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# Studio Sound

THE INTERNATIONAL TECHNICAL MAGAZINE FOR  
PRO AUDIO, POSTPRODUCTION & BROADCAST



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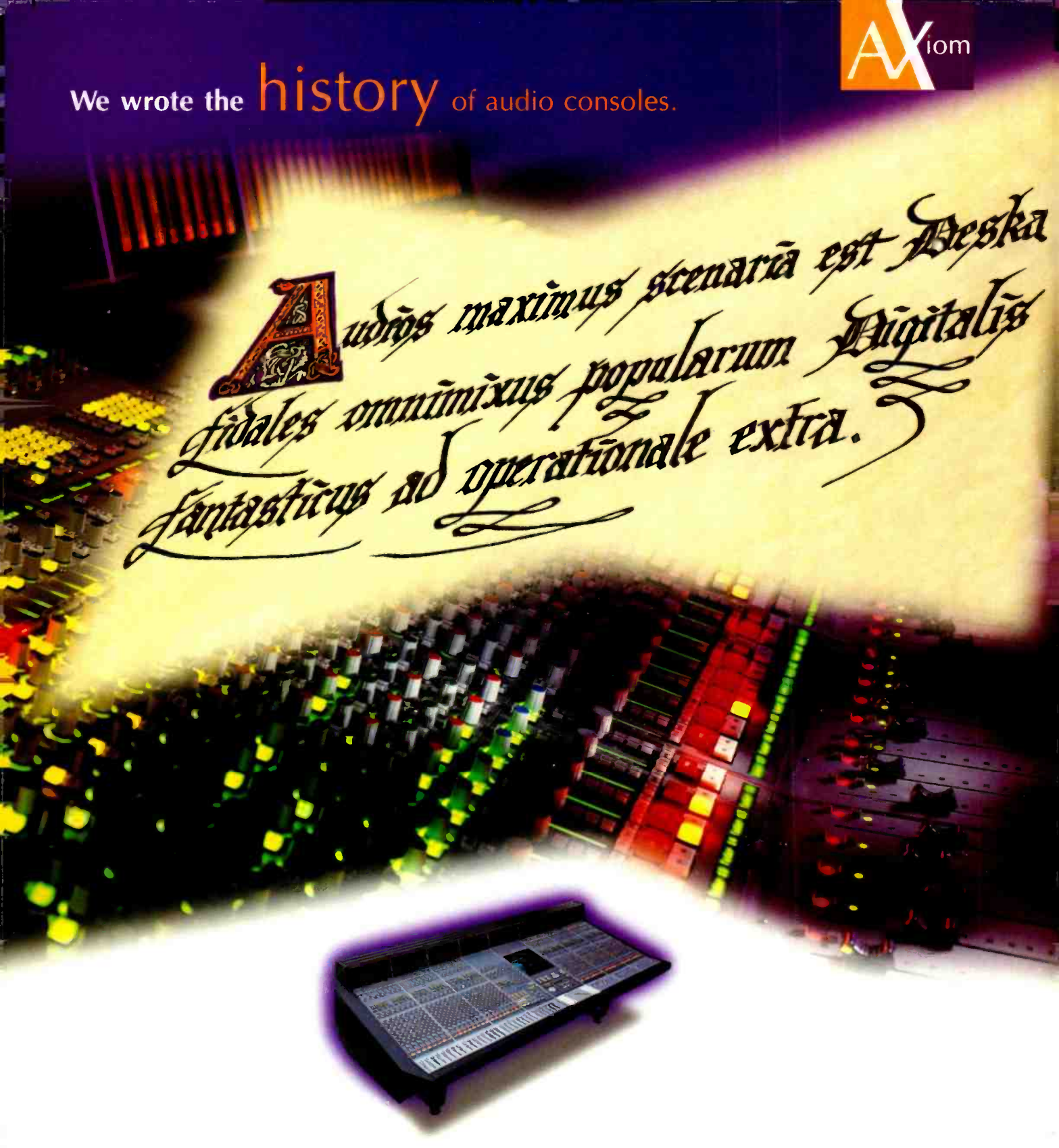
Chic architect Nile Rodgers talks exclusively to **Studio Sound** about his formative funk years and subsequent move into mainstream music production





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## MEMENTO MORI



**LEO FINLAY** It was with deep sadness that we learned of the death of Leo Finlay, occasional Studio Sound contributor and long time Miller Freeman journalist, who died of a heart attack at the end of December. He was 32 and leaves a wife and two children. Many will remember his spell at Pro Sound News where he worked together with then editor Joe Hosken in what has since been referred as one of pro audio publishing's "dream teams". With credits that included Vox and New Musical Express, Leo was a fully rounded and complete journalist, as well versed in sub editing and news writing as he was in features, pinned down by a passion for music that he realised fully at his last position as A&R editor for the music industry newspaper Music Week.

An Irishman by birth and profession, he was always good for a well-timed cynical comment and had a wicked sense of humour which belied a gentle nature. He was interesting and entertaining, company and enjoyed respect from all who worked with him. He is already sorely missed.

We extend our sympathies to his family.

His death was a shocking tragedy but he will not be forgotten by those who knew him.

Zenon Schoepe

## How big is business?

**LAST MONTH'S QUESTIONS** on the origins and nature of the next generation of new-blood audio companies to sweep the industry is not unrelated to this month's Dan Daley US column (see page 11) in which he comments on the increasing legitimisation, or not, of this business. Daley discusses the new collar and tie, big business brigade which he contrasts against the industry's origins. Every business grows up, and we can all smirk about the times when sound engineers wore white coats, clocked in and out on the dot, and took exception to the suggestion of overtime, but one of the enduring lessons from that era is that the innovators were those who broke the mould. In doing so they established the industry as young-at-heart and vibrant, and set the tone for its manufacturing base. Industries mature but their colour and character is their diversity.

What we don't want to see is the faceless, uniformed, trade-show presences of telecoms, where the detailed attention paid to corporate identity suggests that the company's aims are more important than those of its customers. Conformity of ideas and thinking are frequently in tow together, with a less responsive attitude towards user requests, and a rediscovered inability to grasp the concept of problem-solving products when minds are focused on total solutions. Perhaps the search for the young bloods that have traditionally come from nowhere, and turned this industry on its head is no longer a realistic one. Maybe we should just settle for being grateful for its diversity.

Zenon Schoepe **EXECUTIVE EDITOR**



## The past master

**IN A CHARACTERISTIC** moment of profound insight, George Orwell once observed that those who control the past, control the future. And in the context of the record of social or political history—or even in that of the record of popular science fiction—he was inarguably correct. But how does his assertion apply to the record of music? Or even to film?

At the time of the writing of *1984*, the novel in which this assertion appeared (1949), the future of sound recording may have been sufficiently obscure to all, with the possible exception of George Orwell, to render the question premature. But in the decades since, the impartiality of the recording medium has been progressively compromised by the growing sophistication of rerecording, reprocessing and remastering tools. Today, it is possible to sufficiently re-engineer an old sound recording to make the shortcomings of its origins completely unrecognisable.

We're talking about the embellishment element—the power of re-engineering and processing to re-present (patently not to 'represent') a past performance in some light better suited to today's audience. In short, if you can avoid the indignity of old promo photographs and abortive childhood moves into television advertising, you may also be able to subtly sweeten your substandard playing to fall in line with your present public profile.

Of course, you don't have to have a classic artistic temperament to demand that your past performances live up to your current prestige. It may simply be a case of a compromised recording or an inferior delivery medium depriving your very worthy and discerning audience of your best work. It may even be a case of salvaging otherwise unlistenable recordings from the edit bin of obscurity.

There has been plenty of discussion in an assortment of arena's on the merit of remastering, and there's no need to rehash it here—but for a first-hand account of the story behind the recent Jimi Hendrix releases, you can read Eddie Kramer's comments here in this issue. There are, however, a couple of lower profile considerations I'd ask you to consider. The first is that DJ-producer Norman Cook speculated on the merit of an album that explored a single song to its logical conclusion, leaving no room for subsequent remixing, remastering or re anything else. The second is the cab driver who whistled The Rolling Stones' 'Paint it Black' continuously for over 20 minutes recently—I'd have given a lot to hear the arrangement he was hearing...

Perhaps all this is related to that inescapable inclination musicians—like fishermen—have to retrospectively perfect their feats. The obscure club gigs of a major artist's formative years are readily embellished by both artist and audience, but any subsequent performance that found its way onto tape is a potential embarrassment. But there's definitely an element of Orwell at work here. You have been warned.

Tim Goodyer **EDITOR**



# Soundbite



**UK:** The recent film production of Barrie White's *Fork in the Road* benefited from a combination of DAR and Lightworks systems, and DAR's transfer software. A short, budget film (premiered at the London Film Festival) involving considerable sound editing, the pressure was on to deliver the editing and production at optimum cost. The DAR software facilitated the transfer from the British Film Institute's Lightworks system to Wild Tracks Studios' SoundStation Sigma Plus via a T3 optical drive. The movement of the programme material is reported to have run so smoothly that it not only attracted comment on finished quality, but also came in ahead of the tight schedule. *Fork in the Road* will receive its network TV screening later this year.

## Mark IV Sold

**THE MARK IV GROUP** sold its audio interests on Thursday 19th December 1996. The new owner is New-York-based private equity fund, Greenwich Street Partners who have invested \$151m (US) in the new company which will be called EV International Inc. No further details were available at the time of going to press.

**AMSTERDAM:** Vonk Sound has made the largest single order to date for SSL's digital Axiom system. Each of the three Axioms accommodates 48 channels and 72 hours of direct to hard disk recording via SSL's DiskTrack. Vonk handles commercials, and is particularly anxious to address the solutions and problems presented by networking, and the Axiom solution was chosen with this in mind. 'We wanted to go digital but with a system that gave us total operational control,' commented owner Wim Vonk. 'This is the only system available now that can actually do the job.'

**UK:** Further testing on Digital Audio Broadcasting is to be conducted in the London area by British Telecom and a consortium of independent radio stations. Jointly centred on a DAB multiplexer located in the BT Tower and the BBC Crystal Palace transmitter, the tests will involve Classic FM, GWR and London News Radio among others with the intention of exploring in-car data services (such as traffic routing and weather reports). The tests follow last year's DAB coverage tests carried out in the Birmingham area.

**GERMANY:** As the curtain opened on 1997, the German BASF Magnetics tape manufacturer fell under the wing of the Korean KOHAP Group. The new arrangement will run for 10 years and cover manufacture of audio and video tape media as well as computer tape and diskettes. While BASF needs no introduction, KOHAP can claim to be one of the leading business conglomerates in Korea with

13 subsidiaries and 20 overseas affiliates. Operations cover engineering, chemicals and textiles.



**UK:** In presenting an entirely contemporary and potentially controversial interpretation of Shakespeare's *Romeo and Juliet*, Director Baz Luhrman has been comfortably welcoming of digital recording technology. Taking a 70-piece orchestra and 40-piece choir live to Sony 48-track DASH, adding preprogrammed material via Notator Logic and Pro Tools as a starting point for the soundtrack, Luhrman has dared to cast the players in 'contemporary' voice. Read American accents. Mixed in 6-channel Dolby surround, the production has yet to register its critical reception.

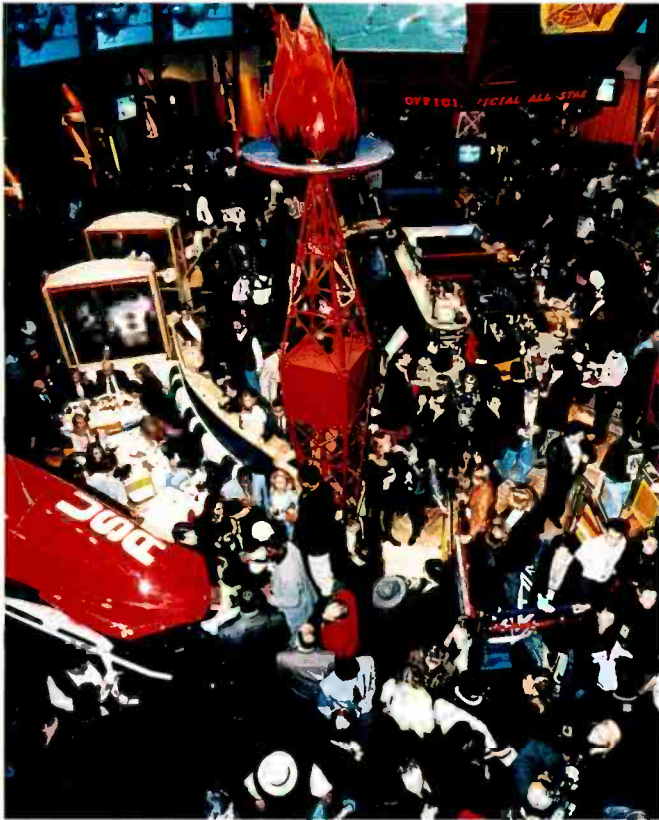
The agreement was signed in November 1996 and was accompanied by KOHAP's endorsement of BASF Magnetics as the leader in the world magnetic tape industry.

**WORLD:** The DVD format will begin to undermine sales of CD-ROM and video cassettes by 1998 according to research from Market Tracking International and *One To One* magazine.

'By the year 2001, we estimate that the worldwide installed base of DVD Video players will be 30 million, and that annual sales of DVD-ROM drives will have reached 70 million, all but replacing CD-ROM drives in new business and home multimedia PCs,' said the report's author Sabine Dupont of MTL. 'DVD will begin to replace CD-ROM and video cassette in Japan in 1997 and elsewhere in 1998. Audio CD is unlikely to be affected until early next century, but will undoubtedly cannibalise this format as multimedia takes off in the music industry.'

The 500-page Media Format 1997 report reviews the international market for storage and delivery on hard formats including audio CD, video cassette, DVD, diskette, CD-ROM and other interactive formats. The report assesses





**US:** Two prestigious sports-theme restaurant and entertainment complexes have opened in New York and Mexico, with the emphasis on atmosphere and achievement. The achievement side is well represented through various displays and abundant video footage of Sport's Great Moments—the principle will be familiar to anyone who's visited entrepreneur Robert Earl's other restaurant chains, Planet Hollywood and the Hard Rock Cafe. Located in Times Square and Cancun, the restaurants feature impressive video and sound installations, consisting of four Bag End S18-E systems located at the corners of the scoreboard display.

trends in world-wide production and consumption levels and evaluates the pace of development and impact of the emerging methods of direct delivery including the Internet, cable and satellite broadcasting, video-on-demand and Intranets. The report costs £595 (US\$965) from MTI Ltd. Tel: +44 171 263 1365. Fax: +44 171 272 8525.

**UK:** Sales of Studio Audio SADiE DAWs to the BBC now stand at more than 400 following Radio 1 specifying that all four of its new studios are to be equipped with the system. Radio 1 recently relocated from Egton House to new premises at Yalding House in Clipstone Street London W1, which used to house

the BBC sheet music library. The new complex has been designed and built by BBC Project Management, and all Radio 1 output from London will soon originate from the new site. The BBC's first SADiE system was commissioned in May 1993 at Pebble Mill in Birmingham and since then the BBC in London, Bristol, Wales, Scotland, Belfast, Regions and the World Service are now also using the system for radio and TV.

**FINLAND:** Paper and board manufacturer UPM-Kymmene has developed an entirely paperboard CD sleeve made from UPM's fully coated Slimwhite folding boxboard.

◆ Hamburg's Studio Funk, one of Germany's largest independent postproduction facilities, is set to move its Studio A installation away from its SSL SL5000 console to a new AMS Neve's Logic 3. The primary application of Studio A is dubbing US-derived TV and film programmes into German. AMS Neve, UK. Tel: +44 1282 417282. WWW: <http://www.ams-neve.com>

◆ American film giant 20th Century Fox has recently completed the refurbishment of a new LA scoring stage. Integral to the design is the Genelec 1035B-based surround monitoring system. The 1035Bs comprise the LCR elements, and 1038As the surround, in the new Alfred Newman Scoring Stage—which is soon to be renamed. Further US activity for the Finnish loudspeaker manufacturer includes the installation of 1039A monitors in Nevada's new Carl-Yanchire-designed Edge mastering studio. Genelec, US. Tel: +1 508 647 4780. Genelec, Finland. Tel: +358 77 13311. WWW: <http://www.genelec.com>

◆ The BBC's Pebble Mill complex has recently opted for DDA QII and CS3 consoles for use in-house and on location respectively. The segregation of duties has begun to fall, however, with the QII seeing service on location assignments. BBC, Midlands. Tel: +44 121 414 8888. Mark IV Pro Audio, UK. Tel: +44 1562 741515.

◆ Singapore's Walt Disney Television studio has installed a G-P Systems D-ESAM 200 digital edit suite mixer in its on-air master control suite where it will be used to manage playback from VTRs and hard-disk voice-overs. Elsewhere in the Asia-Pacific region, the major Japanese postpro facility, Imagica, has installed a D-ESAM 820 for use with a Sony DVS7000 switcher, BVE9100 edit controller and DME7000 effects system. D-ESAM 400s have gone into CTS in Taiwan, Home Box Office in Asia and Nagasaki Cable TV. Graham Patten Systems, US. Tel: +1 916 273-8412.

◆ The Brussels Electric City has recently purchased a selection of Focusrite signal processors for its mastering activities. The selection, including a Blue 315 Isomorphic EQ and Red 4 preamp, is in line with other European support for Focusrite. Other current Brussels activists include Studio Madeleine with its Red 1 mic preamp, Red 2 EQ and Red 6 preamp-EQ; Studio Caralbes with Red 1, Red 2 and Red 3. Red 1, 2 and 3 units have gone into The Chain Gang post facility in Antwerp and Temple of Tune Kuurne. Focusrite, UK. Tel: +44 1628 819456. WWW: <http://www.focusrite.com/focusrite/>

◆ Malaysia's Broadway Entertainment has installed a 40-input SSL SL4000 G Plus console. Special-

ising in music tracking, the Petaling Jaya-based studio in to the fore of the region's recording business. Broadway Entertainment, Malaysia. Tel: +60 3 758 6727. Solid State Logic, UK. Tel: +44 1865 842300.

◆ London's CTS and Lansdowne studios have purchased new Studer A827 24-track analogue multitrack machines. Present trends have CTS' Studio 1 handling an increasing number of large-scale orchestral sessions for film soundtracks while Lansdowne sees a spread of work for film. CTS, UK. Tel: +44 181 903 4611. Lansdowne, UK. Tel: +44 171 727 0041. Studer, Switzerland. Tel: +41 1 870 75 11.

◆ The American tour by Hootie and the Blowfish made much use of Aphex outboard to ease the perennial problems of live performance. The 20-odd Aphex units in question include four Model 661 comp-limiters, a Model 105 logic-assisted gate and a Model 106 4-channel compressor. Additionally, there are two Model 120A distribution amplifiers in play. Aphex Systems, US. Tel: +1 818 767 2929.

◆ The British Shepperton Film Studios complex is set to complete a new Munro-designed remix theatre early this year. The theatre will be equipped with a Harrison console and JBL-DynaudioAcoustics custom surround sound monitoring. The new installation follows Munro's refurbishment of Dubbing Theatre 3 with Harrison console and DynaudioAcoustics M3 monitors, and the conversion of a viewing theatre into a mixing room again equipped with Harrison console and JBL-DynaudioAcoustics monitors. Shepperton has also increased its use of Akai DD1500 DAWs to include one in each dubbing theatre. Shepperton Film Studios, UK. Tel: +44 1932 562611. Harrison, UK. Tel: +44 1442 875900. Munro Associates, UK. Tel: +171 403 3808.

◆ New York's and Los Angeles' Sony Classical Studios have adopted Prism Sound DA-1 digital-to-analogue converters for reference monitoring. The studios both specialise exclusively in prestige classical recording and editing for the Sony label. Sony Classical, US. Tel: +1 212 445 1800. Prism Sound, UK. Tel: +44 1223 424988.

◆ UK post house Ocean Post has recently established itself following its emergence from the former Wired facility. The 5-room studio was designed by AVD and accommodates Avid digital suites and a dedicated Quantel Editbox suite as well as sporting a distinctive Art Deco styling theme. AVD, UK. Tel: +44 171 394 5650. Avid, Europe. Tel: +44 1753 655999.



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# Cracking the humbug

Science has become the foundation of twentieth century society; yet as the time creeps closer to the millennium the need for a watchful eye to combat the dangers of poor science and the humbug of charlatans is ever greater

**I**t was Adam Smith who said: 'Science is the great antidote to enthusiasm and superstition.' As life does seem to bring surpluses of the last two I am compelled to take regular doses of science on health grounds. Science is widely misunderstood, and is often treated with suspicion. This is a great shame because it deserves neither.

Now, I'm not a scientist, and I'm not suggesting that everyone should suddenly become one. But I have found that some of life's problems, within and without the audio industry, become easier to solve if a scientific approach is taken.

Good science is only a rigorous collective form of knowledge, and as such is neither good nor evil. Good science is simply a set of observations about the universe which appear always to be true. In other words, however many times a given experiment is performed, the result is the same. After the experimental phase, a scientist may put forward a theory that explains the mechanism of the experiment, and describes the outcome of all the experiments that have been performed, and also predicts the outcome of experiments that have yet to be performed. If these experiments are found to turn out as predicted, the theory might be true.

When a new theory is postulated, good science requires that serious attempts are made to disprove it by further experiment. If this fails, the theory is said to stand. However, a repeatable experiment that gives results other than those predicted is enough to destroy the theory, and it has to be withdrawn or qualified. A theory which stands for long enough may become a physical law. Physical laws are always true, and are much more reassuring than laws of church or state which differ from place to place and time to time.

Have you ever wondered what alcohol, birthday presents, pork and contraceptives have in common? Simple: each one is banned by a religious law. In contrast, Ohm's law and Shannon's theory apply equally as well in Salt Lake City and the Vatican, and they always will.

State laws are not enacted with such caution. In the UK we are about to get a partial ban on public ownership of hand

guns. I'm not sure why guns are needed outside the military in a civilised society and a partial ban makes no sense. The shooting at Dunblaine was tragic, but was it more tragic than the much greater and continuous toll of young lives taken by incompetent drivers? What consolation is it to the bereaved that these killings are not premeditated?

The scientific approach suggests that if there is a problem, and people getting killed has to be classed as a problem, you go for the most frequent causes first. Smoking, AIDS, road accidents, and bread knives are real killers, yet hand guns and army knives get banned.

**BUT I DIGRESS.** Good science is pure and reliable, and discipline is necessary to keep it that way. Poor science is a great danger because it might be mistaken for the real thing. Poor science uses technical terms to impress the reader rather than to correctly describe the subject of the debate. Poor science designs experiments where the outcome could be due to any number of factors, and then claims that the results 'prove' the hypothesis. This often happens when enthusiasm overrides logic.

I recently read an article 'proving' that loudspeaker cables were transmission lines having a characteristic impedance. As good science knows this to be false, it was interesting to find the inevitable flaw in the argument. The test apparatus simply recorded the waveform at each end of the cable at audio frequencies. Not surprisingly the waveforms were different, as good science can predict without doing the experiment. The key experiment was that a figure-of-eight cable was tested and then unzipped and reassembled with a wider spacing using sticky tape. Oddly enough there was a change in the results, which was explained by claiming that the characteristic impedance of the cable had changed even though its resistance clearly hadn't.

Well, the howler isn't hard to spot. Unzipping the cable changed the lumped capacitance, and, of course, the waveform changed. So the experiment proves only that it is poor science. Transmission lines have certain characteristics and just call-

ing something a transmission line doesn't make it one. However, one characteristic of a transmission line is that the energy flowing down it rolls along interchanging energy between the distributed inductance of the conductor and the distributed capacitance of the dielectric. All of this takes place in the area immediately between the conductors and is little affected by the physical dressing of the cable. Consequently, when I saw reassurances that the speaker cables were carefully dressed for the experiment a pastoral aroma caressed my nostrils. They say pigs might fly, but this one was a contender to get the whole farmyard airborne. The author challenged readers to shoot him down in

Poor science is a great danger: it might be mistaken for the real thing. Poor science uses technical terms to impress the reader rather than to correctly describe the subject of the debate

flames. I draw the line at using real ammunition to avoid hurting all those innocent farm animals up there with him.

But all of this pseudoscience about speaker cables doesn't really advance audio at all and frankly it's boring. Existing good science allows designers to calculate what will happen with a given amplifier, cable and speaker. Of course there is an error due to the cable, but if the error is a source of concern is it better to reduce it, or eliminate it? The use of active loudspeakers puts the amplifier right by the speaker and completely eliminates the cable quality issue and that is where the state of the art now is. Articles about speaker cable are about as relevant as articles about biplane rigging wire to someone designing a stealth bomber. I can't take any more—time for my daily dose of science.

John Watkinson



# The missing link



Driven by the remorseless development of the Internet, the options for sending quality audio over the telephone network are expanding daily. So is the ISDN link to become an obsolete technology? **BARRY FOX** reports

**L**ast month we looked at the cost of installing and renting digital ISDN lines in some European countries. Germany has now privatised its telephone service—Deutsche Telekom—so the Germans may soon find they are paying higher prices for ISDN. And out of the blue comes the news that two computer companies—Rockwell Semiconductor and US Robotics—have developed new modem technology that lets an ordinary PSTN (Public Switched Telephone Network) analogue phone line to carry data at the near-*ISDN* speed of 56kbits/s. You can expect to see adverts for 56k modems start to appear very soon.

This speed should be quite adequate for FM broadcast mono, with the apt-X or G722 compression systems routinely used by reporters and contributors to send stories into a radio station by ISDN line. Currently reporters can only do this if they are reporting from a venue, such as a sports stadium, or home studio, which has installed ISDN lines. The idea of being able

to do the same job with ordinary phone lines, perhaps ganging two lines together for stereo, is immensely appealing. Radio reporters would be able to send in broadcast quality reports, from a public call box; freelance contributors would be able to work from home, without paying £400 to install an ISDN connection, and then over £100 a quarter for line rental.

Unfortunately, it is not as simple as the adverts will make it sound.

Until recently it had been assumed that the copper wires of the PSTN, with an analogue bandwidth of 3.5kHz and signal-to-noise ratio of 38dB or 39dB, could never carry data at speeds higher than the new V.34 standard, 33.6kbits/s. This is true, and Shannon's law of communication still stands. But the rules of the game have changed.

Modern telephone systems are now almost entirely digital. The only analogue leg is the twisted pair of copper wires that connect a subscriber's home or small office with the main network. This is why telephone companies can now deliver video to homes, using a technology called ADSL, asymmetric digital subscriber loop.

A 56kbits/s modem does not rely on expensive ADSL technology. It works like an ordinary computer modem, converting digital pulses to audio tones for transmission down an analogue line and converting incoming tones into digital pulses for the computer to use.

The line noise that puts a ceiling of around 35kbits/s on today's modems, comes from quantisation errors in the telephone

company's PCM coders. But if there is no A-D conversion along the telephone route between modems, there is no need for 8-bit coding and no quantisation noise so the signal-to-noise ratio is better and the line can carry a more rapid stream of pulses without errors.

**THE ONLY WAY** a home or small office can gain direct access to the telephone company's digital network, is to pay for an ISDN line. But a larger organisation, for instance a radio station or recording studio, will routinely connect their digital hardware direct to a digital phone line. So the data which streams down the line to a user's modem never passes through an A-D convertor. It passes only through a D-A convertor before travelling down the last short run of copper wire into the subscriber's home. This conversion introduces a significantly lower quantisation error. Although the theoretical speed should be 64kbits/s, system noise and equalisers in the phone network reduce practical working to 56k.

The reverse route, from the subscriber's modem into the network, must, however, pass through an A-D convertor, because the line from the subscriber's home is analogue, and the network is digital. So the upstream route suffers quantisation noise with data speeds limited to a maximum of 35kbits/s.

So the new connections will be asymmetrical, with data streaming in one direction at 56kbits/s and in the other direction at 33.6kbits/s. This means that a studio or broadcast station can send data at near ISDN speeds out to staff homes, but staff can return data only at half the speed.

So is the idea of sending FM quality mono down an ordinary telephone line a nonstarter? The answer lies in more efficient compression. The computer industry is now working to develop compression systems that will carry speech and music over phone lines and into consumer PCs. The aim is to make sample clips of new music recordings available on the Internet as a publicity tool. Another use is to relay local radio stations round the world.

Because few PC users can afford an ISDN line, these Internet sound systems must all run at the speeds available from an ordinary PSTN line. Because the Internet is now so overloaded, real data rates are often no higher than around 10kbits/s. The new audio delivery systems try to conceal this, by buffering incoming audio. All things considered, the audio quality now available from Internet radio relays is surprisingly good.

If the same compression technology is applied to direct connection between two points, at each end of a fixed telephone line, then 33.6k, modems could soon deliver FM quality mono. Because the telephone network is now so extensively digitised, call quality is very consistent. If you hear a crackle on the line it is almost certainly a fault with the phone or its plug and socket.

There is currently a standards battle raging in the Internet world, with several different companies all competing and leapfrogging with improved versions of their proprietary compression technology. Once the technical developments slow down, and commercial alliances shake down, the time will be right for some enterprising audio firm to offer a black box that compresses audio to 33.6k and packages it for transmission down an ordinary phone line. This equipment could be very cheap, thanks to the computer industry's current drive to sell stand-alone Internet access hardware for under \$300. **S**

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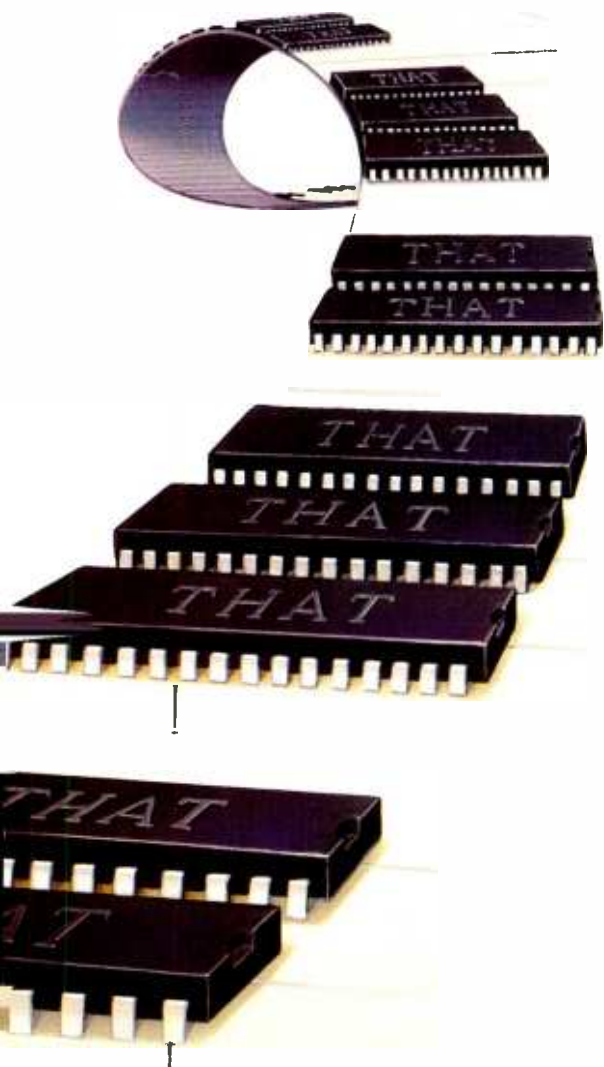
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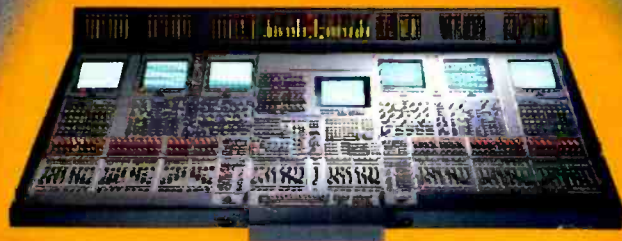
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# TDM PLUG-INS

Digidesign's invention of the TDM bus has consistently gained credibility, and is now considered to be a world standard that has major manufacturers queuing up to support it. **DAVE FOISTER** plugs in to the virtual sound-world

**I WONDER** if even Digidesign foresaw the impact TDM would make on recording. There is no doubt that it has genuinely put the company on the map, placing it at the centre of an ever-expanding web of related products, with rival manufacturers queuing up to use TDM so as not to miss out on the action, and third parties falling over themselves to support the technology and get their names into the virtual world Digidesign has created.

The idea of sharing your technology rather than being jealously possessive has worked so well on the few times it has been tried (look at the humble cassette) that it is surprising more people haven't woken up to it. In this case it has turned what could have remained one of several proprietary systems with limited appeal into a world standard. It has enabled the virtual recording and mixing environment to become a reality, with most of us awaiting the time when the facilities to be found within the computer began to match those available in the physical world rather than being merely a convenient substitute. Judging by the range, quality and pedigree of the plug-ins now available it would seem that time has come.

Here, then, is a selection of plug-in packages covering a variety of applications and giving an insight into what TDM brings to the party. And while the list is constantly changing, a comprehensive run-down of all TDM programs to date is to be found in the side bar.

## FOCUSRITE D2

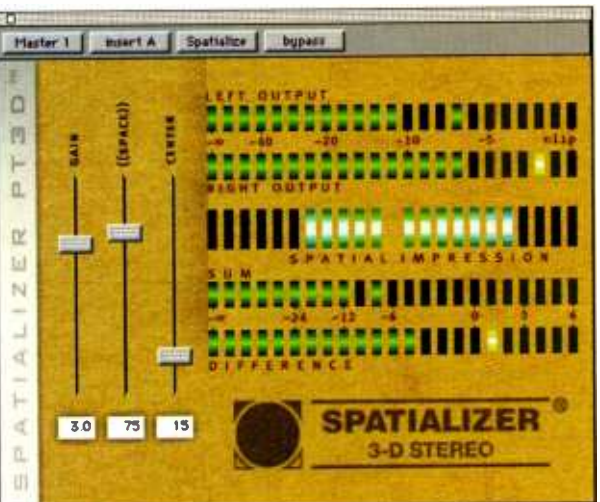
As it became more and more clear that TDM was here to stay, one of the most eagerly anticipated plug-ins was the promised Focusrite EQ. Focusrite built its

business on providing outboard EQ that, unless you were very lucky, knocked your console EQ into a cocked hat. It therefore followed that if the company was prepared to put its expertise into a DSP plug-in it had better be an order of magnitude up from the run of the EQ mill. It should also be taken for granted that it would produce as desirable a sound as the analogue originals.

Given Focusrite's enthusiasm for making a visual impact, it's no surprise that the d2 plug-in presents, and on-screen image virtually identical to the Red range of physical outboard processors. Even the depth of the front-panel sculpturing is imitated, and the virtual rotary controls look exactly like the distinctive aluminium knobs on the 'real thing'.

And there are plenty of them. The d2 can be configured as anything from two to six bands of EQ, and all the relevant controls are there on screen to be grabbed and adjusted, with shelving HF and LF EQ, two full parametric bands and variable HP and LP filters (not working on my demo copy) in the full 6-band version. Thus each parametric band has gain, frequency and Q controls, all adjustable either by up-down motion of the mouse or direct numeric entry, with the knob pointers following the action.

Mono and stereo configurations are available from the same package, with left-right linking switchable on the stereo version. In all cases, the big difference between this and a physical Focusrite Red EQ is a graphic display of the EQ curve, changing in real time and showing all the actual results of the processing including interaction between bands. If ganged



**Desper Spatializer PT3D—spatial enhancement from within Pro Tools**

stereo operation is not required, the two channels can be unlinked and the display then shows two curves, with the right channel in red and the left in blue. Level metering is also shown on two bar-graphs, alongside controls for input and output level, ganged when the d2 is set to stereo.

The EQ sound is really quite remarkable, reassuringly justifying the Focusrite badge. It's warm, smooth and as flexible as any physical equivalent, with seamless real-time adjustment and little to distinguish it from the much-vaunted original.

## TC TOOLS

tc electronic is another company whose entry into the TDM fray was bound to arouse interest, the more so because its acknowledged expertise already lies in the digital domain. The idea of having TC Reverb and other algorithms available within the TDM environment is particularly attractive—assuming they live up to the promise of the name.

Two packages comprise the TC Tools bundle, one providing a broad cross-section of tc electronic's reverberation possibilities, the other a range of time-domain processes falling loosely under the umbrella of Chorus.

TC Reverb is built around a selection of over 30 preset types, each of which has the same wide scope for detailed user adjustment. The presets all have descriptive names related to specific types of space, from conventional ideas like halls and churches, to less familiar spaces such as houses, and locker rooms. The basic algorithms these represent can have the supposed shape changed, drawn from a range including horseshoes, fans and

**Focusrite's d2 with up to six bands of EQ**



## TDM PLUG-INS

### ANTARES SYSTEMS

Infinity

JVP voice processor

MDT multiband dynamics tool

SST spectral shaping tool

APOGEE ELECTRONICS

Master Tools mastering package

CEDAR AUDIO

Declick click removal

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DBX

DC66 dynamics processor

DIGIDESIGN

DINR noise reduction

DPP1 pitch processor

D-Verb reverb

LoFi 'retro' processor

Masterlist CD

SciFi analogue synth effector

Sound Designer II

DOLBY LABS

Surround Tools surround processor

DRAWMER

Drawmer Dynamics processor

FOCUSRITE

d2 equaliser

INA-GRM

GRM Tools 1 audio processor

GRM Tools 2 audio processor

INTELLIGENT DEVICES

AD-1 audio analyser

IQ Intelligent analyser

QSOUND LABS

QSYS/TDM 3D processor

QX/TDM spatial enhancer

QX/SDII 3D processor

SPATIALIZER AUDIO LABS

PT3D 3D processor

STEINBERG

DeClicker click removal

ReCycle

Red Valve-IT 'tube' processor

Spectralizer spectral enhancer

TimeBandit

TimeGuard timing adjuster

Tun-A tuner

TC ELECTRONIC

TC Tools reverb-delay

WAVE MECHANICS

PurePitch pitch shifter

WAVES

Audiotrack EQ, compressor-expander

C1 compressor-gate

L1 limiter

PS22 StereoMaker stereo reprocessor

Q10 equaliser

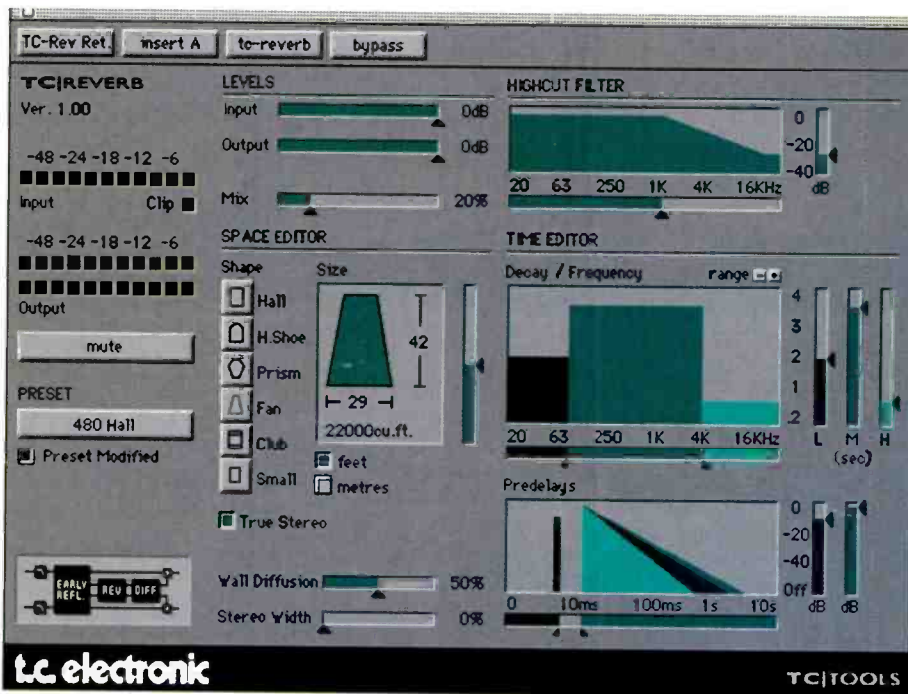
S1 stereo enhancer

TrueVerb reverb

WaveLab

prisms, and the size altered, the resulting dimensions and volume being shown on the display. The reverberant decay is split into three bands whose boundaries are user-definable, and the reverb time of each is independently adjustable. The resulting set of slopes is shown graphically in three colours, along with the early reflections and the initial delays, all of which are also adjustable. Controls for stereo width, diffusion, and high-cut filtering are also provided, making an enormously powerful and versatile reverb engine. More to the point, it sounds superb, with all the smoothness and naturalness one would hope for.

TC Chorus is the companion package, and



tc electronic's TC Reverb plug-in with over 30 preset types

gives a range of delay-related effects differing mainly in the length of delay used, just like the days of the old simple delay line, which in many ways this is refreshingly similar to. Thus short delays produce flanging, while longer ones generate chorus, thickening and double tracking, and all the basic ideas are represented in presets that provide starting points for further adjustment. Both positive and negative feedback are available, along with an HF filter and control over the modulation of the delay. This is graphically represented on a semi-circular display, where the position of a dot shows the speed of modulation by how far round clockwise it is and the depth by how far from the centre. Both parameters are separately adjustable, but the dot itself can be grabbed and moved in real time to change both at once.

While some of the other 'names' included here have gone to great lengths to retain their visual identities in their plug-ins, tc electronic has instead opted for the rather bland grey (yet commendably uncluttered) Digidesign house style in its two packages. Sonically, however, the processors are undeniably tc electronic, bringing top-end effects to the TDM domain just as one would hope.

### DRAWMER DYNAMICS

Drawmer, like Focusrite, is so heavily rooted in the analogue tradition that its presence in the TDM market says much about how far TDM has come. It's also fair to say that both these companies would have a lot to lose by getting a TDM plug-in wrong, so closely associated are they with the best in their respective fields.

Drawmer's field is, of course, dynamics, and its plug-in provides two alternative sets of dynamic processors bringing all the simplicity and flexibility that have made Drawmer's name. Both include a compressor and a limiter, with a choice of gate or expander to complete the suite. Launching either produces a screen display immediately recognisable as a Drawmer front panel, with white legending on black, yellow rings round the rotary controls and coloured LEDs to show what's happening. There are even silver toggle switches for functions like Bypass.

All the familiar control is there, with automatic or manual time constants for the compressor, and filters on the gate's side-chain complete with the facility to listen to the filter settings. There is a key input that can be fed from a TDM aux send via the filters for external triggering, and this is also useful for ducking. The stereo version



Drawmer Dynamics plug-in with two alternative sets of dynamics processing



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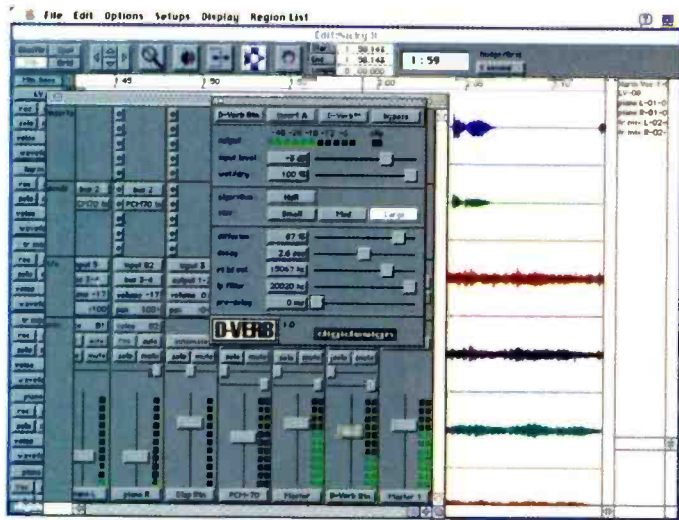
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**Digidesign's D-Verb offers smooth, natural reverb tails**

operates in full linked stereo, with the exception that each channel of the gate can be individually switched to duck mode. Metering shows output levels and gain reduction, with a 3-LED gate activity indicator.

This plug-in is a joy to use as it's just like having a real Drawer box in front of you. All the controls work smoothly and naturally, producing results indistinguishable from a good analogue dynamics processor. The visual approach may be seen by some as going over the top, but to my mind it's just this kind of individuality that an environment like this needs to give it the character of a real studio rather than a word processor with music.

### DIGIDESIGN PLUG-INS

It would be surprising if Digidesign didn't have its own examples of plug-in processors, and indeed its range of TDM tools is among the best known.

DPP-1 is a simple, dedicated pitch-shift program optimised for hassle-free transposition. It will shift up to two octaves either way, with buttons for an octave up or down, coarse shift in semitone increments and fine adjustment in cents. The crossfade time function central to glitch-free shifting is fully adjustable manually, or can be left on auto, which seemed to work perfectly acceptably on most material. Further user control is provided by sliders determining the lowest and highest fundamental frequencies the system will recognise, providing additional optimisation for the material being processed.

The result is very effective pitch shifting straight out of the box, with shifts up to a fourth or more producing few obvious artefacts even on cymbals. Shifting beyond that will inevitably result in *munchkinisation*, unless the new algorithms being introduced by the likes of MOTU are used, but DPP-1 provides far smoother and more acceptable results than many alternatives. Further possibilities are

added by a feedback loop with variable delay, producing the type of effects that in other circles attract names like Barber Pole and Fairy Dust.

D-Verb offers a wide range of reverberation effects with simple but useful control over the most important parameters. Seven algorithms are available, including Hall, Church, two Rooms, Plate and Nonlinear, and all have three basic sizes on offer plus

the usual selection of essential variables to tailor the result to the need. The quality of all the programs is very high, with extremely smooth and natural reverb tails where required, and enough adjustment to produce off-the-wall effects as well.

Proving the versatility of the basic TDM concept, Digidesign has attacked what must remain the most sensitive area of DSP application, that of noise removal. DINR has been around for a while for Sound Designer, but has now been upgraded and ported to TDM. Like other more specialised systems, it relies on taking a sample of the noise to be removed and learning its characteristics, then fitting its set of downward expanders to that learned curve. Although the process is largely automated, several user-parameters allow its mode of operation, and its severity, to be optimised. Considering the price demanded for the mastering-quality, top-end, noise-reduction processes, it would be surprising if DINR matched their performance, but it does produce acceptable results on difficult material, and better results still on less demanding problems. It is accompanied by a hum removal process, which uses two sets of filters to remove mains and other hum, either learned from the input signal or set manually with the on-screen controls. Separate notches can be used to remove nonharmonically related pitched problems, while harmonic filters can generate 300 or 400 notches to remove a fundamental and its harmonics.

### STEINBERG RED VALVE-IT

Surely a candidate for the process you never thought you'd see in a TDM plug-in, Steinberg's Red Valve-It, is nothing less than a valve guitar amp simulator, complete with speaker emulations to stick on the end. It incorporates two stages of valve-type gain with a simple 3-band EQ in between, and can give anything from a clean



**Steinberg's Red Valve-IT valve guitar-amp simulation**

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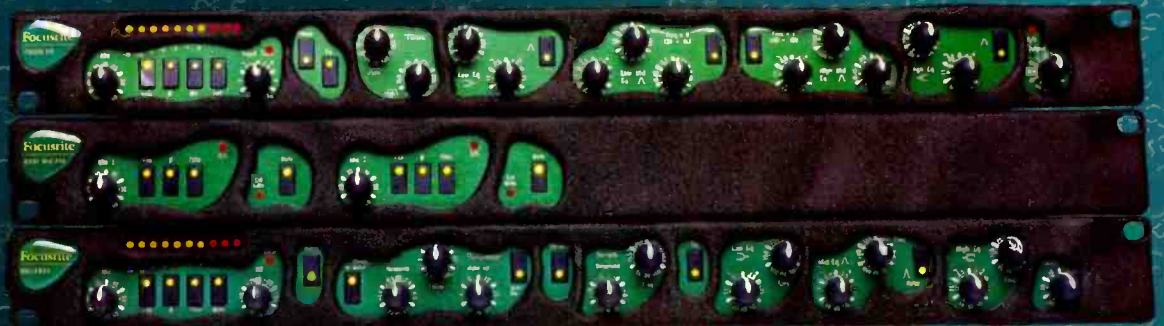
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amp sound through to monster distortion that's good enough to give controllable feedback if you stand in the right place. Just like the real thing, it brings out all the hum and rubbish inherent in the guitar, and has an effective auto-calibrating gate to deal with it.

There is a selection of presets with evocative names like British Crunch, and The Razor's Edge, all of which are starting points for further experiment with the few controls.

The presentation is suitably wacky, with a bright red front panel, mouse-draggable rotary controls, and big digital value displays. The speaker simulation can be used separately or not at all, and has just the two settings which give the hollow coloration of a mic in front of a cheap speaker. All in all this is huge fun, and a poke in the eye to anyone who thinks DSP is about clarity and subtlety. It's also good enough, I suspect, to impress the most sceptical session guitarist as a viable alternative to his favourite do-it-all processor.

## WAVES

Waves has been committed to TDM for some time, and its original suite of dynamics processors, EQ, Gerzon-designed stereo manipulation, and level optimisation is now on Version 2.1. New to me this time around, however, were the PS22 Stereoizer, and TrueVerb.

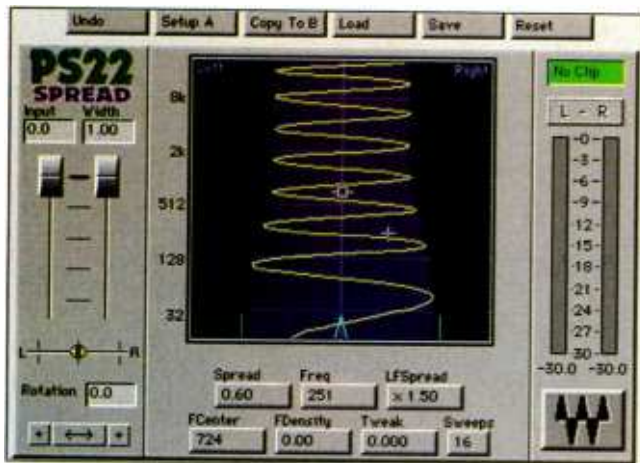
The Stereoizer sets out to create a stereo image from a mono source, using complex splitting techniques controlled by dragging crosshairs round an unusual graphic display. I've never yet heard anything that does this convincingly, and although the PS22 has reduced some of the more unpleasant artefacts it hasn't got rid of them altogether. Personally, I'd prefer to leave the signal in mono, but others might think differently.

TrueVerb, on the other hand, is a very impressive and versatile set of reverbs, all having comprehensive controls for the usual range of parameters. Its sound is smooth and convincing, much more in line with the capabilities of the existing Waves range. Waves is now pretty close to having a plug-in for just about every standard mixing requirement, and a complete suite of Waves software makes a good starting point for a comprehensive TDM collection.

## DESPER SPATIALIZER PT3D

Desper Laboratories' Spatializer technology has been going great guns in recent years, yet although it has been used in films, records, live events, computer games and TV sets, an awful lot of people have never heard of it. Perhaps that could change now that it's available as a TDM plug-in.

Spatializer is part of the drive to achieve more than stereo from two loudspeakers. Its main function as far as the PT3D plug-in is concerned is the expansion of a complete stereo mix out beyond the speakers, bringing it into the room



Waves' PS22 Stereoizer creates stereo from a mono source

and enveloping the listener to an adjustable degree. Using it is as simple as it could be, with one control for the spatial impression and another to reinforce the centre image which can suffer if the width is pushed too far. Bar-graphs show levels for left, right, sum and difference, as well as a width display resembling an old magic eye. The effect produced can be subtle and effective or unsubtle and attention-grabbing as the material demands, and is very tolerant of listening position, and unusually kind to the mix.

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# Amek ANGELA II

Launched in the early 1980s the Angela mixing console had a character that many came to enjoy, and even respect. But the Angela II is more than simply an upgraded desk; it meets many new needs as **ZENON SCHOEPE** points out

**THE NUMBER OF DESKS** that are well known and loved enough to qualify for a Mark II version in whatever form are fairly few and far between, but Amek's long standing Angela is certainly one of them. Angela was an important console for the manufacturer as it strengthened, and to an extent made the company's name and reputation, but what it meant to users was slightly different. It has to be said that the Angela did much to establish the concept of 'a lot for less than you'd think' in mixing consoles and it added credibility in a sector of the market that had gone without until then. For many it represented the price point at which things got serious, and it was also ever so slightly quirky, enough to introduce an

element of uniqueness, and pride, and enjoyment, and it still rates surprisingly highly in the top five of many engineers regardless of cost.

**Angela was praised for its mic preamps and EQ, with a lot of flexibility by virtue of two separate in-line signal paths running through each module, and this is still the case with the Angela II**

the original was introduced, Amek sold more than 500, and just how much things have changed is illustrated by just how different the Mark II version is.

It would be a mistake to regard the

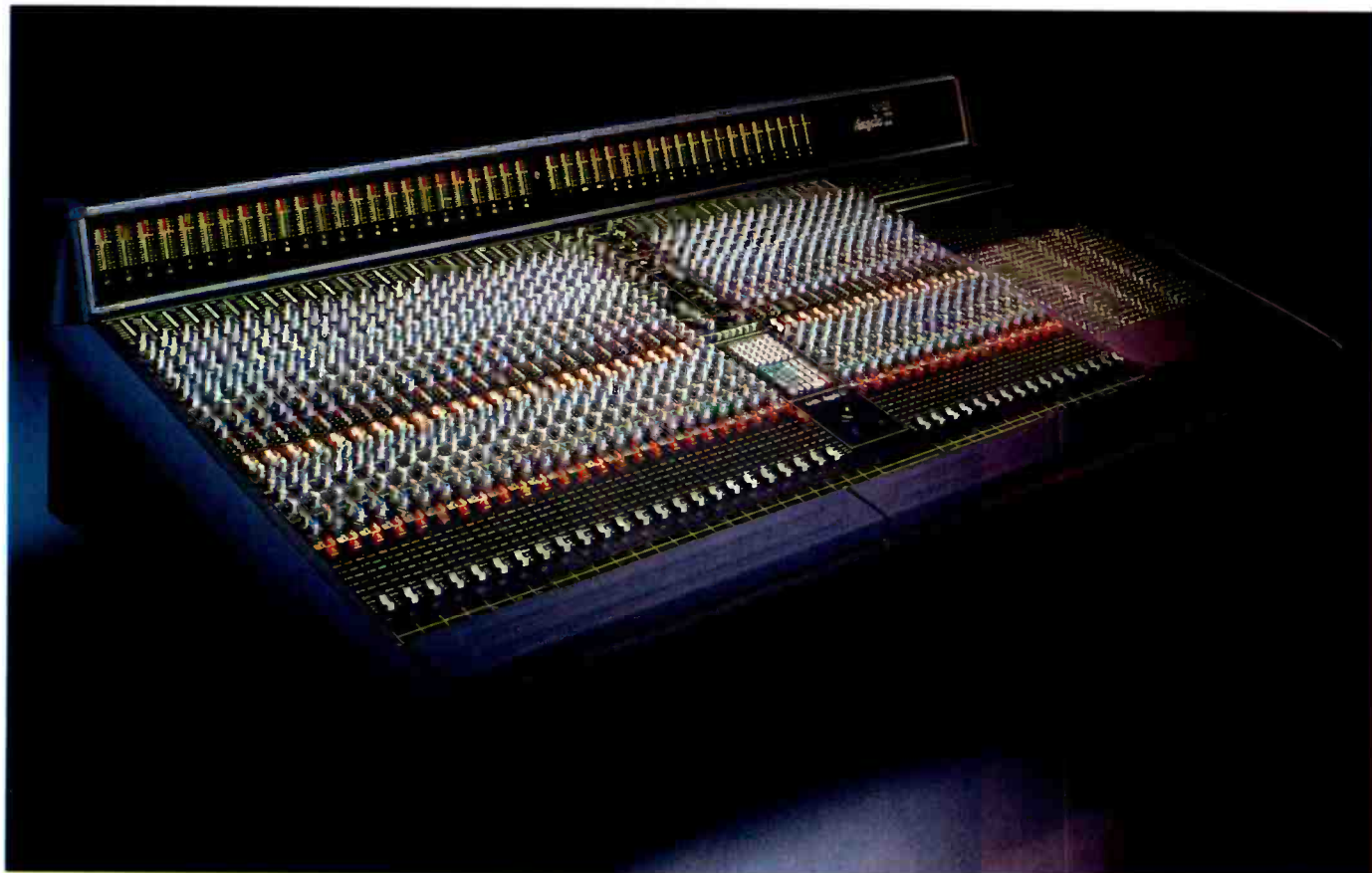
While there are still a lot of Angelas earning their keep out there, you have to admit that its design is now a little inappropriate for modern requirements, and it seems fitting that Amek should preserve the name on an updated board that sits more comfortably in its well featured product range. Times have changed a lot since 1982 when

**The Angela II continues Amek's established concept of 'a lot for less than you think'**

Angela II as just an upgraded desk particularly as many of its features were tied to manufacturing, and the needs of the day; but some of the principles have been retained in the new model. Angela was praised for its mic preamps and EQ, with a lot of flexibility by virtue of two separate in-line signal paths running through each module, and this is still the case with the Angela II.

Each path in the Angela II module has fader and mute automation via SuperTrue, and identical 4-band EQ plus access to 24-bus routing and 8 auxes. The desk can be part filled and will stretch to 40 modules for 80 inputs at remix, and the idea is clearly that you put a bit of thought into the initial wire-up, and then leave things where you can find them.

A patchbay is included, and SuperTrue also enables the automation of solo switches while the company's Virtual Dynamics digitally controlled analogue dynamics and gating package is also standard with one processor per module, along with the relatively recent introduction of VFX MIDI remote outboard effects unit





control all of which can be stored as part of mix data. I will not dwell on the specifics of SuperTrue automation here as the system is established, now well proven, and can be found in varying levels of sophistication across the Amek recording console range so it is not specific to the Angela II.

This desk is a relatively impressive piece of real estate with Amek's traditionally generous front-to-back dimension countered by a steeper-than-most forward rake that aids top of the strip visibility.

There are many similarities to the Amek Rembrandt desk (*Studio Sound*, May 1996) which together with Angela II and the Galileo share the same frame. However, if we want to be accurate Angela II is more of a replacement for the now discontinued Einstein board. If comparisons have to be made then it is the Rembrandt that best fills the gap left by the original Angela. Angela II can be regarded as a less well featured Rembrandt with less EQ, fewer auxes, and fewer central control functions.

**IF WE START** by looking at the duplicated dedicated sections of the input module we can move on to the bits that are shared by the Channel (short fader) and Mix (long fader) paths. EQ is a far cry from the identical overlaying band arrangement of the original Angela which still has its fans. The new section is excellent in a typically excellent Amek sort of way in offering 4-bands with  $\pm 18\text{dB}$  switched fixed frequency HF and LF and swept  $\pm 14\text{dB}$  mids plus a  $12\text{dB/octave}$   $120\text{Hz}$  high-pass filter.

HF covers  $6\text{kHz}$  and  $12\text{kHz}$ , LF operates at  $40$ ,  $80$ ,  $120$  and  $240\text{Hz}$ , while the mids sweep  $400\text{Hz}-18\text{kHz}$  and  $100\text{Hz}-4\text{kHz}$  with the low mid offering two switched Q values of  $0.7$  and  $1.5$ . Overload LEDs for each relevant signal path are also found in these sections along with EQ bypasses.

Both paths have automation Select switches with the usual green and red Read, Write, Update LED indicators, SOLO and MUTE switches, the Mix

**This desk is simplicity itself, and is so much easier to grasp in concept than the original Angela must have been. If the desk has a highlight it has to be the EQ, although this is now such a predictable observation to make about an Amek. On paper it looks almost frugal, but you don't have to mess with it for long to realise that it's good stuff**

path benefiting from a larger illuminated stampable one.

Routing goes out to 24 buses via 6 paired bus switches operating in conjunction with a shift switch to address the upper dozen. The Mix path, rather than the default Channel path, can be switched to the routing on a button.

The eight auxes are presented on 4



**Angela II: a desk that is steeply raked for greater strip visibility**

dual-concentric pots, two pairs of these are arranged as stereos. Blocks of four can be switched pre-post, or onto the channel path, which amounts to a sensible and useful split for most applications. Additionally, the last stereo aux can be switched to address the 24-track routing.

The Channel path has mic-line switching passing through  $+10\text{dB}$  to  $+60\text{dB}$  mic and  $\pm 20\text{dB}$  gain stages, phantom power, phase reverse,  $20\text{dB}$  pad, pan pot, and routing to the main stereo.

The Mix path is completed by Bus-Tape switching, a  $\pm 20\text{dB}$  trim pot, pan and routing to the main stereo. Three-colour LED indicators are also found in this area to display dynamics activity along with an LED to show if the module's single VD processor has been assigned within SuperTrue to the Channel or Mix paths.

**A SINGLE MODULE** houses the main output fader with its automation SELECT switch and 24 pots controlling the multitrack output levels complete with switches flipping each between fixed  $+4\text{dB}$  operation, and fully variable output right up to  $+10\text{dB}$ .

The Master panel includes 8 aux masters with the now established Amek practice of being able to 'blend' auxes 1 to 4 into auxes 5 to 8 individually, that is aux 1 into 5, aux 3 into 7. The purpose of this is to overcome the fixed nature of the Channel-Mix path aux assignment for instances where it's desirable to combine Channel and Mix aux sends, for example in headphone feeds, when otherwise they would have to remain separate. This arrangement is not ideal, because you have to plan to use it, but it is still better than being without it.

There's a 3-frequency oscillator with a level pot

and preset level switch that sends to the slate while talkback, via a mic in the meter bridge, goes to the same plus auxes 7-8 and 3-4 on a nonlatching button.

Four sets of monitors are supported through two level pots, and these can be dimmed, monoed, muted for left and right legs, or cut completely. Aside from the main stereo mix, the control room can monitor 5 2-track returns, and the 8 auxes as 4 pairs.

From here we hit the non-QWERTY sequential alphabetical keyboard with its rather unpleasant squidgey feel complete with keypad, cursor and special keys, plus some function keys that can act as MMC transport controls again as part of SuperTrue.

The automation is controlled from here with lots of short-cut manoeuvres, but most will gravitate towards the built-in trackball for working around the various automation screens.

That really is about all there is to say about Angela II.

**THIS DESK** is simplicity itself, and is so much easier to grasp in concept than the original Angela must have been. If the desk has a highlight it has to be the EQ, although this is now such a predictable observation to make about an Amek. On paper it looks almost frugal, but you don't have to mess with it for long to realise that it's good stuff. It's a really cohesive section with no weak bands or token inclusions. Mid to low control is special, and it's significant that the single switchable Q is placed on the low mid. Voice-band adjustment is exemplary. Two sections of this per module on a desk of this type is a luxury to be enjoyed.



The Angela II is an impressive console that is simplicity itself to operate



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Some of the strengths of Angela II pertain to its simplified features particularly when compared to Rembrandt. Metering on Angela II, for example, has physical switches for following Channel or Mix paths with vu, peak, and peak hold functions. On Rembrandt this is switched from within SuperTrue. Which would you say is handier?

A traditional manual AFL, and solo-in-place system is complemented, as already mentioned, by an automated version that allows the solo data to be written as part of a mix on the automation mode SELECT switches. However, input path solo defeat is selected from within SuperTrue, but a dedicated switch is provided for isolating faders. On balance this isn't a problem.

Unlike Rembrandt, Angela II does not have an input reverse function, and this is arguably the biggest omission from the console. Sure it's flexible strip, but if you really do want to ride a long rather than a short fader for a particular

Ultimately, Angela II is  
a board that will appeal to those  
who appreciate something a little  
more traditional in presentation  
and capability, and don't like  
being restricted by the usual  
in-line hang-ups

signal you'll have to repatch.

Similarly, a methodical approach is required when tracking if 6 paired switch access to 24-buses is not to catch you out.

Thankfully the main stereo fader is down in the fader pod where it should be, and not located way up in the master section as it is on Rembrandt.

Ultimately, Angela II is a board that will appeal to those who appreciate something a little more traditional in presentation and capability, and don't like being restricted by the usual in-line hang-ups—the lack of input reverse accepted. Throw in SuperTrue automation, and its associated software control functions, and you have a very clever console that cannot be regarded as any thing other than outstanding value for money.

This is a desk with a very big heart. 🤝

Special thanks to City of Westminster University, London for making its Angela II available for appraisal.

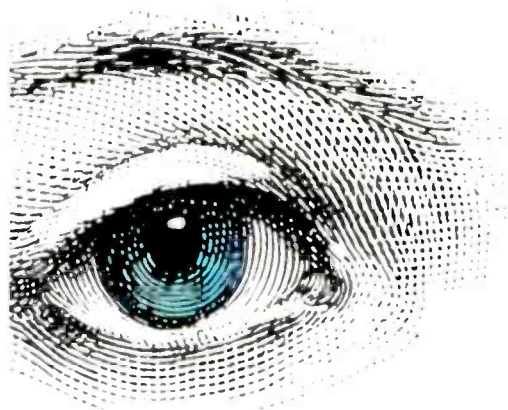
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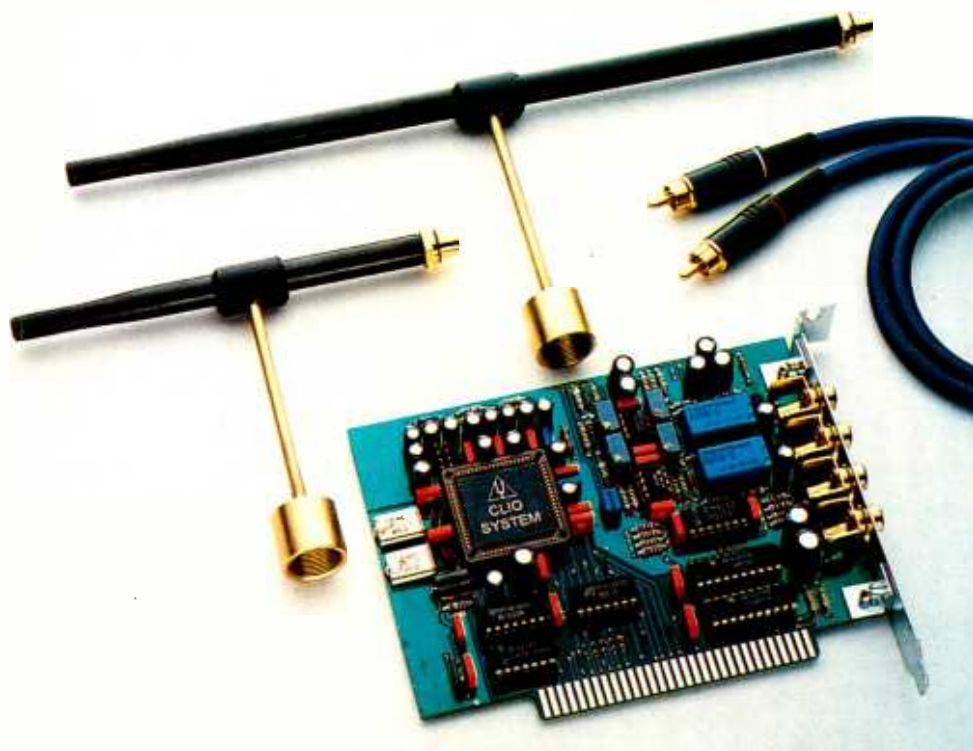
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# Audiomatica CLIO

Clio is a practical acoustical audio analyser supplied as a plug-in card with microphone, manual and software. After rashly buying one for use in loudspeaker development **JOHN WATKINSON** gives his views as a Yorkshireman



expansion slot have been ludicrously over specified for the job, and, consequently, far too expensive. In the mean time I was fortunate enough to place myself on the trajectory of a 386 desktop that was being binned because it was not powerful enough. This turned out in practice to be quite powerful enough, only slowing noticeably on complex waterfall calculations. As Clío is self-contained it doesn't waste any time on housekeeping. The code seems to be amazingly efficient, hence what is considered an obsolete processor is perfectly adequate. I wish a

**Controlling Clío with the keyboard allows one to blast through testing at a fair rate. I'm fairly certain that at least one of the Clío's designers must be a practising audio engineer**

**THIS IS NOT** an impartial review of a product I may never see again, but a set of views formed by actually using Clío in practical loudspeaker development. I was not approached by anyone to write about Clío, I simply had a real requirement for a tool of this kind for developing the Celtic loudspeaker range, and I rather rashly went out and bought one.

As a Yorkshireman, I am pleased to say that it turned out to be extremely good value for money, in fact it has already paid for itself. For those who can't be bothered to read the details, I can summarise right now. Does it work?—Yes. Is it easy to use?—Yes. Would I part with it?—No.

The thing I like about Clío is that it covers such a wide range of test and measurement processes, from the most basic sine wave oscillator and oscilloscope tests, to clever stuff like maximum length sequence analysis and reverberation time measurement. **Table 1** shows Clío's repertoire, from which it should be clear that this is a product aimed at the loudspeaker designer.

**THE CLIO SYSTEM** consists of an 8-bit, half-size ISA plug-in card that will fit in virtually any IBM compatible PC, an electret microphone, various cables, and a

comprehensive manual containing a diskette carrying the software. The host computer requirements are fairly modest: a 286 or faster processor with MS-DOS 3.2 or later will do, provided it has at least 640kb of RAM, a hard disk and EGA video.

The Clío software makes pretty intensive use of the hardware, and cannot tolerate any other memory resident processes except for the mouse driver. It has to have the machine to itself—don't even think of trying to run it under Windows. If anything else is going on in the PC it can play havoc with the time axis and the results will be garbage. Fortunately, it is easy to loop back the generator to the tester and perform a phase measurement. If this is flat then all is well. It is pleasing to relate that it is not necessary to find this out the hard way. The manual is very clear on the subject and, consequently, the installation is straightforward.

In practice, it takes a lot of messing about to go between using the PC with Clío, and for other purposes. As I wanted to do some serious work I decided to obtain a PC that would be dedicated to Clío use only. My ideal would be a portable host machine, but to date the only laptops I have been able to find with an ISA

**The Clío system: a useful and comprehensive package with PC software that is easy to install**

lot of other software was like this. It seems that much of the power of today's processors is only needed to compensate for inefficient software.

The Clío graphical user-interface is quite good, with the usual graphical objects such as soft keys which are virtually pressed by mouse click. As an ergonomist I am of the view using a mouse is fine for analogue-variable control inputs, but for discrete choice controls a keyboard wins hands down. I was pleased to find that in the Clío GUI nearly every screen button has one letter of its legend underlined. Pressing that letter on the keyboard achieves the desired result. Most other commands can be achieved with ESC, Return and the Function Keys. Controlling Clío with the keyboard in this way allows one to blast through testing at a fair rate. I'm fairly certain that at least one of the Clío's designers must be a practising audio engineer, because not only is Clío clever, it's also useable. In a depressingly large amount of equipment these attributes are mutually exclusive. My only operational complaint is that it took a while to figure out how to store and retrieve measurements using the disk.

The microphone supplied with Clío is an electret type which is phantom powered



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### TABLE 1

#### THE RANGE OF TESTS AND MEASUREMENTS PROVIDED BY CLIO

##### Generation of test waveforms:

Sine, Pink, White, MLS

Electrical and Sound

Pressure Level meter

Oscilloscope with freeze function

Inductance-capacitance meter

Impedance vs frequency

Thiele-Small parameter measurement

Sine amplitude

and phase vs frequency

Fast Fourier Transform

Third-octave analysis

THD analysis

Impulse response analysis

MLS analysis

Cumulative spectral decay

Reverberation time Leq calculation.

from the Clio board. The microphone is very long (25cm) and thin, allowing it to make measurements without affecting the reading by its presence. A high-quality microphone cable of useful length is supplied, terminating in very well made phono connectors. Phono to crocodile clip leads are also supplied for general testing purposes. When it is considered that in most PCs the connectors will emerge at the back, these leads are not really long enough. The microphone has a frequency response that is flat enough for most purposes without response correction. Without a decent microphone most of the acoustical measurements would be hearsay, and the provision of a good transducer makes Clio even better value for money.

The startup screen allows the user to branch off into any type of analysis, but a nice touch is that once in a branch it is possible to dive off to the signal generator directly, make an adjustment and then go right back to the branch. This is much more efficient than coming back to the startup screen. Additionally, the signal generator screen controls the input sensitivity, and the phantom power for the mic. It also determines whether the measurements are in the voltage domain or in the acoustic domain. When using many of the branches for the first time it is necessary to run a calibration routine that generally requires input and output to be connected together. Once this is done, subsequent uses are immediate.

I found the impedance sweep feature very useful for testing new drive-unit designs. Being able to measure the Theile-Small parameters is also useful, but of less importance in active speaker design. The oscilloscope tool is useful, especially the freeze function, but is only single trace and doesn't replace a conventional 'scope.

**WITH SO MANY FEATURES** and limited space, I will concentrate on the MLS (maximum length sequence) testing mode. MLS signals allows many loudspeaker tests to be made in real-world conditions rather than in an anechoic room. Normally, room reflections and standing waves make a pig's ear of acoustical measurements, but the MLS technique goes a long way to getting round the problem.

Essentially, an MLS is a pseudorandom bit

pattern that appears like broadband noise to the loudspeaker, (and to a conventional spectrum analyser), but which is in fact a totally repeatable deterministic signal.

The thing about deterministic signals is that it is possible to lock on to them in the time axis by comparing with a reference signal. When the reference and the input are coincident in time, there is a high correlation between the two. MLS analysers use this principle to lock on to the first version of a sound reproduced from a loudspeaker so that this can be captured before reflections arrive. Once time lock is achieved, the impulse response of the speaker can be obtained by comparing the signal from the mic with the original.

Time averaging of several impulse responses can reduce the effect of ambient noise. From the impulse response it is then possible to calculate the frequency and phase response. In fact the phase-response measurement can be very good indeed because the correlation process effectively removes the delay caused by the distance between the speaker and the mic. Conversely the position of the acoustic centre of the transducer can be located.

In practice, the output from the mic is captured, and then the operator has to specify a time window outside of which the data are ignored. The end of the window is positioned just before the first reflections arrive. As with all transform-based analysis, the shorter the window, the worse the low-frequency analysis gets (something to do with Heisenberg's uncertainty theorem). Consequently, if this technique is used in a very small room, only the high frequency part of the analysis will be useful. Although the measuring space does not have to be anechoic or silent, it does have to be fairly big. The problem with MLS testing in most office or domestic space is lack of height, where around 3m is a practical minimum. This may not be a problem in the garden.

The manual provided with Clio points out all of the pitfalls of MLS testing for the uninitiated and even has a bibliography for serious study.

I have very few complaints about Clio. There is a horrendous switch-on thump on the analogue outputs so it is important to remember to disconnect the speakers before powering the computer. The manual is full of good information, but it's not in a very sensible order, and there's no index. The treatment of disk files is not very good, and would be helped by a practical example. The oscilloscope would be better if it was double beam.

Having said that, without a Clio it would be necessary to spend a great deal more to get these facilities. At the end of the day Clio effectively helps me to design loudspeakers, and that I appreciate. ☺

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# Tascam DA-38

The competition between the ADAT and DA-88 digital multitrack machines took a new twist when Tascam introduced the DA-38. **DAVE FOISTER** takes a tour of this serviceable junior machine and reveals its unexpected advantage

**FEW IDEAS** have made such an impact on the recording business as the modular digital multitrack. The transformation it has brought to all layers of the recording process, from the bedroom studio to the world-class film-dubbing complex, is all the more remarkable for the fact that there have only ever been two players in the game, with two others licensing their formats from them. This has produced a parallel series of two-horse races, with Tascam and Alesis vying for dominance across the whole spectrum of applications. Alesis was the first to bring out a replacement for the original machine, but now Tascam has expanded the DA range with a second model offering some increased spec and more streamlining at a lower price with only one significant trade-off.

The most obvious change is the size (the DA-38 is 1U smaller than the DA-88) and this, coupled with the lower price, could suggest that this is a pared-down, entry-level machine. In fact it is neither that, nor a replacement, but an additional model designed for those applications which do not need its most significant omission—time code.

In all other respects it is fully compatible with the DA-88. Not only are the DTRS



all the facilities the SY-88 would bring to an 88-only system.

It is largely the lack of its own time-code facilities that allows the DA-38 its smaller profile, as all the switches for generation, reading and display are missing. Some other functions have been paired up on 'shifted' buttons to save space and clutter, but the features are all still there and almost as convenient to use. Thus full monitor switching including automatic source-tape selection is available, as well as automated punch in and out with rehearsal mode and frame-accurate punch position editing.

Transport control is unchanged, complete with shuttle wheel, and lockup between machines is tight and fast. I found that however far the master machine had run in fast wind the slave would lock to it within a couple of seconds of hitting Play, and often in a second. Certainly with small tape movements the delay in the slave joining the master was small enough not to be a problem.

**SONICALLY** the new machine is excellent, courtesy of new convertors, using 18-bit A-D convertors with switchable dither. This dither can also be used on digital inputs as the TDIF interface can accept up to 24 bits with a suitable interface.

Another important new facility on the DA-38 is an internal matrix for routing the inputs and the recorded tracks both within a single machine and around a multi-machine system. Thus any of the eight analogue inputs can be sent to any combination of tracks without external repatching, and tracks can be copied to any other tracks within a machine or across to another simply by setting up the required

**Tascam's DA-38: no time code, but a saving can be made when piggy-backing with DA-88s**

routing with the straightforward menus.

Various functions are accessed by this scrolling menu system, but as they are mostly set-and-forget system parameters that's probably the best place for them. All the things that are likely to be needed routinely during a session are there on the front, with plenty of juicy orange LEDs that blink or light steadily to show the status of the various functions.

The DA-38 comes across as a splendid machine, fully capable of meeting the demands of professional use and keeping up with an involved session. Given that its inability to handle time code with the rest of the world can be overcome simply by adding one DA-88 to however many 38s are needed, it's hard to see any reason for assembling an all-88 system any more when the 38's price is lower and four machines fit into the space of three of the others. Whether Sony will be able to squeeze all the XLRs onto the smaller back panel to produce a rebadged companion to the PCM-800 is another matter, but the DA-38 can only help to reinforce the Tascam MDM's position in the marketplace, proving that the format was good enough in the first place to continue virtually unchanged as the range expands.



The DA-38 comes across as a splendid machine, fully capable of meeting the demands of professional use and keeping up with an involved session

tape format and the I-O connector arrangements identical, but the inter-machine synchronisation is the same, so that multiple DA-38s can be intermingled with multiple DA-88s up to the system limit of 16 machines. Compatibility even extends to the remote controllers, with both the simple RC-808 and the comprehensive RC-848 common to both machines. The ability to mix and match the machines reduces the negative effect of the 38's lack of external synchronisation, as a system can be assembled with one DA-88, with its SY-88 sync card, and as many DA-38s as required, whereupon the whole lot locks together and also interfaces fully with the outside world, with

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# Akai DR16 WITH SUPERVIEW

While others focus on the one-stop DAW Akai has gone unnoticed in its quiet revolution of family values. They provide an integrated digital product range. **ZENON SCHOEPE** traces the genealogy of the DR16 hard-disk recorder-editor

**AKAI HAS QUIETLY** been putting together a fairly spectacular and complete family product range while other manufacturers have been busy creating their one Frankenstein monster DAW. With the exception of the original DR4d the company can now offer media compatibility and similar operational presentations through the DR8, the DD1500, and now the DR16 with the most recent addition of the DD8 which does the best impersonation of a random access replacement for digital modular multitracks to date.

The DR16 is part of this wider scheme which has, perhaps, not been spotted by other manufacturers. With Akai it is now possible to go completely digital front to end without too much trouble or expenditure. The DR16, like the DR8 before it, is essentially a derivative of the flagship DD1500 which should be regarded as the complete and unrestricted manifestation of Akai's technology. Where the DR8 was indeed restricted to just 8 tracks the DR16 predictably realises 16 tracks making the distinction between itself and the DD1500 harder to ascertain.

It is with SuperView that the DR16 moves on a stage in intelligence and answers the lack of visual indication of track activity and a remote

Well its cheaper for starters, it's a stand-alone rackmount without the DD1500's rather excellent remote, but carries similar mixing and EQ option capabilities (like the DR8), but arguably less accessibly. It's worth pointing out at this stage that Akai is clearly not frightened to slice the salami to suit application specific demands, and as a consequence the range is extremely well defined in purpose, capabilities, and, for that matter, the depth of the buyer's pocket.

Internally the DR16 is for all intents and purposes a DD1500, but will clearly appeal to a different wish list, and role in life. However, the biggest trick up its sleeve is the recent introduction of the SuperView graphics display package, also available for the DR8, which imparts DD1500-style



visualisation of track and editing functions, and has the clever skill of being able to harness a standard PC-style keyboard to act as a type of remote.

The functionality of the DR16 is closely aligned to that of the DR8 with the exception of the number of tracks available, and I would refer readers to the review of that unit (*Studio Sound*, May 1995) for a detailed appraisal. However, some of the smart attributes are worth mentioning, as are some of the differences.

The DR16 is a 16-track, hard-disk, recorder-editor working on tape-machine-style transport keys with predominantly dedicated keys for editing functions, and a built-in 16-channel programmable mixer that can be supplemented by a 16-channel EQ option. It comes with eight analogue inputs (switchable for three sensitivities and controlled on front-panel gain controls), and 16 outputs (switchable for two levels) all on balanced jacks. The last four outputs can be switched to output the aux sends and the master output in a Mix mode.

Converters are 18-bit, 64x oversampled A-Ds on the inputs, and 20-bit, 8x oversampled D-As on the first 12 outputs, with the interesting inclusion of 20-bit, 8x oversampled D-As on the last four.

You get AES-EBU and SPDIF I-Os as standard, along with a SCSI expansion port, external sync connector and remote connectors for daisy-chaining eight DR16s, or combinations of DR16s, and DR8s. Other slots can be filled with SMPTE, MIDI, ADAT, RS422, and biphas interface cards, so the machine is predominantly, although not exclusively

**The DR16 is a 16-track, hard-disk, recorder-editor with dedicated keys for editing functions, and a 16-channel programmable mixer**

aimed at post.

Visually the DR16 and DR8 are extremely similar; the biggest difference centring around the use of shift switches to increment the blocks of eight CHANNEL ON and RECORD-INPUT select switches. Sixteen bar-graph meters normally follow the tracks, but can be switched to show aux send, bus and master levels.

Routing is by definition a little wider ranging than that on the DR8 for obvious reasons but internal digital bouncing is part of the package.

For the record, it is worth mentioning that in extreme cases the DR16 will not play back all 16 tracks simultaneously, and I was advised that this is most likely to occur when attempting multiple simultaneous track punch-ins. However, it is not something I have encountered.

The DR16 has the DR8's excellent Take function for storing five alternative takes on single button access. A track, a section of a track, or a selection of tracks, can all be stored as a Take. One of the smartest things the DR16 can do is to arrange its data in Projects thereby enabling numerous Projects to reside on disk simultaneously, providing you have enough space for them. The Take function can play a role in these as Takes can serve as a means of copying audio chunks or complete sections between different Projects. This means you can effectively perform completely different versions on the same audio.

Projects also play a part in the backup routine, which is to DAT—it is relatively slow, but is reliable in Akai's implementation, and is still one of the cheapest methods. The whole disk or just one Project can be backed



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up in this manner. It's also worth pointing out that such Project backups can be transferred to the DD1500 in line with the DR16's perceived position in the postproduction chain. Projects, which can be named, can also be deleted and loaded selectively.

With the ADAT port option fitted, backup can be performed to this modular digital multitrack.

Recording is 16-bit linear PCM to up to eight drives at sampling frequencies of 48kHz, 44.1kHz, 32kHz, and 44.056kHz. Points of note in common with the DR8 include 100 autolocate points, 9 direct-access locate points, absolute and relative time modes, tempo mapping, adjustable preroll, varispeed playback, automated punch in and out, and an excellent jog-shuttle dial.

Editing centres around entering In and Out points for the intended action for tracks selected on the CHANNEL ON and TRACK RECORD keys for Copy, Insert and Move, Move and Insert, Insert, Erase, Delete and Slip. There's an Undo, and the process is simple and easy to grasp. However, we're still effectively dealing with butt edits, and this remains one area that has not kept up with the evolution of the DR hard-disk family.

**IT IS WITH SUPERVIEW** that the DR16 moves on a stage in intelligence and answers the lack of visual indication of track activity and a remote. Also working with the DR8, the IB807V VGA board slots into the back of the unit and gives a high quality, full-colour, monitor display, while a standard PC keyboard can also be connected to control editing and transport functions in addition to naming sections. You get one display, which can be zoomed in and out for track detail, that tracks audio movement perfectly and smoothly, with no jumping, juddering or creeping. It's a work of art, but simply unveils capabilities that are in the DR16 and DR8 anyway—remember they are derivatives of the DD1500.

The only major feature that SuperView does not give you is remote jog-shuttle control from the keyboard, but in practice this is less of a problem than it might seem. On maximum zoom you can clearly see the audio activity which can be pinpointed accurately but there are still times when resorting to the unit's front panel dial is essential.

SuperView does add one significant trick. While you can continue to edit in the normal front panel manner it introduces a Clipboard Edit function that allows five clips of In and Out points together with copy, delete or erase processes to be stored and applied later. This really is a bonus and takes away some of the DR16's requirement to make a decision on the spot. You can copy, cut, erase, discard, paste and insert to, and from, the clipboard. Combined with the Take function it really opens this machine up.

SuperView has boxes for the named Clipboard and Take audio, in addition to full-time 16-track meters, the four output meters, and the project name. There's a large time-code display, and a scrolling depiction of the 16 tracks running across a Now line, and track statuses are duplicated above the meters, and to the left of the 16 tracks. The colours are pleasant, unmistakably different to reflect different processes, and the whole presentation is clear.

Operation from the QWERTY keyboard takes a little getting to used to, but pays dividends with transport control taken care of by the function keys. Predictably the SHIFT, ALTERNATE and

CONTROL keys are used heavily in many of the commands with combinations of these selecting tracks in conjunction with numeric keys 1 to 8.

Most functions require the holding down of another key, but the important ones like Transport Control, Screen and Timescale Zoom In-Out (using the cursor keys) and the clip editing processes are on dedicated keys—cut, copy, paste, insert, erase and discard are performed on the keyboard's DELETE, END, PAGE DOWN, INSERT, HOME and PAGE UP keys respectively. There's a logic and consistency to the keys used which once learnt is hard to forget.


You can also scroll up and down on zoomed tracks, and increase and decrease the waveform amplitude. Naming and entering Takes and Clips is relatively straightforward as indeed is storing and recalling locates. Throughout all this, the most satisfactory aspect of using the keyboard is that you can thump it in a way that you never could the front-panel controls. This undoubtedly aids operator satisfaction, and also allows you to position the remote in a way that is comfortable and convenient.

**IF I JUDGED THE DR8** to be a wonderful machine then I would have to say the DR16 is better. While the front panel is largely similar across both units, the DR8 benefits from a little more clarity as the extra tracks on the DR16 have meant the introduction of some shift keys to preserve the general presentation. However, if you need those extra tracks then it's the DR16 you will have to turn to with its useful inclusion of Projects which can make life a little easier, and work a little more creative and unrestricted. Backing up in also less of a hassle. Again I'll point the finger at plain butt editing, although I hear that this may yet be addressed by Akai.

The mixer and EQ section, although hardly natural with its method of dialling in values one at a time is certainly useful for monitoring purposes if you intend to use the box as a stand-alone particularly as you can Solo tracks, although, in such an instance, the ability to fire 99 snapshots against time is questionable.

It syncs impeccably with varispeed to the outside world, and also performs as a useful interface box, especially between MIDI and MTC and video transports if the relevant cards are fitted.

SuperView is such a simple and sensible idea yet adds significant value to what is already a very straightforward machine to use. It also adds some new and useful Goto functions for its associated In and Out points.

The DR16 places few new operational demands on anyone who is familiar with the DR8 or, for that matter, the DR4. Its fast, efficient and slick because it never compromises its core function of recording, editing and syncing. Again, it's spot on. 

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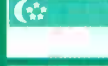
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☞ Unless you have permanent access to a rack of vintage compressors, a unit such as the SC2 would be a particularly worthwhile addition to your effects resources ... (Studio Sound - 1995)

☞ This unit is pretty damn good ... the SC2 is stunningly quiet. It's also extremely distinctive sounding ... It's spectacular ... (EQ - December 1995)



☞ I'm in Heaven ... (Michael Molenda - Electronic Musician Oct 1996)

☞ Joemeek .. Producono una sonorita decisamente individuale che puo piacere a numerosi musicisti e produttori ... (European Musician - October 1996)



☞ The Compression is fantastic. Using just two controls ... a transparent range of compression from a feathered touch to a quilted brick is possible ... (The Mix - September 1996)

☞ The combination of front-end, compressor and enhancer is particularly useful for piping signals directly to tape ( or disk ), bypassing the mixer entirely, but the in-line facility also makes the Pro Channel a powerful post-recording tool ... (Paul White - Sound on Sound - October 1996)

## The Legendary Joemeek User List !!

Tricky, Videosonics, Noise Labs, Grant Headley, Sear Sound N.Y, John Travis, Pulp, Paramount Studios, Disney Corp, Full Flavour, The Tonight Show ( USA ), Sony Mastering, Prodigy, Tina Turner, Leftfield, Brian May, Hootie & The Blowfish, Terry Britten, Hank Williams, Mark Knopfler, Peter Gabriel, ZZ Top, Green Day, The Record Plant, Larrabee Studios Hollywood, Oceanway Los Angeles, The Rapino Brothers, Lisa Stansfield, Simply Red, Cheryl Crow, Paul Weller, "Wind in the Willows", Roy Thomas Baker, Bob Rosa, Edwin Collins, INXS, Toshiba, EMI, Therapy, Radiohead...and many more !!

## Joemeek Compressor

RRP £ 1250 inc. vat

The flagship of Ted Fletcher's Joemeek range is the ubiquitous Stereo Compressor. This powerful analogue device is used by many top producers across the final mix, recreating the warm and powerful sound of the 1960's. The unit is easy to use and very reliable, essential characteristics in today's commercial studio environment.

## VC1 Studio Channel

RRP £ 599 inc. vat

Now in a fully balanced 19" format with stereo linking, +4dB level, DI output, full size metering, variable ratio control and many more new features. The Joemeek Studio Channel now offers the versatile mic-pre, compressor, enhancer direct to tape combination, with the acclaimed 'Joemeek' sound, at a price which can't be ignored. Be prepared to re-master all of your old vocal tracks!

## VC2 Tube Channel

RRP £ 1499 inc. vat

Designed for today's digital studio and as a companion to the famous Joemeek Stereo Compressor, the Tube Channel's classic mic amp, mono compressor and enhancer are themselves enhanced by a powerful tube amplifier for warmth and the classic Joemeek musical punch.

## VC4 Enhancer

RRP £ 340 inc. vat £ 399 inc. vat

After being inundated with requests to produce our enhancer on its own for stereo mixes and mastering, we've done it! The Joemeek VC4 Enhancer will add breath and sparkle to any signal. Make vocals stand out, add an expensive sheen to guitar and bass sounds, or recreate famous drum kits. A seriously powerful tool for final mixes.

## VC3 Pro Channel

RRP £ 254.47 inc. vat £ 299 inc. vat

The Joemeek 'Channel' philosophy on a budget. This box is stunning! A classic high performance microphone pre-amplifier, Joemeek optical compressor and Joemeek enhancer. The Joemeek VC3 Pro Channel is essential when warming up digital sound, playing live or any function which demands the highest quality signal processing on a budget. The Joemeek VC3 Pro Channel will out-perform many similar boxes costing 3 times the price!



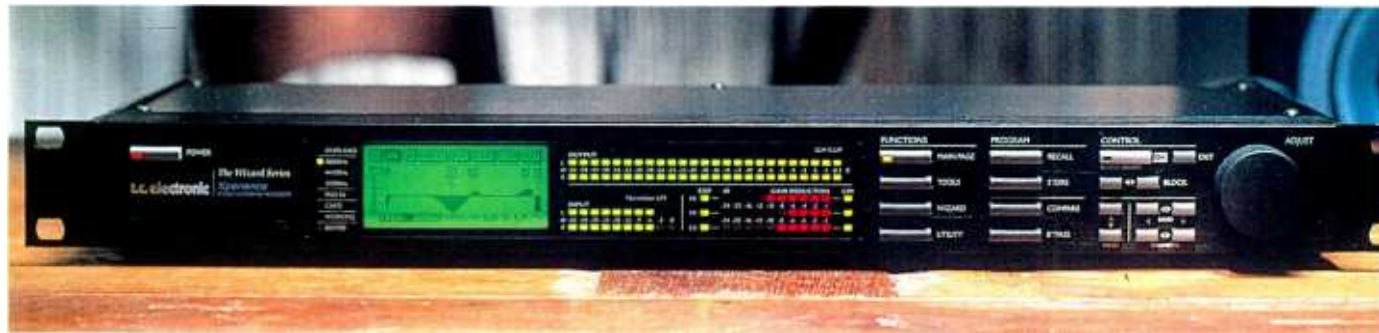
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# tc electronic FINALIZER

A spin-off from the M5000 Digital Audio Mainframe, tc's Finalizer offers sophisticated equalisation, level normalising and dynamics processing for mastering or putting the finishing touches to a mix. **DAVE FOISTER** meets his master



**PROBABLY THE MOST** aspired-to signal processor on the market is the tc electronic M5000. The machine remains physically unchanged after several years in production thanks to its pioneering use of open architecture and consequent upgradability. This design concept has enabled it to sustain its position and add new ideas as they become available. The downside is its price and perceived complexity, and these issues were addressed by the M2000 (The Wizard) which is now joined by The Finalizer (another Wizard), both taking key elements of the M5000 and putting them in more affordable boxes.

Where the M2000 offers a broad palette of studio effects, the Finalizer is intended as a toolbox for mastering, and putting the finishing touches to a mix. It offers a series of modules to be chained together, from flexible analogue or digital input through EQ, level normalising, dynamics, and final digital and analogue outputs complete with dithering to the required number of bits. The whole thing works exclusively in stereo with all the necessary links permanently in place.

EQ comprises high and low shelving filters with variable slope plus three fully parametric bands. This gives a usefully versatile range with the delicacy and precision necessary for mastering EQ, and sounds exceptionally good. Dynamics are in three separate modules for expansion, compression and limiting, and are given huge manipulative power by all being multiband processors.

A common crossover page sets the boundaries between three frequency bands, and each dynamics module can then process the three bands independently if required. This runs right the way through all the parameters, with even the time constants being separately adjustable for the three bands. Further subtleties include variable compressor response from peak to RMS, variable limiter clipping from soft to hard, and a

limiter ceiling tied to digital full scale in terms of hundredths of a dB to compensate for variations in other devices' Over readings.

**THE NORMALIZER** shows a graphic representation of the signal waveform related to the available headroom, and allows the gain to be adjusted to maximise its use. It incorporates its own limiter, with switchable hard and soft clipping, and the display shows the maximum number of consecutive samples clipped during the last second, reinforcing the main display with a bit more detail. It is possible to have the normalizer set itself up automatically just by playing the entire track through it, after which it will make sure that the peaks hit zero and no more.

A choice of three further processes is available as an insert after the EQ. Of particular use for mastering is the Stereo Adjust option, which allows the left-right balance to be tweaked to put the centre where it should be and also uses MS techniques to alter the stereo width. Alternatively a de-esser is available, with full control over all its parameters including time constants, side-chain filter frequency and bell or shelving side-chain response.

The third insert possibility is less expected; the Digital Radiance Generator deliberately adds a variable amount of second harmonic distortion with the intention of producing analogue-like warmth. It is quite a pleasant effect on particularly clinical material, subtle enough to be adjusted precisely without constituting an obvious degradation—no fuzz box this.

What with all the utilities and other setup tools, there's an awful lot to get round on the Finalizer, enough to make it an intimidating minifield if not well implemented, particularly as there's only 1U of panel space to put all the user interface on. Impressively, the graphic screen, and small number of selection

**tc electronic's Finalizer is intended as a toolbox for mastering, and putting the finishing touches to a mix**

buttons combine with the big, solid adjustment wheel to make the whole thing surprisingly intuitive. Nothing's ever very far away, and comprehensive metering is always present, not being part of the LCD window. LED bar graphs show input and output levels as well as gain reduction for all three bands of dynamics, with extra indicators for Normalizer and limiter operation. It all feels good and reassuringly direct and informative, but if ultra-fast setup is required the Wizard is there to help.

Like the M2000 Wizard, the Finalizer is able to ask a short series of questions about the requirements—the nature of the source material, the degree of compression required and the type of spectral balance needed—and then set itself up with a suggested set of parameters. These are then fully editable, and like any configuration can be saved in one of the 128 presets. There are also 128 ROM presets with a wide variety of tailored responses, again to be used as starting points for fine adjustment.

This much power just to tweak a supposedly finished stereo signal could be rather overwhelming, but in fact I found it quick and easy to find my way around it, and produce clear improvements, and enhancements to anything I tried through it. The idea that a mastering engineer's special EQ can improve on something you've already spent days perfecting can be a bit hard to take sometimes, but a couple of hours spent with the Finalizer can show just what the possibilities are for overall polishing and refinement. **S**

## CONTACT

**TC ELECTRONIC, Sindalsvej**  
34, DK-8240 Risikov, Denmark.  
Tel: +45 86 21 75 99.  
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# Fairman TRC

The gentle pleasures of simple valve circuitry are revealed in the form of the Tube Recording Channel; it combines three units in one: equaliser, compressor, and mic preamp. **ZENON SCHOEPE** finds a unit that's a turn-up for the books



**DANISH COMPANY** Fairman has achieved the not inconsiderable feat of combining a handful of golden valve oldies in one unit with the TRC (Tube Recording Channel) by butting together a Fairchild 670/650 compressor clone with Pultec EQ-PM mid, and EQ-P1A high-low clone EQs.

We're the realms of simple circuitry, seven valves, traditional components, and Elma switches in a unit that is a little bit intimidating at first glance with its separate PSU. The single channel box caters for mic (with phantom), balanced line and a front-panel instrument input driven through a gain pot, and then we're into the equaliser which has five sections operating in 2dB steps.

There are 4-frequency high-cut and low-cut filters running down to -18dB, and a 6-frequency +18dB low-boost peaking band. The high and mid bands are 10-frequency variable Q parametrics arranged as dip and boost sections respectively working to maximums of -18dB and +18dB.

A large mechanical vu can be switched to read output level or gain reduction from the compressor which has variable threshold and output level, and 4-preset attack (0.12ms, 8ms, 30ms and 120ms) and release (40ms, 80ms, 160ms and auto 40/320ms) times. The compressor

can be routed to pre or post EQ, and also has key position for frequency dependent compressing through the equaliser.

**THE EQUALISER** does what it ought to do despite the fact that it might look a little restricted by modern EQ standards. The cut-only bands won't be familiar to anyone who has not had the chance to play with some really old stuff. However,

they are useful because they go back to the times when adding and subtracting really were separate, but complimentary processes.

It's impossible to make the EQ sound foul no matter what you do to it. There are no weak bands, in fact it is surprisingly powerful with the parametric bands able to create Qs wide enough to span

the River Thames. Perhaps because of this, the degree of interaction between the individual sections is a gentle pleasure.

**THE COMPRESSOR IS** more difficult to set, but the results are fine if you can balance it right. The reason for this is that unlike your typical solid-state box the attack and release setting presets really do make a difference, and you have to experiment to find the good one. When you slap it hard then it really does topple into saturation which is more extreme than

anything else I've heard with valves in it. That's a handy option, but it doesn't always sound that nice. It's not what I would call a forgiving compressor.

However, run it right and the results are very classy, and it's variable enough to qualify as flexible. Of course, the whole chain sounds like there are valves involved. The mic preamp is superb and in this respect I'd say the compressor is at its best on vocals as it's more fussy with line level signals. It's like rediscovering a mic you thought you knew quite well. Add some EQ and you'll surprise yourself.

The turn-up for the books is, perhaps, the most unlikely capability of the TRC—as an instrument DI channel. It is magnificent. Real quality and depth, and the EQ lends itself so well to the task of processing a guitar or bass.

In all its activities this box is silent and as clean as you'd want it to be unless you want to enjoy those valves. It sounds expensive but then it is expensive.

What's clever about the Fairman is that it combines three units in one and achieves excellent performance but what it doesn't attempt is to do is improve on the old designs in terms of functionality. Not all aspects of old gear are by definition better than those of modern equipment—convenient EQ band, EQ section or compressor bypassing are cases in point. What you have to do is wind back the gain or threshold switches to zero.

It looks retro, but it could have been made to look so much better—the VU meter looks a tad basic—and it's so big, 6u-high to be precise, and it's still only mono. You can link two TRC's VCAs for stereo, but that's a lot of rack.

It is expensive, but it's almost competitive when held against what you could expect to pay for the constituent original units even if you could persuade someone to sell them to you.

Ultimately, the sort of person that the TRC is aimed at is probably already chomping excitedly at the bit. It's an interesting and unique unit. We should be glad that there are still manufacturers that are bothered enough to build this sort of device. Hear it. ☺

**The TRC unit: in the realms of simple circuitry, with glowing valves, and traditional components**

**The turn-up for the books is, perhaps, the most unlikely capability of the TRC—as an instrument DI channel. It is magnificent. Real quality and depth**

**CONTACT**  
 FAIRMAN, Werner Studio-Service, Mose Alle 3, DK-2610 Rodovre, Denmark.  
 Tel: +45 36 72 27 23.  
 Fax: +45 36 72 26 23.



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\* software to be released during 1996

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# New Technologies

The New-born Year beckons with the prospect of plenty of innovation. **DAVE FOISTER** gathers up the last of the AES autumn harvest before tasting the first fruit of 1997

## Galaxy-Valley 730LT

Galaxy Audio, parent company of Valley Audio, has introduced a new digital dynamics processor, the 730LT, describing it as a whole rack's worth of processing power for the price of a single device. The whole gamut of dynamics processes is available, including compression, limiting, expansion, gating, de-essing and ducking, all in the digital domain, and on top of this it offers A-D and D-A interfacing, and stereo width control. Its front panel uses a new 'dead face' display, that appears solid black when not powered but reveals an array of informative LEDs when switched on. *Galaxy-Valley Audio, US. Tel: +1 316 263 2852.*

## Night Technologies EQ3-D

Night Technologies' range of processors known as Nightpro has grown with the addition of a new equaliser, building on the reputation of the EQ3 with its distinctive AirBand high-frequency EQ. Not only is the EQ3-D less expensive than its forerunner, but it adds an extra feature to the AirBand control itself, having a user-adjustable frequency-elbow on its shelf. This operates from 2.5kHz to 40kHz, allowing the effect of the AirBand to be shifted around to avoid noise and sibilance in the source material. The other five bands are retained as before, with

fixed centres, 2.5 octave widths, and 20dB of boost and cut, using NTI's patented circuitry to avoid phase shift and distortion.

*Night Technologies, US. Tel: +1 801 375 9288.*

## Lectrosonics UDR200B

Lectrosonics has introduced a new receiver for its 200 Series UHF transmitter range. It offers 256 selectable frequencies in 100kHz steps, and features a unique 'tracking' front end that retunes as the frequency is changed over the 25.6MHz bandwidth. Its Opti-blend diversity system incorporates two complete channels right through to the audio outputs which are then blended, rather than switching signals earlier in the chain.

Lectrosonics' proprietary AutoSearch function automatically scans the local RF spectrum, detecting RF signals present in the vicinity and displaying their frequencies on the front panel. The same display can also show the user's name, frequency and group names and numbers.

*Lectrosonics, US. Tel: +1 800 821 1121.*

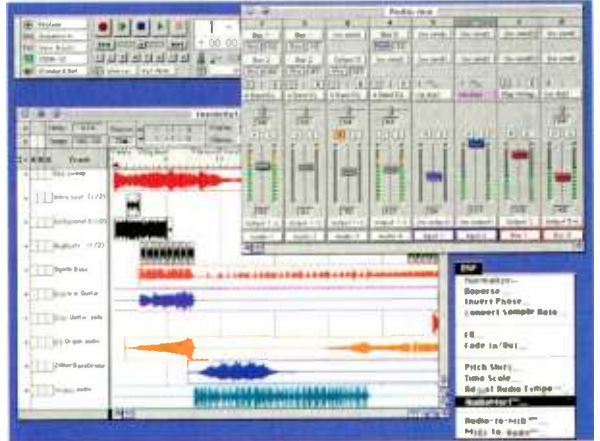
## Opcode Studio Vision Pro

Opcode Systems' Studio Vision Pro now reaches v3.5, with Power Mac Native code, full support for Digidesign TDM busing, new DSP features and enhanced integration with Apple QuickTime. New DSP possibilities include formant-based pitch shifting, allowing pitch to be changed without altering the timbre or timbre to be changed while retaining original pitch, changing male voices to female and vice versa. Also new is Audiomorf, giving 'futuristic resynthesis over time' also using formant technology.

*Opcode Systems, US. Tel: +1 415 856 3333.*

## Earthworks M55

Earthworks has added to its acclaimed range of omni microphones with the M55. In line with the established numbering



Opcode Systems' Studio Vision Pro software reaches v3.5

system, the new microphone claims a frequency response to 55kHz within +1dB to -3dB, being flat within 1dB from 9Hz to 40kHz. Earthworks' investigations into the matter of impulse response and settling time have shown the performance in this area to be particularly good, leading them to state that the microphone is accurate in both frequency and time to a degree that is unavailable from any other microphone they know.

*Earthworks, US. Tel: +1 603 654 6427. UK: Unity Audio. Tel: +44 1920 822890.*

## Auditronics CD Errormonitor

Auditronics, who already produces products for checking errors on 1630 and DAT tapes, has introduced the CD Errormonitor for doing the same job with CDs. It can check for all kinds of errors, both correctable and uncorrectable, including BLER, BERL, E32, NV and Mutes. It also reads details of other information for each track, such as time, length, emphasis, ISRC and copy status, and can produce reports and graphs on a PC. Full documentation, sample output and FAQs are available from:

*Auditronics, Netherlands. Tel: +31 172 419415. WWW: <http://www.cistron.nl/~wpr/wpna.htm>*

Digital Audio Labs now shipping the Big Block V8 multitrack digital audio workstation







**Crown IQ Pocket Serial Interface**

## **Martech MSS-10**

Martech has begun a new range of high definition audio modules with the MSS-10 microphone preamplifier. An unusually styled case, with retro meter and carrying handle, features independent mic and line gain controls, and switchable phase, phantom and pad along with a Mute switch. Martech makes bold claims for the MSS-10's sonic qualities, and for a limited time is backing them up with a 60-day money-back guarantee.

Martech, US. Tel: +1 818 284 3092.

Martinsound International, UK.

Tel: +44 1763 262656.

## **Crown IQ line additions**

Crown has two new tools for its IQ line of intelligent systems equipment. The SLM-8 tests, monitors and reports amplifier and speaker performance, monitoring both impedance (load) and frequency response for eight channels simultaneously. It performs an initial sweep to obtain a reference evaluation after which test curves may be taken at any time, and 16 bi-coloured LEDs on the front panel indicate changes to the stored reference points automatically as well as showing pass-fail status on all 8 channels.

The Pocket Serial Interface allows the Crown Bus to be connected to a portable computer remotely from the central control, linking the IQ System loop to the host's RS232 port. The connected computer can then be used to select components on the Bus, retrieve data and execute commands.


Crown, US. Tel: +1 219 294 8066.

## **Hamlet 503AES Stereo Scope**

Hamlet, specialist in audio metering inserted into picture, has introduced a new model featuring AES-EBU inputs. The 503AES features four digital inputs alongside its video choice of component, composite or YC paths, and produces digitally generated PPM, vu or Nordic bar-graph displays inserted into the video signal. It has peak level indicators and phase-display options, and at the bottom of the screen shows the audio clock-rate, professional or consumer status, and error bits. The AES503 is designed to complement the Video scope 302WVR waveform-vector rasteriser.

Hamlet, UK. Tel: +44 1494 793763.

## **Lucid Technology digital I-Os**

Lucid Technology has two new products for getting digital audio in and out of computers. 

## IN BRIEF

### **MHB Data MiniDisc**

MHB's ever-growing Media Products section is now supporting the emerging digital 4-track market with the MDD14C Data MiniDisc. Personal recorders are already appearing from Sony, Tascam and Yamaha, all using the MiniDisc format, and MHB's disc has been developed specifically for professional audio use, claiming excellence in the key areas of carrier to noise ratio and block error rates.

MHB, UK. Tel: +44 181 962 5000.

MHB US. Tel: +1 207 773 2424.

### **Neutrik mains connectors**

Neutrik has introduced a new connector range designed to handle mains in the style of the Speakon system. The three-pole PowerCon connector comes in two versions for inlet and outlet, and can handle 20 Amps while meeting international and European safety standards. The ground connector makes before the other two, and all contacts are designed to prevent arcing when the plugs are disconnected under load.

Neutrik, Liechtenstein.

Tel: +41 75 232 9666.

Europe: Neutrik (UK).

Tel: +44 1983 811441.

### **Tubistor**

Picking up on the return to favour of the valve, a new device from Tomorrow's Research Today combines the best of tubes and transistors. The Tubistor is claimed to sound like a tube, but to act electrically and physically like a solid-state device, and TRT states that Tubistors are available as exact replacements for all solid-state devices. This means that any existing device can be converted to tube characteristics by having its key transistors replaced with Tubistors, and TRT hopes to see manufacturers bringing out Tubistor versions of existing designs and individuals retrofitting the devices to their favourite equipment.

TRT, US. Tel: +1 619 724 8999.

### **Tactile Technology**

#### **M4000 expansion**

Tactile Technology has added an expansion control surface to its M4000 digitally controlled analogue mixing system. The M415 is similar to the main control surface, but without the output controls, and carries all the input controls including gain, EQ, routing, and motorised faders. Since the system can handle up to 240 input channels, this expansion gives access to much more of the desk at one time. Joining it is a new high-resolution meter bridge, and a video interface allowing all the information from the desk's LCD display to be shown on any TV screen, along with time code.

Tactile Technology, US.

Tel: +1 714 522 8200.



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# RE1000

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For general use, the ADA1000 is designed to replace the low-resolution interfaces often found in DAWs, delivering and retrieving 20-bit SPDIF or AES-EBU. It is an external unit offering the three basic sampling-rates at low cost.

For the Mac, Lucid has a 24-bit NuBus digital I-O card, the NB24. Recognising the large numbers of NuBus Macs still in the market, the card interfaces with external digital equipment via SPDIF and is priced well below other currently available cards.

Lucid Technology, US. Tel: +1 206 742 1518.

## Digital Audio Labs V8

Digital Audio Labs, producers of the CardD PC cards and software, is now shipping the V8 multitrack digital-audio workstation system. The V8 is a modular hardware platform, featuring a main board with an upgradable DSP architecture, and a wide variety of input and output options, including digital interfaces for ADAT and DA-88-type machines. The base configuration is capable of recording and playing up to 16 discrete tracks, and the system is completed by automated mixing and a flexible patching and routing matrix.

DAL has a network of partners, known as Gearheads, who will be supplying application and DSP plug-in software for the V8 system.

Digital Audio Labs, US. Tel: +1 612 559 9098.

## MotU PureDSP

Mark of the Unicorn's PureDSP time-scaling and pitch-shifting technology, previously only available as part of the Digital Performer system, is to be released as a plug-in for Pro Tools and other AudioSuite-compatible systems. PureDSP applies formant correction algorithms to the functions of pitch shifting and time alteration to avoid the *munchkinisation* familiar from most techniques. It claims the ability to transpose monophonic material by as much as an octave without destroying the spectral characteristics of the source, and also to translate male voices into female ones, and vice versa using the optional SpectralShift morphing software.

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



HNB MDD140 Data Minidisc developed specifically for pro audio use

## IN BRIEF

### Gold Lite

Gold Line has introduced what it describes as the world's smallest 1kHz audio oscillator with a phantom power test. The Gold Lite/1k is built into a Neutrik XLR connector, and requires no batteries, powering its oscillator from 12V-48V phantom power. Presence of power is indicated by an LED in the end of the strain relief, and the oscillator delivers a stable 1kHz tone at mic level for identifying and testing lines.

Gold Line, US. Tel: +1 203 938 2588.

### Fostex D15

Fostex has added a new DAT recorder to its range, improving on the D10 with the addition of several new features that make it, according to Fostex, the most affordable chase-lock-capable DAT recorder in the world. The D15 now has an optional external sync card, giving full chase synchronisation, and an RS422 card adding 9-pin control. It has a new graphical user-interface, multiple reference levels and cue times.

Fostex, US. Tel: +1 310 921 1112.

### The Internet for Broadcasters

SYPHA has launched a new trade annual containing technology and management articles, case studies and a useful directory of Internet resources. Topics include the future impact of the Internet on broadcasting, and current practical concerns and considerations.

SYPHA, UK. Tel: +44 181 761 1042.

### Neutrik Z Series

Neutrik has introduced its next generation of XLR connectors. The Z Series are designed to be extremely fast and easy to assemble and to be highly rugged. All the essential parts are enclosed by a heavy-duty rubber covering, and the gold-plated contacts use Neutrik's patented tuning-fork principle, and are available in solder and Mil-Crimp versions.

Neutrik, US. Tel: +1 908 901 9488.

Neutrik, UK. Tel: +44 1983 811441.

### ADgear-GML Over Quality UR-76S

ADgear and GML have joined forces to recreate the now-deleted Urei 1176 mono compressor in a stereo form. The Over Quality UR-76S emulates the Urei in basic operation and panel layout, and adds an input-level meter switch, and significantly greater signal-to-noise ratio.

GML, US. Tel: +1 818 781 1022.

### Audix PH series speakers

Audix' PH-15vs and PH-25vs, popular with multimedia systems, and other applications where small self-powered speakers are needed, have been upgraded. Video shielding has been added, and the amplifier power has been increased to 50W peak. Inputs are now balanced on floating phonos, and extensive protection against thermal overload, DC, and short circuits has been added.

Audix, US. Tel: +1 714 588 8072.

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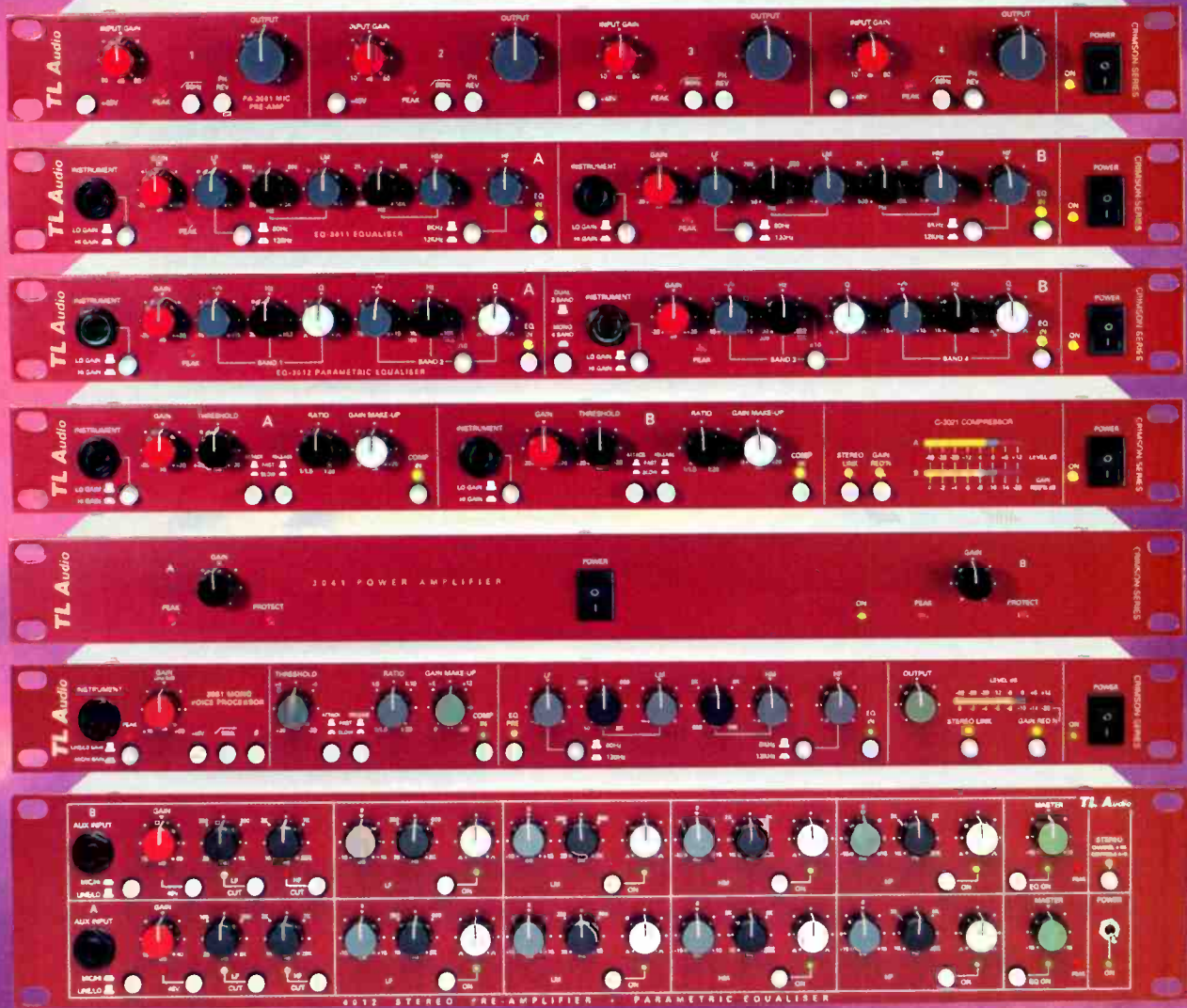
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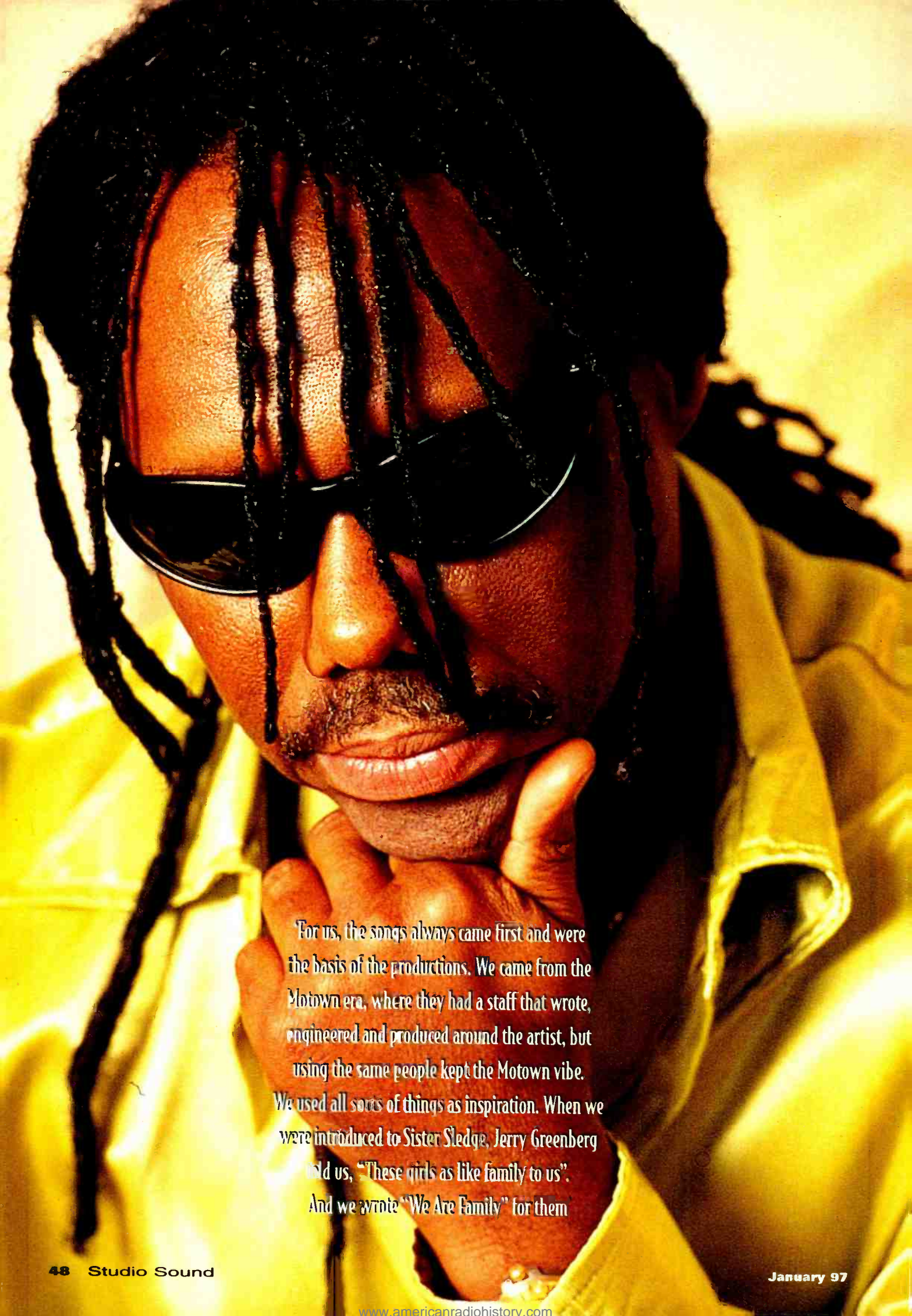


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*For us, the songs always came first and were the basis of the productions. We came from the Motown era, where they had a staff that wrote, engineered and produced around the artist, but using the same people kept the Motown vibe. We used all sorts of things as inspiration. When we were introduced to Sister Sledge, Jerry Greenberg told us, "These girls as like family to us". And we wrote "We Are Family" for them*



After redefining 1970s dance music with Chic partner Bernard Edwards, Nile Rodgers went on to become a major force in record production. Today he tells **DAN DALEY** everything is possible as his writing, playing and production careers are all in full effect

**THE EASE** with which Nile Rodgers reels off names from sessions 20 years past reveals a highly evolved political instinct—one that was necessary to ensure a successful career in the studio session scene that once thrived in his native New York City. Those were the days when session players ruled the streets; the days before personal studio technology and sequencing software substituted programming skills for those of the session player, taking substantial numbers of preproduction sessions out of the studio.

Back then Nile Rodgers wanted in. Nominated by a collision of chops, fate and style, he was able to translate a youth spent playing woodwinds in school bands into a guitar gig with the touring company of the children's television show *Sesame Street* while he was still in high school. Subsequently, with gigs across the US and Europe, he redefined the adolescent notion of cutting classes.

'I had studied clarinet in the bands, and it turned out that the clarinet's range is the same as that of the guitar, so I was able to move to guitar and had an entire repertoire that I already knew', he recalls.

The same guitar that enabled him to fill the spot in the *Sesame Street* company's jazzy backing quartet—where the classics of the ages gave way to the classics of contemporary juvenilia, including the memorable 'Rubber Ducky' song—also gave him an instrument with which to attack the world of contemporary music. The husband of Loretta Long, who played Susan, the female lead, on *Sesame Street*, was the manager of the Apollo Theatre in Harlem. And when he needed a new guitar player for the house band there, Loretta Long recommended Nile Rodgers...

**TODAY** Rodgers is ensconced in a small but densely packed studio in his comfortable home in Connecticut's affluent Fairfield County, an hour or so away from the streets of New York. No studio—no house, for that matter—could comfortably contain the gold, platinum and multiplatinum records that Rodgers has since piled up as a producer and

composer. Beginning with Chic, which he started with long-time friend and bassist, the late Bernard Edwards (who passed away on April 18th in Japan, during a reunion tour with Chic), Rodgers went on to produce records for, and with, artists that covered every conceivable contemporary genre, including Debbie Harry, David Bowie, Duran Duran, Hall & Oates, Peter Gabriel, Sister Sledge, Thompson Twins, Teddy Pendergrass, Philip Bailey, Bryan Ferry, the B-52s, Diana Ross, Cathy Dennis, Paul Young, Stevie Ray and Jimmy Vaughn, Stray Cats, Charlie Sexton, Ric Ocasek, David Lee Roth and Eric Clapton.

A self-confessed workaholic, Rodgers has worked on multiple projects simultaneously, and most recently produced records for Paula Abdul, Marta Sanchez, Ripley Fairchild, Seal and Samantha Cole. At one time he had two rooms filled at Skyline Studios, where he had an office through much of the 1980s, running 24 hours a day with his productions. It is widely acknowledged in NY's studio community that his departure five years ago contributed considerably to that well-regarded studio's demise in 1995. Rodgers' awards beyond records include the Lifetime Achievement Award from NARAS in 1992, three Grammy Awards, and numerous nominations and awards from chart publications and professional organisations.

A talk with Nile Rodgers covers more than his chronology; it covers an alternative and conciliatory approach to culture, one which never becomes anchored to a particular period or genre. From R&B to pop, to rock, to dance, Nile Rodgers' gift is that he seems able to pull off the ultimate magic trick in music: to synergise himself with the artists with whom he's working, and yet to maintain a sense of self that ensures his value to succeeding generations of artists.

'Bernard was working at the General Post Office in Manhattan along side my girlfriend's mother,' Rodgers begins. 'I was playing at the Apollo Theatre, but I wanted to put together a new band, one that was a combination of fusion and Elizabethan music. In those days, fusion music was pop music and I thought of myself as a Renaissance man, I mean, really Renaissance—I wasn't kidding about the Elizabethan music—so I called Bernard up and tried to explain what I wanted to do. He called me the weirdest person he had ever talked to, and then he hung up on me. The funny thing was, Bernard and I had played together before on sessions, but we didn't know it. Eventually we did get together and it became a life-long friendship.

'Back then everything was concept in music. You had groups like LaBelle, and Tony Williams, and Kiss. Everything was concept, and the more outrageous the better. Bernard and [drummer] Tony Thompson and I had been putting together bands with different names and different players. We called ourselves the Boiz, Orange Julius, then the Knife-

Wielding Punks. None of it worked. Even though our music was rock fusion, we were all black musicians except for [keyboardist] Rob Sabino, who was Puerto Rican. The record executives just didn't get it.

'We started to change the music and the sound to something we thought we could get a deal with. Then we hit on this idea after I had seen Roxy Music play in London: keep the rock music, but add R&B and put women in the band to soften the sound and the image. Make it funky and beautiful.

'That was Chic.'

Chic's first recording was to be their first hit, 'Dance, Dance, Dance'. It was recorded at Electric Lady and was paired with an instrumental called *Sao Paulo* recorded at Blank Tapes for the first single. The resulting album was recorded at the Power Station and Sound Ideas, and was among the first engineering projects Bob Clearmountain undertook. Production duties were assumed by Rodgers & Edwards.

The same guitar that enabled him to fill the spot in the *Sesame Street* company's jazzy backing quartet—where the classics of the ages gave way to the classics of contemporary juvenilia, including the memorable 'Rubber Ducky' song—also gave him an instrument with which to attack the world of contemporary music

'We became producers out of necessity,' Rodgers recalls. 'We were musicians first, but the producers who we worked with were either intimidated by us musically, or else they were musicians, too and wanted to jam.

'As musicians', if we were left to our own devices, Bernard and I would revert to fusion so we had to learn to channel ourselves to stay focused. That's where Bernard was smart: he told me, "Every song you write, there's 25 more songs in there". To this day, I still overwrite like that. We also learned about production from Luther Vandross and Ashford & Simpson who used to let us sit in the control room when we played on their sessions.'

From Chic's 1977 debut, 'Le Freak' (the band's third single) went to No. 1, and became the biggest-selling single in Warner Bros Records' history. By 1984, Rodgers & Edwards production work had exploded to include

# C'est Chic!





Debbie Harry's 'Koo Koo', David Bowie's 'Let's Dance' and Madonna's 'Like a Virgin'. 'And Sister Sledge, and Diana Ross, too,' Rodgers confirms. 'People were coming to us because we had the sound that they wanted, but the funny thing was, we would change that sound for each artist, so in a way we didn't understand why they wanted us. For Diana Ross, Bernard and I totally changed our style: she represented class and elegance, so we wrote more sophisticated songs than we did for Sister Sledge. For us, the songs always came first and were the basis of the productions. We came from the Motown era, where they had a staff that wrote, engineered and produced around the artist, but using the same people kept the Motown vibe. We used all sorts of things as inspiration. When we were introduced to Sister Sledge, [Atlantic Records president] Jerry Greenberg told us, "These girls as like family to us". And we wrote 'We Are Family' for them.

**RODGERS' STUDIO** of choice in the early days was NY's Power Station—since renamed Avatar—which was equipped with old Neve consoles.

'It was the best studio in town,' he recalls. 'It's still great, and I still use it. I tried to make a deal to have an office there when I was doing the Thompson Twins record [*Here's To Future Days*, 1985].'

But when Power Station could not accommodate him, Rodgers transferred his attentions and set up at the SSL-equipped Skyline. 'I love to track on Neves, but I like the SSL for its convenience, especially its automation, so the equipment was part of

the reason I went to Skyline, but also because of the maintenance there which was great. And because it was convenient to where I lived.'

The list of engineers whose work has supported that of Nile Rodgers is impressive—not least for the fact that many were relatively unknown before they worked with him.

'I'm a workaholic,' he confesses, 'and I have to have an engineer who can keep up with me. What happened a lot is the assistant engineer, who was usually a lot younger, would put in the hours and he would get promoted to being my main engineer. Clearmountain was one of them, as was Scott Litt, who was with me for a long time; I turned him on to Katrina and the Waves; and he had a big hit with 'Walking On Sunshine'; and now he's best known for his work with REM. Another one was Rob Eaton, who Madonna used to call "Eatin' and Watchin' TV". Jason Corsaro was another one.

'I've always relied heavily on my engineers. I have a very high-tech home studio, but I'm really a musician. My mind is flooded with musical information, and I can't run a console and do arrangements at the same time. I need an engineer who is technically minded, but who also wants to take chances. Stamina is a big part of the job.'

Rodgers' reliance on other engineers does not detract from his own skills, however. One area he is keen to discuss is that of microphone choice.

'With Bryan Ferry, it was interesting. I tried, but could not make him sound like Bryan Ferry, for the longest time, doing his vocals. Then he told me, "My vocal mic

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is an [EV] RE-20", and I said, "What? Who uses that for vocals?". I set one up, and sure enough, he sounds like Bryan Ferry.

'Peter Gabriel is one of the few artists I ever sought out myself to produce. We worked on a film score track ['Out, Out' from *Gremlins*, 1984]. I kept trying to get him to sound like Peter Gabriel and was having trouble. Then he told me, "Here's how you get the Peter Gabriel vocal sound—take every piece of outboard gear you have and put it on his mic, blend it, and don't make it annoying." And that actually worked.

'My personal preference is a Neumann

**'Another thing with vocals is that I'm trying different mics as I go along—like with Paula Abdul. I usually set microphones up press-conference-style and put each one on a different track.'**

tube U-47, although I like whatever works with the vocalist. With Fred Schneider from the B-52s likes to use a ribbon mic, like an old RCA 77 or 44. I gave him one for his birthday.

'Another thing with vocals is that I'm trying different mics as I go along—like with Paula Abdul. I usually set microphones up press conference-style and put each one on a different track. Sometimes I'll go back and do that with a few of the same mics at a different time, just to see if the vocal still sounds the same on them.'

Rodgers' authority with dance music is undisputed, extending beyond production and into songwriting. But his CV extends beyond dance and R&B, and into rock where his role is more confined, yet with which

he has enjoyed similar success.

'I was always a big fan of them,' Rodgers says of his liason with the B-52s. 'I thought the two most innovative rock groups of the time were them and Devo. What I thought was that their records had been kind of thin-sounding before, so I did a lot more layering of instruments and vocals on the *Cosmic Thing* album. It was not done so to be obvious to the ear, but the layering of Cindy's and Kate's vocals—which don't sound doubled and tripled, but they are—especially makes the records sound warmer.

'I also wanted to emphasise that they sounded like a band, so I made the records sound fatter by experimenting with the tuning of the drums. I remember the record that Peter Gabriel made without using cymbals, and I started concentrating on the space that drums take up in a recording. The record actually sounds more expensive than the ones that came before it; it's the antithesis of a garage-band sound, though that is still their roots and that's there, too. The production approach doesn't take away from the fun of the band, but it adds a notch of production.'

The 1990s saw Rodgers work with a preponderance of rock acts that write their own material—Eric Clapton; Wet, Wet, Wet; Bob Dylan; and David Bowie, to name a few. But the close of the decade sees him returning to the more expansive area of dance and R&B acts with responsibilities for songwriting coming back to the fore.

'Now I'm working with a lot of dance and R&B acts again, so I'm writing more,' he confirms. 'And on guitar, what's happened is that, on my earlier records, the guitar was the most rhythmic thing on the record. It had a very piercing, cutting sound quality to it. I used to take the warmth out of the amp. Now, with other things to do the rhythm, my guitar playing has more textures. On the Neve, I go through the console; on an SSL, I'll bypass the console and go direct through a Focusrite or Neve preamp into the tape machine.

'And the music; the music is always changing.' 🎧



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'**RICHARD HILTON**, my main tech, designed my studio. He started with me on the Eddie Murphy soundtrack ['I Got It', *Coming To America*, 1988].

'I still have the first high-end tape recorder I ever bought, a Sony PCM-3324 there, and I keep a 3348 in Manhattan for use there instead of having to rent one. I now use a Pro Tools hard-disk recording system, but I was a die-hard Synclavier user for years—I just donated mine to a music college. The first record I used that on was 'Like a Virgin', but I never compose on synthesizers; I still do that on guitar. I have a couple of Mackie consoles linked together for 48 inputs.

'The room is small, so I monitor off Yamaha NS-10s, and those are fine. There's tons of stuff in the racks but the stuff I can't live without is my old MXR rackmounted stuff: flangers and phasers. I also like the Eventide gear.'

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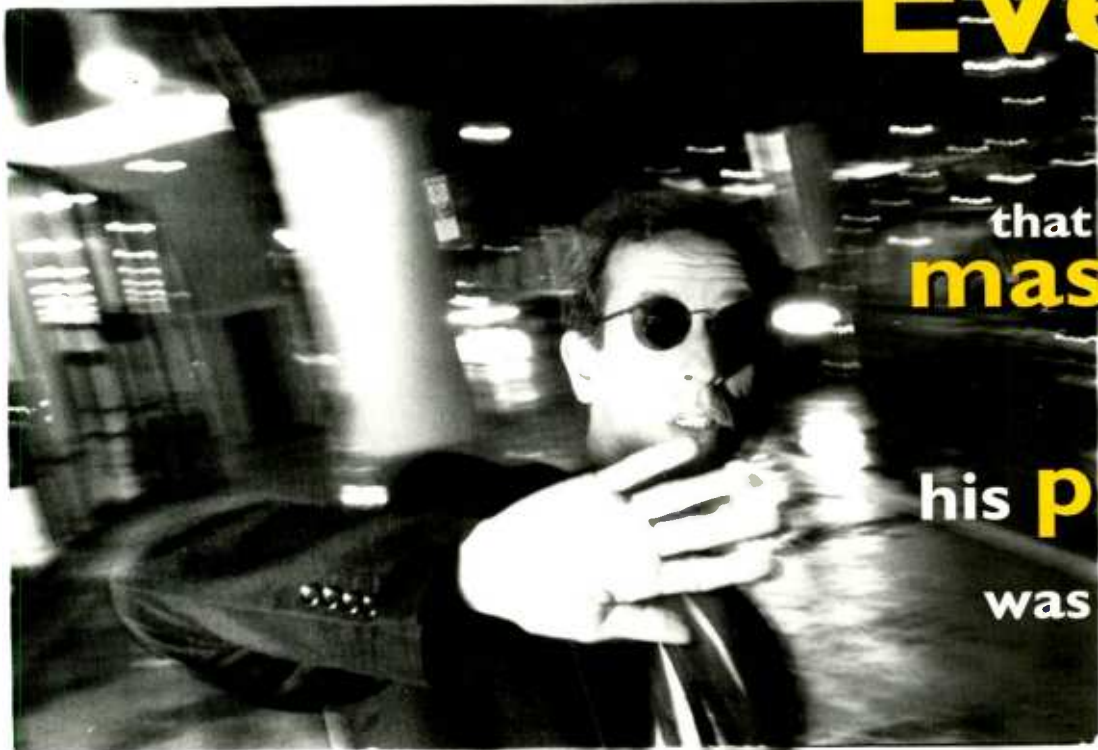
**Steinberg Cubase Audio XT**

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 edit,  
 his **privacy**  
 was all but  
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Sound designer Leslie Shatz narrowly escapes camera barrage

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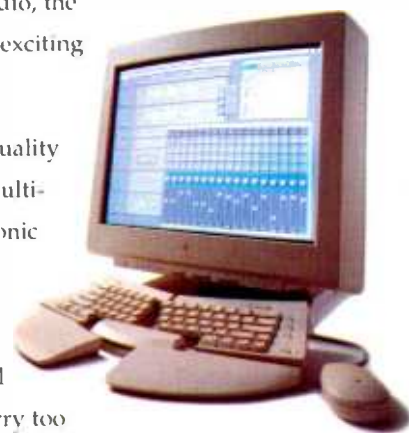


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Termed 'dancing around the bleeding edge of technology' by the crew, *The English Patient* can claim both technical sophistication and Oscar potential. **RICHARD BUSKIN** talks to the film's supervising sound editor, sound recordist, and rerecording mixers

**THE ENGLISH PATIENT** is a movie of the moment. It is garnering much of its critical acclaim not only for the acting and story line, but also for its stunning photography and sound. The latter comes courtesy of an expert crew and the inventive use of cutting-edge technology, not the least of which is a full Sonic Solutions network. Sonic was among the first manufacturers to introduce a networked configuration, and according to the feedback of those who used it on this film it lives up to the company's promises.

'Seeing that any one workstation could access the edit decision list of any other workstation, it effectively meant that the person who was cutting the footsteps would be able to peer over the shoulder of the person who was cutting the music,' says Picture Editor and Head Sound Rerecorder, Walter Murch. 'There were three main sound-effects editors, background editors, a footsteps editor, a music editor, and various assistants all cutting the film, and the network allowed each of them to economise and fine-tune their work to match that of everyone else. That's always been my goal in terms of cutting the sound for a film, but it's never been so easily realised as on this project.'

'The network setup also worked well when we were mixing, and a certain sound effect needed to be changed or fixed,' adds Effects Mixer, Mark Berger. 'An editor would run down to the Sonic station which would have its own video picture, pull up some sound effect off of the network and start to work off-line while we'd go on to do something else. Then, after a few minutes we'd get the call that the effect was ready, so we'd go back, and they'd switch over to stage sync. The time code that was running the stage was also feeding the Sonic, and so we'd bring the Sonic up on our tie-lines and, lo and behold, there was what we'd been asking for.'

'When we'd look at it on the big screen

we might see that it was just a little bit out of sync, but we had a separate control through our Ketchum Advance Retard box, and we'd set that up so that each Sonic that we were feeding had a separate time-code spigot. In that way, from the stage we could advance or retard the individual workstation that was feeding the effect to us without having to crawl to and from the editor.'

Still, Berger points out that there was one difficulty when using the Sonic Solutions

**'The most difficult scenes were the ones in which there was no sound, especially those in the desert. How do you create a sense that it's very, very quiet, even while there is some activity going on there?'**—Mark Berger

system within the Fantasy Records setup, and it was one to which he and his colleagues paid very close attention. 'We used Sondor recorders, which are very good and very flat, and we had Magnatech playback machines,' he says, 'but we found that if something was recorded on a Sondor, played back into the Sonic off a Magnatech dubber, and then put back onto mag using a Magnatech, the sound would change. Due to the different frequency responses of the two recorders and the playback machine, the dialogue would have more transients and lose a lot of the smoothness that we had given it.'

'After all, something that had been recorded

with 1990s electronics without transformers had been played back through 1960s electronics with transformers, edited in an 18-bit digital system, rerecorded back through 1960s electronics, played back through 1960s electronics, had just been bent too much! So what we did was to equip a certain number of our playback dubbers with exactly the same playback amplifiers that were in the Sondor recorders, and then by using those machines to playback and record into the Sonic we were able to achieve an almost perfect match.'

**SET IN NORTH AFRICA** and Italy before and during WWII, the Miramax Films release stars Ralph Fiennes, Juliette Binoche, Willem Dafoe, Kristin Scott Thomas, Naveen Andrews and Colin Firth, in an epic drama of troubled love. It was produced by Academy-Award winner Saul Zaentz, and written and directed by Anthony Minghella.

Principal photography began on the 4th September 1995 at the legendary Cinecitta Studios in Rome. Thereafter the company moved on to the town of Pienza in Tuscany, the coastal town of Viareggio and the Venice Lido, before commencing a 9-week stretch in Tunisia on 13th November for Sahara desert locations as well as those doubling for Cairo in Egypt.

London was the locale for ADR at Angel Recording Studios as well as the recording of the Academy of St Martin in the Fields orchestra at AIR Lyndhurst, while Foley, overdubs and mixing took place back in Berkeley, California. There the Saul Zaentz Company and Fantasy Records occupy a 7-storey complex that houses offices, film editing-mixing facilities, and two state-of-the-art recording studios that are equipped with 64-channel and 80-channel Otari Premier consoles and JBL monitors.



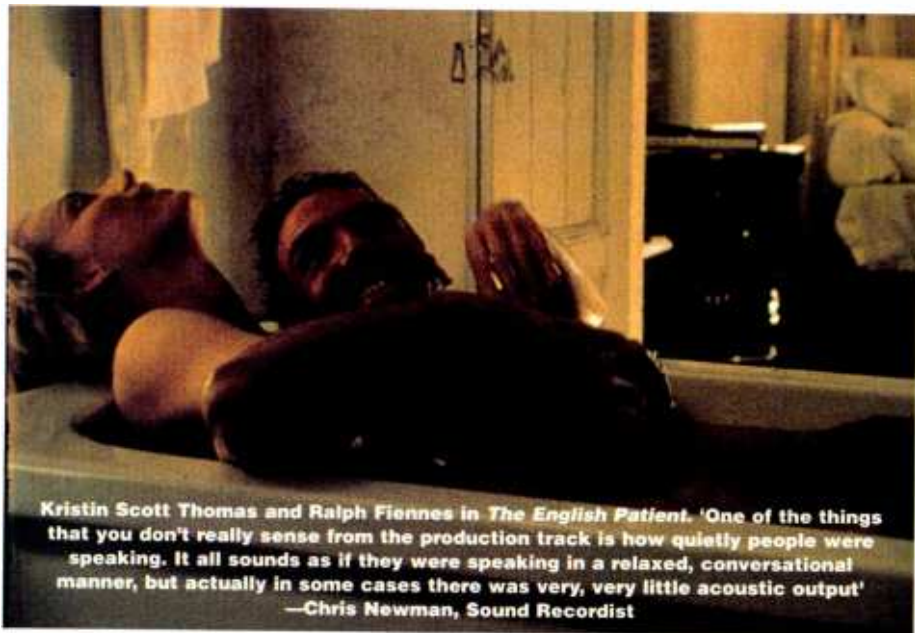
Chris Newman

**THE SOUND RECORDIST  
CHRIS NEWMAN**

'In terms of the dialogue the recorder of choice was the Nagra-D,' he says, 'and the mixer was a 7-input, highly modified Sonosax with four dedicated outputs for the D, and many auxiliary outputs for headphone feeds.'

The primary boom mic was a Sennheiser 816, second choice would be a Schoeps hypercardioid, and we did a great deal of work with Sennheiser radio mics with the multitrack format. One of the things that you don't really sense from the production track is how quietly people were speaking. It all sounds as if they were speaking in a relaxed, conversational manner, but actually in some cases there was very, very little acoustic output, and so getting signal-to-noise was a challenge, whether it was a question of manipulating the background or getting the actors to talk louder. That is why we used the close-miking technique so much.

'I only ever run one tape recorder on the set—my theory is that the machine is either trustworthy, or it is not—and, given all of the weird locations in which we were, we had no problems with the Nagra-D. In fact, to keep sand out in the desert we used gigantic plastic bags over the equipment, and we



Kristin Scott Thomas and Ralph Fiennes in *The English Patient*. 'One of the things that you don't really sense from the production track is how quietly people were speaking. It all sounds as if they were speaking in a relaxed, conversational manner, but actually in some cases there was very, very little acoustic output'  
—Chris Newman, Sound Recordist



Naveen Andrews and Juliette Binoche  
in a scene from *The English Patient*

# A Sound Treatment

worked the controls through the plastic. Occasionally some sand would get in, but it kept it to a minimum.

'When you're the production sound mixer you never know exactly what is going to happen to your material in postproduction, but I have to say that on this film, especially in light of the fact that I wasn't there during the dialogue premixing, the choices that Walter Murch and Pat Jackson made were exactly what I would have done if I could have exercised my aesthetic. The emphasis really is on the words, and the integration of ADR with production is magnificent.'

## FILM EDITOR AND HEAD RERECORDING MIXER WALTER MURCH

'During location shooting I had to return to the United States due to a family medical emergency, and for a time it looked as if I would have to quit the film. However, they wanted me to continue, and so in order for me to catch up and be able to edit at home the film had to be converted to the Avid system.

'After about four months Saul Zaentz, Anthony Minghella and I were all happy with what we had, and then at that point the work on the music began. Throughout the editorial process I was laying up temp music with the film and getting synthesised temp music from the composer Gabriel Yared who was working in France. As a result, by the time that we had a locked picture we also had a



Walter Murch

fully cut music score, although it was all synthesised. After that we simply had to record the music with the orchestra and make fine adjustments.

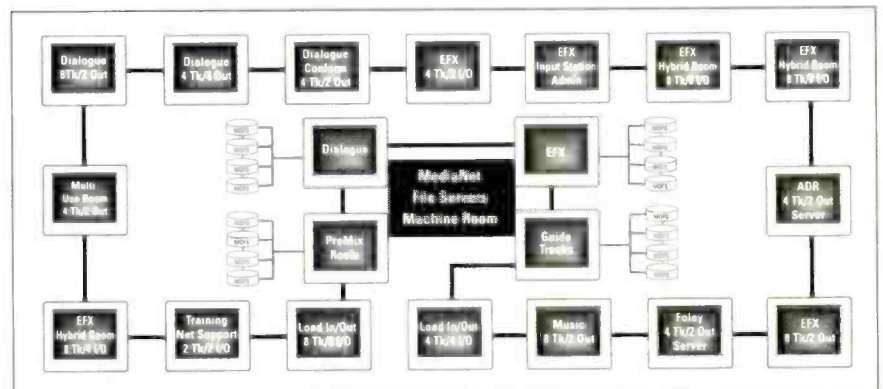
'Once the music had been recorded we did a quick temp mix, and then previewed the film, even though the final premixes had already begun. We were doing two things at once; not only previewing the film and changing it, but also doing the final premixes. Necessarily these were being done to a version that was becoming outdated as we made changes to the picture after the previews, and the Sonic Solutions was great at that stage because we were able to take the 6-track premixes that we'd done to an out-of-date picture, load them into the Sonic, reconvert them to the present version, and then output them either directly onto the stage, onto DA-88s or onto magnetic film. The Sonic made it possible to do a lot of conforming very easily and very accurately.

'The music came to us SR-encoded on

24-track analogue from AIR Studios and we remixed it downstairs [on Stage 2] at Fantasy Records Studios. That was mixed directly on the Sonic Solutions, it was edited on the Sonic Solutions, and then a workstation for the music was with us on the recording stage as we were doing the finals. So, in effect the music last saw mag film when it left AIR Studios. All of the work on the music was done digitally until we made the final 6-track master. In fact we produced a 6-track final mix that folded down to 5.1, as well as the SR version.

'As you cut on the Avid you have four tracks available to you at any one time—you actually have 24 tracks, but you can only manipulate four at once. So, generally speaking, I was cutting one and a half tracks of dialogue, one and a half tracks of music, and one or two tracks of sound effects depending on how intense the scene was. I was sketching out the sound effects as I was assembling the film, and then once we had a lock Pat

### SonicStudio workgroup configuration for *The English Patient*



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## POSTPRODUCTION



**Kyrsten Comoglio editing effects on a Sonic Solutions**

Jackson took what I had done, extended and amplified it, and made it fully realised. The effects came from various sources and they were all fed into the central brain of the Sonic Solutions system which could be accessed by anyone who was cutting.'

### **ASSOCIATE EDITOR and SUPERVISING SOUND EDITOR PAT JACKSON**

'An interesting aspect was the technical implication of having the production sound recorded on a Nagra-D, so that instead of there being two channels there were four channels. We were getting dailies that had been very roughly folded down from four tracks to one, based on Chris Newman's notes in the field, and that was what we were working with in the cutting room. Meanwhile, the sound department was editing on Sonic Solutions, and trying to make all of the systems talk to each other, and take advantage of what digital is supposed to offer.

'That led us to the question as to whether the Sonic could auto-assemble four channels of audio, and how to reconcile the technical specifications of the 20-bit Nagra with those of the 18-bit Sonic Solutions. The Sonic could deal with 20-bit, but it would take up even more drive space. We digitised the Nagra-D production tapes onto many, many drives for the Sonic, and then using the picture department edit list we auto-assembled the production sound, and output it to 6-track mag from which we mixed. However, to come out of the Sonic onto

the mag we needed some fancy D-A convertors, and so, in deciding where we were going to draw the line, we transferred the Nagra sound into the Sonic in several different ways. We truncated the 20 bits down to 18, we dithered them down, we used a fancy D-A convertor going out to the 6-track, and we used the Sonic D-A convertor. So we had four different flavours, but none that really stood out from the others, and we therefore decided to take the simplest choice, which was to truncate the Nagra 20 bits down to 18.

'Then we discovered that the incarnation of the Sonic Solutions software that we were using could not easily auto-assemble four channels of audio. While Chris Newman had made the decision to use Channel 4 of the Nagra as his principal channel the Sonic wanted to use Channel 1, and so at

**'There is no industry standard. The cutting room is in a state of flux, and for the foreseeable future every big job is going to entail a lot of dancing around the bleeding edge of the technology' - Pat Jackson**

every little stage there was some adjustment that had to be made. We had to fool the Sonic into thinking that Channel 4 was Channel 1, and the record-keeping became a challenge that we didn't want to think about.

'Two of the sound editors had never worked on Sonic before, they were much more at home using Digidesign's Pro Tools. By the end of the project I think they recognised that the Sonic is a great system, but for the manipulation of digital sound processing it was much easier to do it in Pro Tools. As a result, for some of the more complicated sequences Doug Murray cut in Sonic and in Pro Tools, and then kind of bumped the Pro

### THE DVD ENGLISH PATIENT

**AT THE RECENT AES SHOW** in Los Angeles, Sonic Solutions was playing a trailer for the film in the DVD format with AC3 digital surround sound and MPEG2 video. This was part of a demo disc that included a variety of different movies which could be listened to either in stereo or surround versions, the purpose being to show off Sonic's DVD Creative premastering system.

'This system uses the DVD Studio which is a new Sonic product,' explains the company's DVD Product Marketing Manager, Mark Ely. 'It does MPEG2 video encoding, and Dolby digital encoding, and it ties into our audio workstation network as well. So, you can do audio preparation on the Sonic studio, and then move those files into our DVD environment to do the proper formatting, proper

authoring and create an actual disc.'

Nevertheless, due to a tight production schedule, the aforementioned AES demo, surprisingly, failed to make use of Sonic's DVD-friendly, first of its kind, 24-bit, 96kHz DAW. 'Unfortunately we didn't have 24-bit sources,' says Ely. 'Our source was on digital Betacam and on DA-88, so we only had 16-bit sources. However, we've since started putting together some demo material that includes 24-bit audio, and we've got some 96kHz audio that we're working with as well, so that will soon be available for all to see.

'Basically, DVD is a very nice entertainment distribution format, and so what Sonic is trying to do is enable that by producing the tools that allow production professionals to go in and actually create the material.'



"It sounds brilliant," explains musician/songwriter **Rob Fisher** when asked why he chose the Euphonix CS2000M for Stone Room, a new independent studio in London.


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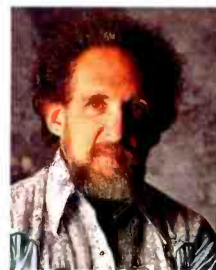
Producer Saul Zaentz on location

Tools session over to the Sonic. That was fine, except that there were hundreds and hundreds of changes up to the last moment, and if you needed to extend something, and you had only transferred over the file of the piece that you had cut, then there was no head extension.

'So that's the level of technical complexity that seems to be the name of the game in modern movie sound. There is no industry standard. The digital cutting room is in a state of flux, and for the foreseeable future every big job is going to entail a lot of dancing around the bleeding edge of the technology.'

## RERECORDING MIXER MARK BERGER

'We were doing a lot of ADR to replace dialogue, and that was for several reasons: Sometimes it was due to production problems with wind machines or special effects, some of it had to do with foreign accents making certain lines hard to understand, and a lot of it was down to fine tuning of the dialogue. Anthony Minghella often wrote new lines to provide information and better explain the plot, and once the actors read these on an ADR stage they would then be dubbed to the existing footage. A lot of times this was done when the character had his or her back to the camera, while at other times there were scenes where we replaced the dialogue of actors facing the camera. In the instances where certain words had been changed we would achieve this by cheating, because generally the ear will fool the eye. If you hit



Mark Berger

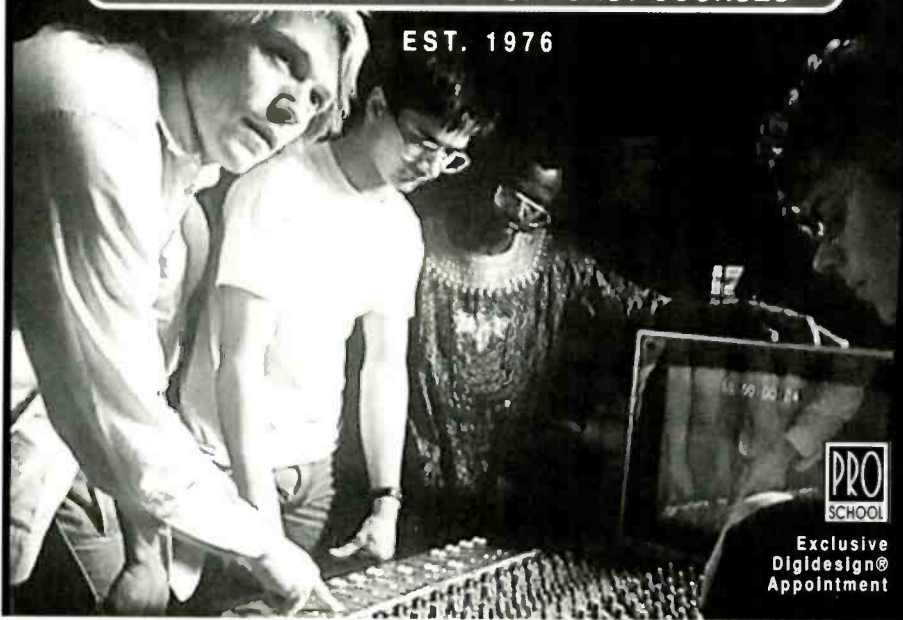
certain consonants when you're looking at somebody—Ps and Bs and Ts; things that are very identifiable—and if they appear to be in sync, then you can slide by some of the softer consonants and vowels. In other words, as long as the ear supplies the eye with certain reference points, you have a lot of room to move around in between those points.

'Overall, however, the most difficult scenes were the ones in which there was no sound, especially those in the desert. I mean, how do you create a sense that it's very, very quiet, even while there is some activity going on there? If you don't play anything it sounds empty, and it also feels like you're missing something, so we spent a lot of time trying to create the sound of nothing. What we ended up doing was to create something and then take it away to emphasise the emptiness. In the desert we start off having these very high frequency, chirpy cricket sounds, and these then go away as the scene progresses. At other times there's something going through the front and the surrounds, and we then take it away from the surrounds so that, even though you still hear it from the front, you can feel that something else is missing. We used Lexicon 480s and 224s a lot to create the surrounds for the music and for the effects, and we used digital delay lines to create more of a sense of the surround.' 🎧

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Replacing film and television dialogue has been used for ends as diverse as restoring the articulation of drunken actors or ensuring strict political censorship. **KEVIN HILTON** hears voices tell him how its done, and gets that synching feeling

**DUBBING IS A DIRTY WORD** to the real film fan. Think of the countless foreign language classics that have been almost ruined by inappropriate British or American voices that don't quite match the lip movements, and it's easy to see why most cineastes prefer subtitled movies—despite the distraction of reading the dialogue.

In some films had dubbing has added to the enjoyment: the actorly vocal performances given to the lowliest villager in Sergio Leone's Spaghetti Westerns, and the total lack of relationship between the words and the lips in Bruce Lee's chopsokey epics are the best examples of completely noticeable dubbing and revoicing.

But in some countries film buffs don't have any option. Italy still revoices all foreign language movies, a practice that began under Mussolini with the purpose of censoring any evil outside influence. And although the political motive disappeared after the war, dubbing did not.

The neorealists and other auteurs, like Federico Fellini, would very often use nonprofessional actors just because they looked the part. Coming across them by chance, the director would shoot the footage, getting them to say whatever came into their heads, writing the script and having it dubbed-in by a professional voice artist later. Italy then became known for international productions, using a mixture of American, French, and British talent, as well as home-grown performers, each of whom would speak in their own language, thereby making more work for the track-layers and dubbing engineers.

**TODAY, THE MAIN** reasons for revoicing and dubbing are if the location soundtrack is unsuitable or unusable for technical



On the set of *The Prince and the Pauper*. Main picture top right, shows left to right, Virginia Beare as Mary; Philip Sarson as Edward; Keith Michell as Henry VIII; and Elizabeth Ann O'Brien as Elizabeth



# Voices of the Past

reasons (too much background noise or a fault on the recording), if the original performance is deemed unsuitable, if a line of the script has to be changed at the last minute, the preparation of restored classics and, of course, the preparation of foreign-language versions.

Crucial to the dubbing process is the creation of loops, which generally consist of the visual scene concerned (to give the actor, or 'talent', something to work with), an audio recording track for the new dialogue (which is used continuously until the desired take is recorded) and a loop of the original performance as a guide. For most of cinema's still relatively short life, automatic dialogue replacement (ADR) was carried out on analogue tape-based systems like the Magnatex, but, as with other elements of the postproduction process, it has now been taken over by nonlinear digital workstations.

Just as this has changed the profile of the music recording and post fields, the growing influence of digital has introduced new styles

of ADR facility to this sector. While the large-scale dubbing theatre attached to a film studio still exists and is crucial for most work, smaller rooms can now take a great amount of the work beforehand.

'ADR is the process of collecting dialogue in the studio and then rightening it up to the picture during postproduction,' defines Jeff Bloom, Director of SynchroArts, designer of the VocAlign system for electronically tying speech to picture. 'It's changed from ten years ago because it's not necessary to go to high-end studios anymore. It can be done in more compact suites.'

Ross Caston, Sales Manager of Fairlight ESP backs up this statement by saying: 'To a certain extent there is less and less specialisation in dialogue replacement. It's becoming something that everyone can do because they have DAWs, which are fully capable of this kind of work. It's especially true of foreign





The employment of young untrained actors on *The Prince and The Pauper* necessitated extensive dialogue rerecording to Audiofile

language versions, where they can go into smaller facilities and do this high volume, dedicated work. With original film production, where big name stars are involved, the work is still being done on serious dubbing stages!

The growth of hard-disk-based units in this field is undeniable, but those working in it still say that they're just another tool. 'Nowadays, people are using at least one

**Computer-based systems may have given technicians the ability to match words directly to the picture, but sometimes this is not enough to fool the human brain**

DAW,' comments Charles Maynes of Los Angeles film sound facility Creative Cafe. 'Doing dialogue is very similar to mixing music, but there are only so many talents around like Bob Clearmountain and Mike Hedges, for example. It's the same with dialogue. Just because you have the tools doesn't make you a great editor—you need the experience, which is something you've got to accrue. In some ways it's a lot more difficult than doing music.'

Creative Cafe is owned by one of the top names in dialogue dubbing and sound-effects editing, Stephen Hunter Flick, who has worked on numerous productions, including *Robocop* and *Twister*, winning an Oscar for his work on *Speed*. The facility has some 25 Digidesign Pro Tools systems, plus five Avid AudioVisions, Media Stores, and two Film Composers, which are for rental.

**BOTH PRO TOOLS** and AudioVision have specific tools for ADR work, which recreate the linear, analogue loops of predigital working. This follows for other DAWs, many of which offer countdown

functions to cue actors in, continual looping, naming of loops, time compression, pitch shifting, rehearse mode and varispeed.

ADR is integral to Fairlight's MFX3 and MFX3 Mini workstations and is based around AD-DUB, which can provide up to 500 loops. This system comes in two parts: the AD-DUB R and the AD-DUB T, which can run off-line with VHS machines and a word processor to prepare foreign-language versions. The MFX3 is used by such US majors as Todd AO and Warners, while the AD-DUB developed from the needs of two Spanish facilities, Best Digital and K2000.

SSL's ADR facilities come as standard on any of its systems utilising VisionTrack, including ScreenSound and Scenaria, with an option for Axiom-Aysis. The new v4.0 software for Pro Tools will see integration of VocAlign, which can tie rerecorded dialogue tightly to a performance, without the need for either the talent voicing accurately or the editor repositioning or treating the track to make it fit. AudioVision can also incorporate this stand-alone device, although this system has its own 'fit to mark' facility.

Bloom's work in this field goes back to

an earlier device, WordFit, which was later included on the DAR Sound-Station. The power of this tool was demonstrated on a sequence from a BAFTA-award-winning British movie, where the original performance was marred by one of the actors being slightly the worse for drink. The scene was later revoiced (sober) and matched perfectly using WordFit.

While a number


of facilities are using VocAlign, some editors prefer to rely on their instincts, as Charles Maynes of Creative Cafe explains. 'VocAlign is a very, very good tool, but it's a next generation tool,' he says. 'A lot of dialogue editors have been at this game since pre computer days and they know how to trim the words to fit.'

Computer-based systems may have given technicians the ability to trim or expand words electronically and match them directly to the picture, but sometimes this is not enough to fool that ultimate sound processor, the human brain. Even if something looks perfectly in sync, the brain can sometimes tell you that things are not quite right. It's the impression of the sound not appearing to emanate from what is obviously the source (the person speaking), which has been likened to watching the screen with the sound off and the radio turned on.

This is all the more frustrating if the dialogue concerned has been revoiced by the same actor, because there is always some leeway given to foreign-language dubs as the words and lip movements are rarely going to match anyway. One of the reasons for the brain noticing the difference is the change of sound in space; if something was recorded on location in a field, but a line was replaced in a nice, dead voice booth with a top-of-the-range Neumann, then the differences are only too obvious.

**A RECENT PRODUCTION** that used a relatively high proportion of revoicing was the BBC tea-time serial *The Prince and the Pauper*. This was shot on location in big, reverberant castles with a large number of young, untrained actors who did not necessarily give the best performance on site. The lines were rerecorded in a dedicated voice studio at BBC TV Centre in West London and then loaded into the AMS Neve AudioFile being used for the overall audio postproduction.

'For the scene we'd be working on, there would be four different sources,' explains dubbing mixer Craig Irving. 'The original take, the wild track that was recorded live, and the two post-sync tracks. The track-layer would fill the gap where the original line had been with atmos, prepare the sync track and then record the new take, which was on a track of its own.'

As the new takes were recorded using a Neumann U87, Irving had to process the tracks to match them to what had been laid down on location. 







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‘I matched the EQ on the Logic 2 console that was used to mix the whole production, and put in some bass cut,’ he says. ‘We also used a Lexicon 300, which is superb, for matching the room acoustics.’

After the lines had been made to match their surroundings, they had to match the actors’ lips. ‘This was done in two ways,’ says Irving. ‘The track-layers do it as accurately as they can and then cut words apart or play with individual words or syllables. Failing that, we used a small amount of the Time-Flex function on the AudioFile. But what we found was that Philip Sarson [the young actor playing both the prince and the pauper] was incredibly good at matching his lines to the picture. All it took was a little snip afterwards.’

In Hollywood, the preferred method is to use alternative voice takes that were recorded on location, as everything will match. Sometimes, due to physical defects, very high background noise or the director wanting to change a line or looking for a better performance, this is not possible.

‘On *Twister* there was horrendous background noise,’ comments Charles Maynes, ‘and most of the dialogue was rerecorded in the studio. In that case we were doing entire scenes, so there’s much more liberty, and the rerecording mixer can add whatever ambience is necessary. It’s different when you working with individual lines, so you try to match the production recording as much as possible by using placement, the same kind of mic and EQ.’

All this can go some way to stop the brain noticing any change in ambience, but with

foreign-language versions the problem remains that the sound of one tongue is being matched to the lip movements of another. The same problem occurs when different words are added to same-language scripts, as in *The Prince and the Pauper*.

‘It happened on a couple of occasions,’ says Irving. ‘For example the word “sir” was recorded where, historically, it should have been “sire”. When you do that you have to pick the most expressive lip movement. As long as the mouth moves and something comes out, then you can usually get the sync through conventional means.’

When it comes to foreign-language dubs, there are ways to get round everything. ‘It’s an inherent problem,’ agrees Jeff Bloom, ‘and the solution is for the translator to sync up words in their own language that have similar lip movements. As long as you end up with half more syllables than there’s

**‘As long as the mouth moves and something comes out, then you can usually get the sync through conventional means’**

not going to be any trouble. With VocAlign we can use a guide track recorded by the translator, which the actors then match. Whatever happens, a lot depends on the skill of the performer.’

A production undertaken by Creative Cafe using VocAlign was the English-language version of Jackie Chan’s kung fu extravaganza *Police Story 3—Supercop*, which was recorded in Cantonese.

‘By matching the amplitude envelope of the words, we made the English sounds match the Cantonese shapes,’ says Charles Maynes. ‘It now looks as though it was shot in English, and the reviews were full of praise for this. The joke is that when we were doing it, everybody said we ought to slip the soundtrack by five frames to make it look like the old kung fu movies!’

## SUBTITLES: THE ELEGANT ALTERNATIVE TO ADR?

**‘I am damn unsatisfied to be killed in this way’**

**‘Fatty, you with your thick face have hurt my instep’**

**‘Gun wounds again?’**

**‘Same old rules: no eyes, no groin’**

**‘A normal person wouldn’t steal pituitaries’**

**‘Damn, I’ll burn you into a BBQ chicken’**

**‘Take my advice, or I’ll spank you without pants’**

**‘Who gave you the nerve to get killed here?’**

**‘Quiet or I’ll blow your throat up’**

**‘You always use violence. I should’ve ordered glutinous rice chicken’**

**‘I’ll fire aimlessly if you don’t come out’**

**‘Beat him out of recognisable shape’**

**‘I have been scared shitless too much lately’**

**‘I got knife scars more than the number of your leg’s hair’**

**‘Beware! Your bones are going to be disconnected’**

**‘How can you use my intestines as a gift?’**

**‘The bullets inside are very hot. Why do I feel so cold?’**

From *SEX AND ZEN & A BULLET IN THE HEAD* by Stefan Hammond and Mike Wilkins, published by Fireside, US

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# The incredible shrinking plan

Back-slapping joviality blends with subversion as the BBC celebrates its 60 years. Concealing yesterday's glory to suit today's politics is making life tough for the Corporation's PR department writes **KEVIN HILTON**

**I**f you've been anywhere near the UK in the past couple of months, or have access to BBC Prime or Worldwide, you'll know that the public service broadcaster is celebrating 60 years of television programming. Naturally enough the Beeb is rather proud of this achievement and has marked the occasion. Prominent among the celebrations has been a viewer survey to judge the best BBC shows of all time—again something one would expect.

What wasn't expected was the way the results were massaged to support the current regime at Broadcasting House. Another surprise was the politically disastrous move of announcing a further shrinking down of the Corporation as part of Director General John Birt's programme to turn the BBC into a resource sharing profit base covering radio and TV simultaneously, just days after the back-slapping of the celebratory show.

The dilemma posed by the 60th anniversary awards programme was that older programmes would win, showing up the paucity of good programming today. When the short-list was prepared, it was dominated by classic shows in all categories. To modernise things a bit, recent programmes were added and these comprehensively beat the older competition, proving the point that the BBC was better now than it was in the past.

Relying on the fact that people will tend towards the more recent if presented with a list, the Beeb successfully traded on its recent history, rather than its past, and making the point, it was hoped, that it was a better broadcaster today, despite the changes in its structure. This admirable piece of publicity management fooled no-one, as most major newspapers in the UK pointed out what had been going on. So it didn't really act as a smoke-screen for further announcements of how the Corporation is either being slimmed down or divided into independent profit bases.

Given that the BBC has made its international reputation on costume drama, closing down the costume department verges on the bizarre, unless dealing with outside suppliers really can provide

cost savings. While this move strongly affects BBC TV, it is the future of radio that concerns many. Although the Beeb has embraced the future for wireless with DAB, the continuing forced convergence between TV and radio would appear to be to the detriment of the pictureless medium.

**THE LATEST EXAMPLE** of this is the announcement at the end of last year to the effect that TV and radio outside broadcasts would be amalgamated under the banner of BBC Resources, the technical services profit point within the BBC. From 1st April (I always find it amazing that companies insist on implementing major changes on this date—it gives people like me the opportunity to make a cheap joke) a new structure will exist, under an overall Head of OBs, Jeff Baker, former boss of the Beeb's Open University operation and an ex-Head of Sound at TV Centre.

Baker has been described as the last craft-oriented head of department within the BBC by those disgruntled with the increasingly managerial turn the Corporation is taking. Reporting to Baker will be a new operations director, with a team of deputies, which may go some way to stripping out the levels of management that were so identified with the BBC (in the past it was described as a huge amorphous monolith), but it could make the task of finding the right person to talk to more difficult.

Or it could if this change is not superseded by another, to wit Resources making the move from directorate to limited company, and becoming a subsidiary of the BBC. A final decision on this is expected either this month or during February, but would further emphasise the Corporation's new commercial nature. With its central and regional facilities, Resources is an impressive proposition, according to the 1995 annual report, 'a £650m turnover business trading very close to break-even for the first time'. At present Resources works on 86% of BBC programmes, with £33m worth of services being sold to other broadcast organisations.

Some people get very twitchy about changes to the BBC; they're probably too hung up on memories of all those old programmes and the values of public-service broadcasting. While its public-

service role is still a vital one, the BBC has had to change, if only to maintain its status and charter. This has meant a slimming down and a realisation that if it expects people to still pay the licence fee, then it should be mindful of the fact that it's spending other people's money.

An example of this can be found at the much battered and criticised Radio 1FM, which has been through a painful period of casting off its old-fashioned image and rebuilding, both in terms of its music policy and audience share. At the end of 1996 the station moved into new studios, which have a pared down, technology-ready approach. This has seen a move to all self-op suites only using operators for live-band performances. As deputy controller Andy Parfitt puts it: 'We're using public money so we've got to be

The short-list was dominated by classic shows in all categories. To modernise things a bit, recent programmes were added and these beat the older competition, proving the point that the BBC was better now than it was in the past

as efficient as possible with it'.

While that appears to mix Reithian ideals with Birtian economics, it is an honest, public-service approach. Which is what the BBC appears to be taking, tempering it with economic realities. What we could do without is the spin doctoring and the lack of courage when it comes to owning up to what is being done.

But that always seems to be the way: those who work in communications seems to have the greatest problems in communicating.



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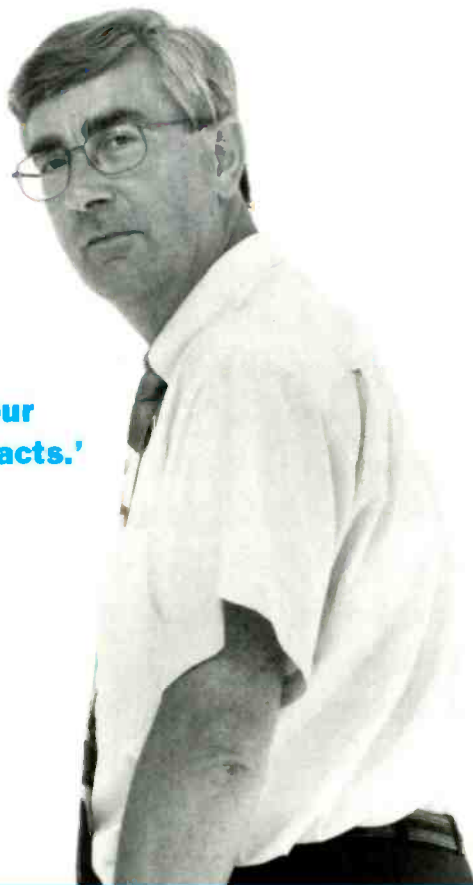
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# Radio Italia Reborn

The latest broadcaster to make the critical move to digital desks is Italy's RAI.

**SUE SILLITOE** tunes in to check on the project's philosophy and progress

## ITALIAN STATE BROADCASTER

Radiotelevisione Italia (RAI) has embarked on a major investment programme to equip its radio production facilities with the latest in digital technology. The broadcaster has already completed the refurbishment of one studio in Turin, and one in Rome—both of these have been equipped with Solid State Logic Axiom consoles—and they will begin work on a second Axiom studio in Rome later this year. Other studios in Rome, Milan and Naples are also earmarked for reconstruction, although it is too early to say what digital equipment will be used in these rooms.

RAI's Technical Manager Enrico Guido, who took over the rebuilding project from its original instigator Vincenzo Viggiani, expects it to take at least two years to complete all the refurbishments in the various sites. He adds that the aim of the project is to bring RAI's audio production facilities for radio and television into the digital age.

'Whatever we undertake from now on will be digital,' he elaborates. 'We have started by investing in three Axiom systems and certainly SSL will be an option for the other studios we are planning to refurbish.'

The most recent studio to undergo transformation is based in RAI's historic radio production building in Rome. The original design of the building—and RAI's occupancy of it—dates back to the 1930s when the state broadcaster was still in its infancy. Although the building incorporates some spectacular Art Deco touches, it was generally felt that most of the studios were well past their sell-by date, and were in need of upgrading. The job fell to UK-based Munro Associates.

'We had reached the point where we really needed to do something to bring our studios up to date—both in terms of technology and acoustics,' explains Guido. 'In the past RAI has always designed its own studios, but on this occasion we felt that we needed specialist help, so for the first time in RAI's history we used an external studio design company.'

**THE STUDIO, KNOWN** as Sala B, is used for RAI's internal radio production, live broadcasts and for some audio preparation for television. Enrico Guido expects it will eventually be opened up to outside clients. 'Because the recording room is large enough for a full orchestra we may allow it to be used for commercial projects where producers and conductors want to work with either of RAI's two orchestras,' he explains.

The two Axioms installed so far replace Studer 900 consoles—as will the third when it is eventually installed in the studio above Sala B in Rome.

'Although we have never had SSL equipment before, we chose Axiom because it has been proved by other

broadcasters to be up to the standard we expect. Also, because it is an integrated system with a built-in hard disk recorder, we will be able to turn projects round very quickly. A key factor in our decision to buy Axioms for Rome and Turin was the highly sophisticated level of integration beneath a control surface that is both familiar and intuitive. It was important that our operators felt comfortable with the control surface, just as it was important that the system provided the maximum amount of speed and flexibility.'



Axiom digital consoles contrast with the Art Deco setting



The console installed in Rome has 48 mono channels, 16 stereo channels and 60 hours of DiskTrack storage. The Turin studio has been equipped with a 32-mono channel version with eight stereo channels and 48 hours of DiskTrack. When the third Axiom is installed it will be identical to the one in Sala B and the two desks will be interconnected so that the studios can share resources.

'By linking the two desks it will be possible for one studio to control the audio recording in the other studio,' says Guido. 'We have gone this route because we are looking for the maximum amount of flexibility. It will also make it much easier to organise our operators' shifts, and to plan which projects we want in the respective rooms.'

At present, the Axiom in Sala B is not being used for surround-sound, although potentially the console is ready for it. 'The studio we have completed is not suitable for surround sound monitoring,' reveals Andy Munro. 'It

isn't necessary because the room is a music recording studio. The second room, however, will have surround-sound monitoring because it is intended for mix work.'

With all of the Axioms installed at RAI, SSL has built in default routing and configuration for auxiliaries to suit the way RAI operators work. In Rome, these default settings were fine-tuned during the one-week training session provided by SSL shortly before the studio opened.

'Our operators have all commented on how easy the Axiom is to use,' says Guido. 'They feel that it looks very familiar, and they were relieved that it didn't involve lots of software menus or a completely new way of thinking.'

Rather than just training one or two staff to use the console, RAI has included all of its main operators in the training programme so that everyone has a basic understanding of how the desk works. 'The six people who

will use the desk most have obviously been trained, but we also allowed other engineering staff to attend the training course so they can at least get the desk working. We intend to take this approach with every installation we do—whether it be an Axiom, or any other digital console—because we feel it is important that all our staff feel comfortable with all of the equipment in general use in our studios.'


Guido adds that the training programme has given RAI a chance to reorganise its engineering staff because it has identified which staff are most at ease with the desk. 'The course gave everyone an opportunity to show what they were capable of,' he says. 'Training is an important issue, and it is good for staff to requalify, and to learn new skills.'

Although the Axiom has a built-in hard-disk recorder, RAI has also interfaced the system in Rome with a Studer D827 48-track digital recorder. This gives the flexibility to move projects from studio to studio. This is important for scheduling reasons as often it isn't possible to complete a production in the same room.

'Whatever we record on the DiskTrack also goes to the multitrack,' Guido says. 'If we want, we can mix the project the same day using the audio recorded on the DiskTrack, or we can move the project elsewhere by simply taking the multitrack tape to another studio. With the multitrack running all the time we can transfer digitally from the tape to the hard disk and get the benefits of hard-disk recording.'

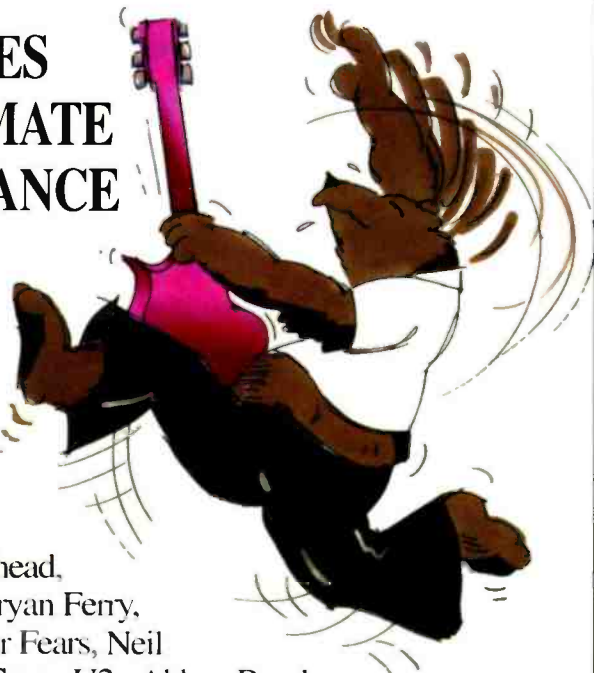
**RAI'S INVESTMENT** in digital reflects its wider acceptance of digital as the format for the future. The broadcaster is already experimenting with digital transmission and has been running a pilot scheme for two years in Aosta in the north of the country. Guido says that once it has ironed out any teething problems digital transmission will be extended to the rest of Italy: 'The digital re-equipping of our studios is part of a much larger project that includes digital transmission of programming throughout the country. It will take some time to complete, but that is the way we are heading.'

'By having the facilities to produce sound digitally we are completing the chain, otherwise we would have to keep converting from analogue to digital which would inevitably mean a deterioration in quality.'

The Axiom in Turin is already in daily use on a wide variety of radio productions, while in Rome the console is only just beginning to be put through its paces. The first session in Rome takes place on Friday, January 17th—a day with the same connotations in Italy as Friday the 13th in the US and UK. Does this mean RAI is tempting fate? Guido doesn't seem concerned. He's too busy scanning the programme schedule to see when the builders can start work on the third Axiom room which, like Sala B, will be a race against the clock to finish. 

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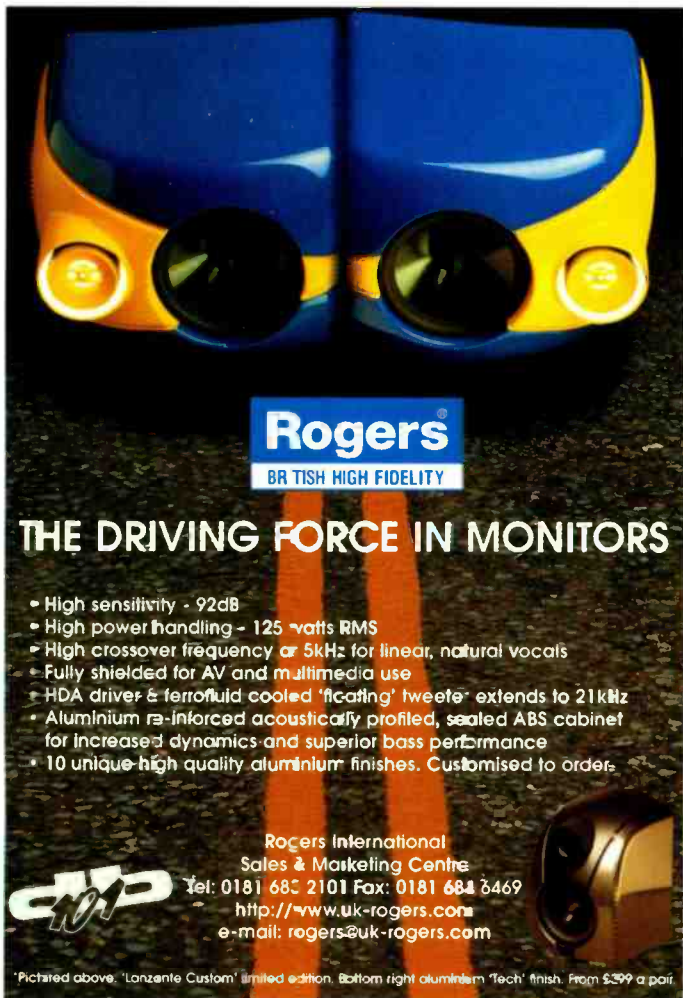
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If you thought that the Hendrix back catalogue had finally dried up, you're about to learn that it's not so.

**SIMON CROFT** reveals the sound of things to come, and talks to engineer Eddie Kramer

**THE MUSIC OF JIMI HENDRIX** is back. Not that it has ever been away, but since his untimely death on 1st September 1970 Hendrix has been the subject of some reprehensible releases, and some reissues of questionable quality. Now the man's music—which always seemed to come from somewhere between the Mississippi and Mars—is to be reissued, having been completely remastered for CD and audiophile 180gm vinyl release. There is a new Hendrix album on the way, and even some outstanding tracks that have never been released before.

Now the Hendrix estate has gone to court and gained ownership of his recordings, every tape in the library has been backed up to Dolby SR and digital formats for posterity. The Hendrix family sensibly entrusted this labour of love, and the subsequent remastering to the engineer who was there for the original recordings, Eddie Kramer.

'It all sounds fresh, it sounds great,' Kramer enthuses. 'Thank God we found, for the most part, the original flat masters, in fantastic shape. No shedding, we didn't have to bake a thing. Some of the tapes are the original LR56 BASF. Some are copies, but for the most part they are the original flat tapes.'

Kramer's comments on previous remasters of *Are You Experienced*, *Axis Bold as Love*, *Smash Hits* and *Electric Ladyland* are largely unprintable, and particularly unsuitable for small children. However, it is fair to summarise his feelings by saying that the new versions have much greater transparency, compared with releases based on EQ'd masters.

'Once the machine was lined up, we were really blown away by the clarity of the stereo image,' Kramer affirms. 'That was the one thing that really stood out for us.'

'Hendrix fans, and music fans in general, will be thrilled, I think. Engineers, and the Hendrix family who have heard the result have said, "My God; it does sound a lot clearer, and an awful lot better". I'm really thrilled about that.'

'I am even more thrilled that the family has gotten the tapes back, and that they are now with the rightful owners, and that I've had the privilege of working with the tapes again.'

Mastering was done at Stirling Sound, using an Ampex ATR100 tape machine, and a mixture of equalisation that included two Pultecs, a Sontec unit, and sometimes a combination of both. A Focusrite Blue 330—the mastering EQ with rotary switches—also saw some action. The output of this chain was fed to a Sonic Solutions system without limiting, and then onto the 1630, ready for preparation of the CD master.

'On *Electric Ladyland* I used the Pultecs because I thought that particular album deserved that particular type of EQ, whereas the other ones I felt the Sontec was needed,' Kramer considers. 'We also used a Focusrite



# Songs of experience



# RECORDING

equaliser. You're talking about a third of a dB, very tiny amounts of EQ here. But the amazing thing is you can put  $\frac{1}{3}$  dB or  $\frac{1}{4}$  dB at 10k and it sounds like 20dB! You have to be very, very careful!

## HELPING INTERPRET HENDRIX'

artistic vision was one of Kramer's original responsibilities—as such he was careful to gain the benefits of 1990s technology without messing with the mixes themselves. He is appalled by the idea of adding digital reverb, for instance.

'No, no, that's really interfering,' he insists. 'But tonally, if a certain track is lacking in bottom end and you can add bottom end, bring out the bass guitar and bass drum without effecting the vocal and the guitar, then do it. Of course, if someone comes up with a multitrack tape that has never been mixed before that's a different story, but once again, would I mix it with a view to making it sound like a 1990s type band? No, I would mix it with a view to making it sound like Jimi Hendrix from the 1960s. Obviously, with all the technology I can bring to bear to make it very present and full bodied.'

'Thinking about the way records were mastered in the 1960s and 1970s, they were limited by a mechanical process. Records were cut on a lacquer, which is an imprecise system. There was a real art to trying to get anything on a disc at the best of times. You were dealing with styluses that were being heated to a certain temperature, and were cutting to a certain depth. Then you would have tracking errors and distortion.'

'By the time you'd hit the end of the side you would not be able to put too much bass on. You have trouble with phase, trouble

with all sorts of things. 'So here we are in the 1990s where you can put the full frequency range on and not worry about these things. Not that we've taken liberties, but we've enhanced what was there and hopefully made it sound like something that Jimi would have wanted.'

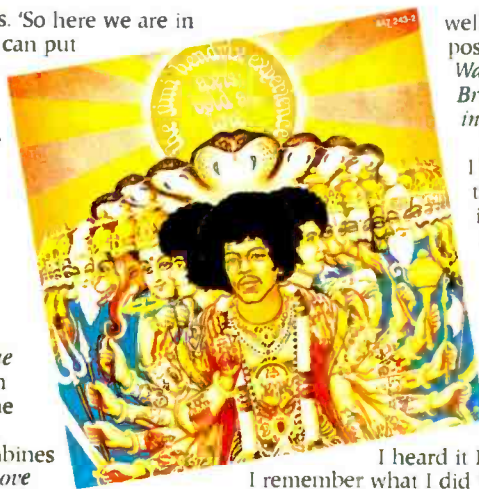
There is also a new album, *First Rays of the New Rising Sun*, which includes not only some previously unreleased material, but also combines the tracks on *Cry of Love* with others, such as 'Dolly Dagger', which found their way onto other albums.

'It's really the last album he did, with all the extra tracks. It's probably the way Jimi would have wanted it. It's about 69 minutes of music. It really is lovely, it flows very well, and it sounds gorgeous.'

According to Kramer, there is more material to come, thanks to tapes which were in the possession of Hendrix' manager Chas Chandler, who died recently. 'It is true that Chas had some master tapes. I've heard them, and they are brilliant. There are songs that have never been released before, and alternative takes of previously released songs.'

'Trust me, over the next few years there's going to be some marvellous stuff released—really wonderful, wonderful stuff.'

Kramer engineered every Hendrix album from *Are You Experienced* to *Cry of Love*, as



well as coproducing the posthumous releases *War Heroes*, *Rainbow Bridge* and *Hendrix in the West*.

'The first time I heard some of these tapes after 25 years it freaked me out because I couldn't believe I had done so many crazy things,' he says. 'I guess the passage of time had dimmed the memory banks slightly, but when

I heard it I went, "Christ, I remember what I did then!"' He ponders for a moment.

'Yeah, I was panning left to right, but at the same time I was moving the faders down and up, trying to get the sound of a motor cycle going across from left to right. Hey, I remember what I did there, it was a 7/8ths slap delay going to an EMT plate set at 1.6 seconds.'

The earliest material was recorded at Olympic Sound Studios in the UK, using successive submixes from 4-track to stereo, in order to free up another pair of tracks. But by April 1968, Kramer had succumbed to repeated requests and joined Hendrix at the Record Plant in New York.

Kramer describes the studio's desk at the time as 'the biggest piece of junk I'd ever worked on.'

'I was working on 12-track; the 12-track was a 1-inch format, a bastardised format. It was absolutely horrendous and noisy. It did

## KRAMER ON GEAR

**DESPITE HIS LEGENDARY** status as an engineer and producer—or perhaps because of it—Kramer is not a massive gear freak. In fact, he believes he works best with a simplified setup rather than a rack full of widgets.

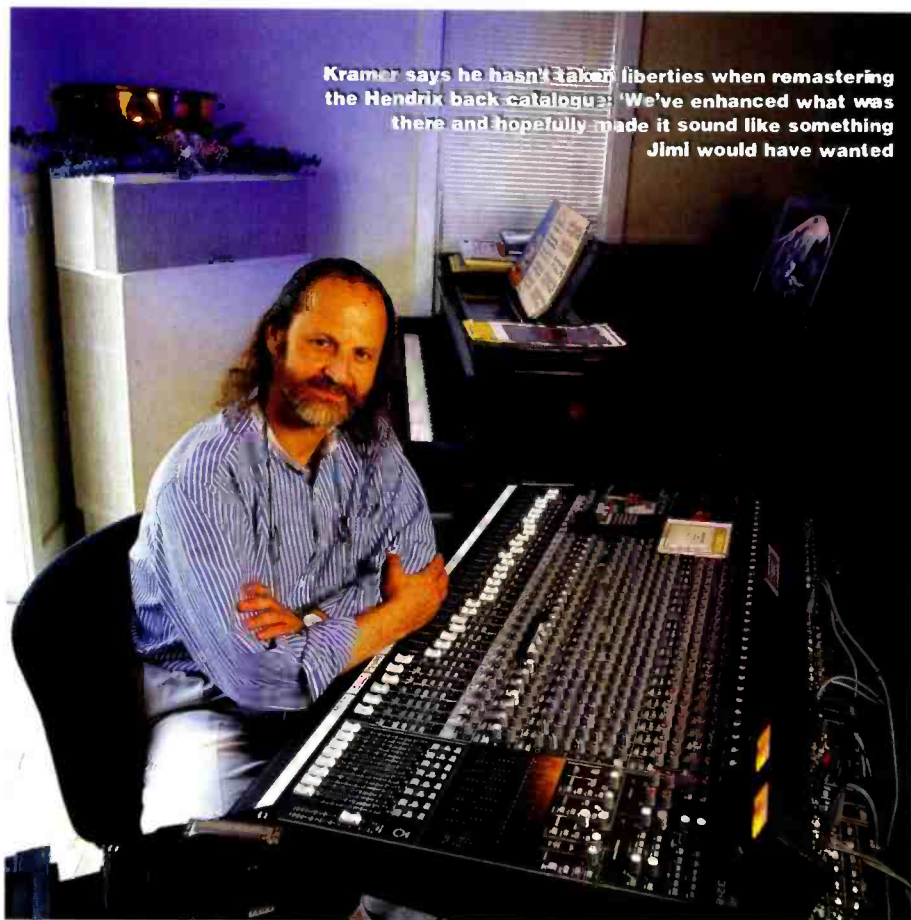
Kramer is a Mackie endorsee and owns a 32-input, 8-bus console.

'The reason they've cornered the market is because they are so bloody good,' he says. 'They have excellent sales service, the console sounds great and it's cheap. They very rarely go wrong. What more could you want? I have a 32:8 at home. I mean the retail price in the United States is under \$5,000.'

'You really can't go far wrong. A couple of reverbs, a nice old analogue machine, some tube mic preamps and you're home. You could make a record in your bathroom!'

Likes: Old Neves, API's and to a lesser extent SSLs, which he will use but bypasses the mic amps. Says the Euphonix is okay sonically, but it's not for him.

Dislikes: Digital multitrack and desks. Kramer says that if you look at the listings in *Billboard*, most hit records have been put through something nice and analogue at some point to make them sound warmer, so why use digital during recording?



Kramer says he hasn't taken liberties when remastering the Hendrix back catalogue: 'We've enhanced what was there and hopefully made it sound like something Jimi would have wanted'



not last long. We took four songs of Jimi's and transferred them from 4 to 12. Jimi filled up the last eight tracks. Then they decided to scrap the 12-track machine and buy a 16-track machine, which was a damn good thing. So when the 12-track was transferred to 16, Jimi filled up the rest of the tracks. All my 4-track recording had already been through three generations before it even hit the 16-track, so it's amazing that it sounds okay!

As is well documented, around a year later Hendrix decamped to the \$1m studio that he had Kramer build for him; Electric Lady. The studio used an Ampex 16-track, but Kramer could see the trend and had it wired 24-track.

In order to understand anything of the Hendrix sound, however, you need to start not with the multitrack or the mixing board, but with the man himself.

'Of course, he had just a superb amount of control over his instrument,' Kramer acknowledges. 'To watch him play with his massive hands, he could barré the whole neck of the guitar with his thumb.

The guy had such control, not only over his guitar, but also over his sound. He knew instinctively how much distortion to get and where to place the guitar in relation to the speaker to get the sustain. He was a total master of the instrument and of sound.

A lot of the early stuff, particularly the stuff that Chas was involved in, was not as loud as you think. If you listen to the multi-track tape, the guitars are not that loud. Later on, when Chas was not in the picture, the volume came up. If you listen to *Little Wing*, that's quiet!

The Hendrix armoury of effects pedals included wah wah, fuzz boxes that were often customised by Roger Meyer, and the Univibe rotating speaker effect. With more tracks to record on, Hendrix and Kramer started to record the guitar in stereo, using a Y lead from the instrument, two Univibe pedals, and two Marshall 100w amp setups.

Kramer, who trained as a musician before becoming a sound engineer, is often reluctant to talk about specific recording techniques, but is prepared to reveal the basic concepts behind the guitar miking method he has evolved from the Hendrix days.

'It's a combination of three microphones on a single source to get the tone. When you put three microphones on a single source, you avoid the phasing problems you get when you mic two speakers.'

Kramer's chosen setup is an Electro-Voice M160, Sennheiser MD421 and a Shure 57 with some pre-delay (usually on 15ips) to an EMT plate.

'I'm not going to tell you the exact positioning of everything, but it's usually very close miked and then I'll have a Neumann 67 or something like that as a distant mic. The others are very, very close to the cones, I mean a 1/2-inch away.'

**OTHER INGREDIENTS** in the unmistakable Hendrix sound include stereo phasing, backwards guitar parts, and rhythmic use of the desk's pan pots. The Beatles had used phasing before Hendrix—indeed, George Martin revealed to Kramer during an Olympic recording session that the fundamentals came from a 1949 BBC Radiophonic handbook—but for *Axis Bold as Love*, Kramer's assistant engineer worked out how to create phasing in stereo, using nothing more than two tape

machines and a VFO control. The pair decided to demonstrate the innovation using the drum fill that starts the heavily effected section that can be heard on the album today.

'We put that on and said, "Jimi, we've got something we want to play you". We sit him down in the middle, put the tape on, with the two machines and the VFO with the big knob controlling the speed of the motor on the second machine.

'We start the tape up and the drums are going from left to right. You have to do it below 60 cycles (in the UK at least) at around 59, and you can hear the thing going swissssh. It flies across from left to right and it's the most amazing stereo phase, flange or whatever you've ever heard.

'He freaks out, he's on the floor and he says, "Oh my God, it's like this dream I had, I dreamed this sound, it's like being under water, it's the sound I heard in my dream, play it again, play it again". After that, everything had to be phased because he dug the sound so much.'

Although Hendrix was always a consummate improviser, Kramer stresses that much of effortless, seemingly almost casual, motifs stemmed from intense periods of planning.

'I would give him a 1/2-inch tape, and if he wanted to do a backward solo, he would



study it, backwards: the whole bloody song,' Kramer recalls. 'He would know exactly, to the point where you would play the tape and you'd have no clue where you were because its playing backwards, and he'd say, "Yeah, right there". On the button, he would know exactly where to come in, how long to play the solo, and he knew what it would sound like when it came back. He was

fantastic, he was just amazing'

Kramer's trademark use of faders and pan-pots came partly from the lack of outboard. 'We had reverb, tape delay, tape delay and reverb—and...erm, more tape delay. That was basically it. Compression and panning of course. The panning that I do is rhythmically orientated. The idea that I have in my head is that it's supposed to draw attention to a particular rhythmic pattern. Or if it's a guitar solo, I try to build it so that it is sweeping across from speaker to speaker and then it ends up in the middle usually, at the peak of the solo.'

Now in his own studio, Hendrix felt free to take part in the mixing process, and during the *Electric Ladyland* sessions became a second pair of hands for Kramer. 'If there was any kind of mistake we would just keep going,' says Kramer. 'It would be a performance mix of about 16 minutes long.

'He'd be grabbing pan pots. I would be grabbing pan pots and faders. Things would

## WORKING WITH LED ZEPPELIN

**'I KNEW JIMMY** and John Paul-Jones prior to them being in Zeppelin, both being session musicians,' Kramer recalls. 'John Paul-Jones' real name was John Baldwin and he was the bass player. I have wonderful photographs of him at Olympic, playing Fender bass with a pick. And I have marvellous mental images of him walking in with a B15, pushing it with one arm, score under the other arm and bass guitar in his hand.

'He would go up to the conductor's rostrum, open up the score, plug his bass into the amp with a mic on it and a little screen around it. Then he would conduct with the bass in his hands, playing and conducting like a 50-piece orchestra. He was a fantastic arranger. He still is. I do like him as a musician and as a person.

'Page came in a couple of times and I was the assistant engineer when he played on the Kinks track, which I think was "You Really Got Me". I know he was on a lot of sessions I did at Olympic. For instance "Hurdy Gurdy Man", he was on. He was the killer guy people would call in for sessions. John Paul-Jones called me up one day and said, "Come over, I want to play you this acetate of this new band I'm in". This was just before I left for the States—March or April 1968. He said, "It's called Led Zeppelin", and I

thought what a lousy name—which shows how much I know. But it sounded amazing, I couldn't believe the sound of the band.

'When they came over in 1969 I recorded a whole bunch of tracks with them for *Led Zeppelin II* at various funky 8-track studios in New York. We mixed the whole album in one weekend at A&R Studios on a 12-channel Altec mixer with two pan pots. Now you figure it out. A couple of EMT plates and that was it.

'You couldn't get any bigger than John Bonham, the World's greatest rock drummer. No matter what you did, stick any bloody mics out there, it would sound like John Bonham. You want a John Bonham sound? You've got to be him, tune the kit the way he did and hit them the way he did.

'*Zeppelin II* is quite dry—it's not as ambient as the later albums. It was later on *Houses of the Holy* and *Physical Graffiti*, that was recorded at Madley Grange and the Stones' house, the Stargrove. That started that whole thing of putting the drums in a separate room.

'And then on "Black Country Woman", we recorded the acoustic guitars outside on the lawn. That's when you can hear this aeroplane coming overhead. I hit the talkback button and said, "What about this aeroplane?" Robert said, "Nah, leave it in!"'



# RECORDING

be moving up and down on the VFO, trying to make the tape delay slower or faster. And he'd be going, "Yes, yes, no, no, that one", and we'd be laughing and falling over one another.

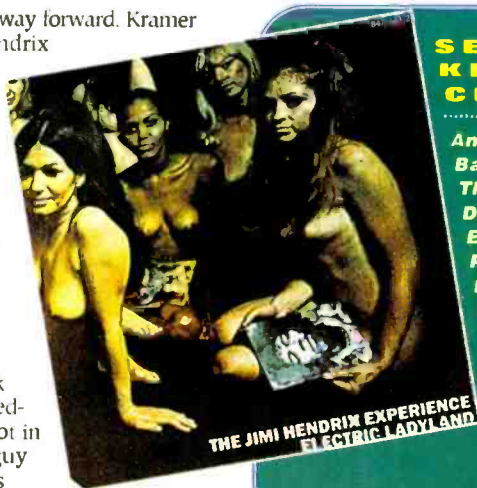
'It was very exciting. Once we had started that process, it carried on into the final album. For a multitude of reasons, when he died it was obviously a severe blow to the world. And to me. I couldn't go back into the studio for about two months. It was really such a shock.

'Fortunately, Jimi and I were able to mix a bunch of tracks before he died. And you could really feel the difference of his input. He and I would mix together, it was really a joint mixing performance if you will!

**THE CRY OF LOVE** saw Hendrix clearly moving in new directions, but listening to this and *The Band of Gypsies* album leaves a feeling that the great guitarist was by no

means sure of the best way forward. Kramer believes that what Hendrix really needed was time out to experiment with new areas of music, without the pressure of producing an album. Had Hendrix been given that space, the tragic turn of events after his Isle of Wight Festival appearance may have been averted.

'A lot of people think that Jimi was this stoned-out, freaked-out guy, not in control. Bullshit. This guy was so in control of his sound, of his music. He knew exactly what he was going to do, how he



## SELECTED KRAMER CREDITS

**Anthrax**  
**Bad Company**  
**The Beatles**  
**David Bowie**  
**Eric Clapton**  
**Peter Frampton**  
**Buddy Guy**  
**Humble Pie**  
**The Kinks**  
**Curtis Mayfield**  
**The Rolling Stones**  
**Santana**  
**Traffic**  
**Johnny Winter**

# NEWS FROM TUBE-TECH EQ 1A



The new TUBE-TECH EQ 1A is a state of the art full range parametric equalizer. Featuring one channel of low and high cut, low and high shelving and three overlapping bands

was going to do it, and what it was going to sound like,' Kramer says vehemently.

'If he would describe to me: I want it to sound green, or yellow, or purple or something, I knew, kind of, what he was talking about, and I could try to go for that sound. But the work that he put in prior to coming into the studio was so critical. He was prepared. I've seen his notes: pages and pages of notes. I've seen legal pads full of notes; a whole song broken down into chords, where he would put his hands on the fretboard, what the bass and drums were supposed to play, the type of rhythmic feel. It may sound casual or kind of crazy, but it was extremely worked out.

'Obviously, a lot was left to chance. A goodly amount of what we did was flying by the seat of our pants, no question, but he was prepared. That's what made it so damn funny. Jimi was one of the funniest guys in the studio. I mean he would be cracking jokes and making fun of himself—and me, and Mitch, and Noel—and be laughing all the time. He was a lot of fun in the studio. It was like our playground. \$

## CURRENT PROJECTS

'I'M WORKING ON this movie called *Festival Express*, and it's footage that was recently uncovered of *The Band*, *The Grateful Dead*, *Janis Joplin*, *Traffic*,' reveals Kramer.

'They were on this train going from one end of Canada to the other. They did concerts in Toronto, Winnipeg and Calgary. And they also show documentary footage on the train.

There's marvellous footage of Janis Jamming with Jerry Garcia and Buddy Guy. It's an amazing documentary. It was a 5-camera shoot with 80 hours of film and the same amount of audio done on 8-track.'

**RECENT ALBUMS:** Paul Rogers, Ex-Spin Doctor Erik Shenkman's new band *The Chrysalids*, pop band *Mystery Bloom* and *The Out of Control Blues Band*.

**NEW BOOK:** Photographic study *From the Other Side of the Glass*. 'There's just a myriad of things I'm constantly working on.'

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It all began when Pioneer introduced 96kHz audio sampling on its DAT machine. Its appeal to engineers was evident, and gradually it became important as an accepted standard on the Digital Versatile Disc.

**FRANCIS RUMSEY** jumps aboard the bandwagon and plays along

# The 96kHz Phenomenon

**SUDDENLY** 96kHz seems to have taken off. The high sample rate phenomenon—until recently little more than a slightly out-of-the-ordinary option introduced by Pioneer in its DAT machine—is securely on the pro-audio agenda. You only had to take a quick tour around the exhibition floor at the Audio Engineering Society Convention in Los Angeles to realise that many more people are getting interested in higher sampling rates, and that manufacturers are producing product ranges capable of handling 96kHz audio. So what is the reason for the activity? We can't put 96kHz audio on a CD, or on any other consumer format can we? And even if we could, why would we want to?


One of the main reasons why 96kHz is important just now is that it has been accepted as an option for audio representation in the DVD (Digital Versatile Disc) format. The DVD 1.0 standard also allows for linear PCM resolutions of 16, 20 or 24 bits, and up to eight audio channel blocks in the space of one video block on the disc, so multiple channels are possible. The 48kHz sampling rate is the other primary rate allowed in the DVD standard, with no 44.1kHz (the CD rate) in sight. (These, by the way, are the DVD-Video specifications—the DVD-Audio specification has yet to be agreed, but it is most encouraging that even the video specification allows for many of the options that audio engineers have been pressing for, including linear PCM and multiple channels, as well as data-reduced multichannel sound in AC-3 or MPEG-2 formats.) A DVD disc could, therefore, hold over two hours of 2-channel, 96kHz, 24-bit audio if necessary, without using any compression (provided it was used for audio alone—no pictures).

**PERSONALLY** I would go for multichannel surround sound rather than 96kHz if I had to choose between them, but the option is there to have either, or both, depending on how the disk is used. Indeed it is possible to have six channels of 96kHz, 16-bit sound on a DVD, but only if two of the channels are used as the mandatory 2-channel-compatible down mix. At 48kHz there is no problem with managing a 5-channel mix and a separate 2-channel mix.

Despite what many believe about the audibility (or otherwise) of super high

frequency audio information, there are many professionals who seem prepared to invest in 96kHz sampling equipment. The less rapid roll-off required of anti-alias and reconstruction filters is cited as just one example of benefits—the 44.1kHz rate was only just adequate to convey the accepted audio band provided that you implemented a brick-wall filter at the top end, and it was dictated by the technology available at the time. If you cast your mind back to the time it was defined, you will remember that designers were limited by convertor technology and the need to get maximum playing time out of CDs. Neither of these factors needs to be considered as a constraint now, and it is unlikely that we would have thought 44.1kHz a desirable sampling rate had we been considering audio quality alone. There is a school of thought that promotes a sampling rate somewhere between 44.1kHz and 96kHz as ideal, and 60kHz or 64kHz has been mentioned in this respect, but my feeling is that there is too much of a band-wagon rolling with 96kHz for these rates to get a look-in. The only fly in the ointment is that 96kHz is not simply related to 44.1kHz, so sample rate conversion is less straightforward, but sample rate conversion technology has reached a point where integer ratio conversion is no longer needed for high sound quality, provided that care is taken in filter design. James Moorer, in a paper presented to the AES recently, stated that with care taken over numerical issues there need be no audible difference between a signal converted from 88.2kHz to 44.1kHz and one converted from 96kHz to 44.1kHz. Bob Stuart and Rhonda Wilson

have also shown that a 96kHz sampling frequency can be used to provide benefits additional to bandwidth extension. Using optimum noise shaping they have been able to demonstrate that you can expect a dynamic range equivalent to around 22 bits from a 96kHz, 16-bit channel, simply because there is more inaudible bandwidth over which to spread the quantising noise. Those involved in lossless coding have also pointed out that 96kHz streams offer a greater potential for data rate savings than 48kHz or 44.1kHz. This is because there is more redundancy in the data stream, allowing it to be coded more efficiently. So in fact, with lossless coding, one often ends up with a data rate for 96kHz audio not greatly in excess of that required for 48kHz. So clearly it is not so much of an issue whether you can hear above 20kHz, since there are a number of other advantages of using a higher sampling rate, and if you can hear above 20kHz then good for you.

**MOVING TOWARDS** a 96kHz standard sampling rate is not without its problems. For one thing it is not yet accepted as an AES standard sampling rate, although that will clearly not stop people using it. The AES is having to consider reopening the sampling rate issue for standardisation work because of all these developments. 96kHz presents problems with digital audio interfacing and with filter design, since everything is happening twice as fast. Your stand-alone digital mixer will not just switch over to 96kHz—it was designed to operate at 44.1kHz or 48, and its filter coefficients are set accordingly. Similarly, its digital interfaces will only operate at the standard rates specified in AES 3, possibly plus or minus a bit of varispeed (but not enough for this purpose!). So a lot of new equipment will be required, or some extensive modifications to existing equipment. Good for the manufacturers (perhaps), but bad for you because it means more investment. Perhaps good for you, though, if enough customers start pestering you for higher quality audio. Audio sampled at 96kHz also gobbles up tape and disc space twice as fast as conventional digital audio, but it must be acknowledged that even this is less of a problem these days. Disc space can be added, and it really isn't very expensive now. You 

One of the main reasons why 96kHz is important just now is that it has been accepted as an option for audio representation in the DVD (Digital Versatile Disc) format




will still need more of it, though.

Crystal Semiconductors has just announced a range of 96kHz silicon, which should help things along somewhat. They have jumped the gun on AES standardisation and will run the AES interface at double speed, just as one or two other have chosen to do. Whilst this is not compatible with standard interfaces, it does use the same protocol. Cable lengths cannot be as great, and susceptibility to losses is greater, but with appropriate cables and careful handling it should be fine for most purposes. Crystal has also announced a 96kHz A-D convertor (CS5936) which claims 24-bit resolution. Moorer of Sonic Solutions reports that they have found one existing AES transceiver chip that seems to work reliably at 96kHz, in the form of the Motorola 56401, but he warns that it is not guaranteed for this purpose by the manu-

facturer. The other option for digital interface design is to adapt the standard speed AES 3 interface to carry mono 96kHz audio instead of stereo 48kHz audio. In this case both subframes would be used for the one channel, but it requires twice as many interfaces for the same number of channels as a double speed interface. It also has the disadvantage that there is no identification of left and right channels in stereo operation, unless some modification is made to the use of channel status or user bits. The advantage is hardware compatibility with AES 3. Nagra has demonstrated a version of its Nagra-D recorder adapted for 96kHz, offering two channels instead of four, since it needs the extra two channels to store the extra data created by the higher sampling rate. dCS has also demonstrated 96kHz conversion equipment in conjunction with Nagra, and

It seems there is little question but that 96kHz is here to stay as a growing feature of professional sound recording—its inclusion in the DVD standard has guaranteed it. One has to admire Pioneer for its tenacity in sticking to its guns over this sampling rate, since the company was regarded by many as out on a limb when it first started showing its 96kHz DAT machine a few years ago

has a product (the dCS 972 DDC) which can convert between different sample rates and resolutions with optimal audio quality, including down-conversion of 24-96 format (24 bit, 96kHz) to 16-44.1. Sonic Solutions also has workstation hardware and software that will handle 96kHz, 24-bit material, and this relates closely to its work with DVD mastering, since the company is one of those at the forefront with software for creating DVD material.

It seems there is little question but that 96kHz is here to stay as a growing feature of professional sound recording—its inclusion in the DVD standard has guaranteed it. One has to admire Pioneer for its tenacity in sticking to its guns over this sampling rate, since the company was regarded by many as out on a limb when it first started showing its 96kHz DAT machine a few years ago. Pioneer clearly has a lot of clout with the DVD Consortium, and this is bound to have had something to do with the adoption of this sampling frequency, but it is now up to the rest of the audio industry to decide how it is going to deal with material in this format. It remains to be seen how enthusiastically the record industry will deal with DVD as an audio carrier, and whether it will appreciate the value of higher sampling rates and resolutions on consumer media. The way they have used SBM and other resolution-enhancing technologies on CD may be a pointer. Some have offered the opinion that record companies want a new audio format like a hole in the head—nothing should challenge the profitable CD market—but it has to be acknowledged that the classical CD market is becoming saturated now, and perhaps we need a new reason to start recording the repertoire all over again. One thing is for certain, mastering engineers will have plenty of work for the foreseeable future. 

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- Akal S 1000 - 2 Mb, as new. £995
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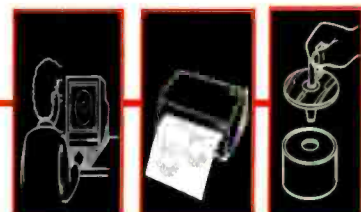
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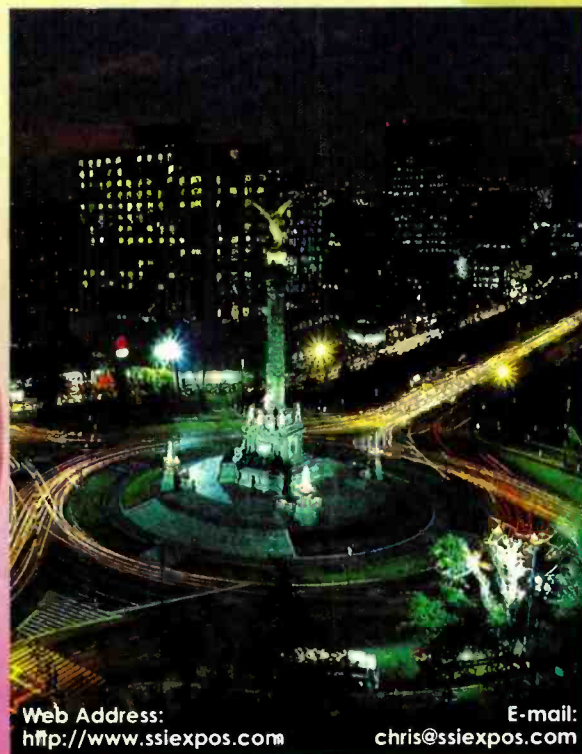
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Specify if Exhibitor or Visitor Information



# World events



## January 1997

### ◆ January 19th-23rd

**MIDEM 97**  
Cannes, France.  
Jane Garton, Press Manager.  
Paris Tel: +33 01 41 90 44 39.  
Email: jane\_garton@midem-paris.ccmil.compuserve.com

### ◆ January 30th-31st

**Live! Show 1997**  
The Roundhouse, London, UK.  
Nexus, UK.  
Tel: +44 1322 660070.  
Fax: +44 1322 615636

## February 1997

### ◆ February 4th-6th

**The ISDN & ATM Show**  
Olympia 2, London, UK.  
Tel: +44 1733 3094304.  
Fax: +44 1733 390042.

### ◆ February 22nd-25th

**Middle East Broadcast 97**  
Bahrain International Exhibition Centre. Tel: +973 550033;  
UK. Tel: +44 171 486 1951.

### ◆ February 26th

**-March 2nd**  
**Musikmesse Prolight & Sound**, Frankfurt.  
Tel: +49 69 75 75 6415.  
Fax: +49 69 875 75 6950.  
Web: <http://www.messefrankfurt.de>

## March 1997

### ◆ March 5th-6th

**2nd Sound Broadcasting Equipment Show (SBES)**  
Jurys Hotel & Towers, Ballsbridge, Dublin.  
Tel: +44 1491 838575  
Email: [dmcv@pointproms.co.uk](mailto:dmcv@pointproms.co.uk)

### ◆ March 13th-15th

**REPLitech Europe**  
Barcelona, Spain.  
Tel: +44 171 287 2087.

### ◆ March 22nd-25th

**102nd AES Convention**  
MOC Centre, Munich Germany.  
Tel: +49 8142 14167.  
Fax: +49 89 32399 351.  
Email: [102nd-chairman@aes.org](mailto:102nd-chairman@aes.org)  
Web: <http://www.aes.org>

### ◆ March 23rd-26th

**SIB 97**  
Rimini Trade Fair, Italy.  
Tel: +39 51 264003.  
Fax: +39 51 238755.  
Email: [nets@nets.it](mailto:nets@nets.it)

## April 1997

### ◆ April 15th-16th

**Intranet**  
Olympia 2, London, UK.  
Tel: +44 181 742 2828.  
Fax: +44 181 742 3182.  
Web: <http://www.intranet-expo.com>

### ◆ April 21st-23rd

**Cable & Satellite 1997**  
Earls Court 2, London, UK.  
Tel: +44 181 910 7884. Email: [catherfne.barrett@reedex.co.uk](mailto:catherfne.barrett@reedex.co.uk)  
Web: <http://www.cabsat.co.uk/>

### ◆ April 23rd-25th

**Entech 97**  
Melbourne Exhibition Centre, Australia. Tel: +61 2 876 3530.

### ◆ April 23rd-28th

**The International Electronic Cinema Festival 97**  
Montreux, Switzerland.  
Tel: +41 21 963 32 20.  
Fax: +41 21 963 88 51.  
Email: [crawford@symposia.ch](mailto:crawford@symposia.ch)  
Web: <http://www.montreux.ch/symposia>

### ◆ April 28th-29th

**The Measure of Audio AES UK Conference**  
Conference Room, Baden-Powell House, Queen's Gate, London SW7, UK.  
Tel: +44 1628 663725.  
Fax: +44 1628 667002.  
Email: [AESUK@aol.com](mailto:AESUK@aol.com)

### ◆ April 28th-29th

**The Measure of Audio AES UK Conference**  
Conference Room, Baden-Powell House, Queen's Gate, London SW7, UK.  
Tel: +44 1628 663725.  
Fax: +44 1628 667002.  
Email: [AESUK@aol.com](mailto:AESUK@aol.com)

## May 1997

### ◆ May

**Pro Audio Light and Music China 97**  
Beijing Exhibition Centre, Beijing, China.  
Tel: +852 2861 3331.

### ◆ May

**Expo Comm Wireless Korea 97**  
Korea Exhibition Centre, Seoul, Korea. Tel: +82 2 555 7153.  
Fax: +82 2 556 9474.

### ◆ May 2nd-4th

**Internet Live**  
Brompton Hall Earls Court, London, UK.  
Tel: +44 181 568 8374.  
Fax: +44 181 232 8288.

### ◆ May 2nd-4th

**Internet World International**  
Olympia 2, London, UK.  
Tel: +44 1865 388000.  
Fax: +44 1865 7365 736354.  
Email: [conferences@leamed.co.uk](mailto:conferences@leamed.co.uk)  
Web: <http://www.lwuk.com>

### ◆ May 21st-23rd

**MIDEM ASIA 97**  
Hong Kong.  
Jane Garton, Press Manager.  
Paris Tel: +33 01 41 90 44 39.  
Email: [jane\\_garton@midem-paris.ccmil.compuserve.com](mailto:jane_garton@midem-paris.ccmil.compuserve.com)

### ◆ May 23rd-25th

**Music Instruments Asia 97 and Dance Tech 97**  
Singapore.  
Tel: +65 337 5574.  
Fax: +65 336 06239.  
Email: [create@pacific.net.sg](mailto:create@pacific.net.sg)

## June 1997

### ◆ June 3rd-5th

**REPLitech International**  
San Jose, California, US.  
Tel: +1 609 279 1700.  
Fax: +1 609 279 1999.

### ◆ June 4th-7th

**4th Annual Latin-American Pro Audio & Music Expo Mexico 97**  
World Trade Centre, Mexico City. Email: [chris@ssiexpos.com](mailto:chris@ssiexpos.com)  
Web: <http://www.ssiexpos.com>

### ◆ June 7th-10th

**Nightwave 97**  
Rimini Exhibition Centre, Italy.  
Tel: +39 541 711249.  
Fax: +39 541 786686.

### ◆ June 24th-27th

**Exposhow & Pro-Audio 97**  
LENEXPO Exhibition Complex, St Petersburg, Russia.  
Irina Neduma:  
Tel: +7 812 325 6245.  
Fax: +7 812 325 6245.

### ◆ June 25th-27th

**AES 8th Regional Convention 97**  
Sunshine City Convention Centre,

Ikebukuro,

Tokyo, Japan.

Tel: +81 45 939 7009.

Fax: +81 45 939 7091. Web:

<http://www.aes.org>

## July 1997

### ◆ July 1st-4th

**SMPTE 97**  
Darling Harbour, Sydney, Australia.  
Tel: +61 2 9976 3245.  
Fax: +61 2 9976 3774  
email: [conference@peg.apc.org](mailto:conference@peg.apc.org)

### ◆ July 3rd-5th

**PALA 97**  
Bangkok International Trade Centre, Bangkok, Thailand.  
Tel: +65 227 0688.  
Fax: +65 227 0913.

## September 1997

### ◆ September 8th-11th

**MIDEM Latin America & Caribbean Music Market**  
Miami Beach, Florida.  
Tel: +1 33 1 41 90 44 39.  
Fax: +1 33 1 41 90 44 50.

Email: [jane-garton@midem-paris.ccmil.compuserve.com](mailto:jane-garton@midem-paris.ccmil.compuserve.com).

US: Tel: +1 305 573 06 58.

Fax: +1 305 573 70 77.

### ◆ September 12th-16th

**IBC 97, Amsterdam.**  
Tel: +44 171 240 3839.  
Fax: +44 171 240 3724.  
Email: [show@ibc.org.uk](mailto:show@ibc.org.uk)

Web: <http://www.ibc.org.uk/ibc/>

### ◆ September 26th-29th

**AES 103rd Convention**  
Jacob K Javits Convention Centre, New York, US.  
Tel: +1 212 661 2355.  
Fax: +1 212 682 0477.  
Web: <http://www.aes.org>

## October 1997

### ◆ October 2nd-5th

**18th Nordic Sound Symposium**  
Bolkesjo, Norway.  
Seem Audio:  
Tel: +47 66 98 27 00.

Fax: +47 66 84 55 40.

Email: [soundsymp@nrk.no](mailto:soundsymp@nrk.no)

Web: <http://www.nrk.no/soundsymp/>

### ◆ October 16th-20th

**International Audio, Video, Broadcasting and Telecommunications Show (IBTS 97)**  
Milan, Italy.

### ◆ October 29th-30th

**22nd Sound Broadcasting Equipment Show (SBES)**  
Hall 7, National Exhibition Centre, Birmingham, UK.  
Tel: +44 1491 838575.  
Fax: +44 1491 832575.  
Email: [dmcv@pointproms.co.uk](mailto:dmcv@pointproms.co.uk)

## November 1997

### ◆ November 4th-6th

**Vision & Audio 97**  
Earls Court 2, London, UK.  
Tel: +44 118 975 6218.  
Fax: +44 118 975 6216.  
Email: [info@aprs.co.uk](mailto:info@aprs.co.uk)  
Web: <http://www.aprs.co.uk>

### ◆ November 18th-20th

**Digital Media World 97**  
Earls Court 2, London, UK.  
Tel: +44 181 995 3632.  
Fax: +44 181 995 3633.  
Email: [digimedia@atlas.co.uk](mailto:digimedia@atlas.co.uk)  
Web: <http://www.digimedia.co.uk>

## June 1998

### ◆ June 2nd-5th

**Broadcast Asia 98**  
World Trade Centre, Singapore.  
Tel: +65 338 4747.  
Fax: +65 339 5651.

## October 1998

### ◆ October 12th

**-November 6th**  
**ITU Plenipotentiary Conference**  
Minneapolis, Minnesota, US.  
Tel: +41 22 730 5969.

## November 1998

### ◆ November 10th-11th

**23rd Sound Broadcasting Equipment Show (SBES)**  
Hall 8, National Exhibition Centre, Birmingham, UK.  
Tel: +44 1491 838575.  
Email: [dmcv@pointproms.co.uk](mailto:dmcv@pointproms.co.uk)

## October 1999

### ◆ October 8th-17th

**Telecom 99**  
Palexpo, Geneva, Switzerland.  
Tel: +41 22 730 5969.

**Studio sound**

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# The Master Race

DVD may be 'versatile' as far as the video and computer industries are concerned, but when it comes to audio, **BILL FOSTER** argues, the uncertainty of the grey eminencies in the DVD consortium about the DVD-Audio standard, now places mastering engineers in a quandary over how to proceed

**THERE IS NO DOUBT** that the DVD disc—with its potential of storing up to 17Gb of data—is the 'maiden's prayer' when it comes to the delivery of near-broadcast quality video pictures or the storage of multilayer computer games with complex graphics. But, in their rush to get these discs to market and recover some of the huge sums that have been invested in the search for a workable high density CD solution, DVD's developers have almost totally ignored the requirements of the audio industry.

Perhaps a little background might be useful.

A DVD disc is capable of delivering data at a rate of 10.08 million bits per second (Mbit/s), around eight times faster than CD's 1.44Mbit/s—or an equivalent rate to an 8x CD-ROM drive. The DVD-Video format also supports a variable bit rate so that during less complex video scenes it can slow down to under 2Mbit/s, thus saving space and increasing the playing time.

Unlike CD, the file structure on all DVD discs—whether they be video, ROM or audio—is the same. This creates the potential for much greater cross-platform compatibility than has been possible with the existing compact disc formats.

Apart from a few minor details, the standards for both DVD-Video and DVD-ROM are now set. The DVD-Audio standard, however, is not.

There have been a number of proposals for DVD-Audio, ranging from two channels of 24-bit resolution audio sampled at 96kHz, to an 8-channel, lossless encoded signal sampled and quantised at a choice of frequencies and word lengths according to the quality and playing time required. These and other proposals are currently being evaluated by a subcommittee of the Japanese-based DVD Consortium.

Many of the original calculations for the multichannel proposals were based upon the assumption that, without video, there would be 10.08Mbit/s available for audio. Unfortunately, this idea hit a brick wall during the Copenhagen AES when a representative from the DVD Consortium pointed out that the DVD format reserved around 3Mbit/s for video, irrespective of

whether it is used or not. In fact, taking into account other system overheads, the maximum data rate available for audio is 6.144Mbit/s.

So, for some of the audio people it was back to the drawing board.

One of the major selling points of DVD-Video is that it is backward compatible with conventional audio CDs. To this end DVD-Video players support 44.1kHz audio in addition to 48kHz (the sample rate used by all video machines with digital audio recording capability) and 96kHz, which it is anticipated—by the Japanese, anyway—will ultimately replace 48kHz.

But at the recent AES in Los Angeles it emerged (by way of a passing comment made by another member of the DVD Consortium during a workshop on DVD) that the DVD format does not support 88.2kHz, and this is now causing considerable concern to those in audio who see a long life still ahead for the audio CD.

Many of the world's leading audio premas-

tering facilities have for some time been 'future proofing' their CD production masters by recording them at higher sampling rates, especially where the source material is analogue. While 96kHz is currently the highest available sampling rate, many engineers are choosing 88.2kHz as they believe that down-sampling from 88.2kHz to 44.1kHz produces a sonically better audio CD master. To effect this conversion needs only a simple decimation, while coming down from 96kHz requires a complex sample-rate conversion with the inherent risk to audio quality that this brings.

**THE NEWS** that 88.2kHz is not supported in the DVD format now places mastering engineers in a quandary. Should they master at 88.2kHz in order to retain the quality of the CD—which will be by far the largest percentage of the market for some years to come—or should they master at 96kHz on the basis that anyone with an ear for quality will dump their CD player in favour of a DVD machine at the first available opportunity?

Because very few digital mixes these days appear to be done on anything other than DAT—and anyone using that format gets what they pay for—perhaps the only real area of concern is for the (slowly) growing band of engineers using M-O recorders such as the Sony PCM-9000 and Genex GX8000. They will need to make

a decision at the time of the recording or mixing session as to the intended final use for the material. In the case of analogue tapes, the answer is probably to encode twice during premastering; once for each sampling rate.

Luckily, the DVD-Audio format is still at the discussion stages and so there is time, in theory, to lobby the DVD Consortium for the addition of 88.2kHz. But, as the DVD-Video format does not support 88.2kHz, it would preclude discs recorded at this sampling frequency from being played on DVD-Video machines, requiring consumers to buy a second unit. That may work fine in Japan's fast moving domestic electronics market, but is likely to be greeted with less enthusiasm elsewhere in the world. 



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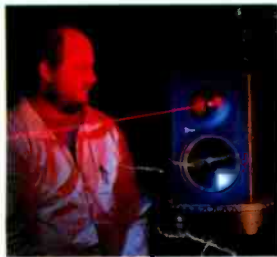
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Mackie acoustic engineer David Bie uses scanning laser vibrometry to map HR824 tweeter dome vibrations.

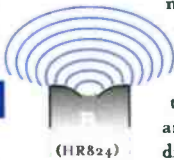
Imaging and definition are compromised. The "sweet spot" gets very small.



Like biamped speakers, wave guides aren't a new concept. But it takes optimized internal electronics

and a systems approach to make them work in near-field applications.

The HR824's wave guide (Fig. B) maximizes dispersion, time aligns the acoustic center of the HF transducer to the LF transducer's center, and avoids enclosure diffraction (notice that the monitor's face is perfectly smooth.) The exponential guide also increases low treble sensitivity, enabling the HF transducer to handle more power and produce flat response at high SPLs.



(HR824)

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

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

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



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



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

## TAILOR THEM TO YOUR SPACE.

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

## CONFRONT REALITY AT YOUR MACKIE DESIGNS DEALER.

We've made some pretty audacious claims in this ad. But hearing is believing. So bring your favorite demo material and put our High Resolution Series monitors through their paces.

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

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

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

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

## INDIVIDUALLY OPTIMIZED.

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

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



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

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

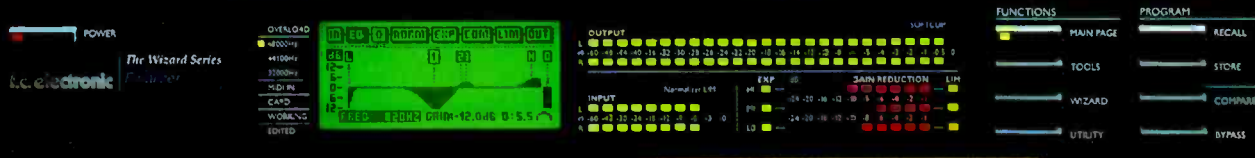
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# MACKIE™

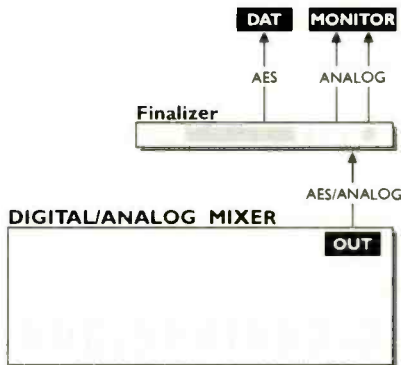
Woodville • WA • USA ☎ 206/487-4333 ♥ 206/485-1152 • E-mail ✉ sales@mackie.com



# Punch Knockout



Want your mixes to deliver the punch and clarity of the industry heavyweights? Now you can... thanks to the Finalizer™. TC's new concept in dynamics signal processing. Inserted between the stereo output of your mixer and your master recording media, the Finalizer dramatically increases the volume without sacrificing fidelity or stereo imaging.



The Finalizer creates that extra energy boost that you otherwise only can get from a professional mastering house. With its powerful multiband processing it will make your mixes sound **punchier, louder, crisper, warmer**, spectrally balanced, more "in your face"... it's your choice!

The Finalizer's "Wizard" function easily finds the optimum setting for your mix: Simply enter the type of music you are mixing and to what extent you want it processed... and you are done! The more experienced user may "tweak" the signal path extensively, with over 75 parameters to choose from. You will also find additional signal analysis tools including a Phase Correlation Meter, Peak-Hold Meter, Level Flow Meters, and a Digital Format Analyzer.

We've even thrown in a Calibration Tone Generator. All of the Finalizer's functions are easily monitored on the graphic LCD and on the seven precision LED meters.

Now even your demos will sound like a CD. You can simultaneously:

- Convert It: 20 Bit precision A/D and D/A Convertors
- Shape It: Five band 24 Bit Parametric Equalizer
- Enhance It: Choose between De-Essing, Stereo Adjust or the Digital Radiance Generator™
- Normalize It: Real-time Gain Maximizer
- Expand It: Variable Slope Multiband Expander
- Squeeze It: Multi-band Compressor
- Trim It: Variable Ceiling Limiter prevents overloads
- Fade It: Manual or Auto Fade Tool
- Dither It: To maintain the highest resolutions on the digital AES/EBU and S/PDIF outputs

Naturally, the Finalizer fully lives up to TC's twenty year reputation for sound quality, specifications and construction.

Try it - you'll be knocked out by what the Finalizer will do for your mix. Call 1-800-798-4546 for the location of a TC dealer near you.

## Wizard | Finalizer

**t.c. electronic**  
ULTIMATE SOUND MACHINES