as secure financial transactions over the net become more common. Some companies are already making money as a direct result of being on the net (see Interstudio sidebar), while for others a net presence is a longer-term investment. With a net population currently estimated at over 30 million and spanning almost every part of the globe (even China is taking its first tentative steps onto the net), the marketplace incentives are clear.

This global reach is one of the most significant aspects of the Internet, and not only for multinational corporations. Now that it is possible to have a global presence via the net for relatively little financial outlay, small companies and even individuals can reach the sort of consumer base that was once only available to the multinationals. The record industry is a good example here: countless independent labels now have their own World Wide Web pages, with the potential to reach as many people via the net as the



majors can. The next step is for labels, and even individual musicians, to sell music in downloadable form directly over the Internet, whether by themselves or via a third party. A significant step in this direction is being taken by London-based company Cerberus. The Cerberus Digital Jukebox is set to go on line in the Autumn, giving any artist the means to reach a worldwide audience. With the CDJ the possibility now exists for an unsigned artist recording in a bedroom to make a track available on the Internet for nothing, and to start earning money off of that track from the moment of the first download. While Cerberus is not about to undermine the existing record industry infrastructure in one fell swoop, its CDJ setup does open up the possibility of a significantly different future.

**ANOTHER INDUSTRY** which could undergo a big shake-up is the radio industry. A huge number of radio stations already have their own Web pages up on the Net, and with good reason. The technology now exists to 'downplay' AM-quality audio in real time over the net to computer users with a PC or Mac and a standard 14.4k modem link; although this is an audio-on-demand rather than a real-time broadcast system, recently-introduced real-time encoding software allows radio stations to make up-to-the-minute information available over the net. In fact, ABC Radio News recently launched RadioNet, a 24-hour Internet news station which uses this technology (known as RealAudio) to make the latest

news available globally via the net. There are many questions to be raised and issues to be debated concerning the commercial viability of such an enterprise, but as with Cerberus its possibilities, at least, cannot be ignored.

Money-making net businesses already exist, earning revenue through either product sales, advertiser funding or subscription funding—or in some cases a mixture of two or three of these models. Some exist only via the Internet, others are real-world businesses which have identified a way to extend their business onto the net. But it is not solely financial transactions which make the net an important business tool for companies.

In essence there are three other ways in which businesses can use the Internet to their advantage: as a means to present information; as a means to gather information; and as a means to correspond with other people. Communication and community are the lifeblood of the Internet. This is, perhaps, the most valuable lesson for any prospective net-connected business to take on board. The evidence so far indicates that a good Internet business presence is one that foregrounds good customer relations; 'give and you shall get' is a good tenet to work by, and establishing a sense of community through customer feedback and involvement should be a priority.

From a practical standpoint, the first step in getting your business on line is to find a suitable Internet access provider. This is the company that will be your gateway onto the net. In the UK, there are now several Internet magazines on the newsstands that include lists of access providers. You need



# Music Industry Guide

to find a company that is either local geographically or else has a Point of Presence that is local (a local phone number). You should also determine what level of access you are going to need to the Internet, and decide whether or not renting a leased line is worthwhile; if you do opt for a leased line, then you need to decide how much bandwidth you are going to need. If your business is already running an internal network then you need to decide whether or not you want to hook it up to the Internet. Putting an internal network on line to the world immediately raises security issues, and so then you need to start considering precautions such as firewalls to protect you from possible outside attack by malicious hackers or on line spies. You can talk over these issues with the access provider.

**THE SIMPLEST** and cheapest way to put yourself on the net is to open a SLIP-PPP dial-up account with an access provider. In the UK this will typically cost you around £12-£25 as a sign-up fee and then a monthly subscription fee of £12-£15; the only other cost you should expect to pay on top of this is your phone bill. When you take out an account you automatically get an e-mail address; now you can send e-mail to anyone else with a net account, and they can send e-mail to you.

Of course this is not much use if no-one knows that you are on line, and so you should start putting your e-mail address on business cards and company letterheads, and including it in promotional packs, press releases and advertisements. But before you do this you might want to consider registering your company name as an Internet domain name. Basically, this allows you to use your company name in your e-mail address and in the 'top level' of the addresses of any Web pages that you put up on the net—so, for instance, you could be chairman@whotsit.co.uk (whotsit.com, if your company is in the States) and your main Web page could be at <http://www.whotsit.co.uk/>. In addition to clarity and accessibility, a domain name buys you portability—you can move to a different access provider and keep the same address. In the UK you can expect to pay around £200 to get your domain name registered. The next stage is to build up a

database of everyone who contacts you via e-mail. Now you can start to build an on-line relationship with customers, potential customers, the press, distributors, retailers and contractors, as appropriate to your business. Always reply to your e-mail and be as helpful as possible; if you create an impression that you can not be bothered, then people will not be bothered with you. Reputations both good and bad spread quickly in the global Internet community via public discussion forums such as newsgroups and mailing lists; if a few people start complaining in a newsgroup about your poor on-line customer service, you can be sure that a few thousand more will read it. Once you have built up a database of contacts, you can think about setting up one or more mailing lists as a means of keeping people informed about you company's activities—for instance, providing information on latest product release, software upgrades, or price changes. However, one point to bear in mind is that unsolicited commercial e-mail can make you unpopular, so check whether or not people would like to receive information from you before adding them to a list.

You can run a distribution list simply and cheaply from any decent e-mail program, by building a list of e-mail addresses attached to a single 'nickname'. However, this has its limits, and there may well come a point at which you need to consider investing in a direct net connection and running proper listserver software, which handles list 'subscribes' and 'unsubscribes' automatically. You can also use such software to set up discussion lists to which all the subscribers can contribute—for instance, so that customers

can talk about your products and help one another out with hints and tips. This can be a useful way of building a community of users around your products, and of getting useful feedback from users.

These days if you are serious about having a presence on the Internet then you need to set up your own pages on the World Wide Web—the hyperlinked multimedia aspect of the Internet which has triggered the incredible explosion in net usage over the past couple of years. In simplest terms, you can think of this as your company's 'display front' on the Internet. Any one of the millions of people running a Web browser on their computer can dial up your URL (Uniform

Resource Locator—your Web address) and visit your Web pages at any time of day or night. You can use your pages to put up whatever information you want, in the form of text, graphics, stills, audio clips and video clips.

The easiest and cheapest way to get your pages on the Web is to create them in-house and rent space on someone else's Web server. Many Internet access-providers offer server space for rent, and some will even allocate you a certain amount of disk space as part of your access account.

Other companies are springing up specifically to offer a Web site for companies who don't want to maintain their own server. And if you don't want to design and build your own pages, there are now plenty of Web design consultancies who will gladly help you out for a fee. Depending on what you

want to achieve, designing a Web site can be a straightforward undertaking or a major task. Either way, it shouldn't be considered lightly. Your Web pages determine how the on-line world will see you—'world' being the operative word here. They also determine whether or not people will visit you again. Create a site

**INTERSTUDIO LTD** is a small North London company providing an international valuing and dealing service in broadcast, video, film, post-production and pro-audio equipment. At the beginning of this year the company decided to put its lists of second-hand equipment up on the Web. The resulting success story illustrates how well a company providing a niche service can fare in the global marketplace of the Internet. According to company Managing Director John Bauch, the effect on business has been 'very beneficial, in that large orders have been placed by people who hadn't heard of us before they found us on the Internet. We get at least four or five enquiries a day via e-mail. We've done many thousands of pounds worth of business as a direct result of being on the Internet, business we could not have got anywhere else.' Yet the set-up and running costs for the company's Web pages are modest. A £25 startup fee and £180 a year subscription buys them a Cityscape IP-Gold dial-up account providing full access to the Internet and half a megabyte of disk space on Cityscape's Web server. In addition the company decided to register its own domain name, becoming [interstudio.co.uk](http://www.interstudio.co.uk), at a further cost of £200. InterStudio's Web pages are modest but functional, and the company does all its page coding and updating itself; and with direct access to its server space, it can upload changes at any time. Interstudio: <http://www.interstudio.co.uk/isl/>.



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## WEB ADDRESSES

### SITES REFERRED TO IN THE ARTICLE:

Audio Engineering Society:  
<http://www.cudenver.edu/aes/>  
 Cerberus: <http://www.cerberus.co.uk/cdf/>  
 Digital Domain:  
<http://anansi.panix.com:80/userdirs/~bobkatz/>  
 Interactive Multimedia Association:  
<http://www.ima.org/>  
 InterStudio: <http://www.interstudio.co.uk/isl/>  
 MusicPro: <http://www.musicpro.com/>  
 Music World III: <http://www.mw3.com/home/main.html>  
 National Association of Broadcasters: <http://nab.org/>  
 Oasys Network: <http://www.oasysnet.com/>  
 Open Media Framework Initiative:  
<http://www.illustra.com/~omf/>  
 Pro Sound News - AES Edition:  
<http://soundwave.com/psn/psn.html>  
 Professional Lighting and Sound Association:  
<http://www.pavilion.co.uk/plasa/>  
 RealAudio: <http://www.realaudio.com/>  
 SoundWave: <http://soundwave.com/>  
 World of Audio:  
[http://www.magicnet.net/rz/world\\_of\\_audio/woa.html](http://www.magicnet.net/rz/world_of_audio/woa.html)

### LISTS OF AUDIO-RELATED WEB SITES:

AES ProAudio Resource Guide:  
<http://www.cudenver.edu/aes/audiopro/aproindex.html>  
 AES WWW Audio Index:  
[http://www.cudenver.edu/aes/audio\\_links.html](http://www.cudenver.edu/aes/audio_links.html)  
 Audio-related Web and ftp sites:  
<http://www.qnx.com/~danh/info.html>  
 Other Audio-related Sites on the Internet:  
<http://www.panix.com/~bobkatz/sites.html>  
 The World Wide Web Virtual Library: Audio:  
<http://www.comlab.ox.ac.uk/archive/audio.html#software>  
 World of Audio (musician, engineer, industry and resource lists):  
[http://www.magicnet.net/rz/world\\_of\\_audio/woa.html](http://www.magicnet.net/rz/world_of_audio/woa.html)  
 .dot music. News and client information.  
<http://www.dotmusic.com>

### AUDIO AND MUSIC

#### INDUSTRY-RELATED DATABASES:

Database of Pro Audio Manufacturers:  
[http://www.magicnet.net/rz/world\\_of\\_audio/gearint.html](http://www.magicnet.net/rz/world_of_audio/gearint.html)  
 Database of Audio Professionals:  
[http://www.magicnet.net/rz/world\\_of\\_audio/engin.html](http://www.magicnet.net/rz/world_of_audio/engin.html)  
 Database of Audio Studios:  
[http://www.magicnet.net/rz/world\\_of\\_audio/studio.html](http://www.magicnet.net/rz/world_of_audio/studio.html)  
 Music Industry Guide:  
<http://soundwave.com/mig/migindex.html>  
 The Music Industry Contacts List:  
<http://www.io.org/~cme/MIC/mic.html>

#### AUDIO TRANSMISSION ON THE INTERNET:

RealAudio: <http://www.realaudio.com/>  
 Xing Technology: <http://www.xingtech.com/>

#### INTERNET SEARCH RESOURCES:

A1 Index of Free WWW URL  
 Submission & Search Sites:  
<http://www.vir.com/~wyatt/index.html>  
 All-in-one search page:  
<http://www.albany.net/~wross/all1srch.html>  
 Infoseek: <http://www.infoseek.com/>  
 CUI meta-index of WWW search engines:  
<http://cuiwww.unige.ch/meta-index.html>  
 Netscape search engine list:  
<http://home.netscape.com/home/internet-search.html>  
 W3 search engines: <http://cuiwww.unige.ch/meta-index.html>  
 Yahoo Directory: <http://www.yahoo.com/>  
 Yahoo - Searching the Web list:  
[http://www.yahoo.com/Reference/Searching\\_the\\_Web/](http://www.yahoo.com/Reference/Searching_the_Web/)

#### INTERNET ACCESS AND PRESENCE PROVIDERS:

The NetAccess worldwide list: <http://www.best.belap>  
 Yahoo - Internet access providers list:  
[http://www.yahoo.com/Business\\_and\\_Economy/Companies/Internet\\_Access\\_Providers/](http://www.yahoo.com/Business_and_Economy/Companies/Internet_Access_Providers/)  
 Yahoo - Internet presence providers list:  
[http://www.yahoo.com/Business\\_and\\_Economy/Companies/Internet\\_Presence\\_Providers/](http://www.yahoo.com/Business_and_Economy/Companies/Internet_Presence_Providers/)

#### PUBLICISING A WEB SITE:

A1 Index of Free WWW URL  
 Submission & Search Sites:  
<http://www.vir.com/~wyatt/index.html>  
 NCSA What's New: <http://www.ora.com/gnn/wn/whats-new-form.html>  
 Submit It!: <http://submit-it.permalink.com/submit-it/>  
 WebAnnounce!: <http://www.wac.org/WebAnnounce/>

which is boring, confusing or plain irritating and you will be doing your company no favours—you may even be harming it. But build a site which is compelling, informative, easy to navigate, generous, and imbued with character and style, and you could be on to a winner. Bear in mind that the Web—in fact, the Internet as a whole—is an interactive, many-to-many medium, not a passive, one-to-many medium like television.

Always encourage feedback from visitors to your site, whether via e-mail or a Web input-form; this way you can find out what people would actually like to see on the site, and what works and what doesn't. Your Web site need not be solely a presentation medium. Web input-forms can be used for a variety of purposes, from user-feedback to competitions to on line ordering, while a new generation of Web chat-programs such as GlobalChat open up new possibilities for on line social interaction (ranging from 'meet the artist' to 'meet the technical support staff!').

If you want to generate sustained interest in your site (and what else would you want to do?), don't let it remain static. Like the Web itself, a good Web site should be dynamic, constantly evolving. If visitors sense that a site is stagnant, they will be less likely to return. You can also boost interest in your site through generosity, by providing 'added value' in the form of useful information—the 'give and you shall get' tenet that I mentioned earlier. A good example of this is the Web site for Digital Domain, a New York-based CD and CD-ROM mastering company run by Bob Katz.

Along with information on Digital Domain's services, Katz, who maintains his own Web pages, has included a number of authoritative, and very informative, self-penned articles on aspects of mastering, together with a list of links to other audio-related Web sites. In doing so he has made Digital Domain a valuable stopping-off point on the Web for musicians and engineers alike; one school of recording has already made it a required Web site for its students to visit.

You should publicise your Web site in the 'off line' world in the same ways as suggested earlier for your e-mail address—only in this case you print your Web URL. However, just as crucially, you should publicise your site on the Internet. There are plenty of accepted places on the Web for announcing your presence.

Do *not* be tempted to post commercial announcements inappropriately, or you'll bring the wrath of the Internet community down on you like you wouldn't believe—just ask Canter and Siegal, the infamous 'spamming' Green Card lawyers who posted a message announcing their service to every newsgroup in the known net universe.



**THE INTERNET'S VALUE** as a research cum intelligence-gathering tool for businesses should not be overlooked. The net gives businesses and individuals alike the ability to trawl for information in a vast global repository which covers just about every subject under the sun—the vast majority of it available free. The very wealth of information can be overwhelming, as can the temptation to 'net surf', but today the powerful search engines available on the net make it much easier to zero-in on the sort of information you need. As more and more companies come on line, so it will become easier for businesses to keep an eye on what the competition is up to. So, too, will the net become an ever more important medium for freelancers to advertise their services. One company already tapping into this new market is Oasys, whose OASYS Network is a Web service which lets freelancers of any discipline post a resume using a downloadable template form; the service is



paid for by the companies who are looking for freelancers. A similar resource targeted specifically at the audio industry can be found at the World of Audio Web site, in the form of the Database of Audio Professionals. Two other useful audio resources at this site are the Database of Pro Audio Manufacturers and the Database of Audio Studios. There is a wealth of audio and music information on the Internet, and the number of audio and audio-related companies and organisations setting up a presence on the Web is growing. For instance, the Audio Engineering Society, the National Association of Broadcasters, the Open Media Framework Initiative, the Professional Lighting and Sound Association, and the International Multimedia Association all have Web sites. There is also a growing number of sites specialising in offering a Web presence to the audio and music industries: SoundWave, MusicPro, Music World III and World of Audio are all currently on line, while the new site ProAudio Web is planning to go on line in October. (You can find Web addresses for all the sites mentioned in this article, in the web addresses table.)

REC.AUDIO  
 NEWSGROUPS  
[rec.audio.car](http://rec.audio.car)  
[rec.audio.high-end](http://rec.audio.high-end)  
[rec.audio.marketplace](http://rec.audio.marketplace)  
[rec.audio.misc](http://rec.audio.misc)  
[rec.audio.opinion](http://rec.audio.opinion)  
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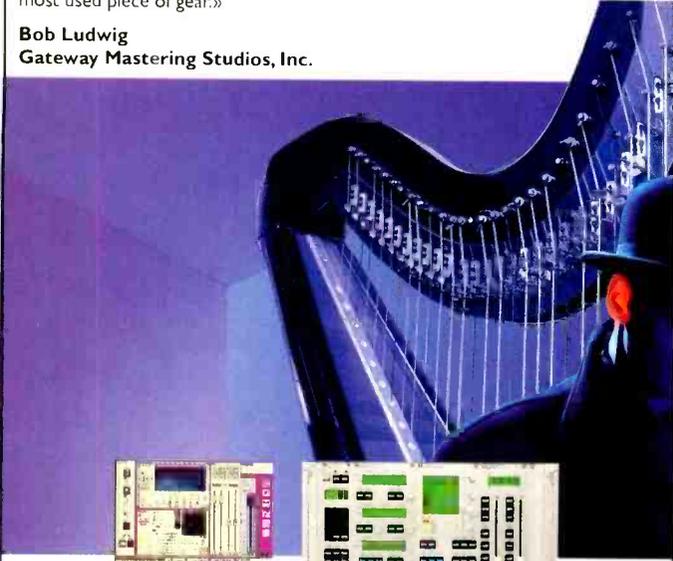
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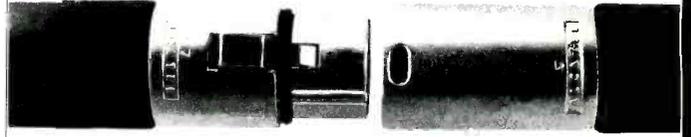
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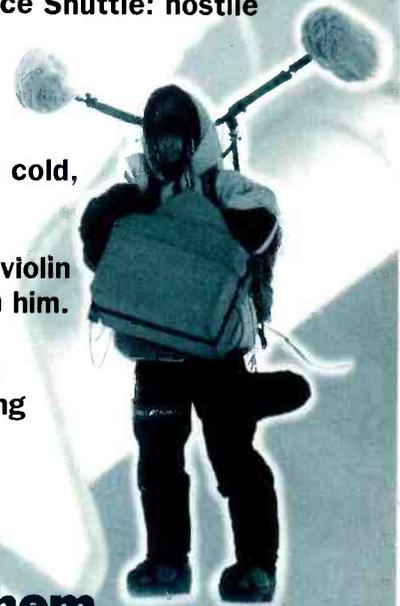
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Switzerland: Tel: (01) 840 0144 Taiwan: Tel: (02) 713 9303 Thailand: Tel: (02) 480 6923 USA & Canada: Ontario Tel: 519 745 1158 United Kingdom: Tel: (01225) 743848 Venezuela: Tel: (582) 358 082

It is all quite simple really, if two or more musicians are to play together they need to hear each other. It's making that happen effectively that can be difficult. **KEITH SPENCER-ALLEN** introduces a new series of studio-technique articles with an explanation of headphone cue systems

# The complete cue

**IT ALL BEGAN** when recorded sound became important. New musical styles or techniques dictated that musicians were frequently arranged in ways that suited the recording rather than the musicians. Normally this meant the use of screens to separate the singer or solo musician from the orchestra and immediately there was a problem of how they were to hear each other. And this is not just a recent problem. The first orchestral session for Walt Disney's *Fantasia* was apparently problematic. Conductor Leopold Stokowski arranged the players in groups separated by plywood screens as part of the concept to create Fantasound—multichannel sound for the movie.

That was in 1938, the year after Beyer introduced the first dynamic headphones. The evolution of recorded music brought with it an increasing need for the separation of musicians. The arrival of multitrack techniques led to musicians not only being separated by distance or screens but also by time and maybe even performing in different studios. Multitrack required a system for letting artists hear what had already been recorded. The need for such a system was to become the 'glue' that held time-differenced performances together. It was now essential.

**SUCH A SIMPLE IDEA**, yet so much grief. There are only two ways of delivering musical cues to musicians—headphones and speakers. Both have their place in different situations depending on the type of music, the instruments involved, and the end result. There are a few cases where either may be used. However this article covers the use of headphones in cue systems.

Headphones are totally unnatural tools. Human beings spent thousands of years evolving an acute hearing sense; our lives depended up on it. We expect sound cues to arrive in defined ways. A combination of physical and neural processing then supplies the data to the brain that in turn makes decisions and issues instructions for physical actions. Headphones placed over the ears prevent this highly developed sense from working in the normal manner. It should therefore come as no surprise that headphones bring out a wide variety of behaviours in users as they try to make sense of their headphone cues. It is quite different to passive listening which

does not make the same demands.

So not everyone hears the same cue even if the signal supplied to the headphone is identical. It is quite commonly accepted among headphone makers that in-ear measurements made while wearing headphones fed with test signals, show a variation in response of up to 10dB between average people across a range of frequencies. Largely, these are due to anatomical differences in the subjects' ears. Further evidence shows that headphones exerting pressure on the ear can cause temporary deformation of the ear canal leading to even greater errors at key frequencies.

Such matters should not cause regular problems but it does mean that in all matters of mix balances you must be guided by the musician as you have no way of knowing what they are hearing in their headphones.

**AS A RULE** most electrical equipment failure occurs when you stop or start using it. Headphones are no exception—they finish a session working fine but can begin the next faulty. Considering the incredible negative and draining effect that cue-system problems can have on a session, a few minutes checking before use is worthwhile. And while regular maintenance helps, most headphone problems seem to escape detection only to surface at less convenient times.

Any headphones that might be used

during a session should be checked. Running fairly loud music through the cue system seems quite effective. One at a time the headphones should be plugged in, the cables waggled and gently pulled at both ends of the cable, while listening for intermittent breaks or crackles or differences in sound due to transducer damage. Headphones which may have lost the sponge covers for the transducer should have them replaced as they have a considerable impact on the sound heard.

The headphones should then be distributed to where needed and plugged in to check the cue feeds. If the studio runs more than one type of headphone, make sure that they are kept on separate cue circuits as differences in reproduction will make it difficult to create a satisfactory mix in both types from the same feed.

Should the worst happen and there be a cue-system fault during the session such that you cannot work around it, check out the system using a constant test tone rather than running the clients tape. Not only is this a more constant source for testing but it also prevents the producer's natural concern becoming aggravated hearing his production intermittently breaking up in the headphones.

**THE MARK OF** a good engineer is not only the quality of his recorded tracks but the maintenance of good cue and monitor mixes. There are several different attitudes about what it is best to do at the very start 

## THE TERMINOLOGY OF HEADPHONES

**CANS**—Slang for headphones (but why?).

**CIRCUMAURAL**—Headphones having a large cushion on each earpiece that fully surrounds the ear and makes contact with the head. This design type is the opposite to Supra-aural.

**CLOSED**—Headphones where the earpiece transducer is enclosed and there is no link from the rear of the transducer to the 'outside world'. This reduces emissions from the headphones and external noise getting in while increasing the perceived LF response. The wearer is more isolated from their surroundings although optimum reduction of external sound also requires a circumaural design.

**HEADSET**—An alternative term for headphones but is now generally taken to refer to headphones used as part of a communications system and frequently have a mic on a mouth boom.

**LEAKAGE**—The audible acoustic emission from a set of headphones detectable outside of the headphones when in use. Obviously, this will be greater with OPEN designs than CLOSED types.

**OPEN**—Derived from the term 'open air'. Headphones where the earpiece transducer is not isolated from the 'outside world' and sound may both leave and enter the headphone from the rear of the transducer. The wearer is therefore aware of sound from the headphone signal and their surroundings. While normally supra-aural in design this is not a necessity.

**SUPRA-AURAL**—Headphones where the earpiece rests on the ear and therefore does not play any role in excluding external sounds. This design type is the opposite to Circumaural.

of a track-laying session with regard to cue levels and these include:

▲ Play a multitrack tape with similar instrumentation and adjust the cue levels for an average mix. This isn't actually very practical for lots of obvious reasons.

▲ Set up what are generally the average levels you know from experience. This is better but is still prone to problems.

▲ Refuse to set a cue mix until all the EQ and levels have been set. Not only does this probably not work but battle lines are being drawn.

▲ Set all cue sends from channels at an even level about half the average value. This means that as soon as the mic channel is opened the cue signal is there and everyone knows that it is working. While the mic levels are being set there is no chance of deafening anyone in the headphones. As the mic inputs are set in level the cue mix can be slowly adjusted. This way also informs the musicians about

how you are progressing on setup.

▲ Also a good way—if you have enough cue circuits, is to put each musician on their own, only feeding them back their own instrument, until all the level set up is roughly complete. This means that changes in level of other instruments do not affect them and they can finish their own tuning and setup.

The adding of reverb to a cue mix should be handled with care. Some have argued that if everything is completely dry it is really asking too much of the performer to create a satisfying performance. Against that you need to balance the fact that reverb can effect pitching and phrasing—both of which cannot be undone on the recorded track. Again it depends on the track and artist.

**SOME STUDIOS HAVE** turned to cue systems that allow musicians some degree of control over what they hear. Studio built

units frequently allow an overall volume adjust and, perhaps, one or two additional signals to be selected from the control room and added to the headphone mix. Normally these would be their own cue return and, perhaps, a major cue item that they are following.

Alternatively, there are at least three commercially available cue-mixer systems allowing 8 or 12 signals to be individually mixed, or the engineer's cue mix modified. The engineer is still required to group the cue signals before routing to the musicians cue mixer. Such systems have both their good and bad points dependent upon the experience of the users. Lack of mixing experience can lead to the musician having trouble balancing and re-inventing the refrain: 'Have you got one with longer faders?' In the right hands it means that the musician can adjust the mix as frequently as they wish. However, such systems remove the ability of the musician to save face when under stress by blaming the cue mix, and is this helpful? Additionally, such systems remove the ability of the engineer or producer to 'play' the cue system to achieve desired results. On balance such systems are helpful when working with studio savvy musicians.

**SO YOU HAVE** got the session underway but some of the musicians seem to be underperforming. Of course this doesn't have to be connected with the use of headphones but it might. Here are some of the problems whose causes could be headphone related.

▲ Timing problems—the musicians are playing consistently but not in fully with the rest of the musicians:

Depending on the situation suggest rebalancing headphones with more of the band and less of the complainant. If this means that they lose the feel for their own instrument consider removing one ear piece to hear their own instrument direct.

▲ Timing problems—playing correctly but varying in tempo:

Check the headphone mix for key rhythm instruments panned in stereo. Many find it easier to follow a beat that is equally in both ears—in mono.

▲ Timing problems—musician losing ability to follow click tracks:

Some musicians find that their hearing becomes gradually desensitised to a specific click sound over a period of time and there is a need for every greater volume to keep awareness of the click. Suggest changing the sound of the click every so often to stop familiarity.

▲ Musician unable to follow related part: Are the parts positioned optimally in the stereo cans so that greater differences can be heard? Are the cans even stereo?

▲ Musicians tiring quickly:

There could be many reasons for this but are the headphones up too loud? High volume fatigues after a few hours and they have to keep increasing the level as their hearing become less sensitive. There is nothing you can do this session but, perhaps, something to remember the next time they come in.

▲ Pitching sharp:

Maybe too little of the musician's sound in own headphones to judge pitch.

## SELECTING HEADPHONES

The ideal headphones for cue-system use do not exist. The demands are quite specific and do not have much in common with uses such as for hi-fi or monitoring. Some headphones are more commonly used for studio cueing because they more closely meet the requirements. Here is a list of the points to consider when looking at a potential design although the order could be argued about.

**POWER HANDLING:** They must be able to play loud without running into distortion. The power handling must still be significant at low frequencies so that there is a chance of hearing a bass or bass-drum cue at a sufficient level. Further, they must be able to take this level for some period of time without giving up.

**FREQUENCY RESPONSE:** The sound characteristics needed are not the same as for monitoring headphones. There is a need for great clarity around the critical cue frequencies, those that give an edge to individual instruments.

**SMOOTH RESPONSE:** The need for a relatively smooth response may sound contradictory to the previous point but it is essential that there are no unpleasant characteristics that may cause listening fatigue. These headphones will be worn over long periods and there must be no increase in the rate at which fatigue sets in due to the headphones

**COMFORT:** They will be worn for many hours and comfort is essential. They need to exert a gentle pressure on the head without squeezing. They must remain on the head when you lean forward and be able to be used single-eared. There must be enough adjustment to accommodate a wide range of heads. Weight is a factor but only if it is too great.

**LEAKAGE:** No headphones are immune to sound getting in or out but some are better than others. When playing with other musicians you normally need to isolate yourself from their sound and this would mean the use of a circumaural closed-type design. To get some idea of the isolation possibilities just wear the headphones with no signal in typical surroundings and judge the degree of exclusion it gives to external noise. Noise emitting from the headphones can be troublesome and this should be accessed in a working situation with a microphone, when they

are being worn. Open headphones can have uses for overdubs. They are frequently more comfortable and allow the artist more awareness of their instrument. But with greater leakage/less isolation their use is application specific.

**SERVICEABILITY AND WASHABILITY:** Whatever headphones you choose, with the beating they take in the studio environment you are going to need to replace parts, transducers, ear pads and cables. Does the manufacture support professional use by designing a headphone that can be easily repaired and also make spares available. Finally, can you remove the ear pads and headband padding to wash them. Reminders of yesterday's hot sweaty session are not welcome.

**CABLE TYPE:** The cable should be of the single, side-entry type but, perhaps more importantly, it should be easily replaceable. You are probably going to have to do that anyway as the short thin cable most units come with are virtually useless in the studio. Many models come with a coiled cable and these give some warning of the headphones being pulled off your head: it is better that they are replaced with straight robust cable.

**ROBUSTNESS:** There has to be a certain amount of robustness about the design. A day in the life of a headphone will involve being kicked and trodden on, thrown across the room and being crushed under an equipment case. None will last for ever but it is best to start with a fighting chance.

**COST:** Certainly a factor but how expensive the headphones will be in use is a different matter. If it falls apart after a few months or the transducers keep failing you are going to find them expensive whatever their cost. Unfortunately you will only be able to find this information from practical use.

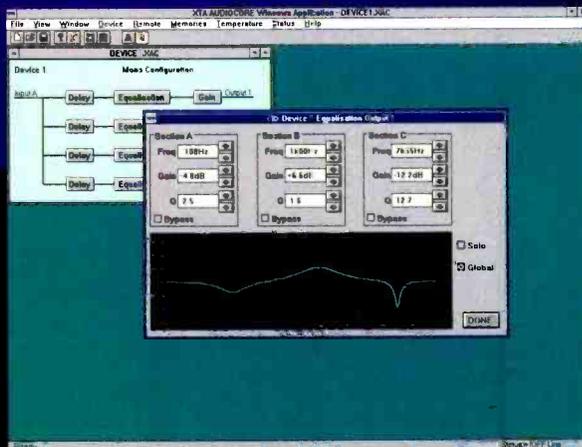
**IMPEDANCE:** The headphones must be available in a high-impedance version of, at least, 150Ω. Because heads and ears differ there is also a case for having a selection of alternatives for those difficult situations. Even if they differ only a small amount in performance, the pampering effect on a big name when the headphone selection rack is wheeled out for their choice prior to a vocal session should not be underestimated.

# Not all delays are equal – not all equalisers are delays

## The DP100

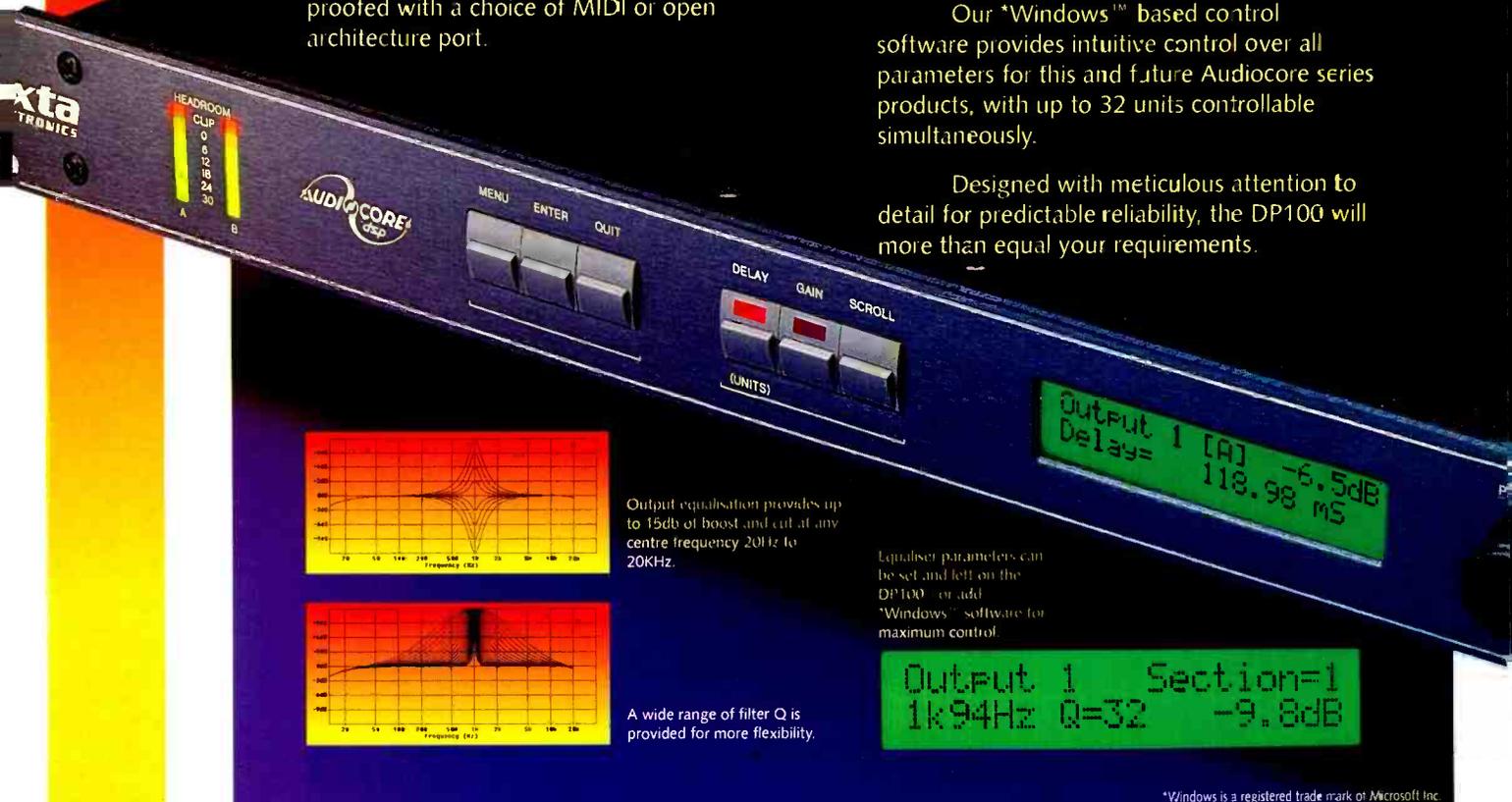
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Our \*Windows™ based control software provides intuitive control over all parameters for this and future AudioCore series products, with up to 32 units controllable simultaneously.

Designed with meticulous attention to detail for predictable reliability, the DP100 will more than equal your requirements.



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# TECHNIQUE



## ▲ Pitching flat:

Maybe too much of self in headphones. Some musicians are very sensitive to this and may not be aware of it. Speak kindly.

## ▲ Erratic pitching or phrasing:

Check that there is not too much reverb on the cue.

## ▲ Uninspired performance:

Try adding a little reverb or rebalancing the mix. If the headphone level is low, you should turn it up.

## ▲ The singer is ready to give up:

Someone's put a 1/4-tone pitch-shift Harmonizer setting on their cue send!

If there are persistent problems, listen to the offending headphones. Headphone transducers age and this may be the problem—a buzzing or low-level distortion is common. Also, experience has shown that a pair of headphones plugged into the console to monitor the cue bus can sound very different to a pair plugged into the cue feed in the studio area.

One thing that always surprises is the range of differences in level between the track and the overdub requested. Some artists require to hear very high levels of themselves and others like to hear something approaching a final mix perspective. It is because of this that you are frequently unlikely to be able to stop the above events happening but be able to recognise them when they do.

**ONE OF THE PROBLEMS** with headphones is their inability to produce a distinct and workable low-frequency cue at sufficient level. The isolation from the world outside is down to, perhaps, only 15dB at low frequencies on most headphones and increasing the volume of the cue does not normally prove too helpful. Equally important is that low frequencies have a certain physical effect when we hear them in the real world. A bass drum or bass guitar has a physical impact that is clearly not present over headphones. Should this prove a difficulty on track laying with the bass player unable to hear themselves, suggest that they stand next to their speaker cab (or even stand on it). If for any reason a similar situation consistently happens on an overdub you may consider building a musicians riser and creating a subwoofer system with an 18-inch LF speaker bolted inside. The vibrations passing through the body from the riser will then help reinforce the headphone cue positively.

A physiological effect that relates to singers might explain why that track to voice balance is so critical and can seem to vary. One of the muscles within the inner ear is known as the Stapedius muscle and it controls the sensitivity of the ear by contracting in the presence of loud sound. Researchers have suggested that it also contracts independently of intensity when the owner's voice makes sounds, possibly to lower the sound of the subjects voice in their own ears. The timing of the muscular contraction has, however, been observed as actually being in advance of the voice sound implying that is part of the vocalisation process. This would seem to make achieving the optimum level for a singer's voice in their headphones a very difficult affair as

not only is their Stapedius muscle reflex being triggered by the cue mix, but every time they are about to sing it may automatically desensitise the ear so altering the perceived volume!

**UNDENIABLY TRICKY** ground. The electrical safety aspects are straightforward and within normal electrical wiring practice. Most headphones are plastic in construction and so quite effective insulators even in the worst scenario. So in general safety terms, good practice should be sufficient.

Oh, but it were all so simple! The problem is that old problem—volume levels. Health & Safety legislation in many countries lays down specifications for acceptable noise levels within the work place and the recording studio falls under this control. The gist of the European legislation was to hold the employer liable for risk to employees. The position of the client in this is not so clear. If the studio puts the client at risk due to excessive volume levels who is to blame even if the client requested it to be that loud? With studio monitoring systems the volume levels are obvious to both the client and the engineer. If we now transfer this experience to headphones, you will see the potential dilemma.

Just because a pair of headphones is only reproducing milliwatts of sound does not make it less of a threat. The close coupling with the ear means that SPL can equate to high monitoring levels. We have all had the experience of wandering through the post-session debris and coming across a set of cans straining under the volume and so loud that it would be impossible to wear—yet one of your clients has been; for several hours. And unlike the control-room monitors, outside of the wearer's head no one had any idea of how loud those headphones actually were.

It may be worthwhile considering the mechanics of setting these levels. Again it falls decisively onto who controls the volume knob. In a normal situation, the engineer sets a headphone mix acceptable to the artist and then adjusts the bus level feeding to the headphone amp. Once this has been set, the engineer will then, generally, be acting under the instruction of the artist with regards to alterations to the mix and total level. In the case of the musician's cue mixer, the control of the headphone level has been passed to the artist, with knobs and faders available in the studio area. The ability to set the headphone signal is now out of the immediate control of the engineer.

In a studio environment, generally, it isn't the engineer who is at risk but the client. The nightmare scenario is of the artist whose hearing has deteriorated so far that they cannot work any longer, acquiring litigious lawyers who decide to go after any possible causes. Those months in the studio could fall within their remit. Even if the studio employee did not set the headphone levels, could merely providing the tools be a problem? But you cannot persistently monitor headphone levels unless you are setting them. It is difficult to suggest

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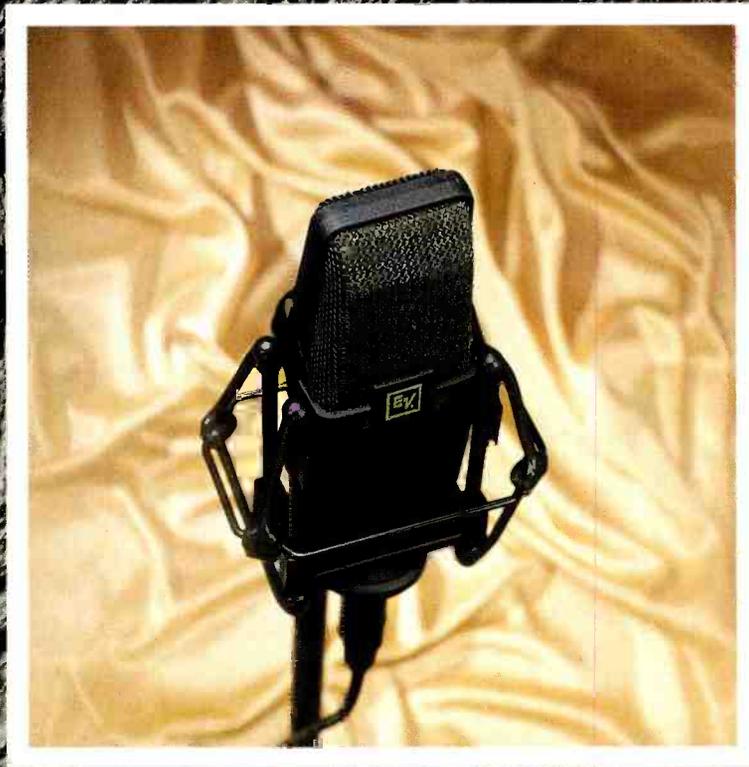
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☞ that a musician is monitoring too loud. If their ears are already shot it is too late, but how do you tell them that?

**MAKING THE ASSUMPTION** that the future of cue system lies in better headphones what may we expect to see? The comment that users make is that they would like to be free from the cable. With current technology, this leaves just three cable alternatives—radio, induction loop and infrared.

Aside from the cost there is an understandable reluctance to introduce RF systems into the studio area and the possible consequences of interference problems. It may be that lessons learnt from stage radio monitor systems find application in exceptional circumstances but available RF spectrum and widely varied legislation will cause hindrance.

Induction loops have been periodically suggested but do not normally progress beyond trial. The concept requires a wire to be laid around the studio area and this is fed with the cue signal via a small power amplifier and an impedance matching transformer. This radiates a magnetic field which is picked up by a small coil feeding an amplifier attached to the headphones. Those I spoke to about such systems said that 'they are worse than radio for interference' and 'just don't work very well in the studio'. The market would also seem to agree—Beyer launched the DT100V for induction-loop use in 1972 and it disappeared shortly afterwards.

Infrared is, however, a possibility. Certain Sennheiser systems have the ability to supply up to 32 simultaneous channels and theoretically all the requirements of studio use could be

met. As yet there are no dedicated pro-studio systems and while some of the domestic headsets could find use in the studio there is nothing to suggest that will solve the cueing problem.

All of these systems would increase studio costs and there would seem little marketing attraction in cue systems. Add to that the complication of batteries to power the headphones in all these cases and as such this would seem to deter their implementation. However, it maybe that a studio wishing to provide a deluxe environment for vocal overdubs could look towards a small cordless system for a single user along with the mood lighting and chilled wine.

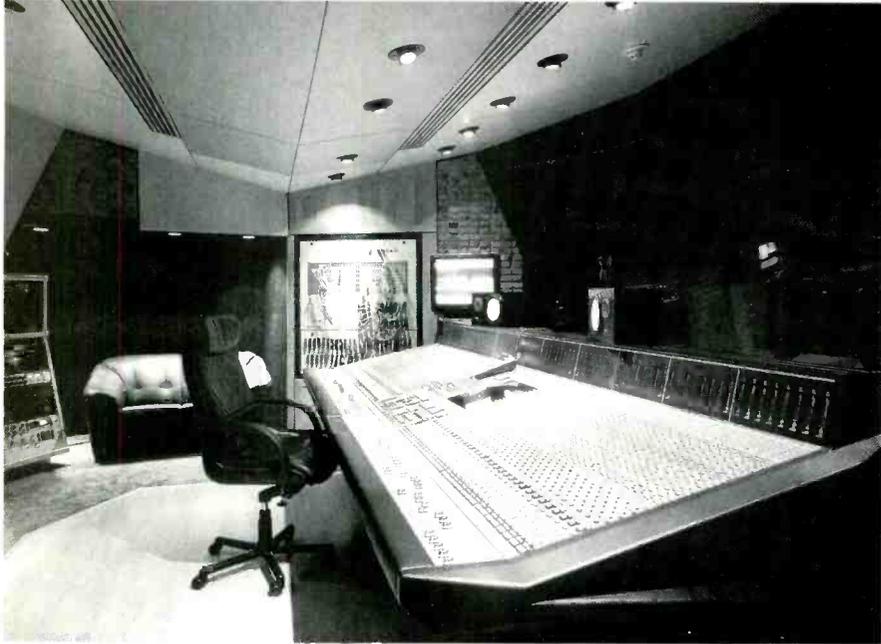
**WITH INCREASING** concern over high headphone levels and musicians' hearing there could be a number of directions to take. In many cases the need for the volume is partly due to the high ambient noise level and if that could be reduced there could be a corresponding reduction in cue volume. Some manufacturers have taken industrial ear defenders and fitted transducers inside but this approach is not very practical for studio use.

Bose and Sennheiser have been supplying specialist headsets to airlines equipped with 'antiphase' noise-cancellation abilities (a mic outside of the earpiece picks up the ambient sound, reverses the polarity and adds it to the signal inside the headset causing leakage cancellation which leads to a reduction in the perceived noise level). Neither manufacturer has promoted their use in music recording saying that they really only effectively work on constant low frequency sound. However, a report on Steely Dan's stage shows in 1993 detailed Drummer Peter Erskine's use of the Bose Aviation Headset placed over a set of in-ear monitoring system. Apparently the level of the in-ear cues could be halved, he could hear more clearly and was less fatigued at the end of a performance. This example would seem to have some merit for further investigation.

Sennheiser recently dropped hints about the greater use of electronics within headphones—'the smart can'. Possible directions for this could include the facility to program your headphones precisely for the response you want—to suit your physiology.

One point that should be mentioned is that headphones are frequently used as a matter of course in all recording. Sometimes they are not needed—the best cue mix is no cue mix.

While it is true that headphones are probably the best method of working with cue systems they are not without their problems. The interface between man and machiner is always a tricky one. If we add to that the seemingly random nature of the human aspect of this interface; throw in the complications of commercial and artistic pressure; the egos and the fatigue; it is a wonder that any consensus on what a reasonable cue-system use can be achieved at all. There is far more to it than just 'a good mix and a little more of me please'. 6



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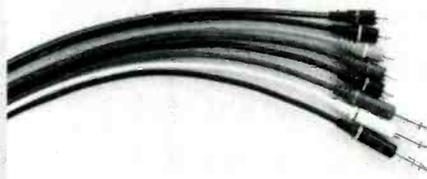
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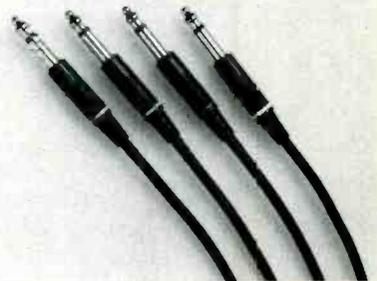
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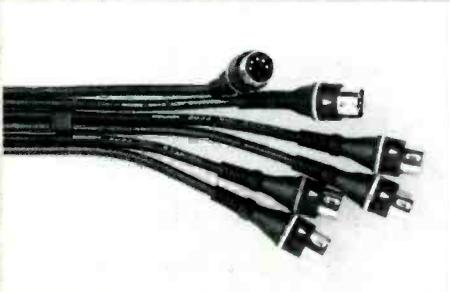
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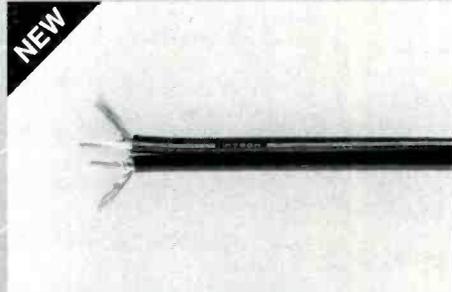
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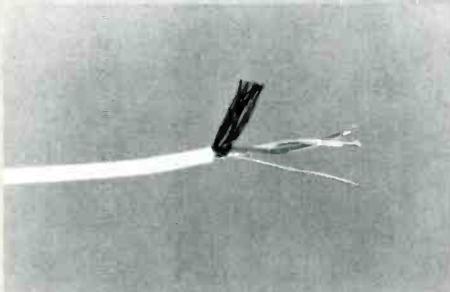
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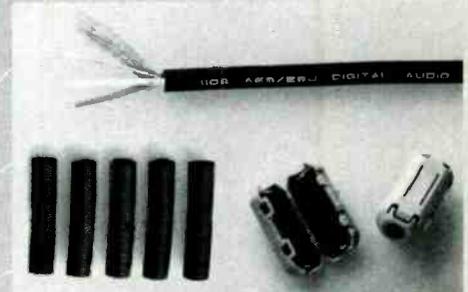
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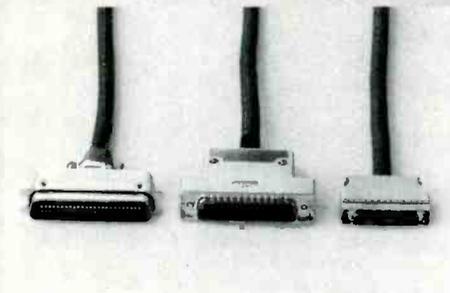
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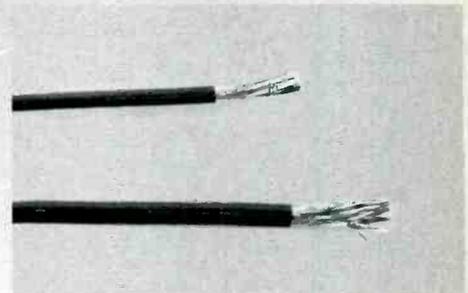
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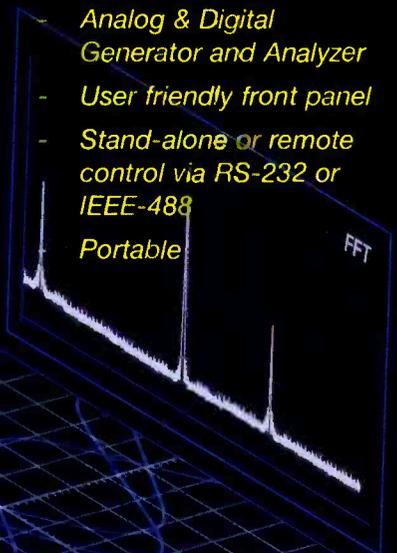
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# Chipping away at DSP

The empathy between pro-audio and DSP chip manufacturers is about to evaporate. It's all a question of scale writes **CHRIS EDWARDS**

**D**SP and pro-audio have become great allies. Unfortunately, DSP chip manufacturers are not quite as enamoured with the pro-audio fraternity as this arrangement suggests.

The discrepancy in affection arises with different applications not of DSP itself but of the term DSP. For while pro-audio DSP (Digital Signal Processing) usually takes the form of purpose-built black boxes, the computer industry likes to think of DSP (Digital Signal Processors) as generic chips produced in the millions. Consequently, the chip manufacturers are far more interested in cellular telephones than in audio reverberation units.

Chip manufacturers also like so-called PC multimedia 'solutions'. Millions of SoundBlaster cards (and clones) are shipped each year and most of these have some sort of DSP capacity built in, often as a sales gimmick. But these are simple 16-bit devices and are unable to handle the relatively high levels of performance demanded by even the most modest of pro-audio applications.

Currently languishing somewhere beneath these 'professional' levels of performance, multimedia systems are beginning to explore an approach termed called 'native' signal processing. This is a system in which all the demanding audio processing (read heavy-duty number crunching) work is handled by a personal computer's main processor rather than it being delegated to a dedicated DSP chip. Curiously, although you can already see this process in use in certain professional hard-disk recording systems—for example, Digidesign's Pro Tools is now using a DSP Farm to protect the host computer's CPU from the demands of DSP chores since these, if heavy enough, threaten to compromise the ability of the system to handle real-time audio. There is a ready parallel to this in computer-based MIDI sequencing, where the experience has shown that it is best to reserve the host's processing power for

managing MIDI and off-load any extra tasks to dedicated add-ons.

This disparity between the game plans of the pro-audio and computer industries arises from the increased processing prowess of the latest generation of computers. Since digital signal processing is simply the application of mathematical processes (algorithms) to a digital-audio signal—which is already a stream of zeros and ones—it is easy to see the attraction of powerful maths processors. What is less readily apparent to the computer business, however, is the reluctance of many pro-audio people to welcome computers into their working environment. Meanwhile, the factor threatening the survival of dedicated DSP chips themselves is that the processors in personal computers have quietly caught them up and surpassed their performance. Computers are now happy to deal with 32-bit quantities as a matter of course and newer processors—such as the PowerPC 604 chip found in the Macintosh 8500—easily outpace most DSP chips.

This sort of picture is almost certain to make the semiconductor companies think twice about staying in the dedicated DSP business. For them, the cellphone is a safer bet not only because of the quantities involved but because the processing needs of a cellular phone are not as great as those found in pro-audio.

The problem left facing the computer is that its audio performance is not good—not in the digital domain, it's the analogue performance that lets it down.

Professionally (and increasingly semiprofessionally) peripherals provide the necessary standards of A-D and D-A conversion for hard-disk recording and sampling. Alternatively, the computer is relieved of direct conversion duties and lives on digital audio alone.

The attraction of using digital technology for recording and processing is its accuracy and reliability. Increasingly, the attraction of analogue is its imperfection. With better processing algorithms, these

imperfections are likely to become another option in a digital process. But why should pro-audio equipment manufacturers and users be persuaded to go digital?

Firstly, as expectations of audio in general rise (largely as a consequence of the performance of digital-audio systems), the concessions demanded by much analogue equipment are going to appear steep. Every stage of D-A/A-D conversion required to incorporate an analogue processor into a digital environment involves a quantum compromise in quality. The pressure on providers of digital systems to imitate analogue processing anomalies is sure to mount—just as it did when the transistor amplifier first challenged its valve predecessor and the synthesiser challenged the Hammond and the Rhodes.

But the ultimate problem for pro-audio manufacturers is that they will be faced by higher performance signal processing appearing in 'standard' personal computers. There are RISC processors on the market that were designed for laser printers but have fast, wide multipliers on board capable of handling DSP—with the result that the acronym RISC may supplant the abbreviation DSP as reconfigurability becomes the key to big sales figures. These machines will be reprogrammed with new algorithms dependent upon the requirements of the purchaser. And instead of selling dedicated software as part of a dedicated audio product, audio processes are likely to be sold as software for whichever box you have.

In the near future, there will be strong incentives for all to accept a digital studio. It may well become a digital world. If it does, can you learn to love it?

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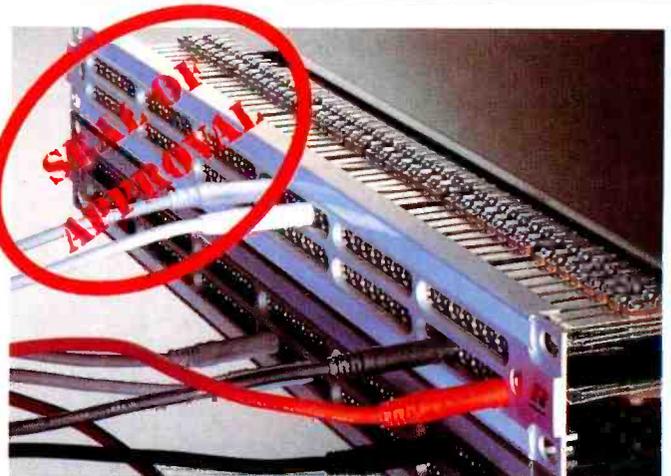
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—Alec Nesbitt

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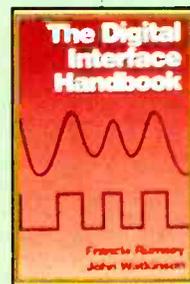
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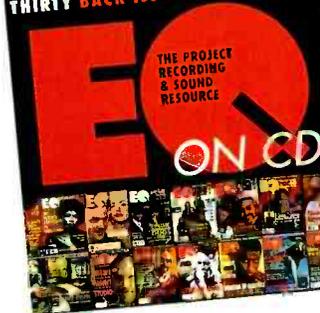
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# Advertisers

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# World events

## October 1995

**SATIS**,  
Porte de Versailles, France  
◆ October 7th-8th,  
**ITU Telecom 95 Forum**,  
Geneva Arena, Switzerland.  
Tel: +41 22 730 5111.  
◆ October 3rd-11th,  
**ITU Telecom 95—the 7th  
World Telecommunication  
Exhibition and Forum,  
PALEXPO**,  
Geneva, Switzerland.  
Tel: +41 22 730 5111.  
◆ October 6th-9th,  
**99th AES Convention**,  
Jacob K Javits Centre,  
New York, US.  
Tel: +1 212 586 5989.  
◆ October 17th-19th,  
**Vision 95**, Olympia, London,  
UK. Tel: +44 181 948 5522.  
◆ October 18th-19th,  
**SoftExpo**,  
RAI International Exhibition and  
Congress Centre, Amsterdam,  
The Netherlands.  
Tel: +1 303 745 5711.  
◆ October 23rd-25th,  
**European Cable  
Communications 95**,  
Olympia, London, UK.  
Tel: +44 171 222 2900.  
◆ October 24th-26th,  
**REPLItech Asia**,  
Singapore International  
Exhibition Centre, Singapore.  
Tel: +1 212 643 0620  
◆ October 25th-28th,  
**Broadcast Cable and  
Satellite India 95**,  
Pragati Maidan, New Delhi,  
India. Tel: +91 11 462 2710.

## November 1995

◆ November 1st-5th,  
Audiovideo-95, Lenexpo  
Exhibition Complex,  
St Petersburg, Russia.  
Tel: +7 812 119 6245.  
◆ Nov 2nd-3rd,  
**7th Annual Magnetic &  
Optical Media Seminar**,  
Mark Hopkins Hotel,  
San Francisco, US.  
Tel: +1 212 643 0620.  
◆ November 2nd-4th,  
**Broadcast India 95**,

World Trade  
Centre, Bombay,  
India.  
Tel: +91 22 215 1396.  
◆ November 7th, **Sound  
Broadcasting Equipment  
Show (SBES)**,  
Metropole Hotel, Birmingham,  
UK. Tel: +44 1491 838575.  
◆ November 7th-9th,  
**Wireless World Expo 95**,  
Moscone Centre,  
San Francisco, US.  
Tel: +1 301 986 7800.  
◆ November 9th,  
**20th Sound Broadcasting  
Equipment Show (SBES)**,  
Metropole Hotel, NEC,  
Birmingham, UK.  
Tel: +44 1491 838575.  
◆ November 14th,  
**UK AES Conference:  
Tape—Is There a Future?**,  
Imperial College, London, UK.  
Tel: +44 1628 663725.  
◆ November 16th-19th,  
**Reproduced Sound 11**,  
Hydro Hotel, Wyndermere, UK.  
◆ November 21st-23rd,  
**Visual Communications 95**,  
London, UK.  
◆ November 23rd-27th,  
**9th International Audio,  
Video, Broadcasting and  
Telecommunications  
Show (IBTS)**, Milan Trade Fair,  
Milano-Lacchiarella, Italy.  
Tel: +39 2 48 15541.  
◆ November 28th-30th,  
**Global 95—Worldwide  
ISDN Solutions**,  
Tel: +44 1733 394304.  
◆ November 28th-30th,  
**Computer Graphics  
Expo 95**,  
Wembley Conference and  
Exhibition Centre, London, UK.  
Tel: +44 181 995 3632.

## December 1995

◆ December 1st-4th,  
**ITS Conference: The  
Changing Role of  
Teleproduction  
Engineering—Overcoming**

## Obsolescence

The Chaminade, Santa Cruz,  
US. Tel: +1 212 877 5560.  
◆ December 5th-9th,  
**Expo Comm  
China South 95**,  
Guangzhou Foreign Trade  
Exhibition Centre, Guangzhou,  
Peoples Republic of China.  
Tel: +86 1 841 5250,  
US. Tel: +1 301 986 7800.  
◆ December 6th-9th,  
**Communications India 95**,  
Pragati Maidan, New Delhi,  
India. Tel: +91 11 462 2710.

## January 1996

◆ January 5th-7th,  
**Showbiz Expo East**,  
New York Hilton & Towers,  
New York, US.  
Tel: +1 513 8400.  
◆ January 30th-February 1st,  
**SortExpo 96**,  
Santa Clara Convention Centre,  
Santa Clara, US.  
Fax: +1 303 745 5712.

## February 1996

◆ February 6th-8th,  
**The ISDN & Broadband  
User Show**,  
Olympia 2, London, UK.  
Tel: +44 1733 394304.  
◆ February 11th-14th,  
**SIEL 96**, Paris, France.  
Tel: +33 1 45 22 35 40.  
◆ February 13th-16th,  
**Expo Comm Mexico 96  
including Wireless  
Technologies Mexico 96**,  
World Trade Centre,  
Mexico City, Mexico.  
Tel: +1 301 986 7800.  
◆ February 15th-18th,  
**World Audio Visual  
Entertainment Fair**,  
Bangkok Convention Centre,  
Bangkok, Thailand.  
Tel: +662 95066014.

## March 1996

◆ March 11th-14th,  
**DSPx 96**,  
San Jose Convention Centre,  
San Jose, US.  
Tel: +1 203 840 5652.  
◆ March 13th-17th,  
**Musikmesse and Pro  
Light & Sound**, Messe,  
Frankfurt, Germany.  
Tel: +49 69 7575 6662.

## April 1996

◆ April 4th-7th,  
**Broadcast Thailand**, Queen  
Sirikit National Convention  
Centre, Bangkok, Thailand.  
Tel: +66 2 503 2199.  
◆ April 21st-23rd,  
**Midcab & Midsat 96**,  
Abu Dhabi Exhibition Centre,  
UAE. Tel: +971 4 310551.  
◆ April 23rd-25th,  
**Entech 1996**,  
Sydney Exhibition Centre,  
Sydney City, Australia.  
Tel: +61 2 876 3530.  
◆ April 23rd-27th,  
**Information Super  
Highway China 96**,  
Beijing Exhibition Centre, China.  
Tel: +86 841 5250.

## May 1996

◆ May 11th-14th,  
**100th AES Convention**,  
Bella Centre, Copenhagen,  
Denmark. Tel: +45 9785 1122.  
May 14th-16th, Midem Asia,  
Hong Kong.  
Tel: +33 1 44 34 454 44.  
◆ May 25th-28th,  
**Pro Audio, Light &  
Music China 96**,  
Beijing Exhibition Centre,  
Beijing, China.  
Tel: +852 2861 3331.  
◆ May 28th-30th,  
**7th Conference and  
Exhibition on Television  
and Audio Technologies**,  
Thermal Hotel Helia, Budapest,  
Hungary. Tel: +36 1 153 0127.

## June 1996

◆ June 4th-7th,  
**Broadcast Asia**,  
World Trade Centre, Singapore.  
Tel: +65 338 4747.  
◆ June 6th-9th,  
**Montreux International  
Radio Symposium and  
Technical Exhibition  
including 1st Interactive  
Media Symposium and  
Exhibition**, Montreux,  
Switzerland.  
Tel: +41 21 963 52 08.  
◆ June 10th-15th,  
**Americas TELECOM 96**,  
Rio de Janeiro, Brazil.  
Tel: +41 22 730 6161.  
◆ June 20th-22nd,  
**World Lighting Fair 96**,  
Pacifico Yokohama Exhibition  
Hall, Yokohama, Japan.  
Tel: +81 3 3706 5687.

## July 1996

◆ July 10th-12th,  
**Pro Audio & Light  
Asia 96**,  
World Trade Centre, Singapore.  
Tel: +65 227 0688.

## September 1996

◆ September 18th-23rd,  
photokina, KölnMesse, Cologne,  
Germany. Tel: +49 221 8210.

## November 1996

◆ November 5th-9th,  
**PT/Expo Comm China**,  
China International Exhibition  
Centre, Beijing, Peoples Republic  
of China. Tel: +52 525 592 3257,  
US Tel: +1 301 986 7800.  
◆ November 7th-10th,  
**101st AES Convention**,  
LA Convention Centre,  
Los Angeles, California, US.  
Tel: +1 213 258 6741.  
◆ November 15th-18th,  
**Tonnelstertagung**,  
Stadhalle, Karlsruhe, Germany.  
Tel: +49 2204 23595.

# Studio sound

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## APPOINTMENTS

### DIGITAL VIDEO & MPEG

Our client is one of London's leading post-production houses. Already a market leader in the audio business they are now turning their attentions to digital video.

#### DIGITAL VIDEO OPERATOR

Reporting to the Operations Director you would play a key role in setting up the new facility using the latest MPEG technology. This is a challenging role for someone with previous operational experience in a commercial video, film or TV production facility.

#### VIDEO ENCODING ENGINEER

You will be responsible for delivering MPEG digital encoding solutions using video bitstreams. Ideally you would have some familiarity with UNIX, Macintosh or PC operating systems.

#### OPERATIONAL ASSISTANT

To support the digital video encoding team. You would be working with a wide range of video and computer systems, networks and digital media. Some knowledge of PC and Macintosh platforms would be useful.

Please reply in the first instance to our retained recruitment partners, for the attention of Mark Hubbard. All replies will naturally be treated in the strictest confidence.

Vantage, Acorn House, Midsummer Boulevard, Central Milton  
 Keynes MK9 3HP. Tel: 01908 691400 Fax: 01908 691155.

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**Film**  
 Television  
 School

#### PROJECTIONIST/ POST PRODUCTION TECHNICIAN

The purpose of this job is to operate, and provide technical instruction in the use of, the NFTS Film and Video projection and dubbing facilities, including portable equipment.

The applicant must be expert in the use of all S16/16/35 mm projection and sound equipment including arc and xenon projectors, magnetic film transports and other audio/video record and playback equipment.

A thorough knowledge of professional sound post production practices within the film and television industry is essential.

Please send CV and covering letter, explaining what motivates you to apply for the job, to Angela Jones, The National Film and Television School, Beaconsfield Studios, Station Road, Beaconsfield Bucks. HP9 1LG.

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### Audio Electronics Test Engineers

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# Satellite Broadcasting

Based in Malaysia, MEASAT Broadcast Network Systems (MEASAT Broadcast) aims to beam its multi-channel digital DTU service into potentially 30 million living rooms in Asia. MEASAT Broadcast will inaugurate its digital DTU subscription service in Malaysia mid-1996. Its Malaysian and regional rollout will be facilitated by the launch of two Malaysian satellites, MEASAT 1 in December '95 and MEASAT 2 in October '96. MEASAT Broadcast will deliver world class satellite tv, radio and information services to the region from its new Asia Broadcast Centre located in Kuala Lumpur. The centre will be the largest and most advanced all-digital broadcast complex in the world. To support the substantial investments in technology, we have created a truly global team of experienced professionals and fresh talent. We are looking for bright, energetic and creative individuals to join the team and to build a corporate culture that is sensitive to our markets.

## HEAD OF POST PRODUCTION

### The job:

- Reports to the Director of Broadcast Operations and is responsible for all video, audio and language dubbing post production facilities and staff at the Broadcast Centre;
- To lead the post production team, arranging staff recruitment and training as necessary;
- On a daily basis, to ensure that the staff and facilities are utilised in a cost effective manner reporting any facilities shortfalls to the Production Resources Manager and advising of any suitable alternatives;
- Will be expected to keep abreast of new techniques and technologies in broadcast post production and to recommend suitable new equipment purchases as appropriate, providing a high quality post production service to the programme and presentation departments at all times.

### Requirements:

- Degree / Diploma in media studies, electronics, communications engineering or similar;
- 5 years experience in hands-on broadcast video or audio post production preferably in a linear and non-linear environment is essential.

## CENTRAL TECHNICAL FACILITIES MANAGER

### The job:

- Reports to the Broadcast Operations Manager and is responsible for the smooth operation of all central technical facilities including programme acquisition and recording, format dubbing, the central media server and programme tape playout;
- To lead the CTF team and take responsibility for recruitment and training of less experience staff to ensure a high quality service at all times to the presentation and programme departments.

### Requirements:

- Degree in Computer Science or Electronics is required plus extensive vocational training on all aspects of broadcast technology as related to signal routing, digital video recording and video compression to the MPEG standards;
- 5 years experience in automated broadcast playout or VTR operations at a senior level is necessary.

## MASTER CONTROL ROOM MANAGER

### The job:

- Reports to the Broadcast Operations Manager and will be responsible for coordinating and monitoring the broadcasting function on a minute by minute basis and ensuring that any failures in transmission are rectified without delay;
- Responsible for monitoring the technical quality of audio and video on all channels and organising any necessary remedial actions;

- As leader of the MCR team, will be responsible for recruitment and training of less experience staff.

### Requirements:

- Degree or Diploma in electronics or communications engineering;
- 5 years experience in MCR room or associated operations with a broadcaster;
- Ability to accurately assess picture and sound quality to the CCIR grading scale is necessary;
- Must be familiar with common faults in digital systems and their effect on programme quality

## STUDIO SOUND SUPERVISOR

### The job:

- Reports to the Head of Studio Services and is responsible for supervising the studio sound team and organising the sound and communications rig for the production. During the production, to operate the studio sound mixing console and associated outboard equipment;
- To assist in recruitment and training of less experienced staff on studio equipment and techniques;
- Expected to keep abreast of new techniques in studio mixing, recording and communications and to advise on new audio equipment purchases as appropriate, ensuring that the programme departments receive a high quality service at all times.

### Requirements:

- Degree/Diploma in electronics or audio/radio engineering plus vocational training on audio mixing and microphone techniques;
- 5 years experience as a sound engineer with at least 3 years of this in broadcast production is necessary. Some supervisory experience is desirable.

## PRODUCTION TRAINING MANAGER

### The job:

- Reports to the Production Resources Manager and is responsible for coordinating and scheduling training of all operational staff in the Broadcast Centre;
- To work closely with each section head to determine training needs and to identify suitable trainers and training facilities both within the company and outside;
- Required to keep accurate records of training performance in respect of each technical discipline to assist with future recruitment;
- Responsible for specifying and constructing permanent training facilities and courses including induction courses for new personnel when the Broadcast Centre is operational;
- Responsible for creating and maintaining a database of freelance staff who can be employed at short notice to cover shortfalls in the workforce and provide a source of local trainers in the future.

### Requirements:

- Degree in electronics or an associated discipline plus a wide range of vocational training on current broadcast technology and techniques;
- 10 years in broadcast operations with 3 years as a trainer or training supervisor is necessary;
- Must have a mature outlook, should be well informed of current broadcast operational techniques, computer literate, have a good classroom manner and pleasant personality.

## SENIOR AUDIO EDITOR

### The job:

- Reports to the Head of Post Production and is responsible for the operation of a range of state of the art audio editing and dubbing equipment;
- Expected to assist with the training of less experienced editing staff and to keep abreast of new audio editing technology, advising on new equipment purchases as appropriate.

### Requirements:

- Minimum SPM with subsequent vocational training in broadcast technology and audio editing techniques;
- Extensive knowledge of audio editing and dubbing equipment plus 3 years operational experience as an audio editor/dubbing mixer in a broadcast TV or film production facility is required;
- Ability to read a score or play a musical instrument would be an advantage.

## LANGUAGE DUBBING SUPERVISOR

### The job:

- Reports to the Head of Post Production and is responsible for supervising the Automated Dialogue Replacement facilities, staff and artists at the Broadcast Centre;
- Will be expected, as an experienced language dubbing mixer, to assist with the training of less experienced dubbing staff and to keep abreast of new language dubbing technologies, advising on new equipment purchases as appropriate;
- To compile and maintain a register of freelance dubbing artists and translators and to supervise their engagement and workload.

### Requirements:

- Degree / Diploma either in technology or language related discipline followed by vocational training in audio editing/dubbing techniques;
- 2 years as a fully accredited language dubbing mixer is required;
- Fluency in Bahasa Malaysia and English is necessary. Fluency in Mandarin and Cantonese would be an advantage.

If you possess the necessary attributes, please respond by letter or fax with a detailed resume stating current and expected salaries, together with a recent passport-sized photograph (n.r.). Interviews will be conducted during November 1995.

Please state the position applied for on the top left-hand corner of the envelope. Only shortlisted candidates will be notified.

**Head, Human Resource (SSOCT)**  
**Measat Broadcast Network System Sdn. Bhd.**

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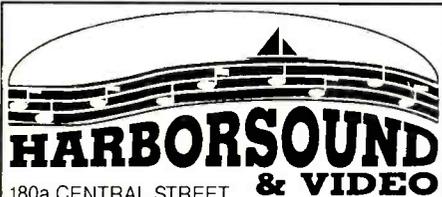
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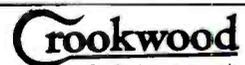
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OPEN MIC

# Love Shaq

Q: What do you put in a seven-foot superstar's studio?

A: Anything he tells you to. But it's not always that easy

**SHAQUILLE O'NEAL** is a star. Not only is he North America's highest earning sportsman in the NBA, but he also has two platinum rap records, he's starred on the silver screen and, what's more there's a future blockbuster waiting to happen. He also wanted to build a project studio in his house—and when a guy the size of Shaq wants something, it tends to happen. The task fell to trusted friend Gary Platt, who specified most of the gear, but when it came down to the logistics of the studio design itself, Platt, in turn, turned to his long-term friend John Storyk.

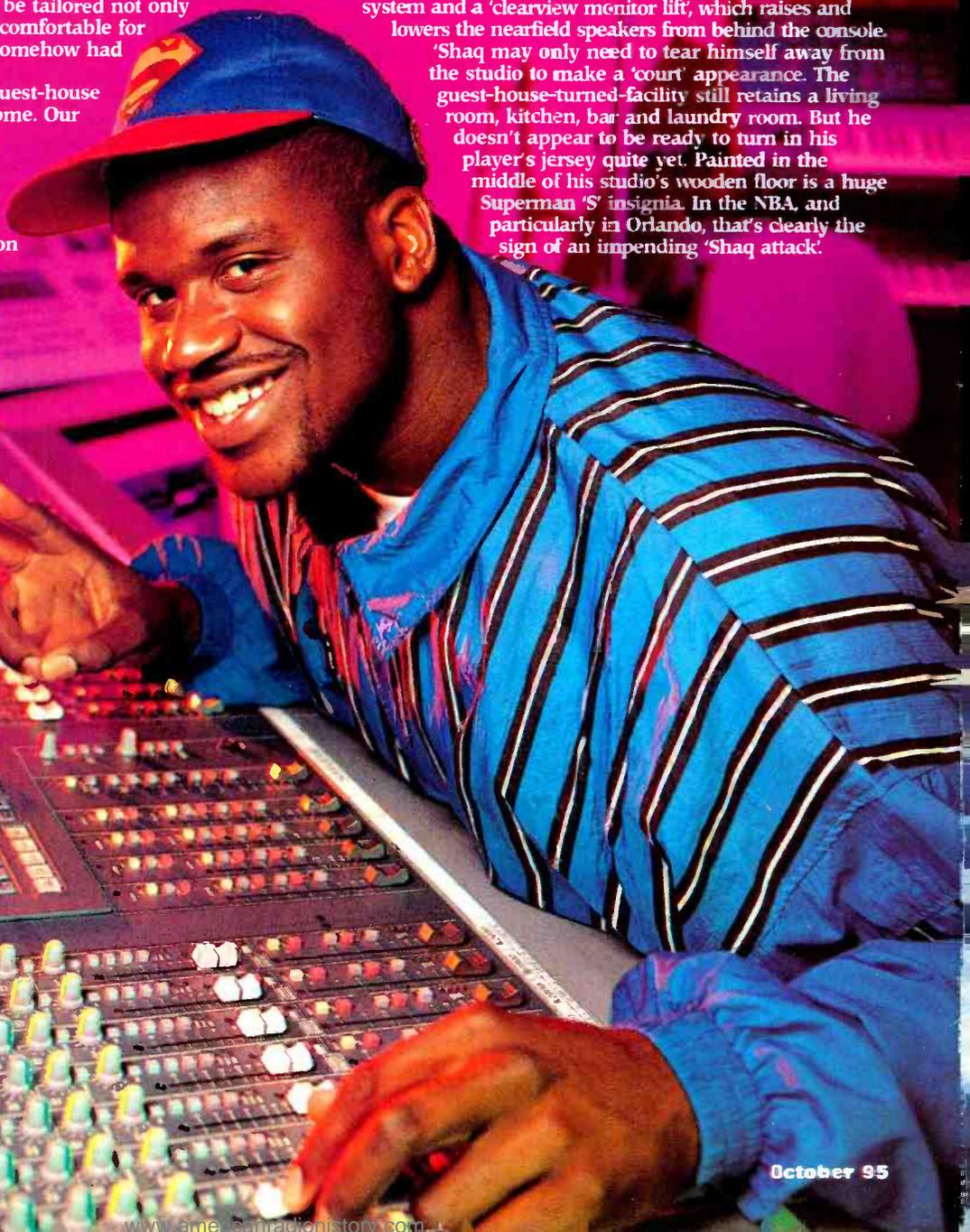
Storyk takes up the story: 'We immediately recognised the challenge of creating a studio for an artist of O'Neal's proportions. We structured everything bigger, and elevated the furniture and cabinetry, including the console, half-a-foot to accommodate the big guy.' In fact the ergonomics of the studio were one of the most important aspects that needed to be addressed because the room had to be tailored not only for Shaq (most studios are really uncomfortable for him) but also the engineers, who somehow had to work comfortably at 'Shaq-level'.

'The studio is set in a converted guest-house adjacent to Shaq's plush Orlando home. Our design called for gutting the guest bedroom and the bathroom. The lavatory is now a full vocal and isolation booth. The bedroom has been converted to a state-of-the-art digital recording and MIDI production

control room. With sound quality always our top priority, we introduced several acoustic treatment designs into the project studio, including custom D-Viewisor partial plexiglass diffusors. Acoustic wall panels bass trap wedges, and SDG surface-applied diffusors were also added. Both rooms are floated within the building structure.

'Accommodating Shaq's size wasn't our only challenge. The sheer amount of gear he wanted called for a complex yet compact design. His substantial hardware investment, including a fully automated Soundcraft DC2000 console with Flying Faders and an extensive MIDI network, empowers the Orlando Magic star to rap poetic. To support his 40 tracks of digital recording, he's spared absolutely no expense in acquiring state-of-the-art technology, including equipment by Eventide, Lexicon, Soundcraft, Kurzweil, Akai, Meyer, Tascam, Roland and E-mu, rounded off by a High Power monitor system and a 'clearview monitor lift', which raises and lowers the nearfield speakers from behind the console.

'Shaq may only need to tear himself away from the studio to make a 'court' appearance. The guest-house-turned-facility still retains a living room, kitchen, bar and laundry room. But he doesn't appear to be ready to turn in his player's jersey quite yet. Painted in the middle of his studio's wooden floor is a huge Superman 'S' insignia. In the NBA, and particularly in Orlando, that's clearly the sign of an impending 'Shaq attack'.

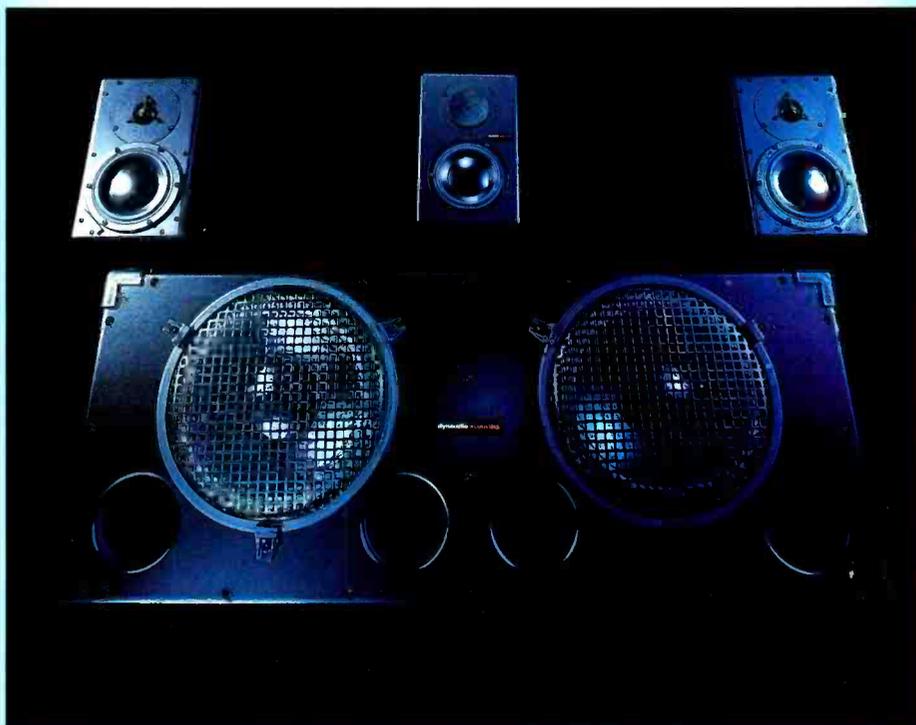


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